

The Design of Semi-lexicality
Evidence from Case and Agreement
in the Nominal Domain

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The Design of Semi-lexicality
Evidence from Case and Agreement
in the Nominal Domain

Het Ontwerp van Semi-lexicaliteit
Naamval en Congruentie in het Nominale Domein

(met een samenvatting in het Nederlands)

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To my family, love, and happiness

Table of Contents

Acknowledgments.....	ix
Abbreviations.....	xv

Chapter 1: Introduction

1.1	On categories and their exceptions.....	1
1.2	Semi-lexicity in the nominal domain.....	3
1.3	The present study.....	5
1.3.1	Research questions.....	6
1.3.2	Hypotheses.....	6
1.3.3	Empirical domain.....	10
1.3.3.1	Polish numerals.....	11
1.3.3.2	English quantificational noun (Q-noun) pseudopartitives.....	11
1.3.3.3	English kind-nouns.....	12
1.4	Chapter overview.....	12

Chapter 2: A theory of semi-lexicity

2.1	Introduction.....	15
2.2	Semi-lexicity in the literature.....	17
2.2.1	Past approaches to semi-lexicity.....	17
2.2.2	Taking stock: Approaches to semi-lexicity.....	20
2.3	A new definition of semi-lexicity.....	23
2.4	Canonical categorial structures.....	27
2.4.1	A short history on the structure of the nominal domain.....	30
2.4.2	On the notion of a functional sequence.....	32
2.4.3	Canonical nominal structures in English and Polish.....	37
2.5	Semi-lexicity.....	41
2.6	Conclusion.....	44

Chapter 3: A theory of case and agreement

3.1	Introduction.....	47
3.2	Chomsky (2000, 2001).....	49
3.3	Against the case-agreement link.....	55
3.4	Agreement.....	60
3.4.1	On Features.....	61
3.4.1.1	On feature sharing.....	61
3.4.1.2	On Probes and Relativized Probing.....	63
3.4.1.3	Summary.....	65
3.4.2	The Mechanics of Agreement.....	66
3.4.2.1	The Search Domain.....	66
3.4.2.2	Crashing Derivations and Default Agreement.....	73
3.4.2.3	Summary.....	76

3.5	Case.....	77
3.5.1	Case as an uninterpretable feature.....	77
3.5.2	Alternative approaches to case assignment.....	80
3.5.2.1	Dependent case assignment.....	80
3.5.2.2	Case stacking and categories.....	84
3.5.3	Inherent case.....	85
3.6	A Theory of Case and Agreement.....	87
3.6.1	A theory of Agreement.....	88
3.6.2	A theory of Case.....	93
3.7	Conclusion.....	96

Chapter 4: Polish numerals: A primer

4.1	Introduction.....	99
4.2	Case and Agreement in Polish.....	100
4.2.1	Agreement in Polish.....	100
4.2.1.1	Agreement morphology.....	101
4.2.1.2	The feature system.....	105
4.2.1.3	Features on nouns, verbs, and adjectives.....	110
4.2.2	Case in Polish.....	112
4.3	Numerals in Polish: The Paradigm.....	117
4.3.1	Numerals 1000, 1,000,000, etc.....	118
4.3.1.1	The morphosyntax of numerals 1000, 1,000,000, etc.....	118
4.3.1.2	Agreement with numerals 1000+.....	119
4.3.1.3	Lexical specification of numerals 1000+.....	125
4.3.1.4	Speculations on the distribution of gendered 1000+.....	130
4.3.1.5	Summary.....	133
4.3.2	Numerals 5-10 and 100.....	134
4.3.2.1	Interpreting the morphology: Approaches in the literature.....	135
4.3.2.2	The morphosyntax of numerals 5+.....	140
4.3.2.3	Lexical specification of numerals 5+.....	142
4.3.2.4	Summary.....	146
4.3.3	Numerals 2-4.....	148
4.3.3.1	The morphosyntax of numerals 2-4.....	149
4.3.3.2	Lexical specification of numerals 2-4.....	151
4.3.3.3	Summary.....	153
4.4	Conclusion.....	155
4.5	Appendix: Adjectival Numeral 1.....	156

Chapter 5: Polish numerals: An analysis

5.1	Introduction.....	159
5.2	Numerals in the structure.....	160
5.2.1	Numerals in the quantity domain.....	160
5.2.2	Numerals as Heads or Specifiers.....	161
5.3	Polish numerals 1000+.....	165
5.3.1	The structure of numeral 1000.....	165

5.3.2	Case, agreement, and numeral 1000	170
5.3.2.1	Gendered 1000	170
5.3.2.2	Genderless 1000	173
5.4	Polish Numerals 2-4 and 5+	177
5.4.1	The structure of numerals 2-4 and 5+	177
5.4.2	Case, agreement, and numerals 2-4 and 5+	180
5.4.2.1	Gender probing 2-4	181
5.4.2.2	Probe-less and featureless 2-4 and 5+	183
5.4.2.3	A morphological alternation	186
5.4.2.4	Numerals 2-4 and 5+ in oblique positions	188
5.5	Issues for further research	194
5.5.1	Complex numerals	194
5.5.2	Numerals in other Slavic languages	198
5.6	Discussion and Conclusions	201
5.7	Appendix: Grammaticalization	202

Chapter 6: English Q-noun pseudopartitives

6.1	Introduction	211
6.2	Pseudopartitives versus partitives	212
6.3	Quantificational Nouns (Q-nouns)	216
6.3.1	Q-noun pseudopartitives and number	217
6.3.2	Q-nouns and movement	219
6.3.3	Construction-internal properties	225
6.3.3.1	<i>Lot</i>	226
6.3.3.2	<i>Ton</i>	230
6.3.3.3	<i>Bunch</i>	234
6.3.3.4	<i>Number</i>	238
6.4	The semi-lexicality of Q-nouns	245
6.4.1	Previous approaches to Q-noun pseudopartitives	246
6.4.2	Quantity features and Q-noun roots	250
6.4.3	Roots in the quantity domain	252
6.4.4	Idiosyncrasies	260
6.4.4.1	Plurality	260
6.4.4.2	Definiteness	262
6.4.4.3	Distribution of adjectives	264
6.4.4.4	Lexical specifications	267
6.4.5	Verbal agreement	269
6.4.6	The distribution of the particle <i>of</i>	269
6.5	Conclusions	273

Chapter 7: Kinds & the expression of number

7.1	Introduction	275
7.2	The basic problem	276
7.2.1	Types of kind-words	278
7.3	Locating kinds and kind-words	280

7.3.1	The meaning of a kind	280
7.3.2	The position of a kind	283
7.3.3	The position of a kind-word	289
7.3.3.1	Kind-words and semi-lexicity	289
7.3.3.2	The functional structure of kind-words	290
7.3.3.3	Kind-words and the extended projection of the N2	293
7.4	The morphosyntax of kind-words	298
7.4.1	Numberless N2s in the kind-construction	298
7.4.1.1	Numberless N2s	298
7.4.1.2	A word on bare N2s	301
7.4.1.3	The syntax of kind-words with numberless nouns	302
7.4.2	Count nouns in the kind-construction	303
7.4.2.1	Plural count noun N2s	304
7.4.2.2	The syntax of kind-words with count nouns	310
7.4.3	Pluralia tantum nouns	314
7.4.3.1	<i>Pluralia tantum</i> N2s	314
7.4.3.2	The syntax of kind-words with <i>pluralia tantum</i> nouns	315
7.4.4	An indefinite N2	316
7.4.4.1	Indefinite and bare N2s in the kind-construction	317
7.4.4.2	Mutual exclusivity	321
7.4.4.3	The syntax of kind-words with indefinite singular nouns	323
7.4.5	Kind-words with minimal functional structure	325
7.4.5.1	Numberless kind-words	326
7.4.5.2	The syntax of numberless kind-words	331
7.4.6	Summary	332
7.5	Discussion and Conclusions	333

Chapter 8: Conclusions

8.1	Semi-lexicity	337
8.1.1	Chapter summary	338
8.1.2	Types of semi-lexicity and semi-lexical effects	343
8.1.3	Implications for a theory of categories	346
8.2	On language variation and change	347
8.3	DP – CP parallelism: Restructuring	349
8.4	Outlook	353

References	355
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Sammenvatting in het Nederlands	375
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Curriculum vitae	381
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Utrecht, May 2017

Abbreviations

#	number
1	first person
2	second person
3	third person
A	animate
ABS	absolutive
ACC	accusative
ADJ	adjective
C	common gender
COLL	collective
COND	conditional
CONT	continuous
DAT	dative
DEF	default
DEM	demonstrative
DIM	diminutive
DIR	direct
DIST	distributive
DO	direct object
ERG	ergative
EXPL	expletive
F	feminine
GEN	genitive
H	human
I	inanimate
INF	infinitive
INST(R)	instrumental
INV	inverse
LOC	locative
M	masculine
N	neuter
NEG	negation
NOM	nominative
NPT	non-past
NV	non-virile

OBL	oblique
P	pejorative
PL	plural
PRES	present
PT	past
SG	singular
STR	structural
TR	transitive
V	virile
Y	gender
π	person
φ	phi

Chapter 1

Introduction

1.1 On categories and their exceptions

The notion of a category plays a prime role in our understanding of language, and has had a lengthy history, with early records from Aristotle (384-322BC, Robins 1967: 14) and Dionysius Thrax (100BC, Robins 1967: 30) on the question of categories. Groups of words which show similar patterns in distribution, function, and morphology are categorized together. These categories allow us to make generalizations on how language works, in particular, rules on how categories interact and behave. From this perspective, identifying categories is a necessary initial step in describing and modeling language: it provides the required abstraction to go beyond the behavior of individual words to the behavior of classes of words.

Categorization in natural language is often defined based on distributional properties, which create mutually exclusive classes. For example, a noun is not simultaneously a noun and a verb. Nouns and verbs are characterized by different sets of properties, and being one logically excludes being the other. Many nouns in English are characterized by their ability to occur with the definite determiner (*the book*), to take singular and plural morphology (*book, books*), and to co-occur with numerals (*two books*) or demonstratives (*this book*). These are defining properties of nouns. Likewise, many verbs in English are characterized by their ability to take tense morphology (*leap, leaped*), to vary in form according to properties of the subject, also known as agreement (*leap, leaps*), to inflect for aspect (*leaping, leaped*), and to be the obligatory predicational component of any English sentence (*The book is long, The book is being written*). Together, these are defining properties of verbs. These different classes of properties provide the motivation for positing two disjoint classes: nouns and verbs. By definition, elements in the class of “noun” share properties with nouns, and similarly, elements in the class of “verb” share properties with verbs.

Linguistic theory has been concerned with both identifying and defining natural language categories. At a very high level of abstraction is the distinction

between lexical and functional categories (Jespersen 1924, Fries 1952, Jackendoff 1977, Chomsky 1977, 1981, Emonds 1985, Abney 1987, Corver and van Riemsdijk 2001, among others). Languages generally respect this rough, but intuitive categorization into things which are lexical and carry meaning and things which are grammatical or functional and contribute to meaning in a more obscure way. A basic property of language is the ability to talk about objects, events, states, properties, and so on, and to use grammatical material like number, definiteness, tense, etc. to glue those things together and to connect them to the context and ongoing discourse. This basic distinction introduces the first stage of categorization a study of language must deal with. At lower levels, more categorization is possible. The set of lexical categories, for example, can be divided into noun, verb, and adjective (Baker 2003), and those categories can themselves be divided, for example, nouns as mass and count.

Given these divisions, which seem correct at a meta-level, we expect language to be consistent in its use of categories. It should be possible to classify some element as a noun or verb, and thereby predict its morphology, syntax, semantics, etc. according to other elements in that category. The problem, of course, is that there are exceptions. Each new exception challenges the notion of generalizing over classes of words via categories. If every category has a set of exceptions, then this may be an indication that the system of classification is incorrect. It could imply, for instance, that language does not employ any form of categorization, the no-categories hypothesis, or alternatively, that the system of classification needs refinement, perhaps by adding additional categories to accommodate the exceptions, or to re-evaluate and redefine the existing sets of categories. A famous example of the latter is the problem of the Universal Grinder (Pelletier 1975). Placed in the right context, a noun which is usually count can acquire a mass interpretation:

- (1) The two **hippopotamuses** bravely charged at the electrified fence.
- (2) Björn gulfed down an entire bowl of **hippopotamus**.

English has nouns which are systematically mass, count, or both. However, the Universal Grinder shows that even “systematically count” nouns like *hippopotamus* can be used as a mass noun, given the proper context. The solution has been to reformulate and reanalyze the mass-count distinction. It is not determined as a function of the choice of lexical item, but rather as a function of the distribution and morphology of an instance of a lexical item. In (1), *hippopotamuses* is count because it is preceded by a numeral, it inflects for plural, and it engages in an activity characteristic of objects or individuals (*bravely charging at an electrified fence*). In (2), *hippopotamus* is mass because it does not (and here, cannot) occur with a numeral or plural morphology, and it has been put into a bowl, something too small to hold an entire hippopotamus, but not a massified version of (part of) one. Mass and count remains an apt categorization, but they

must be redefined so as to give context a role (see e.g. Doetjes 1997, Borer 2005, de Belder 2011).

This dissertation is concerned with a particular type of problematic exception: semi-lexicity (van Riemsdijk 1998, Vos 1999, Corver and van Riemsdijk 2001, and the works therein, also Emonds' (1985) term "grammatical"). Semi-lexicity combines properties of lexical and functional categories, producing semi-lexical nouns, semi-lexical verbs, and semi-lexical adjectives. By combining lexicity and functionality in a single lexical item, semi-lexicity disturbs the basic lexical-functional dichotomy. Furthermore, it challenges our understanding of how lexical categories are defined and constructed. If a noun or verb is "semi-lexical," is it still a noun or verb? Should we instead posit an additional category for such elements or can we adjust an existing category? Would doing either of these things allow us to maintain generalizations about how classes of elements work? If there is only one type of exception, the problem is minimal; adding or adjusting a category is a sufficient solution. However, if the exceptions are numerous, to the point where there are nearly as many categories as lexical items (an exaggeration, but it makes the point), then the usefulness of assuming categories is lost. A balance must be maintained between the number of categories posited and the lexical items in those categories. The question of semi-lexicity then is an important one, and the extensiveness of semi-lexical phenomena can give us an idea of how dire of a problem it is. This dissertation addresses the semi-lexicity question, and in particular, the implications of semi-lexicity for the lexical-functional distinction, and our understanding of what makes a noun a noun or a verb a verb. The focus of this dissertation is limited specifically to semi-lexicity in the nominal domain, and furthermore, focuses on binominal constructions, namely Polish numerals, English quantificational nouns (*a lot, a bunch, a ton, a number*), and English kind-words (*kind, type, sort*).

1.2 Semi-lexicity in the nominal domain

Identifying semi-lexicity is a matter of finding those elements which do not behave as we expect them to. Suppose there is something like a category "count noun" in English. Count nouns can be distinguished because they behave identically for a number of properties. For example, the count noun *book* inflects for singular or plural (*book, books*), combines with a numeral (*two books*), co-occurs with the indefinite article (*a book*), and combines with count quantifiers (*many books, *much books*). Count nouns can be defined on the basis of these properties, and we predict other count nouns to behave identically.

- (3) English count nouns:
 - a. Take singular/plural morphology
 - b. Combine with numerals

- c. Combine with the indefinite article
- d. Take count quantifiers

Count nouns share with non-count nouns a number of other properties which validate treating them together as a macro-category “noun.” For example, nouns can surface as the subject of a sentence, and if they do, they control the form of the verb, with plural morphology surfacing when the noun is plural and singular morphology surfacing when the noun is singular (or mass).

- (4) The dolphin **was** able to escape from its pen into the sea.
- (5) The dolphins **were** able to escape from their pens into the sea.

In addition, if two nouns are used in a phrase, an *of* often separates them. This is another property of nouns, although not one necessarily exclusive to nouns.

- (6) Jolien’s study of possessives finally resulted in an epiphany.

Let us start with this basic hypothesis of what it means to be a lexical noun, and more specifically, count. In addition to the count properties listed in (3), count nouns also control agreement, and relations with other nouns are mediated via *of*.

Below, I introduce an instance of semi-lexicality. The element *bunch* looks like a canonical count noun. It surfaces with an indefinite article, sits in subject position, and is connected to the second noun via *of*. This example gives no indication that *bunch* is not a run-of-the-mill lexical noun.

- (7) A **bunch** of chickens ran down the mountain.

However, it does not show the full set of count noun properties. While it does combine with the indefinite article, it does not pluralize (**bunches of chickens*), combine with numerals (**fifteen bunches of chickens*), or take a count quantifier (**many bunches of chickens*). If we combine it with a verb that overtly shows agreement morphology, we also see that unlike the count nouns defined above, *bunch* does not control agreement:

- (8) A bunch of chickens **were**/***was** found on the trail.

Bunch shares some properties with count nouns, but does not show the full range of count properties. Furthermore, it cannot control agreement, a property shared by nouns in general. *Bunch* is problematic for our understanding of the category noun. It shows some nominal properties (e.g. the indefinite, the *of*), but it fails to show other defining nominal properties (e.g. plurality, agreement). If we classify *bunch* as a noun, we ignore its idiosyncrasies. If we do not classify it as a noun, we fail to capture its similarities to nouns. *Bunch* behaves differently from canonical lexical nouns and the question arises of how to deal with it. Is *bunch* lexical?

Functional? Is it even a noun?

There are plenty of examples which are similarly problematic. As a second case, we can consider *lot*. Like *bunch*, *lot* shows a number of count noun properties. It can occur with an indefinite article, sit in an object position, and surface with *of* between it and another noun.

- (9) Paul snapped a **lot** of photos of the dancing bees.

The presence of the indefinite article, a property open only to count nouns, would suggest *lot* to be a count noun. Like a count noun, it also has a morphological plural (*lots of photos*), but unlike a count noun, it does not combine with numerals (**two lots of photos*), nor count quantifiers (**many lots of photos*). It cannot control agreement either, neither in its singular nor its plural form:

- (10) A lot of photos **were** / ***was** taken of the dancing bees.
 (11) Lots of wine **was** / ***were** drunk at the party.

Similar to *bunch*, *lot* shares some properties with (count) nouns, but not all properties. *Lot* presents the same basic problem as *bunch*: what is it?

1.3 The present study

Assuming a strict theory of categories fails to capture the idiosyncrasies of elements which share only a subset of properties with a particular category. Proposing a new category, semi-lexical noun, does not help either. The term expresses that *bunch* and *lot* are “different from but similar to” nouns, but such a category also predicts them to show identical behavior within the semi-lexical noun category, contrary to fact: *bunch* does not express morphological plurality, while *lot* does. I propose that what is needed is a nuanced theory of categories, which allows for shades or degrees of nominality (e.g. Ross 1972). If we can decompose categories into their component parts, then it should be possible to identify how a semi-lexical element can share some but not all properties with a certain category.

The literature acknowledges the need for the term semi-lexical. It acts as a label for data which show properties of some lexical category (noun, verb, adjective), but also some idiosyncrasies which sets the item apart, often in a way which is considered more functional. However, aside from sporadic discussions or uses of the term, the literature still seems to lack a clear definition of what semi-lexicality is. Corver and van Riemsdijk (2001) present a collection of work intended to explore the concept of semi-lexicality, but the myriad of results and analyses highlight the problems in coming to a unified definition of semi-lexicality. What connects cases like *bunch* and *lot* to semi-lexical verbs, adjectives

or prepositions? The range of semi-lexical phenomena is wide, and infects every category. As such, an approach to semi-lexicity must be broad enough to generalize over the data, but also narrow enough to actually be useful. Such an approach is attempted in this book. This dissertation is focused on phenomena in the nominal domain, but in principle, the basic idea should be applicable to other categories.

The rest of this section outlines the research questions and hypotheses, and discusses the empirical domain.

1.3.1 *Research questions*

The goal of this dissertation is to explore and define the concept of semi-lexicity in relation to notions of categories. I do this by drawing on evidence from semi-lexical phenomena in the nominal domain, particularly phenomena involving case and/or agreement. At a very abstract level, this thesis is concerned with the following question:

- (12) What does semi-lexicity in the nominal domain tell us about the nature of categories, in particular, the division between lexical and functional and the implementation of lexical categories?

At a more practical level, the thesis addresses the following sub-questions, based on phenomena in the nominal domain:

- (13) How can semi-lexicity be defined?
 (14) What types of semi-lexicity exist? How is it manifested?
 (15) How do languages differ in their expression of semi-lexicity?
 (16) Where does semi-lexicity originate?

I turn now to my hypotheses, starting with the sub-questions and building towards the larger question of categories.

1.3.2 *Hypotheses*

In developing an understanding of semi-lexicity, I return to the basic question of what it means to be lexical and functional. Semi-lexical nouns can only be identified in relation to other nouns in a language, namely, by the fact that the semi-lexical noun behaves in an idiosyncratic way. Semi-lexicity only surfaces in the comparison between some element and its corresponding lexical category. As such, any study of semi-lexicity also requires a clear understanding of lexicity, functionality, and what the relevant lexical category should look like.

I adopt the view that roots are the core of a noun, verb, or adjective (Halle and Marantz 1993, Marantz 1997, Borer 2005, de Belder 2011) (see chapter 2 for

further discussion). Roots are not specified in the lexicon for their category, but instead acquire it in the syntax, according to the context they are embedded in (recall the example of count and mass). If we are to identify something as lexical then, it follows that roots are lexical. Thus, as a first part of my hypothesis on semi-lexicality, I propose that lexical implies the existence of a root.

- (17) **Hypothesis, part I:** Lexical implies the existence of a root.

With regards to functional categories, the current state of the art seems to identify syntactic features as the currency of syntax, where syntactic feature refers to grammatical notions like tense, number, animacy, etc., and more technical features including agreement probes and the EPP (see e.g. Emonds 1985, 2000). Thus, features drive syntactic computation (case, agreement, movement, Merge, etc.). In the second part of my hypothesis, I propose that functional implies the existence of a syntactic feature.

- (18) **Hypothesis, part II:** Functional implies the existence of a syntactic feature.

As regards semi-lexicality, I propose, rather simply and in line with intuitions on the nature of semi-lexicality, that it is the combination of something lexical with something functional. Given the preceding discussion, this requires that semi-lexical is what happens when a root is specified for a syntactic feature in the lexicon.

- (19) **Semi-lexicality Hypothesis:** Semi-lexicality is what arises when a root is also specified in the lexicon for a syntactic feature.

This answers the first sub-question: semi-lexicality is defined as a root lexically specified for syntactic features.

This leads us to the second sub-question, concerning types and manifestations of semi-lexicality. As per the semi-lexicality hypothesis, I predict that the semi-lexicality that exists is dependent on the types of features present in a given language. If a language has gender as a feature, then gender can play a role in the creation of semi-lexical effects; in a language without gender, gender can play no role in semi-lexicality for the obvious reason that that language does not manipulate gender as a feature. In this sense, the range of semi-lexical effects is predicted to be constrained by the types of features active in a language. This implies that at a surface level, identifying commonalities in semi-lexicality will be a challenge and potentially impossible. However, it is possible to make generalizations about *how* features are used by semi-lexical nouns. This thesis identifies three main ways of being semi-lexical, which I summarize below:

- (20) **Ways of being semi-lexical:**
- a. **Restrictions on the semi-lexical noun:** The semi-lexical noun must or must not project a particular piece of structure.
 - b. **Restrictions on the contexts a semi-lexical noun surfaces in:** The semi-lexical noun either requires or prohibits some piece of structure in the larger structure it has been inserted in.
 - c. **Minimal structures:** Insertion of the semi-lexical noun overrides the ability of an embedded noun in a binominal construction to project any further functional structure.

The first type of semi-lexicity (20)a involves restrictions on the semi-lexical noun, where certain roots must or must not project a particular piece of structure, where “project” implies that the relevant piece of structure is Merged in and projected above the root node (e.g. number). *Pluralia tantum* nouns are roots which necessarily project a piece of structure. *Pluralia tantum* nouns are inherently plural, and this implies that such nouns **must** project plurality (*pants*, **(one) pant*, *scissors*, **(one) scissor*). This is a restriction on the functional structure generated above the root, where that structure must include plurality. This is in contrast to lexical nouns which do not have such a restriction; lexical nouns can project plurality, but do not have to (e.g. *book*, *books*). The restriction applies to the functional structure of the semi-lexical noun. *Pluralia tantum* nouns are discussed briefly in chapters 2, 4, and 7. The opposite of necessarily projecting a piece of structure is necessarily omitting a piece of structure (e.g. the semi-lexical noun **must not** project a piece of structure). This creates *deficiency* in the functional structure projected above the root, where “deficiency” is understood as there being missing pieces of functional structure. For instance, in a language with gender, lexical nouns will typically project gender in a nominal context, and we therefore expect gender to be available to a lexical noun. If the lexical specification of that noun blocks the projection of gender, however, that noun will not project gender in the syntax. This is due to the semi-lexicity of the root, and the result of that semi-lexicity is a deficiency in the functional structure dominating the root. This deficiency may have further consequences for how operations such as case or agreement are computed. Again, this is a restriction on the realization of the semi-lexical noun, where it is prevented from projecting some piece of structure. Examples of semi-lexical deficiencies are further dealt with in chapters 4, 5, 6, and 7, with Polish numerals, English quantificational kind-words, and English kind-words. Whether a root must or must not project something in its functional structure constitutes a restriction on the semi-lexical noun. This is the first type of semi-lexicity: restrictions on the realization of the semi-lexical noun.

The second type of semi-lexicity (20)b involves contextual restrictions on the semi-lexical noun, where it requires or prohibits something in its immediate environment. This type of semi-lexicity determines the *distribution* of the semi-lexical head. For instance, suppose we are dealing with a semi-lexical head which is only permitted in an indefinite context. A lexical noun is not restricted in its

environment and thus, would be permitted in both definite and indefinite contexts. The semi-lexical head, however, would never surface in a definite context, given that it is lexically restricted to indefiniteness. This is a contextual restriction, requiring something (definiteness) to be absent in its immediate environment, and can be reduced to semi-lexicality. Alternatively, a root may require something in its immediate context. This implies a dependency on some feature or piece of structure for realization, where the semi-lexical head will not surface in contexts where that feature is not present. Again, this is a contextual restriction, but one which requires something to be present in the immediate environment of the semi-lexical head. Together, such semi-lexicality constrains the distribution of the semi-lexical noun. It differs from the previous in that it does not concern the functional structure projected by the semi-lexical head, but rather the larger context the semi-lexical element is inserted in, which is determined by other elements. This creates a dependency of the semi-lexical head on there being or not being some feature or piece of structure for its realization. This type of semi-lexicality (20)b is dealt with in chapters 4 and 5 on Polish numerals and chapter 6 on English Q-nouns.

The third type of semi-lexicality (20)c affects the functional structure of the embedded noun. Once the semi-lexical head is inserted in the structure, it “takes over” the projection of functional structure, with the embedded noun no longer being capable of projecting functional structure. For instance, the insertion of this type of a semi-lexical head above the root of the lexical noun blocks the lexical noun from projecting any structure (e.g. a number phrase). This type of semi-lexicality is in fact very similar to restructuring (Wurmbrand 2001), where a restructuring verb does not combine with full CPs, but smaller structures (a comparison we briefly consider in chapter 8). In the nominal domain, the result of this type of semi-lexicality is a deficiency on the embedded noun, where the structure of the embedded noun is necessarily minimal. Examples of this type (20)c of semi-lexicality are found in chapter 7.

This takes us to our third sub-question, namely whether languages differ in their expression of semi-lexicality. Given the preceding discussion, the answer depends on which aspect of semi-lexicality we are considering. If we mean surface effects, then the hypothesis is yes – languages can differ widely in the surface effects of semi-lexicality, according to the features employed in the language. However, if we ask this question at the level of how the features are used by semi-lexical nouns, the hypothesis is no: there seems to be a few ways features are utilized. This dissertation compares semi-lexicality phenomena in two languages, Polish and English, which differ substantially in their morphological systems. Thus, we explore to what extent semi-lexicality differs between them.

The final sub-question asks where semi-lexicality originates. I hypothesize that semi-lexicality is the result of grammaticalization processes, which transform a lexical noun into something functional. This hypothesis is tested in chapter 5, on the basis of Polish numerals.

I repeat the main research question below:

- (21) What does semi-lexicity in the nominal domain tell us about the nature of categories, in particular, the division between lexical and functional and the implementation of lexical categories?

The semi-lexicity hypothesis predicts that lexical categories, functional categories, and semi-lexical categories are each constructed notions. Lexical categories are roots embedded in various syntactic contexts. Thus, where a root is embedded defines what lexical category it will be. In this sense, it is not correct to talk about categories in terms of lexical items, but rather, in terms of contexts, where a certain set of syntactic configurations share the property of being “nominal,” “verbal,” or “adjectival.” In this system, neither noun nor semi-lexical are linguistically relevant terms to syntactic computation; these are descriptive labels for classes of structures (nominal structure), and the type of input fed to the syntactic computation (a bare root as lexical, or a root with a feature as semi-lexical). We discuss this in more detail in chapter 2.

1.3.3 *Empirical domain*

Empirically, this book addresses semi-lexicity in the nominal domain. I further focus my attention on phenomena of case and agreement, as triggered by semi-lexical nouns. Case and agreement are both processes which function on, and are dependent on, a noun. As such, their behavior with an apparent semi-lexical noun can provide important clues into just how noun-like the semi-lexical element is. Case and agreement are furthermore characterized by visible, identifiable effects on the morphosyntax. This makes them a highly informative, powerful diagnostic for probing the nature of semi-lexicity. I develop the system of case and agreement assumed in this dissertation in chapter 3. The case studies chosen for study in this book each share idiosyncrasies in their patterns of case and/or agreement. This book contributes to the semi-lexicity question from the perspective of case and agreement phenomena in the nominal domain.

There are two main languages considered in this dissertation: Polish and English. Polish is a language morphologically rich in its case and agreement. Nouns inflect for one of seven cases, and those cases are reproduced on agreeing demonstratives, adjectives, possessive adjectives, and (some) quantifiers. Verbs show agreement in person, gender, and number, and the features of gender and number are also marked on demonstratives, adjectives, possessive adjectives, and (some) quantifiers. The abundance of morphology gives easy clues into how semi-lexicity interacts with case and agreement. This is contrasted with English, a morphologically poorer language. Case in English seems to exist only in the pronoun system, though there are some preposition-like elements similar in nature to case morphology (e.g. the particle *of* as relating to genitive, and the

preposition *to* as relating to dative). The feature system in English manipulates only person and number (though pronouns do show gender). Verbs show agreement in person and number, and demonstratives show number agreement. The juxtaposition of Polish and English allows us to compare the manifestations of semi-lexicality in both morphologically rich and morphologically poor languages. It furthermore allows us to test the hypothesis that languages differ in their expression of semi-lexicality at the surface level, but not necessarily in terms of how semi-lexicality is achieved.

There are three case studies conducted in this dissertation. These are (a) Polish numerals, (b) English quantificational (Q-nouns), and (c) English kind-words. I briefly introduce and motivate the case studies in the following sections.

1.3.3.1 Polish numerals

Numerals are notorious for being difficult to classify (e.g. Corbett 1978, Donohue 2005). Some research attempts to identify them as nouns (Jackendoff 1977, Corbett 1978, Ionin and Matushansky 2006, Corver and Zwarts 2006), others as adjectives (Corbett 1978, Zweig 2005), and in more traditional grammars, as a category “numeral”. The ambiguity of the numeral suggests that it may be semi-lexical. In this regard, I consider the morphosyntax of numerals in Polish, which varies between being adjective-like and noun-like according to the value of the numeral (see Corbett 1978). The choice to examine Polish numerals, as opposed to English numerals, follows from their complex morphosyntax. Polish numerals can be divided into four main classes, each with its own set of idiosyncrasies. This complexity gives a wonderful opportunity to explore the manifestations of semi-lexicality amongst a small set of lexical items which all share the same function. Chapters 4 and 5 both contribute to the discussion on Polish numerals. English numerals are briefly discussed in chapter 6, but no in-depth study of them is attempted here.

1.3.3.2 English quantificational noun (Q-noun) pseudopartitives

Semi-lexical quantificational nouns (Q-nouns) were briefly introduced in section 1.2 involving *bunch* and *lot*. Q-nouns belong to the set of quantifying elements, given that they say something about the quantity of the embedded noun. In addition, they show a very nominal-like morphosyntax. The construction which Q-nouns surface in has been termed the pseudopartitive (Selkirk 1977, Jackendoff 1977). The pseudopartitive also includes container nouns (*a glass of water*), measure nouns (*a pound of rice*), part nouns (*a piece of cake*), and more. The family of pseudopartitive constructions involves binominals, where the first noun has been identified as semi-lexical in many works (van Riemsdijk 1998, Stavrou 2003, Alexiadou, Haegeman, and Stavrou 2008, Hankamer and Mikkelsen 2008). The use of the term acknowledges the idiosyncrasies, but it does not in and of itself

provide an analysis for them. The study of Q-nouns allows us to make a comparison between Polish numerals and English Q-noun pseudopartitives, which show similar ranges of variation in their semi-lexicality, and share the function of quantification.

1.3.3.3 English kind-nouns

English kind-nouns include the nouns *kind*, *type*, and *sort*. Kind-nouns have a particular function, namely that they convert the reference of a nominal to a subkind of the kind denoted by the second noun (Zamparelli 1998). The example below, for instance, creates reference to three pillow subkinds (for example, a feather pillow, a polyester pillow, and a memory foam pillow).

- (22) Three kinds of pillows

When the embedded noun is a canonical count noun, the kind-word is subject to what I term the kind-word generalization; its number feature must be identical to the number feature of the embedded noun.

- (23) **Kind-word generalization:** The number marking present on the kind-word (*kind*, *type*, *sort*) and the N2 (second noun) must be identical.

This follows from the ungrammaticality of examples like the one below:

- (24) *This kind of pillows

This phenomenon can be derived from the semi-lexical nature of the kind-word. Kind-words are variable in where they Merge in a structure, and if they Merge in a low enough position, their expression of number interacts with the expression of number by the embedded noun. This example identifies a new form of semi-lexicality, and is discussed in depth in chapter 7.

1.4 Chapter overview

Chapter 2 motivates and develops a theory of semi-lexicality in the nominal domain. This chapter expands on the basic hypothesis introduced in this chapter: semi-lexicality arises when a root is also specified for functional features. It also develops the notion of a “canonical nominal structure.” Adopting the assumption that a root comes to represent a noun as a function of its syntactic context, there are various syntactic structures associated with noun-hood, e.g. the structure of a mass noun, a plural noun, a singular indefinite, etc. These are the structures which a bare root would be capable of projecting, and hence, can be considered canonical

structures. Canonical nominal structures capture the range of possibilities for a bare root when functioning as a noun, which differ from what is found with semi-lexicity. This chapter further develops a basic structure of the nominal domain and a syntax for canonical nominal structures in Polish and English, to facilitate the discussion in the following chapters.

Chapter 3 develops a theory of case and agreement. The phenomena considered in this dissertation have been chosen precisely because they show some idiosyncrasy in how case or agreement is realized. In order to interpret such data, it is necessary to first have a clear understanding of how case and agreement operate. This chapter develops that background. The chapter scans the agreement and case literature and based on the discussion, proposes mechanisms of case and agreement. Case and agreement are taken to be independent operations, where agreement has the property of uniting valued and unvalued features via feature sharing, and case has the property of assigning case values to bundles of phi-features within a particular domain. The case assignment mechanism here is derivative of the dependent case mechanism.

Chapter 4 begins a two-part study into Polish numerals, and represents our first semi-lexicity case study. The chapter is data-oriented and aims to describe the major morphosyntactic patterns of Polish numerals. There are four main classes of numerals: 1, 2-4, 5-10 and 100, and 1000 and higher, and these show varying degrees of nominality. The chapter posits lexical specifications for each numeral class, based on their morphosyntactic behaviors. This chapter shows that it is possible to be semi-lexical in a *deficient* way. Some numerals are prevented from projecting certain nominal features, and the result is a deficiency in the structure of the numeral itself, which is responsible for the semi-lexicity. The chapter also identifies semi-lexicity in terms of a required projection, with semi-lexicity surfacing in terms of the distribution of the numeral.

Chapter 5 is a continuation of the study into Polish numerals, but is focused on developing a hypothesis of how the lexical specifications of the numeral classes interact with the projection of structure. This chapter develops structural analyses of each numeral type, and explicitly illustrates how agreement and case are predicted to operate on those structures. The chapter directly relates the deficiencies in the numerals to the idiosyncrasies found in case and agreement.

Chapter 6 represents our second case study into semi-lexicity. It focuses on the English quantificational nouns (Q-nouns) *lot*, *ton*, *bunch*, and *number*. Each of these Q-nouns has a noun-like morphosyntax, surfacing with the indefinite article (when morphologically singular) and an obligatory particle *of*. However, they are each subject to idiosyncrasies which cannot be captured by assuming a category “Q-noun,” and instead, must be dealt with on a case-by-case basis. Q-nouns

interact with the projection of definiteness in the structure, and this shows that, in addition to semi-lexical elements showing deficiency in their own projection of structure, they can also induce deficiency in the structure of the quantified noun, via feature specifications which are incompatible with a particular context.

Chapter 7 is a study of the morphosyntax of the kind-words *kind*, *type*, and *sort* in English, our final case study into semi-lexicity. English kind-words adhere to the kind-generalization: when the noun they combine with is a canonical plural noun, they must bear identical number features to that noun. This phenomenon is analyzed as a product of where in the structure the kind-word is merged, where certain positions create a unifying effect between the number features of the two noun-like elements. Once the kind-word is inserted, it continues the projection of functional structure and not the embedded noun. This results in small nominals underneath the kind-noun. Kind-noun semi-lexicity involves minimal structures, showing another form that semi-lexicity can take.

Chapter 8 summarizes the main points of the dissertation and concludes. Semi-lexicity as developed here is also relevant for language variation and language change, specifically grammaticalization. A short discussion of the implications of semi-lexicity for these topics is provided, and furthermore, a parallel is drawn between some semi-lexical phenomena and restructuring in the verbal domain.

Chapter 2

A Theory of Semi-Lexicality

2.1 Introduction

Linguistic theory recognizes a distinction between lexical categories and functional categories, the basic intuition being that lexical categories provide the brunt of the semantic content and functional categories serve as the glue, connecting those lexical categories together in a meaningful way. For example, in a sentence like *the man was eating a cookie*, we have *man*, *eat-*, and *cookie* as lexical elements, and *the*, *was*, *a*, and *-ing* as functional elements. The lexical content tells us that we are dealing with an eating event involving a man and a cookie, and the functional content allows us to situate this eating event in time and within our own discourse model of participants; more concretely, it tells us that this was an ongoing (*-ing*), past (*was*) event, and the man is someone we should be familiar with (*the*), but the cookie not (*a*); the order of the words tells us that it was the man doing the eating of the cookie and not the other way around. Together, this combination of lexical and functional material allows us to express the complex nature of the event which this sentence embodies.

In the literature, lexical and functional categories have been defined using the following five characteristics (cf. Emonds 1985, Abney 1987, Corver and van Riemsdijk 2001, among others), a categorization system which is not without its problems (e.g. prepositions):

(1)	Lexical:	Functional:
	Open class	Closed class
	Phonologically and morphologically independent	Phonologically and morphologically dependent
	Take different kinds of categories as their complement	Restricted to a single category as their complement
	Assign theta roles	Do not assign theta roles
	Separable from complement	Inseparable from complement

For example, a plural morpheme is functional because (a) it belongs to a closed class (SG, PL), (b) it is phonologically reduced (occurs as a bound morpheme, -s), (c) it only combines with nouns, (d) it does not assign a theta role, and (e) it cannot be separated from its complement. A verb like *eat*, on the other hand, is lexical because (a) it belongs to an open class of elements (there are thousands of verbs), (b) it is phonologically and morphologically independent, (c) as a group, verbs can combine with different kinds of complements (*eat food*, *eat*), (d) it assigns theta roles, and (e) it can be separated from its complement (*what did she eat ___?*). Together, these diagnostics distinguish between lexical and functional elements.

While the lexical-functional distinction is appropriate for functional elements like tense and lexical verbs like *eat*, it turns out that there are numerous cases where that simple distinction breaks down. The relevant examples involve elements which appear to combine properties of lexical and functional categories, and have, for this reason, been termed ‘semi-lexical’ (Corver and van Riemsdijk 2001) or ‘grammatical’ (Emonds 1985). Numerals, for example, show both lexical and functional properties: (a) they belong to a semi-open class of elements (new numerals can be added, particularly fake numerals such as (*ba*)jillion and (*ga*)zillion, but new numerals are not as common as new nouns or verbs),¹ (b) they are phonologically and morphologically independent, (c) they only combine with nouns (**three eat*), (d) they do not assign theta roles (though they do take arguments), and (e) they cannot be separated from their complements (**what did she buy three?*). Thus, they show two lexical properties (class membership and independence) and three functional properties (complements, theta roles, separability). This intermediate behavior has earned them the term ‘semi-lexical.’

As this toy example shows, language does not fully respect the proposed lexical-functional divide, despite the applicability of this distinction for (perhaps) the majority of elements in a language. For every language, it seems possible to find numerous elements which muddy the lexical-functional distinction. The existence of the term ‘semi-lexical’ acknowledges the problems that come with such elements. Being neither fully lexical nor fully functional, they defy categorization, and as such, we struggle to incorporate them into our theory of linguistic categories. The term ‘semi-lexical’ is an attempt to come to grips with the difficulty such elements present, but assigning them a name is only the beginning. It would be desirable to understand where semi-lexicality originates, what types of semi-lexicality exist, and what the restrictions on it might be.

The lexical-functional distinction has had a prominent position in linguistic theory, and a commonly held view is that the lexicon consists of purely functional

¹ There is a list of high numbers on Wikipedia (https://en.wikipedia.org/wiki/Names_of_large_numbers), which goes as high as *googolplex*, $10^{10^{100}}$ (“ten to the ten to the hundred”); most of these are completely useless to the average speaker, and presumably even unknown (*novemdecillion?* 10^{60} *vigintillion?* 10^{63}). We do not coin new numerals very often, since the most useful quantities have already been named, but, as this list shows, arguably, speakers are fully capable of adding new numerals to their lexicon if necessary.

or lexical elements. It is one of the purposes of this dissertation to challenge that view, especially once we consider the morphosyntax of quantificational elements and *kind*-words. Instead, I defend the view that a more nuanced approach is necessary, one which allows for lexical entries that might combine “lexical-ness” and “functional-ness.” In this chapter, I introduce and develop a theory of semi-lexicality, building on the work of my predecessors (e.g. Ross 1972, Emonds 1985, van Riemsdijk 1998, Corver and van Riemsdijk 2001). It is intended for this theory to introduce the nuances that we would need to accurately model the behavior of (a) numerals in Polish (chapters 4 and 5), (b) quantificational pseudopartitives and numerals in English (chapter 6), and (c) the English kind-construction (chapter 7). While the theory developed here is to some degree tailored to the types of constructions that will be considered in this dissertation, it is also general enough to allow further development with regards to other phenomena.

The current chapter is structured as follows. Section 2.2 provides a brief overview of studies into semi-lexicality, and from this, builds a three-way classification of the semi-lexicality we find. Of importance is lexicon-based semi-lexicality, i.e. cases of semi-lexicality which are reduced to properties of the lexical item in the lexicon. It is this type of semi-lexicality which is the focus of the rest of the chapter. Section 2.3 is definitional, and works out precisely what it means to be lexical, functional, and semi-lexical: lexical elements are roots, functional elements syntactic features, and semi-lexical elements the combination of the two, i.e. roots with syntactic features. As is discussed in this section, this definition includes many types of phenomena, not all of which are interesting for the study of semi-lexicality undertaken here. To further restrict our attention, I propose the concept of a ‘canonical categorial structure’ in section 2.4, which is basically the set of canonical structures we expect for a particular lexical category in a given language. This is contrasted with non-canonical categorial structures, which is where the majority of the semi-lexicality cases I consider here lie. Given that this dissertation is focused on constructions in the nominal domain, I also briefly introduce what I take to instantiate a canonical nominal structure in English and Polish, the languages most relevant to the present work; the structures will be embellished, where necessary, in future chapters.

2.2 Semi-lexicality in the literature

2.2.1 *Past approaches to semi-lexicality*

Early work can be found in Ross (1972) who deals not necessarily with the lexical-functional distinction (which was not as clearly defined as it is now), but with the “squishiness” of lexical categories like nouns, verbs, and adjectives. Ross argues that the boundary between nouns, verbs, and adjectives is not discrete, but forms a quasi-continuum, where adjectives fall between nouns and verbs, nouns and

verbs sitting on opposite ends of the spectrum (e.g. N – A – V). Ross's point is that the familiar lexical categories of noun, verb, and adjective are not discrete categories, but rather fuzzy categories, where peripheral elements can be less noun-like or less verb-like than central elements; furthermore, when considered together, certain categories (namely V and A, and A and N) start to blend together. While Ross is concerned with properties of lexical categories, some of his arguments can be reframed in terms of the lexical-functional divide. For example, Ross considers the ability of *-ing* to combine with verbs, adjectives, and nouns, noting that it combines most freely with verbs, less freely with adjectives, and the least freely with nouns; he takes this as evidence for his category squish. However, if we take *-ing* to be a functional morpheme, which presumably has certain functional constraints (e.g. what it can combine with), then the distribution of *-ing* becomes not only a lexical issue, but also a lexical-functional issue: what lexical categories does *-ing* combine with, and why might it be more predominant with some categories rather than others? The interesting contribution of Ross's work is that it suggests that it might not be only the lexical-functional divide which is "fuzzy," but also the traditional distinction between nouns, verbs, and adjectives (as moderated by functional elements like *-ing*).

The work of Emonds (1985) provides the next study of semi-lexicity we discuss, at a time when "semi-lexicity" was not yet a term. Emonds (1985) considered the lexical-functional dichotomy and identified "in-between" elements, which he termed grammatical nouns (*one, thing, time, place, body*), verbs (*be, have, get, do, go, let*), adjectives (*often, other, same different*), and prepositions (*out, up* (particles), *as*). According to Emonds (1985: 162), within each lexical class, there exist more grammatical subsets which differ from their lexical cousins in terms of distribution, frequency, and semantics; these "grammatical" subclasses are generally the most frequent and least semantically specified members of their respective categories and are subject to different grammatical rules. Emonds' (1985) work represents an early study into phenomena which fit under the rubric of semi-lexicity.

Van Riemsdijk (1998) discusses Dutch and German direct partitive constructions (see also Vos 1999); these constructions involve the juxtaposition of two nouns, for example, Dutch *een plak kaas* 'a slice cheese' (English: *a slice of cheese*) or *een aantal voorbeelden* 'a number examples' (English: *a number of examples*). Van Riemsdijk argues that these constructions are monoprojectional, despite the presence of two nouns. He proposes to call the first noun in the construction "semi-lexical," treating the second noun as lexical. Van Riemsdijk assumes a feature system which includes the features "functional" and "grammatical." In the context of his work, then, "semi-lexical" means that the noun occurs in the extended projection of the other noun, and is marked either (a) functional but not grammatical or (b) grammatical but not functional (lexical elements are neither grammatical nor functional and "functional" elements are both grammatical and functional). His work hints at the mixed nature of semi-lexical elements by

making a divide between functional and grammatical features.

The volume edited by Corver and van Riemsdijk (2001) bundles together a number of case studies into semi-lexical phenomena. The volume itself represents an attempt to come to a better understanding of the nature of semi-lexicality, in particular the types of phenomena which we might call semi-lexical and the ways of dealing with them. In the rest of this section, we consider the types of analyses found in this edited volume, picking out common themes.

One approach, found in Emonds (2001) and Schütze (2001b), is to treat semi-lexical elements as contentless heads within some lexical category. Emonds (2001) makes a distinction between purely semantic features *f* (those being features involved in selection and the interpretation of the element, not interacting with the syntax) and syntactic features *F* (those being features relevant to syntactic computation). Lexical items carry only semantic features, while semi-lexical items are contentless heads which carry only syntactic features. They are “lexical” in the sense that they belong to a lexical category, but “functional” in the sense that they carry syntactic features; such elements lack semantic features *f*. Building on Emonds (1985; 2001), Schütze (2001b) also argues for a set of semantically empty lexical heads which are inserted into a structure as a last resort mechanism (*one* for nouns, *so* for adjectives, *with* for prepositions, and *be* for verbs). He takes these last resort elements to be entirely absent of semantic features; it is this absence of semantic features, despite being “lexical” which makes them semi-lexical.

Another type of approach is to assume that semi-lexical elements are lexical heads which have been associated with functionality in some way (similar to van Riemsdijk 1998). Cardinaletti and Giusti (2001), for example, argue that motion verbs in what they call the “inflected construction” (*I’ll go buy bread*) have been merged in a functional position immediately above the spell-out position of the lexical verb. This accounts for certain lexical properties of these verbs (e.g. semantic content, selection of a connecting element *I’ll go and buy bread*, etc.), as well as certain functional properties (e.g. fixed order, morphological restrictions, etc.). Semi-lexicality derives from the use of a lexical head in a functional position. Zeller (2001), in a slightly different line, argues that postpositions in Dutch and German are composed of a lexical preposition in combination with a functional affix; his approach treats semi-lexicality as the result of syntactic composition – by combining a lexical node with a functional affix, the result is semi-lexicality. For Haider (2001), who looks into the semi-lexical use of verbs like *lassen* ‘let’, *kriegen* ‘get’, and *bekommen* ‘get, receive’ in German and other Germanic languages, semi-lexicality is the result of merging in a lexical item with its argument structure underspecified; this underspecification prevents the item from selecting arguments, and instead, like a functional auxiliary, it is restricted to selecting dependent heads. Thus, it is the absence of full argument structure which creates the semblance of functionality, and hence, semi-lexicality. Crucially, each of these accounts shares the result that semi-lexicality is a product of the syntax, i.e. the semi-lexical element is fully lexical in the lexicon, but it acquires a functional

flavor in the syntax when used in a particular way, for example, by merging into a functional position, merging with a functional affix, or failing to bring its full argument structure to the derivation.

Another class of approaches assumes semi-lexical elements to be functional heads which are lexical in some way. For Powers (2001), who studies the use of semi-lexical heads like *more* and *no* in child speech, and Haider (2001), who studies word order in Dutch and German, “being lexical” seems to mean “specified in the lexicon.” Both Powers and Haider differentiate between purely functional elements, which presumably do not belong in the lexicon (“lexical storage of information is unavailable for non-lexical functional heads” Haider 2001: 69), and lexical and semi-lexical elements, which are specified in the lexicon. What makes a semi-lexical element unique is that it is a functional element which belongs to the lexicon (this is also quite similar to the approaches of Emonds (2001) and Schütze (2001b), who take semi-lexical heads to carry only functional features). Haider exemplifies this through patterns of word order; he operates under the assumption that directionality is fixed for functional categories (right-branching), but not for lexical categories, since they can specify directionality in the lexicon. Being creatures of the lexicon, semi-lexical elements (“lexical functional heads”) also exhibit freedom of directionality. Note that this approach makes for a very broad definition of semi-lexicality, as any functional element which has some idiosyncratic property such that it occurs in the lexicon as opposed to the “functional lexicon” (whatever that might be) would be considered semi-lexical.

A final alternative is to assume that semi-lexical represents a third category, i.e. there are “lexical,” “functional,” and “semi-lexical” elements. Butt and Geuder (2001) argue for this interpretation of semi-lexicality on the basis of light verb constructions in Urdu (Indo-Iranian) and Wagiman (Australian). They show light verbs to be dissimilar from main verbs (lexical) and auxiliaries (functional), and argue on the basis of this that semi-lexical verbs must be treated as a separate class of verbs. This is perhaps the least interesting of conclusions, as it does not acknowledge the intricacies of semi-lexicality, and solves it by positing a new category in the lexical-functional domain.

2.2.2 *Taking stock: Approaches to semi-lexicality*

We have seen a variety of ways of being semi-lexical, which can be reduced to three main types of analyses. Let us study these.

The first type of analysis takes semi-lexicality to be entirely a product of the syntax. Zeller (2001) models semi-lexicality by proposing that a lexical head has combined with a functional affix; under this type of analysis, each individual part is strictly functional or lexical, and it is only in their combination that semi-lexicality arises. As an example, we might consider the morpheme *-ful* in English to be a functional affix which attaches to a lexical head to create a quantity interpretation and likewise semi-lexical behaviors. Taking a noun which can be

used to denote a container of sorts, we add *-ful* to turn it into a quantifier, where the quantity is approximately the amount that can be contained in the noun: *mouthful*, *thimbleful*, *capful*, *handful*, *sockful*, *boxful*, *roomful*, *storeful*, *armful*, *tablespoonful*, etc. There is nothing inherently semi-lexical about a structure which combines a lexical head with a functional affix (and the same state of affairs holds with tense affixation *walk-ed* or pluralization *sock-s*). The use of the term semi-lexical is warranted only by the fact that the combination produces something which is difficult to classify (it's between a noun and a quantifier), and hence, appears semi-lexical on the surface. Zeller's account has the effect of removing semi-lexicality as a valid notion in the grammar (it's basic affixation), and instead maintains the clean division between lexical and functional elements at all levels.

The second type of semi-lexicality analysis is subtly different from the previous. It assumes semi-lexicality to arise in the transition between the lexicon and the syntax. In the lexicon, the element in question is taken to be fully lexical, and hence, fully specified. However, it is not inserted in the syntax as a fully lexical head. Instead it is a lexical head being *used* grammatically in a more functional way. It is precisely this combination which creates semi-lexical behavior – having lexical origins, the element shows lexical properties, but by being used in a functional way, it also necessarily has functional properties. This is the approach we saw in Haider (2001), for whom semi-lexicality was the result of the lexical head failing to enter the derivation with a complete argument structure (this constituting a more functional property); we also saw something similar in Cardinaletti and Giusti (2001) and van Riemsdijk (1998), for whom semi-lexicality was (partly) the result of inserting a lexical head into a functional projection. In both cases, there is a process by which an otherwise lexical head is taken and made functional in some way during its insertion into the structure. Unlike Zeller (2001), this semi-lexicality is not compositional, as it does not involve affixation of some lexical head with some functional head.

Again, like with Zeller (2001), there isn't anything inherently semi-lexical about these elements – it is the way in which they are used which creates semi-lexicality. At the same time, we cannot escape the fact that a functional use of lexical heads is restricted to certain lexical items, and hence, not freely available. For example, in English, nouns like *ton* and *number* seem to exemplify this kind of semi-lexicality: while they have fully lexical interpretations and uses (*ton*: “a weight of 2240 pounds”; *number*: “some arithmetic value”), they can also be used in a functional way as vague quantifiers (*a ton of people* ≠ “2240 pounds of people”; *a number of people* ≠ “some arithmetic value of people”). But not just any noun can do this – only nouns which lend themselves to a quantity interpretation allow this functional use as a quantifier (e.g. *a majority / host / couple of people*, **a coffee / store / honesty / dance of people*). These facts suggest that at some level of representation, these elements have some property such that they can be used in a functional way, whereas other elements cannot. The difference from Zeller (2001) is very subtle, but it amounts to recognizing semi-lexicality as the result of a (restricted) process

in the grammar, as opposed to a compositionally built structure. Furthermore, it triggers the question of how the grammar decides what can and cannot be used in a functional way.

The final approach takes semi-lexicity to originate in the lexicon. Butt and Geuder (2001) take this to an extreme, assuming semi-lexicity to be a third category in addition to lexical and functional categories. Emonds (2001) and Schütze (2001b), on the other hand, do not treat semi-lexicity necessarily as another category, but rather a way of naming (for linguists) those elements in the lexicon which lack semantic features (semantic features being those features “which play a role in selection and interpretation, but not in derivations,” Emonds 1985: 24); this is also the stance of Powers (2001) and Haider (2001), who take semi-lexical heads to be functional heads which are placed in the lexicon (as opposed to wherever the non-lexical functional heads are located). As an example, quantifiers like *a lot of* and *a few* show very idiosyncratic behaviors which set them apart both from the more canonical (and presumably functional) quantifiers like *many*, *much*, and *some*, and from the lexical nouns which they share an undeniable resemblance to. Unlike other quantifiers they require the indefinite article (**lot of*, **few²*), and unlike lexical nouns which co-occur with the indefinite article, they do not trigger singular agreement (*a lot of / a few people were/*was...*). Under the previous approaches we’ve discussed, if these are lexical heads which are being combined with functional material or being used in a functional way, we expect that they also have a fully lexical use. But, they don’t. They only function as quantifiers, despite the resemblance to nouns. Such quantifiers seem most amenable for a lexicon-based approach to semi-lexicity.

Under a lexicon-based approach (although not necessarily Butt and Geuder 2001 style), semi-lexicity is not derived from anything; it simply exists, presumably as a result of the fact that the lexicon can store a variety of information and is not just limited to purely lexical elements. It predicts that there should be many different kinds of semi-lexicity, depending on the properties of the element itself. Haider (2001: 68) argues explicitly for this, taking the various possibilities to be a result of the organization of the system: a “*semi-lexical head*, therefore, is characterized as a *cover-term* for non-canonical head properties of lexical items vis-à-vis the canonical heads of each category.” The immediate question that arises is what the limits and range of possible semi-lexical entries is; thus, it is a question as to the structure and possible content of the lexicon.

We can summarize the three approaches to semi-lexicity as follows:

- (2) Approaches to semi-lexicity
 - a. Syntax-based semi-lexicity: Created through the interaction of lexical and functional heads in the syntax. (Examples: *room-ful*,

² *A few* meaning “some” differs in interpretation from *few* meaning “not many.” They also differ with regards to polarity, e.g. (**A*) *few would ever consider this*. To get the “some” interpretation, the indefinite article is obligatory.

hand-ful, mouth-ful, spoon-ful)

- b. Use-based semi-lexicity: Created through the grammatical use of a lexical head in a more functional way. (Examples: *a number of, a ton of*)
- c. Lexicon-based semi-lexicity: A product of the lexicon – some head is specified in the lexicon in such a way as to produce semi-lexical effects in the syntax. (Examples: *a lot of, a few*)

I take use-based and lexicon-based semi-lexicity to be true cases of semi-lexicity, both motivating a need to acknowledge semi-lexicity as a notion relevant in the grammar. A major difference between use-based and lexicon-based semi-lexicity is that use-based semi-lexical elements also have fully lexical counterparts; thus, use-based semi-lexical elements are multifunctional, allowing both a lexical and a semi-lexical usage. This forms part of the motivation for assuming they are lexical heads used in a functional way. A piece of the semi-lexicity puzzle is understanding how and when some lexical element can function semi-lexically. For simplicity, let us hypothesize that this is derivable from some property in the lexical entry of the element; thus, use-based semi-lexicity can also be attributed to properties in the lexicon and, like lexicon-based semi-lexicity, argues for semi-lexicity as a grammatically relevant notion. Syntax-based semi-lexicity produces semi-lexical behaviors, but there is nothing inherently semi-lexical about it, and hence, it does not argue for the existence of semi-lexicity. In the following section, I turn to a definition of semi-lexicity.

2.3 A new definition of semi-lexicity

I do not assume that there is some tag “semi-lexical” which can be attached to lexical entries to create semi-lexicity. Such a solution offers little insight into the phenomenon of semi-lexicity and might predict that semi-lexical elements form a homogeneous class of elements, which, as we will see in this dissertation, is false. Instead, I argue that surface patterns of semi-lexicity are derivable from properties of the lexical specification of the element in question, both for use-based and lexicon-based semi-lexicity. A consequence of this type of approach is that the term ‘semi-lexical’ is only a label for certain types of input, and has no independent status as a label in the grammar.

The argument goes as follows. Suppose we are dealing with some phenomenon which has consequences for structure-building or the distribution of features in the syntax (and is crucially not due to a post-syntactic process). Assuming we can identify some element as the instigator, we call that element semi-lexical because it does not “do” what we expect a lexical element to do, and it’s not functional either. Assuming that syntactic processes function the same regardless of the input, i.e. that syntax is a “dumb” machine which simply

computes, then it follows that the difference must originate in some stage *prior to* syntactic structure building. The most obvious suspect in our current theory is the lexicon, given that we know elements in the lexicon have some power over how syntactic structures are built (e.g. argument structure). If syntax is fed some element with a non-canonical lexical entry (the input), then we can expect that the output is similarly non-canonical. Under this hypothesis, deviant or non-canonical ('semi-lexical') surface patterns are directly related to lexically-specified properties of the element in question; semi-lexicality is the output of an interaction between processes of syntax and requirements of the semi-lexical element. In short, assuming a uniform syntax, semi-lexicality arises from a non-canonical lexical entry. This perspective suggests that a study of semi-lexicality is in fact a study of the set of possible lexical entries in the lexicon, and the consequences of being non-canonical for syntactic computation. This is a huge topic, and the contribution of this book is limited to the nominal domain.

To understand what makes a lexical entry non-canonical, we first need to know what counts as a canonical lexical entry. This amounts to adopting a particular theory of categories which we can compare our semi-lexical elements to, in order to determine in what way they are non-canonical. There are various theories, and it is not my intention here to discuss all of them, as that would be another book entirely (see for example Borer 2005, Baker 2003, de Belder 2011, Emonds 1985, 2000, among others). Instead, let me outline the most basic of assumptions here, and I flesh them out in the main text, where necessary. As the focus of this book is semi-lexicality in the nominal domain, I do not discuss the status of elements in the verbal domain.

I follow Borer (2005) and others who assume that the nominal, adjectival, or verbal status of an element is a product of the syntax. Thus, if we take some root, which refers to some concept, we can embed that root in a nominal, adjectival, or verbal syntactic structure, the result being that we interpret it as a noun, adjective, or verb. The implication is that categories such as noun, adjective, and verb do not exist independently of syntax, and hence, there are no category denotations in the lexicon. In principle, this approach predicts that it is possible for a root to be used as any of the traditional categories. Thus, restrictions that might exist are, by definition, external to the linguistic system. For example, there could be conceptual reasons for a speaker to avoid using some particular root in some categorial frame. *Table* and *chair*, for instance, are normally used as nouns, presumably because they usually refer to objects; however, this does not *a priori* exclude the ability to give an interpretation to a verbal usage, as evidenced by verbs *to chair/table (a discussion)*. Thus, I take traditional categories to be a product of syntactic computation. If we count the traditional lexical categories as our "canonical" categories, then it follows that a canonical lexical entry is just a root, which lacks any specification of syntactic features and only carries semantic

conceptual information.^{3,4} The root then is the most default lexical entry and constitutes the largest chunk of the lexicon. This is what I assume for the representation of “lexical” categories.

With regards to functional categories, I think the field has even less of an idea of where or how such elements are situated in the lexicon, or if they even occur there (although see e.g. Emonds 2000 for some work in this direction). For the purposes of this work, it is not important where functional elements are located, only what form they take, to allow for comparison with semi-lexical elements. Following standard approaches, e.g. as in distributed morphology (cf. Embick and Noyer 2007), I assume that functional elements are (bundles of) syntactic features, which lack a root. In other words, their only meaning contribution is the one carried by the syntactic feature (e.g. definiteness, number, etc.). Putting this together with my assumptions concerning lexical categories, we get the following dichotomy:

- (3) Broad organization of the lexical-functional distinction:
 - a. Lexical categories: roots
 - b. Functional categories: syntactic features

Thus, we have a very simplistic view of what defines a lexical and a functional category: lexical categories are pure semantic content (roots) and functional categories are pure syntactic content, composed of syntactic features. This fits with general intuitions as to what is lexical and what is functional. Now, as discussed previously, I take semi-lexicality to originate in lexical specifications, and moreover, to not be derived from some tag ‘semi-lexical.’ If the “tools” of the lexicon are roots and syntactic features, then where should semi-lexicality fall? The simplest solution, given the current set-up of the system, is to assume that semi-lexical elements are the exceptions to the lexical-functional dichotomy: thus, any roots which also carry syntactic features are by definition semi-lexical:⁵

- (4) Semi-lexical categories: roots with syntactic features

Now, if we think about this carefully, we will see that there are very many

³ This characterization is completely ignoring the fact that at some point, the lexical item has to be spelled-out. I am ignoring this because the phonological form does not interact with syntactic operations (although it may provide evidence of some syntactic operation having occurred); I take it as a given that roots are also associated with phonological forms.

⁴ There is also something to be said about the status of selection in relation to roots, i.e. whether selectional relations are encoded on roots or elsewhere. The issue is complex and beyond the scope of this work; I direct readers to Alexiadou, Borer, and Schäfer (2014) for discussion.

⁵ The other alternative would be to treat semi-lexicality as the absence of any root or feature in a lexical entry. However, I would expect that the absence of either is simply nothing, and hence, semi-lexicality could not be the negation.

syntactically specified roots in natural language, suggesting that semi-lexicity is much more common than previously thought. For example, in Polish, each and every noun in the language is associated with a gender value. This seems like information which belongs in the lexicon, as it amounts to arbitrary morphosyntactic information which must be learned on a case-by-case basis (although see Hachem 2015 for an alternative view of gender in Dutch and German). Let us assume then that some roots can be associated with morphosyntactic information like gender (see also Embick 2015: 53-54 for a similar conclusion).⁶ This information is utilized when building a nominal structure in Polish, but not elsewhere (i.e. if the root is used as a verb, the gender specification is immaterial), and presumably, if a genderless root is inserted in a nominal structure, some default gender value might be assigned. Because the root is associated with a gender feature, it qualifies as semi-lexical, given our assumptions of lexical and functional categories. A similar story holds for nouns which require lexical specification of morphosyntactic features like number. *Pluralia tantum* nouns like *pants* or *scissors* in English, for example, are obligatorily plural in a nominal structure, but not necessarily in other contexts (e.g. as part of a compound *pant leg* or when used as a verb *to scissor*). Assuming these roots are specified for number, this information is utilized in the construction of nominals; by definition, roots specified for number are semi-lexical. Under this system, any root which is specified for some morphosyntactic feature, whether it be gender, number, or something else, combines lexical material (the root) with functional material (the syntactic feature), and is therefore, by definition, semi-lexical.

Normally, we would not think of having a gender feature as making something semi-lexical, since gender is minimally necessary to build a noun in gendered languages. Under the approach here, however, being semi-lexical isn't necessarily anything special; instead, it is rather ordinary, and even expected. Languages have roots and features, and if those roots and features can occur in isolation, there is, in principle, no reason why they cannot also occur together. Nothing in the current system prevents this. A *pluralia tantum* noun is the effect of combining plural number with a root, and nouns taking a particular gender value

⁶ A work-around would be to say that gender is an independent head, realized as, for example, [neuter], [feminine], [masculine], etc., and these heads select for certain roots. For this work-around to apply, the gender head would have to be accompanied by a list of all the roots it can combine with. The work-around amounts to a question of where arbitrary morphosyntactic information should be stored – on the root, as I have suggested, or on functional heads which are specified for the set of roots they combine with. In principle, this could be adopted as a solution for any case of an otherwise seemingly morphosyntactically specified root: no roots carry any features, and in those cases where it seems like they do, there is a head with the feature that selects for the root. The question is where to draw the line, and if we agree that in some cases it makes sense for the root to be specified, as opposed to some potentially null selecting head, then this opens the door for analyzing other similar cases as involving roots with syntactic features. This thesis represents an exploration of what happens when we allow features on roots.

is the effect of combining gender with a root. Roots and features are the atoms of the lexicon, and the hypothesis is that those atoms can occur both independently and together. Semi-lexicality is what happens when those atoms occur together. As a result, however, the term semi-lexicality refers to a whole variety of possibilities, not all of which are interesting for furthering our understanding of the grammar (the gender example being a case in point). It would be useful if we had a way to restrict our notion of semi-lexicality to only a subset of semi-lexical cases, in particular, those cases where the specification of syntactic features produces an “unexpected” result.

I propose we restrict our attention to cases which have consequences for the nominal, adjectival, or verbal structure the root would be embedded in. Going back to our two semi-lexicality examples, the specification of gender is uninteresting as the canonical nominal structure always requires specified gender. Thus, whether or not gender is specified on a root, the nominal structure dominating that root will be the same (aside from the value of gender). The specification of number, however, is interesting, as the usual state of affairs is *unspecified* number, and it is possible for a noun to occur in the structure without number (e.g. mass noun contexts). Thus, the specification of gender on a root has no effect on the nominal structure, while the specification of number does, and we see this in the fact that *pluralia tantum* nouns do not occur in mass noun contexts (**much pant(s); *much scissor(s)*). Let us introduce the notion of “canonical categorial structures” to capture this. Canonical categorial structures refer to the set of structures that a fully lexical root could appear in, i.e. the set of possible structures for a root which lacks any specification of syntactic features. The set of canonical categorial structures will differ between languages, depending on what information the language encodes. In the following section, I define a canonical categorial structure more carefully, and work towards a characterization of canonical nominal structures, particularly in English and Polish.

2.4 Canonical categorial structures

The use of the term ‘canonical’ is borrowed from Corbett (2006), who discusses what he terms canonical and non-canonical cases of agreement. For him, ‘canonical’ cases are really just what we as linguists are most used to seeing as examples of agreement, for example, subject-verb agreement, while ‘non-canonical’ cases are those we are less used to seeing, such as adverb agreement. The distinction between canonical and non-canonical is not linguistically relevant in any way, and only serves to alert the reader to those types of agreement which are presumably more familiar. The same distinction holds here. Canonical categorial structures represent the set of structures that should be possible for a bare root in a nominal, adjectival, or verbal context – basically, the set of structures prototypically available to a noun, adjective, or verb. Semi-lexical heads can either

participate in the set of canonical categorial structures or they cannot, with consequences for how deviant or semi-lexical they might appear. When the bareness of a root is disrupted by introducing syntactic features on it (i.e. it is semi-lexical), we can expect that the set of contexts that element appears in might be limited or altered in some way. The set of structures or the structures themselves would then be considered non-canonical, given that it is not what we find in the usual case (taking the root to be the “usual” case). Note that there is no sense in which any of these terms, canonical, non-canonical, or semi-lexical, are terms which play a role in computation. The grammar computes based on its input, and one type of input has no advanced status over another type of input. Semi-lexical is just a convenient way of labeling certain types of input, namely, input which involves both a root and some syntactic feature(s), while ‘canonical’ and ‘non-canonical’ are convenient labels for the types of output we might find.

The structures that a bare root occurs in are termed “canonical structures,” where “canonical categorial structures” are the category-specific set of canonical structures. Taking a simple root, which consists only of the semantic conceptual information needed to capture whatever concept is being referred to by the root (e.g. the root for *cat* would contain the conceptual information necessary to convey a CAT-concept), that root can be inserted into any position in the structure which allows for a root. This freedom in where a root is inserted is what gives us the many and frequent cases in which something we expect to surface as one category, surfaces as another.

- (5) Turn your **brights** on – you can’t see a thing! (adjective as noun)
- (6) He had a good **sleep**. (verb as noun)
- (7) They really **upped** the price! (preposition as verb)

When we talk of canonical *categorial* structures, we are talking about the set of structures which we as linguists take to instantiate a “noun,” “verb,” or “adjective.” For example, singular indefinites, singular definites, mass nouns, bare plurals, non-bare plurals, etc. are all assumed to contain a nominal core. Taking WATER and CAT to be roots, these roots can be inserted in any of those contexts (*water, a water, the water, waters, three waters; cat, a cat, the cat, cats, three cats*) and whatever the context, we consider them to be nouns. Despite the fact that each of these is slightly different in terms of feature content, structure, or both (depending on the analysis), we still take them to instantiate a single category “noun.” This is what is meant by the set of canonical categorial structures. Taking a root and inserting it in any of these contexts, it will be conceived of as a noun. These are the structures which are associated with noun-hood, and hence, are the set of canonical nominal structures. The same argument can be repeated for verbs and adjectives, for which there is a set of structures that we take to instantiate the category of adjective and verb. These are the canonical adjectival and verbal

structures.⁷

Returning to our semi-lexical examples of gender and *pluralia tantum*, gender results in a canonical nominal structure, given that, in those languages with gender, a nominal structure always includes gender. Because it is the usual case for a noun to have gender in the syntax (regardless of whether gender is specified on the root or not), then the specification of gender on the root does not introduce any idiosyncrasies into the structure or interfere with that root participating in the set of canonical categorial structures; the set of canonical nominal structures *includes* gender. Gender-specified roots, while semi-lexical, can be used in the canonical set of categorial structures. A *pluralia tantum* noun, on the other hand, introduces non-canonical constraints on how the dominating structure is built in the nominal domain. In particular, it requires that a plural is included in the structure, which immediately blocks it from occurring in a mass noun context (**much pant(s)*, **much scissor(s)*) or a singular indefinite context (**a pant(s)*, **a scissor(s)*). The specification of number on the root restricts the contexts that the root can appear in and hence, gives it non-canonical properties (no bare root would have these restrictions). Number-specified roots are also semi-lexical, but in contrast to gender-specified roots, they cannot be used in the canonical set of categorial structures. It is by distinguishing between canonical and non-canonical that we are able to restrict our attention to those cases of semi-lexicality which interact with structure building.

There are many things to be said about the set of canonical structures in a language, and an exhaustive treatment of the topic would require a full study of the structural possibilities of nouns, verbs, and adjectives in a particular language. Instead, I will outline a basic treatment of the structure of the nominal domain for the languages most relevant to this thesis, namely English and Polish. Before turning to language specific data, we will look at how the structure of the nominal domain has been conceptualized in the literature; following this, I outline my assumptions on the structure of the English and Polish nominal domain.

⁷ A question which I do not intend to address here is whether categorial features exist as functional elements in the lexicon. For example, there is a substantial amount of literature dedicated to the heads *v*, *n*, and *a*, which, in some cases, are assumed to contribute the categorial features of 'noun', 'verb', or 'adjective' to a projection. In these analyses, roots are not associated with categorial content in the lexicon, but are associated with it through syntax, this assigning them a lexical category. The alternative to this approach is to assume that concepts of 'noun', 'verb', and 'adjective' do not exist in any way in the system, and are rather, descriptive labels created by and for linguists. What we think of as a noun, verb, or adjective arises based on the context the root occurs in. These alternatives have consequences for how we conceptualize 'canonical categorial structures' - under the first account, the canonical categorial structure always contains a *v*, *n*, or *a* head (and could be defined as such); under the second account, it constitutes the set of structures we take to instantiate a noun, verb, or adjective. I find it more ideal to avoid categorial heads altogether, if possible, and much of the text is written with this in mind.

2.4.1 *A short history on the structure of the nominal domain*

Perhaps the most important shift in the conceptualization of the nominal domain is the one from the lexical head hypothesis to the functional head hypothesis (Corver 2013). Prior to the 1980s, the noun was viewed as the head of the NP, NP serving as the main phrasal unit of the nominal domain. As such, the NP was the host of all additional nominal material, such as determiners, demonstratives, numerals, quantifiers, possessives, etc., and each of these fell under the rubric of NP material. This is clear in pre-1970 phrase structure rules (Chomsky 1957, 1965) and X-bar structure (Chomsky 1970, Jackendoff 1977). Phrase structure rules necessarily included an N in the re-write of NP, other material generally being optional (e.g. NP \rightarrow (Det) N (PP), Corver 2013: 358, ex. 7c); as such, it was the N that made the NP an NP, and the NP which was the point of interaction with other non-nominal categories. Similarly, under X-bar structure, the NP, which necessarily contained an N, was the highest projection of the nominal domain, and therefore, the point of interaction with other categories. All other material fell in as a specifier, adjunct, or complement to the noun. For these theories, the structure of the nominal domain involved only projections of N. For a fuller historical discussion of these theories, see Corver (2013).

The 1980s saw the advent of functional projections in the nominal domain. Developments in the nominal domain mirrored developments in the verbal domain, which was moving towards independent IP/TP and CP projections, dominating the VP. Brame (1981, 1982) was perhaps the first to suggest that the determiners of the nominal domain should also be considered heads in their own right, projecting a DP (Determiner Phrase) above the NP. This novel idea was picked up and further developed by Abney (1987). The DP-hypothesis, as it was known, quickly became a standard, and work in Longobardi (1994), for example, argued for the obligatoriness of the DP projection, accrediting it the function of converting a noun into an argument. As the argument goes, without the D-layer, the noun cannot function as an argument, and hence cannot be used to satisfy the theta requirements of the verb; the net result is that without D, no language can use nouns as arguments, and hence, D must actually be universal. Such work has since sparked a debate on whether the DP is universally available, and more strongly, necessary cross-linguistically (see, e.g. Szabolcsi 1987, Corver 1992, Bošković 2008). The DP hypothesis represents an early representation of a functional head in the nominal domain, where it is no longer the N which projects to the highest point of the nominal domain, but D, and thus, D which interacts with other categories. By treating D as the head of a DP, we open the door for analyzing other components of the nominal domain as independent heads and projections, rather than a specifier of NP.

The 1990s saw an explosion of work into functional projections in the nominal domain. Ritter (1991, 1992), for example, argued for the existence of a functional projection between the D- and N-layers, which she took to be NumP,

the host of number inflection. Likewise, Picallo (1991) argued that there should be a GenderP, the host of gender. We also find arguments for a QP (Giusti 1991) and K(ase)P (Bittner and Hale 1996), among other things (see for example Cinque 1999, 2010). These various projections allow for a more nuanced view of the nominal domain, and are also in part responsible for ushering in a new era of further decomposition, as found in cartographic approaches (Cinque 1999, 2010) and nanosyntactic approaches (Starke 2009). Furthermore, by treating the components of the nominal domain as phrasal, we immediately gain an extra position in the structure, namely the specifier of these various heads. This is both a blessing and a curse, as, on the one hand, it gives us more flexibility, while, on the other hand, it introduces the complication of determining whether some element is itself the head of its own projection or the specifier of some silent head. This issue has had a varied history in the domain of numerals, for example, where Franks (1994) argues that numerals are specifiers, Ionin and Matushansky (2006) that numerals are heads, and Danon (2012) that numerals can be either, this depending on the language and the numeral in question.

With the growth of the nominal domain (and verbal domain) came the pressing question of how these many projections fit together. Under the lexical head hypothesis, each of these elements was “nominal” by virtue of sitting in the NP, and hence, only the order of elements remained a mystery (one partially solved by X-bar theory). However, under the functional head hypothesis, many of those elements which were initially subsumed under the NP now headed functional projections dominating the noun. As such, nothing in the system predicts them to only surface in the nominal domain, and only in a particular order. Yet, this is exactly what happens, where, for example, NumP sits under DP (never above it) and neither NumP nor DP exist in the verbal domain. The reason for this is not immediately clear, and generally, further assumptions are necessary to enforce such behaviors. Another pressing issue is the term “nominal domain” – while NumP, DP, etc. are very intuitively considered a part of the nominal domain, there is no technical sense in which they actually form a nominal domain with the noun. Instead, the concept of nominal domain must also be stipulated, along with the set of projections belonging to the nominal domain. Finally, there is the issue of how the nominal domain intersects with the verbal domain. As mentioned before, this has been related to the universal DP-hypothesis, where it is the DP which facilitates intersection of the nominal domain with the verbal domain; however, under accounts where the DP is not necessarily the highest projection of the nominal domain (see, e.g. Bošković 2008), the question returns.

Researchers are not unaware of these questions, and there have been a number of developments in the field aimed at addressing them. For example, a common assumption is the notion of a “functional sequence” which dictates the order in which projections are combined in the nominal and verbal domains. The use of a functional sequence answers the ordering question, although it itself is a stipulation. The notion of a functional sequence has been combined with the

DP/CP symmetry hypothesis, which claims that DPs are simply CPs in disguise, or rather, these are symmetrical structures, potentially derived from a single supracategorial structure, which is more general than either the CP or DP (Abney 1987, Szabolcsi 1994, among others). Under this approach, there isn't a sense in which some functional projection belongs only to the nominal or verbal domain – it belongs to both, but depending on the context, is realized differently (in a nominal or verbal way). We return to this in the next section.

The work of Grimshaw (1991, 2000, 2005) represents, perhaps, the most cited answer on how to define the nominal domain. She proposes the concept of an “extended projection” (independently proposed as the M-projection in van Riemsdijk 1990 and further expanded upon in van Riemsdijk 1998). The extended projection unites those elements which were included inside the NP, but have now been conceived of as independent projections, e.g. DP, NumP, GenderP, QP, KP, etc. Grimshaw achieves this by assuming that each element in the nominal domain shares some property, more specifically, a feature set of the type [+N,-V] (borrowing the feature system [\pm N(oun)] and [\pm V(erb)] of Chomsky 1970). Each element forms part of the same extended projection because it carries “nominal” features and all projections carrying nominal features constitute part of the nominal domain. The noun is viewed as the lexical core, and all projections dominating the noun within the nominal domain (or rather, within the extended projection of the noun) form the functional structure of the noun. This captures the unity among certain projections. Grimshaw enforces the ordering effects between the projections by use of an F feature, where higher projections have a progressively higher F value. Thus, for example, the NP carries the feature F0, the NumP F1, and the DP F2. Grimshaw's notion of an extended projection remains a heavily adopted assumption in the literature, although it is not always clear that her exact implementation involving [F], [N], and [V] features is being adopted.

Following the current trend in nominal theorizing, this thesis will also assume a series of functional heads which instantiate the nominal domain. Following Grimshaw (1991, 2000, 2005) and the many others who have followed her, I assume the concept of an extended projection which constitutes the lexical nominal core and the largely functional set of projections dominating that lexical core. In keeping with the previous discussion, a canonical nominal structure involves a root (the nominal core) and the (mostly) functional structure dominating that root (i.e. the extended projection of the noun). The task that remains is to determine the contents of the functional structure which dominates the root in the canonical case. With this in mind, let us develop the notion of a functional sequence.

2.4.2 On the notion of a functional sequence

Ordering effects are one of the most convincing arguments that something like a functional sequence must exist. I start this section with that very argument,

outlining very briefly some of the work into ordering effects in the nominal domain. Following this, I turn to conceptualizations of the functional sequence. The format of the functional sequence can differ widely between theories, and this section includes a discussion of the more prominent theories.

Greenberg (1963: 52) addresses cross-linguistic restrictions on the ordering of elements in the nominal domain, proposing Universal 20:

- (8) “When any or all of the items (demonstrative, numeral, and descriptive adjective) precede the noun, they are always found in that order. If they follow, the order is either the same or its exact opposite.”

Universal 20 takes only the following orders to be acceptable cross-linguistically:

- (9) Dem > Num > Adj > N
 N > Dem > Num > Adj
 N > Adj > Num > Dem

However, Greenberg’s universal is far from universal, and plenty of other orders have been observed, such as N > Num > Adj > Dem and N > A > Dem > Num, among others (see Cinque 2005). Yet, it is not as simple as “anything goes.” Of the 24 logically possible orders, only 14 have been observed (Cinque 2005: 319-320, ex. 6). Cinque (2005) argues that each of the observed orders is derivable by assuming movement operations from a single base order: Dem > Num > Adj > N. The result is that all orders found in the nominal domain cross-linguistically can be traced back to a single fixed order;⁸ according to Cinque, this is the most basic order, the order in which External Merge applies. This provides strong evidence for the idea that there is some functional sequence which dictates how the various projections of the nominal domain are merged together. The functional sequence, often called the *fseq*, provides the base order, and all other orders are derived via movement from this base order.

Because word order restrictions are so pervasive in natural language, the functional sequence has become a theoretical necessity (though of course, it would be desirable to derive it from independent facts). In generative syntax, we can think of the functional sequence as a Universal Grammar (UG) endowment: all languages carry some kind of blueprint which dictates structure building. This is the order in which Merge applies, but languages manipulate how that order is

⁸ Theories differ with regards to whether Merge forces ordering between the complement and the head (e.g. the Linear Correspondence Axiom of Kayne 1994). In analyzing the word order facts of Universal 20, Cinque (2005) assumes that complements are always merged to the right of the head; Abels and Neeleman (2006), analyzing the same set of data, take the order to be freer, instead adjusting the restrictions on movement. Both derive the same facts. Crucially (for us), both analyses assume the same order of Merge, despite disagreeing on whether Merge fixes the linear order between complement and head or not.

realized on the surface through movement operations. When we turn to the implementation of our UG “blueprint,” we find that theories differ in terms of how much of the functional sequence they consider to be innate, and how much is learned through experience.

We start at the extremes. One extreme is to say that everything that occurs in one language must occur in all languages. This effectively explodes the number of projections or categories assigned to the functional sequence in UG. Cartography and nanosyntax are examples of this first extreme. The cartographic enterprise, led and inspired by Cinque and his work on adverb and adjective placement (e.g. Cinque 1994, 1999, 2010), has resulted in a highly articulated functional structure for nouns and verbs; cartography represents an attempt to map out all the possible projections in a language, taking the resulting functional sequence to be cross-linguistic. Nano-syntax builds on cartography, but dissects the functional sequence into even smaller units, “nano”-units, which occur below the word level; in nanosyntax, features are heads in the functional sequence (Starke 2009). Because the resulting functional sequence is universal, all differences between languages are attributed to differences in movement and the phonological realization of syntactic structure.

Under such approaches, anything that occurs in one language occurs in all other languages. With regards to the nominal domain, for example, it predicts that gender (if it is indeed a projection) should exist in some form in all languages. We know that morphologically it does not, and thus, these analyses require an explanation for why we don’t always see gender in an obvious way. Lowenstamm (2008), for example, argues that gender is the categorial marker *n*, and hence, gender has the function of making something into a noun. Languages differ with regards to how many exponents *n* has and thus, a genderless language like English has only one exponent of *n* (and hence, apparently no gender), a gendered language like Dutch, two exponents of *n* (neuter and common), and a language like Norwegian, three exponents of *n* (masculine, feminine, and neuter). The result is that gender isn’t anything other than a categorial specification, which exists in all languages; the perceived absence of gender in some languages is related to how *n* is realized. Alternatively, Hachem (2015), in a semi-nanosyntactic approach to gender in German and Dutch, proposes that gender is not an arbitrary morphosyntactic device on nominals, but instead encodes information about the denotation of the noun, for example, whether it is an unbounded mass, a bounded mass or a collection. In Dutch and German, these functions are realized as gender. The result of this is that there isn’t really a thing such as gender, and more careful study in other languages might similarly reduce it to other phenomena. According to these approaches, that which we conceive of as “gender” will not necessarily be realized in the same way in all languages (or even encode the same functions) and for this reason, gender might not seem to be universal, despite actually being universal. Under such approaches, the burden of proof lies in showing that there is something deeper to gender across languages, such that it

could be considered universal.

The other extreme is to say that there is some bare skeletal structure shared by all languages, but the majority of what we find are language specific categories which have embellished the skeletal structure.⁹ In other words, if we abstract away enough, we will find that the functional structure of all categories is identical, following some very general blueprint in UG. This stance is derivative of earlier attempts to establish a symmetry between the CP and DP domains (e.g. Abney 1987, Szabolcsi 1994), and has also been expressed in den Dikken (2010) and developed in Hiraiwa (2005).

One recent implementation of this idea is the Universal Spine Hypothesis of Wiltschko (2014). Wiltschko proposes that languages share a base universal spine, each piece of the spine having a dedicated interpretive function, which can be implemented in language specific ways. The categories (or rather the functions represented by the categories) are taken to be universal, but languages vary in how they construct language-specific categories to instantiate those functions. Wiltschko's universal spine is depicted below, with representative categories and descriptions of their interpretative function. Her model draws its inspiration from the verbal domain, although it is independent of the verb-noun distinction.

- (10) Linking > Anchoring > Point-of-View > Classification
 CP/KP IP/DP AspP/φP vP/nP

CLASSIFICATION:	Introduces and classifies some root as an event (verb) or individual (noun)
POINT-OF-VIEW:	Adds a viewpoint with respect to the event or individual
ANCHORING:	Anchors the event or individual to the utterance
LINKING:	Links the event or individual to the existing (discourse) structure

The classification domain “classifies” the root as being some event (verb) or individual (noun). This would be *v* or *n* in theories which assume categorizing heads. The point-of-view domain adds a point of view to the interpretation of that noun or verb. In the case of a verb, this is instantiated as aspectual information. Wiltschko suggests that in the nominal domain, it is the phi-information which adds on point-of-view information, for example, gender and number; we will return to this point shortly. The anchoring domain is perhaps the least intuitive at first, given that it involves a very specific way of conceptualizing the contribution of tense-like information. In the verbal domain, an utterance consists of the utterance itself and the event being described by the utterance; the function of the

⁹ A further extreme is to assume that there is no shared set of categories at all between languages. Being a generativist, I reject this hypothesis.

anchoring domain is to encode the relation between the utterance and the event, thereby “anchoring” the event to the utterance. This is how Wiltschko conceptualizes the contribution of tense. Tense tells us if the time of the utterance coincides with the time of the event: present tense indicates co-occurrence, past tense non-co-occurrence, and in this way, the event is anchored to the utterance via temporal information. Languages can use different types of information to encode this relation, and Halkomelem Salish, for example, is argued to involve spatial information (does the utterance location coincide with the event location or not?). In a nutshell, the universal spine forms the “basic necessities” of structure building, present in all languages all over the world, but each language adds its own bells and whistles to create language-specific categories which instantiate these functions in potentially a very language-specific way. Wiltschko’s main point, however, is that if we abstract away enough from what we find in individual languages, what is left behind will be the universal spine.

Hachem (2015) builds on this idea, but proposes the notion of “universal distinction domains” to capture the interpretive functions of Wiltschko’s universal spine, without adopting her specific implementation. Hachem argues for the following universal distinction domains (particularly for DPs), replacing “point-of-view” with “quantity,” and adding a new domain “identification.”

- (11) The hierarchy of Universal Distinction Domains (Hachem 2015: 57)

Linking > Anchoring > Quantity > Classification > Identification
 PP/KP DP QP φ P \sqrt

IDENTIFICATION: Converts a chunk of encyclopedic knowledge into a root for use in the syntactic structure

CLASSIFICATION: Classifies the root as an individual (via φ P, e.g. number and gender)

QUANTITY: Determines the size of quantities (via QP)

ANCHORING: Anchors the individual to the utterance (via DP)

LINKING: Links the individual to the existing (discourse) structure (via PP / K[ase]P[hrase])

Hachem argues that a root originates as a “yet-uncomputed chunk of encyclopedia knowledge” (2015: 58); as such, it cannot participate in syntactic computation without first being converted into something that syntax can understand. This is the function of identification, which acts as the “permeable membrane between the language system and general cognition” (2015: 58). Hachem’s identification domain is not one I adopt explicitly, although I acknowledge the potential need for such a category. Note that Wiltschko’s original formulation of the nominal domain leaves no space for quantity information; Hachem acknowledges this, and in her implementation of universal distinction domains takes quantity to be the point-of-view equivalent of verbal

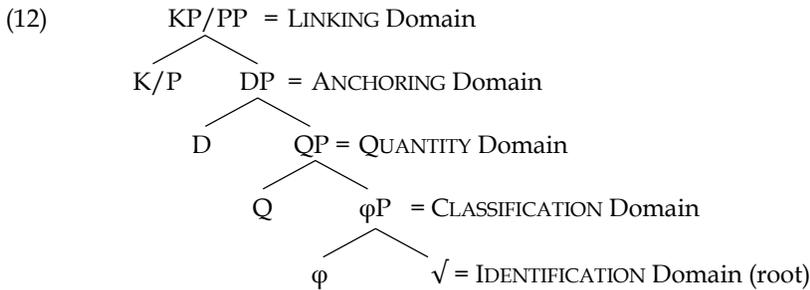
aspect, and phi-information to instantiate classification (not point-of-view). As regards the nominal domain, this seems a more intuitive approach.

In line with Wiltschko, Hachem, and the many others who have sought symmetry in the nominal and verbal domains through a cross-categorial UG template, I assume that there is something like a universal spine, or in the terminology of Hachem, universal distinction domains, which dictate, at a very general level, how the nominal domain is constructed. The universal spine contains domains whose function it is to classify, indicate quantity or point-of-view, anchor, and link, necessarily in that order. The order is to some extent intuitive (e.g. a root needs to be classified before it can be counted), and future research can hopefully determine to what extent the order of these domains must be stipulated, and to what extent it can be inferred from human cognition.

By adopting the universal spine, as opposed to a universal hierarchy of functional projections (as in cartography or nanosyntax), I am admitting to the possibility that not all instantiations of say, a demonstrative, numeral, or quantifier will be the same between two languages. In this system, there isn't necessarily a category "numeral" or "quantifier" which can be assumed to exist in the same way in all languages. Rather, we can expect that while quantifiers and numerals might share properties cross-linguistically in terms of function (and their position in the quantification domain), they will not necessarily be instantiated in a similar way, and hence, we should find a wide range of morphosyntactic possibilities. This approach predicts rampant variation, and in this sense, is more suited to a study of semi-lexicity than an approach which assumes a set number of pre-determined functional categories which all elements of the language must map to. I turn now to a short discussion of the canonical nominal categories in Polish and English.

2.4.3 Canonical nominal structures in English and Polish

I present below a basic skeletal structure for the nominal domain. The projections used are illustrative and present the more prototypical types of categories we would expect in these domains, borrowing from the functional projections research in the nominal domain has produced:



In this section, I present my assumptions regarding the universal distinction domains found in the nominal domains of Polish and English. I start with the identification domain and work my way to the linking domain. I end this section with a visual illustration of the basic structures I adopt for Polish and English.

The identification domain is the domain of roots, and hence, corresponds to the root. For both Polish and English, I assume that this is where roots are inserted. The classification domain refers to the ϕ -information which has been associated syntactically to a root. English nominals morphosyntactically make number distinctions, while Polish nominals make both number and gender distinctions. This suggests that the content of the classification domain differs between Polish and English, with the Polish classification domain encoding gender and number and the English classification domain only number. I adopt the convention of referring to number with the number sign # and gender with the Greek letter ‘gamma’ γ . In line with Ritter (1991, 1992) and many others, I assume that number is represented in a #P, both in Polish and English; thus, both project #P in the classification domain. There is discussion on the representation of gender syntactically, for example, as an expression of *n* (Lowenstamm 2008), an independent GenderP projection (Picallo 1992), or a feature on the root itself (see further discussion in Kramer 2009). For my purposes here, I adopt the naïve (and perhaps incorrect) assumption that gender is instantiated via a γ P which projects immediately above the root; this creates a parallelism between the projection of number and gender in the classification domain, assigning them a similar type of syntax.¹⁰ Thus, in addition to #P, Polish also projects a γ P. Above the classification domain, we have the quantity domain, the locus of quantificational elements such as numerals and quantifiers. The quantificational domain is an area we will explore in the coming chapters, and hence, it is enough for now to simply assume a quantificational layer, such as QP, for both languages.

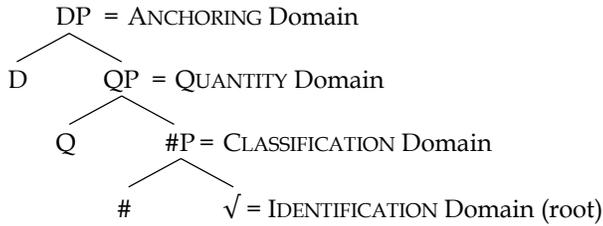
¹⁰ The formulation is identical to Picallo (1991), involving only a renaming of GenderP to γ P. It is superficially similar to Lowenstamm (2008), who assumes gender to be a feature of *n*. Syntactically, the configuration is the same: there is a piece of structure immediately dominating the root which hosts gender; the difference lies in the presence or absence of a nominalizer. Notice, however, that under the view in which lexical categories (nouns, verbs, and adjectives) are a product of the syntax (epiphenomena), a γ P contributes to the nominal character much like an *n*P contributes to nominality; in that sense, they are not so different.

In the nominal domain, the anchoring domain constitutes that material which “anchors” the content of the nominal to the utterance. This is the domain of referentiality: determiners and demonstratives. In English, the main projection of the anchoring domain is the DP, though some approaches take a more nuanced view, assuming multiple projections (e.g. Zamparelli 2000). For simplicity, I assume only a DP for English. Our case studies will not deal with the anchoring domain to any great extent, and hence, it is sufficient to make only the most basic of assumptions. With regards to Polish, determining the content of the anchoring domain is slightly more complex, given that Polish, like many Slavic languages, lacks definite and indefinite determiners. This has led to a debate in the literature, some arguing Polish to lack DPs altogether (e.g. Corver 1992, Willim 2000), and others arguing for a DP analysis of Polish (Rutkowski 2002a, 2006a; Rappaport 2001). However, regardless of whether Polish has DPs or not, the fact remains that the language is fully capable of using nominal expressions referentially; furthermore, Polish does have demonstratives, which appear to adhere to the functional sequence, generally surfacing in an initial position with nominals. Together, this suggests that the anchoring domain must be instantiated in some form in Polish, to create referentiality (“anchoring”) and the ordering effects with demonstratives. For this reason, I adopt the assumption that Polish has some kind of projection in the anchoring domain, and for simplicity, I term it a DP (whether or not it is in fact what is usually conceived of with the notion of “DP”).

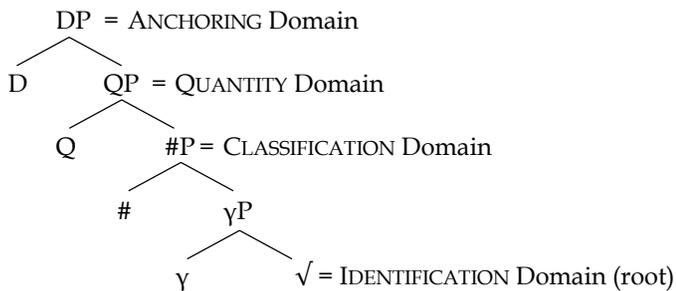
By including the linking domain in the universal spine, Wiltschko (2014) and Hachem (2015) are assuming that prepositions (PP) and case (KP) form part of the extended projection of the nominal, on a par with CP of the verbal domain. However, this assumption remains controversial in the field (although it is a view held by Grimshaw 1991, 2005, and others). Furthermore, as regards case (KP), there is still discussion as to whether case can project (cf. Bittner and Hale 1996, Caha 2009, Levin 2015), and presumably, there are further differences between structural and inherent case in this regard (cf. Asbury 2008, Řezáč 2003). Given the lack of consensus in the field over the representation of the proposed linking domain, I will side step the issue by not representing it; we return to the relation between case and the nominal domain in chapter 3.

This gives the following basic structures for English and Polish, respectively, with the linking domain omitted:

- (13) Basic structure of the English nominal domain:



(14) Basic structure in the Polish nominal domain:



The structures above represent a fully projected structure. However, it is not always the case that all projections in a structure must be projected. As has been noted in the literature, it is possible for certain domains and their phrases to be absent. Lyons (1999), for example, argues that indefiniteness is the absence of definiteness. For him, indefiniteness would be modeled by omitting the DP layer. Borer (2005) develops a system in which both QP and #P might be absent in a structure (those corresponding roughly to #P and Cl(assifier)P in her system). The presence or absence of these projections has implications for the interpretation, and for her, # (her Cl) is responsible for turning the root into a count noun; if # is absent, the denotation of the noun is mass. Similarly, quantifiers are not obligatory in a structure (she terms them “counters”), and hence, QP might be absent.¹¹ Such differences in the structure dominating the root have been used to account for morphosyntactic and semantic differences between different types of nominals

¹¹ Each piece of structure in Borer’s nominal domain is assigned an explicit function, acting on the structure it combines with. The denotation of the root is just ‘stuff’, or rather, a mass. CIP (our #P) acts on the root, creating a division. At the level of CIP, the members created by that division are not individually accessible, and this is the contribution of her #P (our QP), which selects and returns some subset of individuals from the division, as dictated by the quantifier. Metaphorically, we can compare this to the process of cutting a cake. Taking some mass of cake, too much for any one person to eat (in theory!), we start by slicing it into pieces. This is the function of CIP: cutting the cake. However, at this stage, no piece of cake is accessible for eating, as the pieces must first be taken out of the cake. This is the function of #P (our QP). It removes individual pieces of the cake from the division of cake, based on the quantity specified in # (our Q).

(e.g. mass nouns, bare plurals, non-bare plurals, singular indefinites, singular generics, etc.). I similarly adopt the assumption that the structure dominating a root might vary as a function of the interpretation.

2.5 Semi-lexicality

In chapter 1, I introduced the following three ways of being semi-lexical:

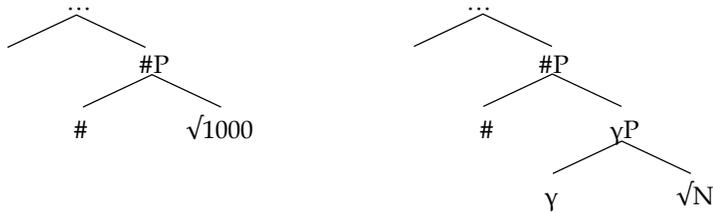
- (15) Ways of being semi-lexical:
- a. **Restrictions on the semi-lexical noun:** The semi-lexical noun must or must not project a particular piece of structure.
 - b. **Restrictions on the contexts a semi-lexical noun surfaces in:** The semi-lexical noun either requires or prohibits some piece of structure in the larger structure it has been inserted in.
 - c. **Minimal structures:** Insertion of the semi-lexical noun overrides the ability of an embedded noun in a binominal construction to project any further functional structure.

In this section, I briefly illustrate how these are instantiated structurally.

The first type of semi-lexicity involves restrictions on the functional structure of the semi-lexical noun. Restrictions can apply in one of two ways, either requiring or blocking some piece of structure from being projected. This is a type of semi-lexicity which is fairly common in the phenomena discussed in this book, and is found in the form of a deficiency amongst the three classes of Polish numerals discussed in chapters 4 and 5, the quantificational nouns (Q-nouns) discussed in chapter 6, and the kind-words discussed in chapter 7. Semi-lexicity is also found in the form of a required piece of structure, as in the context of *pluralia tantum* nouns, which are briefly dealt with in chapters 4, 5, and 7.

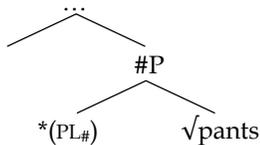
Deficiency implies that some piece of structure or defining nominal feature is absent from the functional structure dominating the semi-lexical root. For instance, in chapters 4 and 5, we deal with Polish numeral 1000, which is optionally blocked from projecting a γ P. When no γ P is present, its functional structure is deficient and differs crucially from a lexical noun. This is illustrated in the simplified structures below:

- (16) Deficient semi-lexical structure: Lexical nominal structure:



The alternative to deficiency is a required piece of functional structure. This is what is found with a *pluralia tantum* noun, for instance, which projects a plural #P. The structure of the semi-lexical noun is in fact fully lexical, but the difference lies in the fact that certain parts of this structure cannot be omitted. Thus, a semi-lexical *pluralia tantum* noun cannot project singular number or no number at all. This is illustrated for the English *pluralia tantum* noun *pants* below.

- (17) Obligatory plural structure:



Both types of semi-lexicity constitute restrictions on the projection of functional structure by the semi-lexical head. In the lexical specification, I represent the required presence or absence of a particular feature as a positive or negative feature. The negative feature captures the obligatory absence of that projection; further discussion of this feature type is provided in chapter 4, section 4.3.1.3.

- (18)
- Semi-lexicity:**
- Restrictions on the semi-lexical head

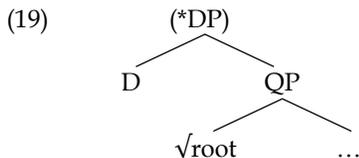
Deficiency: [√root, -feature]

Required feature: [√root, feature]

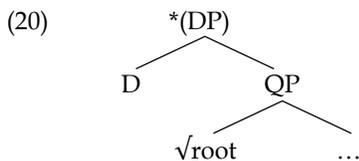
The second type of semi-lexicity involves restrictions on the contexts a semi-lexical head can surface in. Again, restrictions can apply in one of two ways, either needing something in the context, or requiring something to be absent. This type of semi-lexicity is found with numerals 2-10 and 100 in Polish, where the realization of the numeral is dependent on the noun projecting a particular piece of functional structure in a particular way. It is also found with some Q-nouns in English, which are incompatible with definiteness. This type of semi-lexicity differs from the previous in that it is not the functional structure of the semi-lexical noun which is problematic, but rather, the structural context (projected by other heads) which may or may not be compatible with the semi-lexical head.

In chapter 6, following Lyons (1999), I model indefiniteness as the absence

of definiteness (section 6.4.3). This implies that the introduction of a DP in the structure creates definite reference on a nominal which would otherwise be indefinite. Certain English Q-nouns can only surface in indefinite contexts, which implies an incompatibility with definiteness and therefore, the D-layer. Structurally, we expect something like the following, where the Q-noun is incompatible with a definite environment (overt DP):



The reverse of this is where a root is dependent on some piece of functional structure. Without that piece of structure, the root cannot surface. Adjusting the example above, this implies that the structure is ungrammatical if DP is omitted.



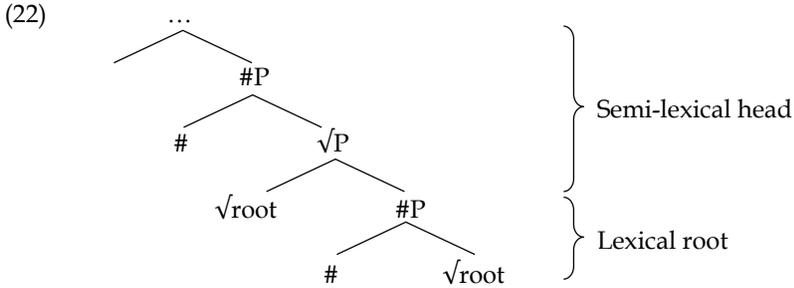
Both types of semi-lexicity constitute restrictions on the context in which the semi-lexical head is to be used. In the lexical specification, I represent the obligatory presence of a piece of structure via an embedded syntactic structure (which is similar in nature to nanosyntactic approaches to lexical specifications). With regards to where the semi-lexical head cannot appear, this can also be represented as a negative feature, or, for instance, by requiring the opposite feature (where the opposite of definite is indefinite). This is illustrated below.

- (21) **Semi-lexicity:** Restrictions on the context of the semi-lexical head
 Required feature: [$[_{XP}$ [$\sqrt{\text{root}}$]]]
 Prohibited feature (a): [$\neg[_{XP}$ [$\sqrt{\text{root}}$]]]
 Prohibited feature (b): [$\sqrt{\text{root}}$, feature]

In this dissertation, we only deal with one instance of a prohibited feature in the context of the semi-lexical head, and that prohibited feature is definiteness. In chapter 6, I represent this using a feature $INDEF$.

The final type of semi-lexicity this dissertation deals with what I have termed “minimal structures,” where the insertion of the semi-lexical head blocks the root underneath it from projecting any further structure. This type of semi-lexicity surfaces in chapter 7, with the English kind-words. Structurally, it

implies that wherever the semi-lexical head is introduced, what dominates it will be projected by the semi-lexical head and not by the N2 (the second noun in a binominal construction). We can illustrate this as follows, where I indicate which root is responsible for which structure:



We return to this type of semi-lexicality in more detail in chapter 6.

2.6 Conclusion

This chapter has developed a notion of semi-lexicality, proposing semi-lexical elements to represent a fusion of lexical and functional properties. Assuming lexical heads to be bare roots (hence their flexibility in where they surface) and functional heads to be syntactic features, a semi-lexical element is a root carrying some syntactic feature(s). In this way, it combines the notion of lexicality and functionality within a single lexical entry. Two examples immediately come to mind, those being nouns which are specified for gender, and nouns which are specified for plurality, termed *pluralia tantum* nouns. Taking gender and number to be syntactic features specified on those roots, such elements are by definition semi-lexical.

In this regard, I introduced the notion of a canonical categorial structure, pointing out that the specification of a feature on a root does not necessarily affect the syntactic structure that will be built above that root. In the case of gender, gender is obligatory in the nominal domain (and elements without gender will be assigned a default gender), and hence, the specification of gender on a root will not affect syntactic structure building. The specification of number on a root, however, will, given that number is not necessarily projected above a root (and its absence is presumed to produce a mass interpretation, cf. Borer 2005). The term canonical categorial structures refers to the set of structures that a bare root would appear in. A root specified for gender participates in the set of canonical categorial structures (since its gender does not affect what can and cannot project), whereas a root specified for number does not – structures which lack #P are unavailable to *pluralia tantum* nouns, and hence, they do not participate in the set of canonical

categorial structures. The notion is important, as it can guide us in our study of semi-lexicality, and furthermore, points out that not all cases of semi-lexicality result in something that we as linguists might perceive as being semi-lexical.

Following this, I began a discussion of the nominal domain, considering the history of projections posited within it, and the functional sequence which presumably drives structure building in the nominal domain. I adopted the notion of universal distinction domains, drawing on the work of Wiltschko (2014) and Hachem (2015). I applied these notions to English and Polish, discussing the set of projections present in each language. This resulted in a basic structure of $DP > QP > \#P > root$ for English and $DP > QP > \#P > \gamma P > root$ for Polish. Lastly, I briefly introduced the semi-lexicality we discuss in this dissertation and how it relates to the structures of the nominal domain.

Chapter 3

A Theory of Case and Agreement

This chapter develops the theoretical apparatus necessary to study semi-lexical effects in patterns of case and agreement. The coming chapters involve case-studies into the numeral system of Polish (chapters 4 and 5), quantificational nouns in English (chapter 6), and kind-words in English (chapter 7). Each of these case studies involves phenomena related to the case and/or agreement systems of the relevant language. In other words, the semi-lexical nouns we study trigger semi-lexical case and agreement effects. To interpret such effects, it is necessary to have an understanding of how the mechanisms of case and agreement work. This chapter develops that background, and can be seen as a preliminary step towards a study of semi-lexical case and agreement phenomena.

3.1 Introduction

The term “agreement” generally refers to a relation established between two elements, which involves the properties of one element co-varying with morphology on the other. A common form of agreement cross-linguistically is subject-verb agreement, exemplified in (1) below. Here, differences in the number specification of the subject (singular versus plural) have a direct impact on the form of the verb (no affix or an *-s* affix).

- (1) a. The **boy** walks to school every day.
- b. The **boys** walk to school every day.

Another common agreement relation is that between an adjective and the noun it modifies, typically termed “concord.” For example, in Polish, the form of the adjective co-varies with the case, number, and gender of the noun, as shown in (2) and (3) below for a masculine and feminine noun in the singular and plural,

declined for nominative and accusative case.

- (2) a. Duży chłopiec, duży chłopcy
 Big.M.SG.NOM boy.M.SG.NOM, big.M.PL.NOM boys.M.PL.NOM
 'Big boy, big boys' (nominative)
- b. Dużego chłopca, dużych chłopców
 Big.M.SG.ACC boy.M.SG.ACC, big.M.PL.ACC boys.M.PL.ACC
 'Big boy, big boys' (accusative)
- (3) a. Duża dziewczyna, duże dziewczyny
 Big.F.SG.NOM girl.F.SG.NOM, big.F.PL.NOM girls.F.PL.NOM
 'Big girl, big girls' (nominative)
- b. Dużą dziewczynę, duże dziewczyny
 Big.F.SG.ACC girl.F.SG.ACC, big.F.PL.ACC girls.F.PL.ACC
 'Big girl, big girls' (accusative)

Cross-linguistically, the set of agreeing elements is rather broad, including numerals, quantifiers, adverbs, adpositions, complementizers, determiners, etc. (Corbett 2006). Nouns are the most common agreed with type of element (Corbett 2006). Gender, number, person, case, and definiteness are all possible features of agreement (Corbett 2006), and person, number, and gender have been termed together "phi-features," being the most common set of agreement features.

Turning to "case," at a very basic level, case refers to the morphological marking that occurs on a nominal in different contexts. For example, pronouns in English make two morphological distinctions according to whether they are the subject or the object, surfacing as nominative and accusative, respectively:

- (4) a. He_{NOM} / *him_{ACC} walked to school every day.
 b. The girl kicked him_{ACC} / *he_{NOM} in the shin.

The set of elements expressing case and the set of cases that occur within a language can vary widely cross-linguistically. English, for example, is limited to two cases (nom, acc), which surface almost exclusively on pronouns, while Polish has seven cases (nom, acc, gen, dat, loc, inst, voc), which surface on nouns, adjectives, demonstratives, numerals, quantifiers, and pronouns (anything in the nominal domain). Additionally, the contexts in which a single case might surface can also vary between languages, making it difficult to compare, for example, the use of accusative between two languages. The English accusative, for instance, is assigned to all verbal objects; the Polish accusative, however, is assigned to only a subset of verbal objects, with genitive, dative, and instrumental also surfacing on verbal objects. Despite such cross-linguistic differences, within a single language, it is possible to identify a set of syntactic contexts which a particular case is responsible for. In short, there is a lot of variation in case systems cross-linguistically, in terms of the set of cases used in a language, the elements which express that case, and the contexts a particular case appears in, but within

languages, case assignment seems to be rule-governed. It is in this sense that case is a morphological indication of the syntactic context a nominal appears in, albeit one which requires understanding of the case system in question.

This chapter is a study of case and agreement. Its purpose is to develop the mechanics of case and agreement for use in the coming chapters. I start from the perspective of Chomsky (2000, 2001) (section 3.2). Chomsky's theory is often the starting point for work into case and agreement, and as such, it is crucial to establish a clear understanding of the mechanisms he proposes before moving on to a discussion of the literature. The discussion continues by considering the assumption that case and agreement are interdependent phenomena (section 3.3); I briefly discuss data which argue both for and against this hypothesis, concluding that the case-agreement link faces difficult empirical issues, which suggest that abandoning it could prove insightful. I then turn to an overview of the relevant literature (for this book) on agreement (section 3.4) and case (section 3.5). With regards to agreement, I discuss problematic data for Chomsky's formulation and point out existing solutions. I repeat this exercise for case, but the feature-based approach to case assignment has been severely challenged, leading many to abandon the approach (rather than adjust it); this section focuses on the alternative case assignment mechanisms. Finally, I finish with an overview of the theoretical assumptions that I adopt in this dissertation (section 3.6). In short, I take case and agreement to stem from independent mechanisms, although case is (partially) computed on the result of agreement. The form of agreement I adopt is very similar to Chomsky's (2000, 2001) approach, with additions like default agreement (Preminger 2011) and cyclic agree (Řezáč 2003, Bejar and Řezáč 2009). As for case, I discard the feature-based approach to case assignment (which is incompatible with taking case and agreement to be divorced), and adopt a mechanism of dependent case (Marantz 1991).

3.2 Chomsky (2000, 2001)

In Minimalism, Agree is considered to be one of the core syntactic mechanisms, alongside Merge and Move. Agree (with a capital "A"), as a syntactic mechanism, is responsible for patterns of agreement and case assignment. Chomsky (2000, 2001) assigns Agree a central role in syntactic theorizing, by arguing that an Agreement relation is a prerequisite for movement. As movement is a purely syntactic process and often a major point of variation between languages, this places Agreement strictly within the syntactic component and makes it one of the loci of variation. Agreement operates on features, which are more or less the currency of syntax – features drive Agreement and movement, two critical (but dependent) syntactic operations. In this section, I consider Chomsky's formulation of Agreement, paying attention to his conceptualization of case. I start with the notion of features, and move towards the Agreement mechanism.

Chomsky (2000: 95) distinguishes between two types of features. There are features which are legible or interpretable to the interfaces, for example, NUMBER on nouns, and there are features which are illegible or uninterpretable to the interfaces, and CASE is taken to be a core example of this, given that it contributes no obvious semantic content. Such features are termed interpretable and uninterpretable, respectively. The interpretability of a feature depends in part on where in the structure that feature is. NUMBER on nouns, for example, is interpretable, as it affects the interpretation of the noun (whether it denotes one entity or multiple entities), while NUMBER on verbs, as found with subject-verb agreement, is uninterpretable, as it does not (usually) contribute to the interpretation. At the interfaces, the derivation can only converge if the features contained in it are interpretable to the interfaces. Interfaces cannot manipulate uninterpretable features, and thus, a derivation is said to “crash” if such features are still present. This makes it necessary to posit some mechanism which is responsible for removing uninterpretable features from the derivation. This is where Agree comes in. Given two lexical items, X and Y, both of which contain matching but complementary features, those features being uninterpretable on X and interpretable on Y, Agree establishes a relation between X and Y, whereby the uninterpretable features of X are valued with the interpretable features of Y and then deleted before the interface is reached.¹

A further distinction is made between the type of feature, which is what syntax operates on, and the value for that feature. Chomsky (2000, 2001) assumes the *ATTRIBUTE: VALUE* form of features, where the type of feature is represented by *ATTRIBUTE* and the value for the feature by *VALUE*. For example, NUMBER is a type of feature, and *singular* is a value for that feature, forming the following:

- (5) NUMBER: *singular*

The inventory of features varies from language to language, as do the values that

¹ We most often talk about LF-induced crashes, e.g. failed subject-verb agreement, but the logic of the system predicts that we should also find PF-induced crashes. Presumably, if there can be features uninterpretable to the LF interface causing crashes (e.g. unvalued NUMBER on a verb), so can there be features uninterpretable to the PF interface which cause crashes. This suggests three things. First of all, use of the terminology interpretable and uninterpretable should be relativized to the interface in question, e.g. LF-interpretable, PF-interpretable, LF-uninterpretable, PF-uninterpretable. Thus, NUMBER on nouns is LF-interpretable, while NUMBER on verbs is LF-uninterpretable. Secondly, we expect to find PF-uninterpretable features which can crash the derivation. There are some candidates floating around, namely the EPP and case, both features which many have struggled to incorporate into the LF-centric view of features and agreement (compare Pesetsky and Torrego 2001, 2004 and Bobaljik 2008). And finally, given that Agree is purely a syntactic mechanism for uniting matching pairs of uninterpretable and interpretable features, we expect both LF-motivated and PF-motivated syntactic relations.

those features might take. For example, in English, the feature NUMBER can only be valued as *singular* or *plural*, while in Slovenian, it has a third value, namely *dual*. In Dutch, the feature GENDER takes two values, *common* or *neuter*, while in Polish, it has (at least) three values: *masculine*, *feminine*, and *neuter*. In English, the feature GENDER doesn't seem to exist at all, outside of pronouns. The feature PERSON has three values in English, namely *first*, *second*, and *third*, and other languages also show a distinction between *inclusive* and *exclusive* "we" (*inclusive* "we" = you and me; *exclusive* "we" = me and others who are not you). The features PERSON, NUMBER, and GENDER, where they exist, are generally considered to be core features, i.e. phi-features, which tend to initiate Agree relations. In this system, CASE is also a type of feature, taking *nominative*, *accusative*, *locative*, etc. as values; what is distinct about case is that in contrast to the phi-features, it is always uninterpretable. For Chomsky, it is the feature itself (PERSON, NUMBER, GENDER, CASE) which is relevant for Agree, not its value (*first*, *singular*, *masculine*, *nominative*, etc.). Values are only involved in the copying mechanism during the valuation of uninterpretable features; features, rather than their values, are the driving force behind Agree.

Let us now turn to the role these features have in Chomsky's Agreement. Chomsky is interested in pursuing the claim that the language organ, a.k.a. the faculty of language, is an optimal solution for the problem of transferring information between the systems of thought (the meaning component) and the sensorimotor systems (the components responsible for producing and perceiving the auditory or visual stimuli that make up language in the external environment). The hypothesis is that syntax is the mediator between these two systems (PF and LF), enabling us to convert meaning into a physical stream of information that can be interpreted by another party (or vice versa: converting physical information into meaning); syntax is taken to be an optimal solution to this problem. Given this hypothesis, the existence of something like uninterpretable features which must be deleted before reaching the interfaces appears to be an imperfection in the system. Why should uninterpretable features exist if they play no role beyond the syntax? Patterns of displacement, or movement, are also apparent imperfections. Such things will remain imperfections, unless we can find some principled reason as to why they might constitute a realization of optimal design – in this regard, Chomsky suggests that movement might find its motivation in processing or semantic considerations. Given these two apparent imperfections in the language system, Chomsky capitalizes on them by suggesting that they are not two, but one imperfection, with Agree being a component of the displacement property. He formalizes this as follows. Certain elements carry an EPP feature and it is this feature which triggers movement. However, an EPP feature can only trigger movement if an Agree relation is first established between an EPP-bearing head and the to-be moved element. For Agree to be activated and occur, both the EPP-bearing head and the to-be moved element must have some uninterpretable feature which makes them "active" and visible for Agreement, hence the role of

relation. Thus, the relation is symbiotic, and results in the valuation of uninterpretable features on both the noun and Tense, as well as movement of the noun to the specifier of Tense to satisfy the EPP. To account for expletive constructions, like in (8) below, Chomsky further assumes that the transfer of case in an Agree relation only occurs if the target of agreement is phi-complete (i.e. has all phi-features present).

- (8) There seems to be a man in the garden.

Chomsky assumes the expletive *there* to be deficient in features, and as such, an Agree relation between Tense and *there* does not involve case assignment; instead, it is the phi-complete *a man* which receives case from Tense through Agreement. There are two Agree relations in this example, only one of which leads to case assignment. This follows from the assumption that case assignment is only successful with a phi-complete target.

We've discussed many of the facets of agreement, but, let us review them and consider the formalization of Agree. Chomsky utilizes the terminology "probe" and "goal" to refer to the two participants in an Agreement relation. One element acts as a probe, searching for a goal to Agree with. An Agree relation results in an exchange of features between the probe and the goal, this generally being phi-features for Tense and case for the noun, as well as movement if an EPP feature is present. If Agreement fails (i.e. any uninterpretable features remain), the derivation crashes. The conditions on Agree are summarized as follows:

- (9) An Agree relation between a Probe P and a Goal G is established if:
- a. P and G both have some (possibly unvalued) matching feature(s) in common, where matching is feature identity. (Matching Condition)
 - b. P and G are both active, by virtue of carrying at least one uninterpretable (unvalued) feature. (Activity Condition)
 - c. G is contained in the c-command domain of P. (C-command condition)²
 - d. G is the closest possible goal to P, i.e. there is no other X with matching features such that P c-commands X and X c-commands G. (Intervention condition)
 - e. P and G are contained in the same phase. (Phase condition)³

² Given two elements, A and B, A c-commands B if and only if: (a) A does not dominate B and B does not dominate A and (b) every node that dominates A also dominates B (Reinhart 1976). See also section 3.4.2.1 for a discussion of c-command.

³ Phases refer to chunks of structure which are sent off to PF and LF. The content of these chunks is no longer accessible once the phase has been transferred. The phases of Chomsky (2001, 2005) include CP, *v*P, and potentially DP.

The Matching Condition and Activity Condition are both conditions on the initial state of the probe and goal – they must be active and they must carry matching features. The C-command Condition, Intervention Condition, and Phase Condition are concerned with the configuration and locality: both must occur in the same phase, in a c-command relation, and with no other possible goals intervening. If all conditions are satisfied, Agree occurs.

Let us consider an example of agreement, involving subject-verb agreement in an intransitive sentence, with an unaccusative verb.

(10) The ball rolls.

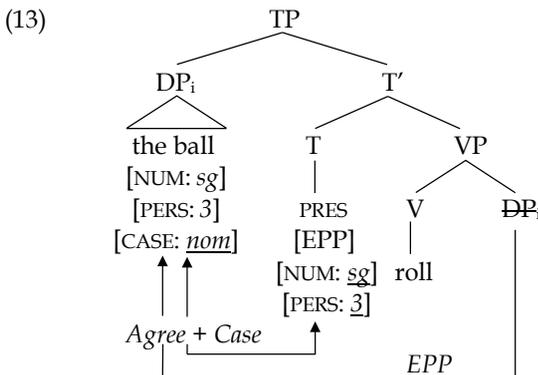
The underlying structure is as follows:

(11) [TP PRES [VP roll [DP the ball]]]

The DP *the ball* carries interpretable phi-features (*third person, singular*), as well as an uninterpretable case feature. Tense carries uninterpretable phi-features and an EPP feature. In this example, Tense is the Probe and the DP is the Goal.

(12) [DP The ball]: NUMBER: *singular*, PERSON: *third*, CASE: ___
 [T PRES]: NUMBER: ___, PERSON: ___, EPP

All conditions for Agree are satisfied in this example. Both Probe and Goal carry matching features, namely NUMBER and PERSON, and are both active by virtue of some unvalued, uninterpretable features: CASE on the Goal and NUMBER and PERSON on the Probe. Furthermore, the Goal occurs in the c-command domain of the Probe, there are no interveners between them, and they sit in the same phase. As all requirements for Agree are met, Agree can proceed. NUMBER and PERSON on the Probe are valued with the NUMBER and PERSON features of the Goal, namely *third person* and *singular*. CASE on the Goal is valued as *nominative*, and because the Probe also carries an EPP feature, the Goal moves to the specifier of the Probe.



This is the Agree of Chomsky (2000, 2001). I turn now to a discussion of the problematic aspects of this approach.

3.3 Against the case-agreement link

Chomsky's formulation makes an explicit link between case and agreement. Because case is an uninterpretable feature, it can only be valued in the way features are valued, namely through Agreement. Furthermore, because case will never satisfy the Matching Condition on its own (since there is no interpretable counterpart to case), we always expect that there will be some other features on the case target which participate in the Agree relation. Thus, case assignment always involves Agree, and presumably an Agree relation which operates on phi-features. Morphologically, this predicts that wherever case assignment takes place, we should also find agreement morphology. With regards to subjects in English, this holds true. Nominative case is accompanied by verbal agreement.

- (14) I_{NOM} **am** a dragon-fighting knight.
- (15) You_{NOM} **are** a dragon-fighting knight.
- (16) He_{NOM} **is** a dragon-fighting knight.

In the Chomskian system, this is predicted, since case assignment is an exchange of phi-features and case. Notice, however, that not all nominative case assignment results in verbal agreement morphology. For example, lexical verbs in the past tense make no person or number distinctions.

- (17) The dragon(s) **stepped** on my lance, when I **stepped** under the dragon.

Despite this, it is not a property of the past tense that no agreement takes place, given that past tense *be* does show person-number distinctions:

- (18) I **was** going to slay the dragon.
- (19) They **were** going to slay the dragon.

Instead, this is taken to be a quirk of lexical verbs: they lack the morphological means to express person-number distinctions, even when Agreement has occurred. In other words, there is Agreement (as evidenced by the nominative), but not agreement (the morphological instantiation of Agreement). The same issue holds for accusative case assignment, given that in English, there is never any morphological evidence of an Agreement relation with accusative objects.

- (20) The dragon ate me_{ACC} / you_{ACC} / him_{ACC}.

However, it is still assumed that Agreement has occurred here, since accusative case is present. This particular Agree relation (that between a case-assigning verb and the accusative object) is assumed to lack a morphological reflex in English.

This same kind of reasoning is also quite common with case. While in English we see case on pronouns, we do not see case distinctions on nominals:

- (21) The dragon chewed on me.
 (22) I chewed on the dragon.

Despite this, the usual assumption is that case is still assigned in these examples, but there is no morphological reflex of that case assignment for the lexical item in question. Thus, *dragon* as a subject or an object has the same form, regardless of whether it is marked as nominative or accusative. This distinction is captured via the notions of abstract Case (with a capital “C”) and morphological case (with a lower case “c”). Abstract Case is the case assigned to a nominal in its environment, regardless of whether we see that case or not; morphological case is the morphological reflex of that Case, i.e. the morphological form of the nominal. The implications of this kind of reasoning is that neither an overt expression of case nor an overt expression of agreement is required for the claim to hold that Agreement has occurred, assigning Case to a nominal.

Convincing evidence for the link between case and agreement can be found in Raposo (1987) on European Portuguese and George and Kornfilt (1981) on Turkish. Raposo (1987) shows that infinitives in European Portuguese can host an overt subject, but crucially, only if inflection is present.

- (23) Será difícil [(eles) aprovar-em a proposta].
 It.will.be difficult [they to.approve-3PL the proposal]
 ‘It will be difficult for them to approve the proposal.’
 (24) *Será difícil [eles aprovar a proposta].
 (25) Será difícil [PRO aprovar a proposta].
 ‘It will be difficult to approve the proposal.’
 (Raposo 1987: 86, ex. 2a-c & 1987: 93, ex. 25)

Examples (23) and (25) are the two grammatical options and consist of either an overt (or silent/pro) subject with overt inflection on the infinitive, or a silent PRO without any inflection on the infinitive. The combination of an overt subject without inflection is ungrammatical (24), suggesting that there is an obligatory relation between the two – with an overt subject comes agreement.

In the era in which these data were discussed, there was thought to be a direct relation between the overtness of a nominal and its ability to receive case. Overt nominals were subject to the Case Filter (all overt nouns need case), and thus, the distribution of overt nominals is explained by the availability of case in a particular position. Where no case could be assigned, caseless PRO would surface. Applying these hypotheses to the examples above, the subject position in

(23) must involve case assignment whereas the subject position of (25) cannot. In English, it was noticed that PRO only occurred in nonfinite contexts, where T was realized as *to*.

(26) I want [PRO to fly on the dragon].

From this, it followed that nonfinite T could not assign case, while finite T could. This meant that case assignment was dependent on finiteness. However, the European Portuguese data show that it cannot be only finiteness which is relevant to case assignment. Overt subjects can clearly surface in nonfinite environments (cf. (23)), and thus, some other factor must determine case assignment and consequently, the distribution of PRO. The difference then must result from the presence of inflection on the infinitive. Based on this evidence, Raposo concludes that it is agreement which is responsible for the distribution of overt nominals, and hence, agreement which assigns case.⁴ George and Kornfilt (1980) provide a similar argument based on Turkish, concluding that agreement morphology plays a crucial role in determining what is and is not “finite” (finiteness informing us as to what can and cannot assign case); in other words, agreement morphology licenses case assignment. Data such as this provided a very clear indication at the time that there must be a link between case assignment and agreement.

When we look from a fuller cross-linguistic perspective, however, we find data which makes maintaining the case-agreement link rather difficult. This comes from languages in which case, agreement, and grammatical function do not always line up, for example, languages where T agrees with elements which are not marked nominative. Let us consider some examples and the issues they present for the case-agreement link.

Bardi is an aboriginal Australian language of the Nyulnyulan family (Bowern 2012). The case system of Bardi is ergative-absolutive, meaning that subjects are marked differently depending on whether the verb is transitive or intransitive. Intransitive subjects are absolutive (or rather unmarked), while transitive subjects are marked ergative; objects in a transitive construction receive

⁴ Note that there is an alternative interpretation of the data which Raposo (1987) does not consider. Suppose that in each case, (23), (24), and (25), the infinitive does carry inflection which attempts to agree with the subject, regardless of whether it's overt or not. Raposo shows that third person singular agreement is realized with a null affix in European Portuguese. Thus, an alternative interpretation of the data is simply that in (23), we get third person plural morphology, in (25) third person singular morphology (the null suffix), and in (24), ungrammaticality, for the simple reason that we have failed to correctly agree with the subject. Granted, this is a much less exciting and more mundane analysis of the data, but it would suggest that the distribution of PRO in this example is not necessarily governed by the availability of agreement morphology, undermining this evidence for the case-agreement link. However, as Raposo points out, inflected infinitives with overt subjects only occur in specific constructions, and it's not clear to what extent this analysis would still hold against other data. I leave this to future research.

absolutive case. Crucially, regardless of whether the subject surfaces with ergative or absolutive case, in Bardi, agreement still targets the subject of the sentence.

- (27) **Ngayoo nga-lirrimi-n.**
I.ABS 1SG-call.out-CONT
 'I'm calling out.'
- (28) **Ngayoo-nim nga-na-m-boo-n=irr.**
I-ERG 1SG-TR-PAST-spear-REMOTEPAST=3PL(DO)
 'I was spearing them.' (Bowern 2012: 395, ex. 10.2)

Both subjects and objects are cross-referenced on a Bardi verb, but subjects are marked via an affixal prefix, and objects are marked via a clitic. The prefix references the subject, regardless of its case. This phenomenon happens in more languages than Bardi. Bobaljik (2008), for example, discusses similar phenomena in Nepali, an Indo-Aryan language spoken in Nepal.

- (29) a. **Maile** yas pasāl-mā patrikā kin-ē.⁵
1SG.ERG DEM.OBL store-LOC newspaper.NOM buy-PT.1SG
 'I bought the newspaper in this store.'
- b. **Ma** yas pasāl-mā patrikā kin-ch-u.
1SG.NOM DEM.OBL store-LOC newspaper.NOM buy-NPT-1SG
 'I buy the newspaper in this store.' (Bobaljik 2008: ex. 24)

Here too agreement is with the subject of the sentence, regardless of whether it is marked absolutive (glossed as nominative by Bobaljik) or ergative. Note that Nepali has split-ergativity, and thus, the distribution of case is sensitive to the tense/aspect of the verb, hence the lack of ergative in (29)b despite the transitivity.

A quick survey in the World Atlas of Language Structures (WALS) and their entries on the distribution of case (Comrie 2013a, b) and verbal alignment (Siewierska 2013) reveals that in a sample of 52 languages,⁶ 11 of them show the pattern mentioned above (e.g. an ergative-absolutive case system with subject-verb agreement); 37 of those languages show the familiar pattern of nominative-accusative case with subject agreement, and 4 show a pattern of ergative-absolutive case with ergative alignment (e.g. agreement with the absolutive argument, that being the subject in intransitive clauses and the object in transitive clauses). This shows that while the English pattern of agreement and case assignment is fairly prevalent in the sample (71%), the Bardi pattern of a mismatch between case and agreement is not necessarily so rare either (21%).

How problematic is the Bardi and Nepali data? Under the assumption that

⁵ Glosses: NPT = (non-)past tense; MH = masculine honorific

⁶ Restricted to the set of languages in the WALS which (a) show overt case morphology, (b) show overt agreement morphology, and (c) involve either an ergative-absolutive or nominative-accusative case system.

a single case is assigned by a single head, we immediately face the problem that absolutive case appears to be assigned to objects in transitive clauses and subjects in intransitive clauses. Thus, our Agreement probe (wherever it might be) must be capable of targeting the object of transitives and the subject of intransitives. This is something that can potentially be overcome, by, for example, placing the probe between the subject and object and adopting the assumption that Agreement can proceed both upwards and downwards (cf. Cyclic Agree, section 3.4.2.1), or by assuming that a transitive subject is somehow invisible to the probe, for example, because it is embedded in a PP of sorts.

(30) Intermediate probe with upwards and downwards Agree

a. $S_{\text{ERG}} \quad \text{Probe} \longrightarrow O_{\text{ABS}}$
 b. $S_{\text{ABS}} \longleftarrow \text{Probe}$

(31) Invisible transitive subject

a. $\text{Probe} \longrightarrow S_{\text{ERG}} \longrightarrow O_{\text{ABS}}$
 b. $\text{Probe} \longrightarrow S_{\text{ABS}}$

However, while this type of a system could arguably work for a language in which the morphological expression of Agreement also tracks the absolutive argument (which is the case in the Indo-Aryan language Hindi, for example, cf. Bobaljik 2008), it is much more problematic for a system like Bardi or Nepali, where the result of Agreement does not map to the agreement that we see. Thus, Agreement presumably targets the absolutive object of transitives and the absolutive subject of intransitives, while agreement necessarily tracks the subject, regardless of its case. If the probe is able to target the object of a transitive verb and assign it absolutive case, it is not clear why the features of the subject appear on the probe, given that we do not expect it to have any relation with the subject (the ergative presumably being assigned by a different probe). In the Chomskian system, a mismatch of this type simply cannot be modeled. Instead, it argues that the system of case assignment and the system of agreement in these languages function independently of each other.

Baker (2015) has argued that in some languages case assignment proceeds via Agreement, as in the Chomskian system, whereas in other languages, case assignment is the result of a mechanism independent from Agreement. Thus, for Baker, a language like Bardi would presumably be subject to independent case/agreement mechanisms, whereas a language like English would be subject to the feature-based approach to case assignment and A/agreement. However, as I will argue shortly, the feature-based approach faces issues even in English, and more concretely, problems akin to the Bardi/Nepali type.

There are certain constructions in English where the target of agreement is not what we predict to be the nominative argument. Binominals with quantificational nouns (Q-nouns) allow for agreement with the second noun (N2) over the first noun (N1).

- (32) A number of **people have**/***has** come up to talk to me.
 (33) Lots of **wine was**/***were** spilled in the hallway.
 (34) A shitload of **books were**/***was** dumped on my doorstep.

These are quantificational nouns in pseudopartitive constructions, a topic I address in detail in chapter 6 (see also 1.2 of chapter 1). Importantly, the target of agreement in these examples is the N2, rather than the N1; agreement with N1 is ungrammatical. The N2 is embedded under a preposition, suggesting that, if anything, its case would be accusative (*of him*, **of he*) rather than nominative. Alternatively, we might also conceive of the *of* as an indication of genitive case (either the case assigner, or a reflex of that case), in line with what N2s in other languages look like. At any rate, we do not expect the N2 to be nominative, given the distribution of nominative case in English. These examples present a problem very similar to the Bardi/Nepali one. The N1 is presumably what is assigned nominative, yet it is the non-nominative N2 which is agreed with. This is a case-agreement mismatch, and one which can only be overcome by making very specific assumptions about the nature of *of* in constructions of this type.

The case-agreement link has been a central component to Chomsky's theory of Agreement. However, on a wider cross-linguistic scale, there are case-agreement systems which are problematic for maintaining this link. Furthermore, when we look a little closer to home (English), we even find examples which argue explicitly against this link. While the case-agreement link ensconced in the feature-based approach to case has been useful for modeling the correlations between case, agreement, and grammatical function in languages like English, it cannot be the final solution to problems of case and agreement, given the existence of phenomena which argue explicitly against it. Rather, a theory in which case and agreement are not reflexes of the same syntactic mechanism could prove to be more explanatory. Dropping the case-agreement link is not without its problems, but it is only by exploring this new direction that we can truly see whether it is a viable alternative. With this aim in mind, this thesis will treat case and agreement as independent phenomena. I turn now to an overview of studies which have focused on the agreement aspect of Chomsky's Agreement.

3.4 Agreement

Chomsky's (2000, 2001) theory of Agree has remained highly influential, often forming the base hypothesis for studies involving case, agreement, or EPP movement. In this section, we explore some of the challenges faced by Chomsky's theory, as well as the alterations that have been suggested. We start with features in section 3.4.1, introducing notions such as feature sharing and relativized probing. In section 3.4.2, I continue by evaluating certain assumptions of agreement, including the search domain of a probe and the effects of

uninterpretable features on a derivation.

3.4.1 On Features

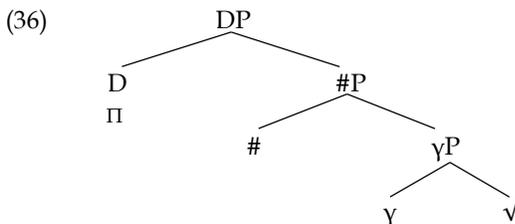
Features are the driving force behind Agreement under Chomsky's (2000, 2001) approach. Agreement relations are triggered by uninterpretable unvalued features which need to find a matching set of valued interpretable features for valuation. While there is much to be said about features, I focus specifically on two aspects of the use of features in Agreement relations. I start with the concept of feature sharing (3.4.1.1), which includes a short discussion on interpretability and valuation, and then turn to the concept of relativized probing (3.4.1.2).

3.4.1.1 On feature sharing

A problem noted by Danon (2011) is that with features spread out in the nominal domain on different functional heads, there is in principle no single phi-complete head in the nominal domain to Agree with, an assumption Chomsky draws on in analyzing expletive constructions. As mentioned in the previous chapter (section 2.4.3), the phi-feature number (#) can be represented not as a feature on the noun, but rather as a functional projection dominating the noun.

$$(35) \quad [_{\#P} \# \ [\ \checkmark \]]$$

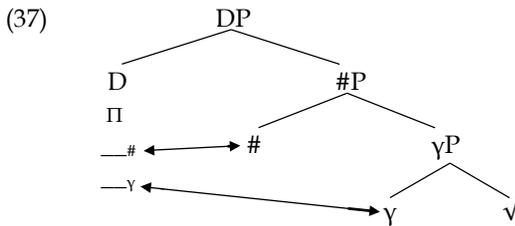
The same has been suggested for gender (γ) (Piccolo 1991), which I take to form a γP , and person (Π), which is arguably a feature of D in the DP (Danon 2011, Longobardi 2008). Under this formulation, each individual phi-feature sits on a different head; hence, there is no phi-complete goal within the nominal domain.



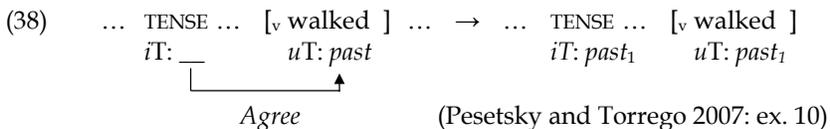
If Agreement functions on phi-complete bundles, then Agreement could never be successful, given this configuration.

As a solution, Danon (2011) suggests that we need some way for all the features of the DP to accumulate on a single element, for example, the highest projection of the DP. This would give us a phi-complete goal for external probes to Agree with. However, the solution is not as simple as placing unvalued uninterpretable features on D, which Agree into the DP. Given the mechanism of

deleting uninterpretable features which have been valued, # and γ would be deleted before Agreement with an external probe could reach them. Instead, Danon proposes an account of feature sharing in the nominal domain, building on Frampton and Gutmann (2000) and Pesetsky and Torrego (2007). Simply put, feature sharing involves a sharing of features between the probe and the goal rather than the copying of features from the goal to the probe. The features of the probe and the goal coalesce into a single feature during an Agreement relation, forming a single feature “object” which has multiple instantiations. Feature sharing has the power to create a phi-complete representation of features which would “survive” for Agreement with an external probe. This is illustrated below.



In addition to adopting feature sharing, Pesetsky and Torrego (2007) also argue against what they term the “Valuation/Interpretability Biconditional” of Chomsky (2000), which basically bundles uninterpretability with the property of being unvalued and interpretability with the property of being valued. Rather, they propose that interpretability should be split from valuation, such that it is possible for a valued feature to be uninterpretable or an unvalued feature to be interpretable. As an example, they point out that TENSE is presumably an uninterpretable but valued feature on V, while TENSE is an interpretable but unvalued feature on T; this captures the fact that TENSE morphology tends to appear on the verb itself, despite the locus of TENSE being in a higher projection. Agreement is assumed to proceed via feature sharing, the result being that the two instances of the feature are shared, or linked (as indicated by the indices).



Under this approach, it is not the uninterpretability of a feature that makes it a probe, but rather the property of being unvalued, regardless of whether that feature is actually uninterpretable or interpretable. Together, we have a system in which the interpretability of a feature is orthogonal to the question of its status as a probe (as all unvalued features are probes), and where all features in a probe-goal relation are in fact instantiations of a single feature, which has been united via Agreement. Feature sharing allows us to combine Agreement with the idea

that features are spread out in the nominal domain, and abandonment of the Valuation/Interpretability Biconditional gives the theory more flexibility.

3.4.1.2 On Probes and Relativized Probing

In the traditional approach, features on the probe form an unstructured feature matrix, which probes all together, assigning case once a phi-complete goal is found. However, a problem with this, explored in detail by Bejar (2003), is that there exist empirical phenomena which suggest that agreement can be selective in choosing an agreement target. This reflects on the make-up of probes.

Bejar (2003) is concerned with accounting for the phenomenon of context-sensitive agreement, i.e. the situation in which the values of a particular feature have consequences for whether that element is a target of agreement or not. She gives the following description as an example of this phenomenon in Georgian, a Kartvelian language spoken in Georgia.

- (39) “A verb cross-references the person feature of its object, unless the object is 3rd person, in which case the person feature of the subject is cross-referenced. Number is preferentially that of the subject, unless the subject is singular, in which case the number of the object is cross-referenced, unless the object is 3rd person.” (Bejar 2003: 4)

In Georgian, the choice of agreement target depends not only on the types of features present, but also the values for those features: for instance, only if the object is 3rd person, does agreement occur with the subject. Contrary to Chomsky (2000, 2001), for whom the values of features are inconsequential, the Georgian system clearly shows that agreement can and does care specifically about the values of features. Furthermore, context sensitive agreement also shows that number and person agreement do not need to target the same element. For example, in Georgian, it is possible for the slot preceding the verb to mark the PERSON of the object while the slot following the verb marks the NUMBER of the subject.

- (40) M-xedav-t
1-see-PL
‘You(PL) see me.’ (Bejar 2003: 123, ex. 52)

This suggests that the “probe together” concept does not hold universally either, and it is possible for some languages to probe separately for NUMBER and PERSON.

Context sensitive agreement also presents an interesting locality problem. In Nishnaabemwin, an Algonquian language, the same morphemic slot can cross-reference either the subject or the object, depending on the arrangement of feature values between the two. For example, in (41), the initial agreement slot marks the second person argument, that being the subject in (41)a and the object in (41)b.

features on probes, in order to understand how the intervention and anti-intervention effects of context sensitive agreement arise. While I will not model this here (see Bejar (2003) for her approach to context sensitive agreement), it is important to point out that these data imply that an assumption of unstructured feature bundles on the probe is too naïve. Empirically, probes can be relativized for certain feature values, and can even probe separately for those feature values. These data also show that the formulation of the Matching Condition in (9)a, which states that the probe and goal must match in some feature(s), cannot be entirely correct. The Matching Condition predicts the scenario in (42) to be impossible, which is clearly false, as shown by Nishnaabemwin. Context sensitive agreement functions on feature values, as opposed to features; it motivates a reformulation of the Matching Condition to allow for relativization.

Before concluding this section, I would like to make one final point with regards to context sensitive agreement. Context sensitive agreement highlights the purely configurational nature of agreement: agreement does not care whether something is a subject or an object – it will simply agree with the first thing it finds that matches to its probal specifications, regardless of grammatical function. Agreement, then, is a blind mechanism, aware only of the structural configuration and the features needed to satisfy its probe. In this sense, it is also a very powerful diagnostic. If we understand the restrictions on the probe, i.e. the set of features that the probe is sensitive to, then agreement can inform us both of the structural configuration between elements and the distribution of features on potential goals. It is this second point which will become very important in the chapters to come, i.e. using agreement as a diagnostic for the presence of phi-features.

3.4.1.3 Summary

Two points were addressed in this section, namely the notion of feature sharing and the notion of relativized probing. With the hypothesis that features are functional projections within the nominal domain comes the problem that features are spread throughout the nominal domain, there being no single phi-complete element for Agreement to target. Feature sharing solves this by assuming that Agreement creates shared instances of features; in a sense, the derivational history of Agreement is stored in the features themselves, which have become linked via Agreement. The notion of the Interpretability/Valuation Biconditional, which couples interpretability with the property of being valued, was also addressed; Pesetsky and Torrego (2007), in particular, argue that this assumption should be dropped.

Relativized probing was the second topic addressed in this section. A common assumption is that probes are sensitive to features, and not their values; however, the phenomenon of context sensitive agreement shows that this cannot be entirely correct. Rather, probes can be relativized for certain feature values, or

sets of feature values. The existence of context sensitive agreement serves to highlight the purely configurational nature of agreement, which appears to be sensitive to features and hierarchical relations, rather than grammatical function.

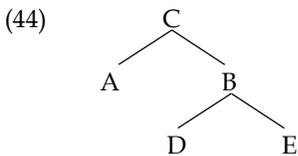
3.4.2 *The Mechanics of Agreement*

In the Chomskian theory, a probe can only search in its c-command domain, basically “downwards” agreement. This assumption has been challenged with some arguing that upwards agreement is the norm, and others that both upwards and downwards agreement occur. We begin in section 3.4.2.1 with a consideration of these different alternatives. A second assumption of the standard agreement relation is that unvalued features cause a derivation to crash, given that the interfaces are incapable of manipulating unvalued features. This assumption has been thoroughly rejected in the work of Preminger (2011), who argues that agreement is obligatory, but its success is not. In section 3.4.2.2, we examine some of the literature on the notion of “default agreement,” one of the main arguments against the crash approach to syntax.

3.4.2.1 The Search Domain

Chomsky (2000, 2001) adopts a c-command approach to agreement (the C-Command Condition, cf. (9)c): a probe P searches for a goal G in its c-command domain. C-command is defined as in (43), depicted in (44).

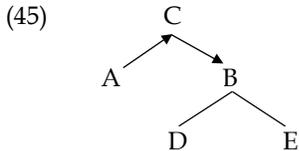
- (43) A c-commands B if and only if:
- A does not dominate B and B does not dominate A⁸
 - Every node that dominates A also dominates B



In the diagram in (44), A c-commands B, D, and E, given that A does not dominate B, D, or E, and all nodes which dominate A (that being C) also dominate B, D, and E. Likewise, node B c-commands node A: B does not dominate A, and C dominates both A and B. Similarly, D and E c-command each other (neither dominates the other, and both are dominated by B and C). Putting aside the

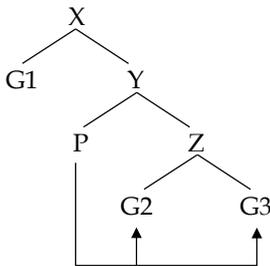
⁸ Dominance is defined as follows: A node X dominates a node Y if X occurs higher in the tree than Y, such that a line can be traced downwards from node X to node Y. In the diagram in (44), C dominates A, B, D, and E, and B dominates D and E; A, D, and E dominate nothing.

technical definition, another way to visualize c-command is to go up one branch and down the other side (to the sister) – all nodes there and below constitute the c-command domain.



Given a probe P, it can only agree with goals in its c-command domain. Thus, given potential goals G1, G2, and G3, as depicted in (46), P can agree with G2 or G3, but not with G1.

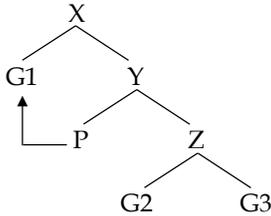
(46) Canonical Agree (Chomsky 2000, 2001)



There are two main alternatives to this which have been proposed in the literature. One approach is to suggest that agreement actually works in the reverse, i.e. probes must be c-commanded by their goals. In this system, probes appear to agree upwards. Bjorkman (2011), Zeijlstra (2012), and Wurmbbrand (2012a, 2012b) term this “reverse agree.”⁹ Thus, given P and the same distribution of potential goals G1, G2, and G3, as depicted in (47), P can only agree with G1, not G2 or G3 (only G1 c-commands P).

⁹ The configuration of reverse agree is very similar to what was found in older stages of the theory termed Spec-Head Agreement, i.e. agreement between a head and its specifier (Kayne 1989, Chung 1998, Koopman 2006). Spec-head agreement, however, would only constitute a subset of the reverse agree configurations, given that reverse agree is not necessarily limited to upward agreement between a head and its specifier.

- (47) Reverse agree (Bjorkman 2011, Wurmbrand 2012a,b; Zeijlstra 2012)



Reverse agree has been proposed to account for a number of dependency relations which have an agreement-like flavor, including negative concord, anaphor binding, and sequences of tense. Bjorkman and Zeijlstra (2014), for example, argue that if we conceptualize negative concord relations as an instantiation of agreement, reverse agree becomes a necessary component of the theory. They cite examples similar to the Polish ones below, where the presence of the negative marker *nie* before the verb obligatorily requires negative marking on c-commanded elements.

- (48) Nie widziałam nikogo.
 Not see.1SG.F nobody
 'I didn't see anybody.'
- (49) Nikt nie widział nikogo.
 Nobody not see.3SG.M nobody
 'Nobody saw anybody.'

They take the fact that, as in (49), multiple indefinites can be marked negatively in a single clause without triggering additional negation semantics to imply that it is the indefinites which carry uninterpretable NEGATION features; this in turn implies that the verbal negation carries the interpretable NEGATION counterpart, which is responsible for valuing the indefinites as negative. In the example below, which is an Anglicization of the Polish example in (48), the indefinite *nobody* functions as the probe and the negation *not* as the goal.

- (50) Not see nobody
 [NEG: *neg*] [NEG: ___]
 ↑

They further cite scopal relations in support of the analysis that the indefinites scope under negation. Together, this forces a system in which the probe is necessarily c-commanded by the goal, i.e. agreement is upwards.

An agreement-based approach to these phenomena has remained controversial, and its extension in particular to patterns of phi-agreement (PERSON, GENDER, NUMBER) hotly contested. Zeijlstra (2012, 2015) and Bjorkman and

Zeijlstra (2014), for example, argue that all patterns of agreement, including phi-agreement, can be explained using the upwards agree mechanism detailed in their work. Others, however, argue that there are certain phenomena, all phi-related, which an upward agree account is incapable of modeling. Preminger (2013, 2015), for example, discusses patterns of long distance agreement in Tsez and Basque, where the goal appears to be in the clause embedded under the probe, and thus, not c-commanding it. Diercks, Putnam, and van Koppen (2011) discuss patterns of complementizer agreement, where the probe on C agrees with the subject of the clause, a DP which it c-commands rather than is c-commanded by. Similar arguments are also found in van Koppen (2011), who, in addition, discusses problematic cases of expletive agreement, among other things.

The problem of these constructions for a reverse agree account is the configuration: the probe necessarily occurs in a hierarchically higher position than the goal, and working around this requires a number of stipulations which would be entirely unnecessary under a downward agreement approach. For these researchers, the application of reverse agree to the domain of phi-agreement is too costly (although see the discussion in Bjorkman and Zeijlstra (2014) which argues the opposite). Preminger (2015), who accepts the plausibility of reverse agree in other domains, argues explicitly that the canonical downward agree is empirically necessary for patterns of phi-agreement. Smith (2015a,b) chooses to adopt both reverse agree and a more canonical system of agree into his machinery to explain patterns of verbal and anaphor agreement with British group nouns;¹⁰ in his system, the two exist side-by-side (although in different modules: reverse agree in the syntax, and the more canonical agree in the morphology), thus acknowledging the possibility that, contra Bjorkman and Zeijlstra (2014), reverse agree may exist, but is not the only way to agree.

Given the empirical focus of this thesis on patterns of phi-agreement (as opposed to sequences of tense, or negative concord), I accept the argument that adopting only reverse agree for phi-agreement leads to an unnecessarily more complicated system, at least for the data here. For this reason, I do not adopt the approach of Zeijlstra and others that reverse agree is the only way to agree.

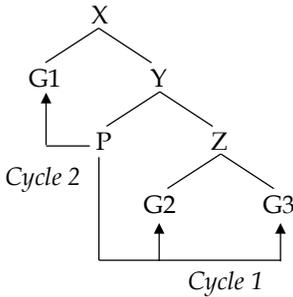
¹⁰ Smith (2015b) bases his conclusions on patterns of anaphor and verbal agreement with British group nouns. Taking sentences with both a verb and anaphor, he reports that they can agree both as singular or as plural (i, ii), or they can show a mismatch. Crucially, only one type of mismatch is permitted, namely, a plural anaphor with a singular verb (iii), but not a singular anaphor with a plural verb (iv).

- i. The government **has** offered **itself** up for criticism (with this economic policy).
- ii. The government **have** offered themselves / each other up for criticism.
- iii. The government **has** offered ?themselves / each other up for criticism.
- iv. *The government **have** offered **itself** up for criticism.

Smith takes this as evidence that agreement can occur both in the morphology and in the syntax. The example in (iii) has morphological verbal agreement and syntactic anaphor agreement. The semantic plural feature of the group noun is only available in the syntax, hence the inability of the reverse pattern (iv) to occur.

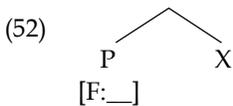
The second major alternative to Chomsky's (2000, 2001) c-command approach is the cyclic agree approach of Řezáč (2003) and Bejar and Řezáč (2009). Cyclic agree is basically a combination of the downward agree and reverse agree approaches: a probe first agrees downwards, and if no goal is found, then it agrees upwards. Thus, given a probe P and the below distribution of goals G1, G2, and G3, as depicted in (51), P can agree with G1, G2, or G3.

(51) Cyclic Agree (Řezáč 2003; Bejar and Řezáč 2009)



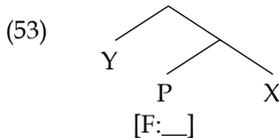
Theoretically, Řezáč (2003) motivates the existence of cyclic agree through the Earliness Principle of Pesetsky and Torrego (2001), developed from the Earliness Principle of Pesetsky (1989). It states that “an uninterpretable feature must be marked for deletion as early in the derivation as possible” (Pesetsky and Torrego 2001: 400). This principle serves to trigger probing as soon as a probe enters the structure, and if we assume it, cyclic agree follows as a logical consequence, without any need for the C-command Condition.

Assuming the operation Merge, which builds a structure bottom-up by combining maximally two objects together at a time, there will be a point in the derivation when all that exists is the probe and the object which it is combined with. By definition, that object will belong to the probe's c-command domain. This is depicted below, for a probe P made active by some feature F and an object X.



Note that we have derived the C-command Condition (see also Epstein 1999 for the original formulation of c-command in derivational terms). If a probe initiates probing immediately upon Merge, then it will always probe downwards, given that this is all that is available in the structure. If there is also an accessible goal within the c-command domain, then the probing will stop, given that the probe has found a goal with which to value its features by. This also gives us the conception that phi-agreement probing is downwards, especially if this is the most common configuration of probe and goal. Řezáč further argues that there is

in principle no reason why probing should stop if it cannot locate an accessible goal in its c-command domain; more specifically, it is stipulatory to restrict the search space to the c-command domain, especially given that the probe is still active. Instead, Řezáč proposes that as more material is added in the structure (for example, a specifier above the probe), the search space of a probe expands accordingly.



He takes the search space of a probe to be a dynamic thing, dependent on the amount of structure present at each step. His approach predicts that there can be probing of specifiers, as well as higher material, assuming no higher barrier, e.g. the phase level, is reached (which we might expect to make the probe inert). This gives us the notion of cyclic agree: in the first cycle, Agree probes downwards, in its c-command domain; in each successive cycle, as more material is added, it probes successively higher.

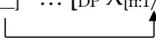
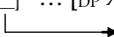
Having understood the implementation and motivation behind cyclic agree, let us consider some empirical evidence in favor of it. Like Bejar (2003), Řezáč (2003) and Bejar and Řezáč (2009) are primarily concerned with languages which exhibit context sensitive agreement, such as Georgian and Basque. Recall that context sensitive agreement languages probe for particular feature values (e.g. 1st, 2nd, 3rd), as opposed to features (e.g. PERSON, NUMBER). Further recall that probes could be relativized, such that certain feature values were visible to the probe, whereas other feature values were not. Under such circumstances, it is not so difficult to identify cyclic agree effects. In Basque, for example, the first slot on the auxiliary probes for a 1st or 2nd person argument – 3rd person arguments are invisible to this probe. The result of this is that if the object is 1st or 2nd person, the probe agrees with the object, as in (54)a, b, c; however, if the object is 3rd person, this being invisible to the probe, agreement is with the subject, as in (54)d.

- (54) Basque
- a. Ikusi z-in-t-u-da-n
seen 2-X-PL-have-1-PAST
'I saw you.'
 - b. Ikusi n-ind-u-en
seen 1-X-have-PAST
'He saw me.'
 - c. Ikusi n-ind-u-zu-n
seen 1-X-have-2-PAST
'You saw me.'

- d. Ikusi n-u-en
 seen 1-have-PAST
 'I saw him.' (Bejar and Řezáč 2009: 37, ex. 2)

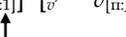
Assuming the probe sits on *v* (or somewhere near it), between the subject and the object,¹¹ we have a clear example of cyclic agree. In the first cycle, the probe searches its c-command domain finding (or not) the object – 1st and 2nd person objects are visible to it, and are capable of valuing and thereby deactivating the probe. 3rd person arguments are not. If the object is 3rd person, the probe will remain active.

(55) First Cycle Effects

- a. *First/Second person object*: [_{vP} *v*_[ir:] ... [DP *X*_[ir:1/2]]]

- b. *Third person object*: [_{vP} *v*_[ir:] ... [DP *X*_[ir:3]]]


As more material is added, its search domain expands, thus, making it possible for the probe to see the subject. Given that the subject in (54)d has a 1st person feature, it is visible to the probe. The probe agrees with the subject, and then deactivates.

(56) Second Cycle Effects

- First person subject*: [_{vP} [DP *Y*_[ir:1]] [_{v'} *v*_[ir:] ... [DP *X*_[ir:3]]]]


Carstens (2015), who has a similar approach, termed “delayed valuation,” notes that this delayed valuation and cyclic agree also has the potential to capture reverse agree effects. Reverse agree is simply the not so extraordinary situation in (56) above, where agreement occurs on the second cycle, due to lacking a viable goal in the first cycle. Reverse agree is the result of there not being a goal in the c-command domain. Cyclic agree and delayed valuation predict this to be possible.

In this section, we have discussed three approaches to the directionality, or search space, of a probe: downward agreement, upward or reverse agreement, and cyclic agreement. Downward agreement restricts probes to agreeing with goals in their c-command domains. Reverse agree, on the other hand, requires the reverse – goals must c-command their probes. Finally, there is cyclic agree, which is a combination of these two approaches, built off the assumption that probes agree as soon as possible.

Given that there are reasons to believe that both upward and downward

¹¹ The most logical assumption to make here. If it were above both subject and object, say on T, we could not explain why agreement targets the object in (54)a and (54)c, instead of the subject, given that both carry 1st or 2nd person features.

agreement occur in natural language, albeit, generally among different domains (e.g. negative concord always seems to require upward agreement, cf. Bjorkman and Zeijlstra 2014: 11), the adoption of the mechanism of cyclic agree may offer a solution for those who argue that the difference in directionality between phi-agreement and negative concord-like phenomena warrants treating these as separate processes (e.g. Preminger 2015). Cyclic agree allows for a unification of these phenomena, a result desired by Bjorkman and Zeijlstra (2014). What it leaves unexplained, however, is the correlation between the type of phenomenon and the distribution between goals and probes – phi-agree allows goals which are both higher and lower than the probe, while negative concord seems only to allow goals which are higher than the probe. The reasons for this remain unclear, but reverse agree offers no more of an explanation for this than cyclic agree.

3.4.2.2 Crashing Derivations and Default Agreement

According to Chomsky (2000, 2001), uninterpretable features have the property of crashing derivations if they are not deleted before reaching the interfaces. This means that all uninterpretable features must obligatorily enter into an agreement relation if the derivation is to survive. Preminger (2011) terms this type of approach the “time-bomb” approach, as uninterpretable features can be viewed as a time-bomb which will go off if not defused through agreement.

However, there exists a set of phenomena which call into question this assumption, namely, systems of assigning defaults, e.g. default case or default agreement. Schütze (1997, 2001b), for instance, provides examples of default case in English. Some examples of default accusative case are: left dislocated or appositive pronouns (57), pronouns in elliptical constructions lacking an overt verb (with (58) as the trigger question, compare (59)-(60) with (61)), and coordinations of pronouns (62).

- (57) a. Me/*I, I like beans.
 b. The best athlete, her/*she, should win. (Schütze 2001b: 210, ex. 4)
- (58) Q: Who wants to try this game?
- (59) A: a. (Just) me/*I.
 b. Me/*I too.
 c. And me/*I!
 d. Me/*I next!
- (60) A: a. Not us/*we
 b. Me/*I neither.
- (61) A: I/*Me do (too). (Schütze 2001b: 211: ex. 6-9)

- (62) a. Us and them / *We and they are gonna rumble tonight.
 b. Her and us / *She and we have been friends for ages.
 c. Did your parents or him/*he pick up Mary?
 (Schütze 2001b: 214, ex. 14)

In each of these examples, the nominative form of the pronoun is ungrammatical. Schütze argues that in these contexts (and a number of other contexts he discusses), there is no possible source of case for the pronouns. Instead, the accusative we see is actually a default case form, assigned in the morphology.

These facts are problematic for an approach in which case is an uninterpretable feature on nominals, where uninterpretable features lead to crashes. The time-bomb approach predicts that without a case-assigner, the uninterpretable case feature of the pronoun will remain unvalued, triggering a crash. To rectify this approach, we would have to assume that the default value on the pronoun is acquired during the syntax, before the structure reaches LF. Yet, by doing this, we undermine the role of uninterpretable features - if there is a syntactic default case assigning mechanism, it predicts that unvalued, uninterpretable case should never crash the derivation. The time-bomb approach would never apply to case, leading us to question why this assumption is necessary in the first place.

Default agreement presents another set of difficult facts. There are a number of constructions in which the phi-features of the verb do not appear to be valued by anything. For example, in English, CPs with an overt *that*-phrase can be used as subjects, as can infinitival *to*-phrases.

- (63) a. That she found happiness makes me happy.
 b. That he took the money really bothers me.
 (64) a. To err is human.
 b. To govern is to choose.

In each of these sentences, verbal agreement is 3rd person singular. Neither the CP nor the infinitival presumably carries PERSON or NUMBER features,¹² making the existence of such sentences difficult to explain – without a DP goal for the verb, its uninterpretable phi-features should remain unvalued, crashing the derivation. The prediction is that these sentences are ungrammatical, contrary to fact.

Dutch impersonal passives present another example of default agreement. Impersonal passives are clauses which lack a subject and take a passive form of the auxiliary, with a participial form of the lexical verb. In these constructions, an

¹² Although, in the case of (63), Koster (1978) argues that these ‘sentential subjects’ do not actually sit in subject position, but are rather left dislocated topics, with an empty pronoun in the subject position. This accounts for the fact that they are not permitted as subjects in embedded questions, e.g. **I wonder whether that she found happiness is a good thing* or yes-no questions.

expletive is generally obligatory. Verbal agreement is 3rd singular.

- (65) Er wordt gedanst.
 EXPL is.3SG danced
 'There is dancing.'

While we might be inclined to assume that the expletive is the source of the 3rd person singular agreement features on the auxiliary, the example in (66) below suggests that this cannot be true. If we turn a transitive verb into an impersonal passive, suppressing the subject, but keeping the object, agreement no longer seems to target the expletive, but instead targets the object *jongen(s)*. Importantly, the auxiliary varies its NUMBER feature based on the NUMBER on *jongen(s)*.

- (66) a. Er worden / *wordt jongens geslagen.
 EXPL are.3PL / is.3SG boys hit
 'There is hitting of boys.'
 b. Er *worden / wordt een jongen geslagen.
 EXPL are.3PL / is.3SG a boy hit
 'There is hitting of a boy.'

Given what we've seen before with context sensitive agreement, these facts would rather suggest that the expletive is invisible to agreement in (66), since it does not behave as an intervener, despite being in a more local relation with the verb.¹³ If the expletive is invisible in (66), then we have no choice but to assume that it is also invisible in (65). The implication then is that there is nothing controlling the verbal agreement in (65), predicting the sentence to be ungrammatical. But the sentence is grammatical, and the most logical conclusion is one in which the features on the auxiliary in (65) are actually default agreement features. Preminger (2011) makes a similar type of argument for the existence of default agreement in agent-focus constructions in the Mayan language Kichean.

More examples can be found in Polish (see also Dziwirek 1990). With weather verbs like *padać* 'to rain' or *wiać* 'to be windy,' there is no apparent subject nor expletive which could be used to value the features of the verb. The familiar 3rd person singular surfaces on the verb, also marked neuter in the past tense.

¹³ Whether the expletive is in the configuration to be an intervener or not depends on whether we analyze expletives as being inserted in Spec,vP or Spec,TP; in other words, are expletives a part of the numeration or are they inserted as a last resort? If we assume that expletives start their life in Spec,vP, the issue holds that they should be the goal encountered first in (66). If expletives are only inserted in Spec,TP as a last resort, then the argument in relation to (66) does not apply; however, we can still ask with regards to (65) whether the expletive would be inserted soon enough in the derivation for T to Agree with it? If not, then we have same issue, namely, there is no source for the features on the verb in (65).

- (67) a. *Padalo.*
 Rained.3SG.N
 'It rained.'
 b. *Wiało.*
 Was.windy.3SG.N
 'It was windy.'

Again, these predicted-to-be-bad sentences are perfectly acceptable and natural.

The prediction of the time-bomb approach is that the examples discussed above should be ungrammatical, given that they lack a phi-complete DP with which to value the features of the probe on. However, they are fully grammatical, a testament to the availability of default agreement in language. Preminger (2011), who is focused specifically on showing that grammars are actually crash-proof (i.e. uninterpretable features are not time-bombs triggering crashes), comes to the generalization that agreement is obligatory, but its success is not. Thus, if there is a probe in the structure, it must try to agree (recall the Earliness Principle), but if it has not valued its uninterpretable features by the time the interfaces are reached, there are no consequences. I adopt the same approach in this thesis – agreement is obligatory, but a failure to agree will not crash the derivation. There exists a default feature assignment mechanism, likely in the morphology, for valuing unvalued features.¹⁴

3.4.2.3 Summary

We've discussed two aspects of the agreement mechanism: the search domain of a probe and whether uninterpretable features trigger derivation crashes. The standard approach to search domains assumes that a probe must find its goal in its c-command domain. However, there has been some disagreement, with some researchers arguing that in fact, agreement works upwards, where the goal must c-command the probe, and others arguing that both upwards and downwards agreement are possible. We considered the motivation for these two alternatives, with the conclusion that both upwards and downwards agreement are an empirical necessity. We also considered patterns of default case and default agreement. The mere existence of such phenomena argues that not all uninterpretable features crash a derivation; such facts severely weaken the claim. Preminger (2011) offers an alternative view, which captures both that which uninterpretable features were claimed to capture, and the system of defaults – he argues that Agree is obligatory, but its success is not. This assumption takes us a long way in understanding the data.

¹⁴ Schütze (2001b) mentions two possibilities, aimed at explaining default case, but also perfectly applicable to default agreement: (a) the default form is morphologically the elsewhere form, inserted for those vocabulary items with unspecified features, or (b) the default form is the result of filling in a set of default features.

3.5 Case

At the start of the chapter, I introduced case as being the morphological marking which occurs on a nominal in a particular syntactic context. In section 3.3, I further introduced the concepts of morphological case and abstract Case, morphological case corresponding to the morphological marking we find on a nominal, and abstract Case the case we expect a nominal to have given its syntactic environment. This distinction has played an important role in analyses of the Germanic language Icelandic, a point we will come back to in section 3.5.2.1.

A second important distinction concerns the difference between structural and inherent case. In Chomsky's (2000, 2001) formulation of case and agreement, case was taken to be the result of an Agree relation, where Agreement resulted in an exchange of phi-features and case between the probe and goal. In this system, Agree is responsible for two cases: nominative case (subjects) and accusative case (objects). Together, these have been termed "structural case" (Chomsky 1986), given that such cases are assigned in a well-defined structural configuration. Inherent case, on the other hand, is not assigned via Agree, and instead refers (more or less) to lexically specified cases (see Blake 2004). The topic of inherent case deserves special attention and we return to the distinction in section 3.5.3.

This section is dedicated to a discussion of case assignment, and the possible mechanisms of case assignment that have been proposed. I begin with a historical overview of the treatment of case in mainstream generative literature (section 3.5.1). The Chomskian view of case is one which I reject, and in section 3.5.2, I discuss alternative views on case assignment. These approaches take different stances with regards to the distinction between structural and inherent case, and section 3.5.3 focuses on approaches to inherent case assignment.

3.5.1 *Case as an uninterpretable feature*

Case has played a prominent role in linguistic theory. In the early 1980s, case was considered to be the motivation for nominal movement, not yet having been connected to agreement (see Vergnaud 2006[1977], Chomsky 1981; Rouveret and Vergnaud 1980). For example, the Specifier of TP was considered to be a caseless position whenever T was non-finite (i.e. when it contained *to*). Consider the following pair of examples.

- (68) It seems that **Marta** is making a gingerbread house today.
 (69) **Marta** seems to be making a gingerbread house today.

Both sentences seem to mean the same thing, but they differ in where the subject of the embedded clause (bolded) has surfaced. In example (68), the subject of the embedded clause (*Marta*) sits in the embedded clause, the matrix subject being

filled by expletive *it*; in example (69), the subject position of the matrix clause has been filled by the subject of the embedded clause, suggesting that it has moved to this position. This difference was explained in terms of case assignment. In example (69), the subject position of the embedded clause (Spec,TP) is a caseless position, given that it is headed by nonfinite *to*. Assuming the Case Filter, which states that all nominals need case, the example would be ungrammatical unless the nominal were to move to a case position. The verb *seem* only selects for a proposition, leaving its subject position (Spec,TP) empty; as such, if the nominal were to raise to this position, it could receive nominative case from finite T, thereby satisfying the Case Filter. According to this analysis, it is the need to get case which drives movement of *Marta* from Spec,TP of the embedded clause to Spec,TP of the matrix clause. *Marta* originates in a caseless position, and the sentence can only survive if the nominal *Marta* moves to a position in which it can get case. In example (68), on the other hand, *Marta* can receive case in Spec,TP of the embedded clause (since T is finite) and hence, there is no need to move *Marta* to another clause. Under this analysis, case is the driving force between examples like (68) and (69). Case was further utilized to model the distribution of PRO, expletives, and nominals in passives and unaccusatives. Case functioned as a licensing mechanism for nouns, determining the distribution of nominals – nouns could only surface in positions where case could be assigned.

With work like Raposo (1987) and George and Kornfilt (1980) (see section 3.3), which argued for the role of agreement in determining the distribution of nominals, the position of case as a licensing mechanism for nouns began to shift. If case, agreement, and structural position correlate, it is no longer clear that the position of a nominal is due to case and not due to agreement. Under Minimalism (and the case-agreement theory we have been examining in this chapter), case and agreement are bundled together, both sharing the responsibility of determining the distribution of nominals. However, as compared to the previous era, the status of case is weaker. In this system, case is an uninterpretable feature, and it functions to make a noun active so that it might participate in an Agreement relation (by the Activity Condition which states that both probe and goal must be “active” via some uninterpretable feature). Rather than case determining the position of a nominal, it is Agree which determines the position of a nominal, and in particular, Agree-relations with EPP-bearing probes (given that Movement is only triggered if the probe in the Agree relation carries an EPP feature). In this system, case acts only as a signal that the nominal can (or cannot) participate in Agree. Notice that the Activity Condition is, in effect, a reformulation of the Case Filter: DPs are assumed to be active by virtue of some uninterpretable case feature, and thus, all DPs must be assigned case during the course of the derivation to avoid a crash. This insight of the 80s has remained in the current theory, albeit in a different form.

Recent work has argued that with the use of a movement-triggering EPP feature, the role previously ascribed to case is no longer necessary (McFadden

2004, Nevins 2004). Case-centered approaches to passives, for instance, claimed that object-to-subject promotion (as in *the apple was eaten* __) occurred because the object could not get case in its base position, and instead, needed to move to subject position for case. However, under the proposal that T carries an EPP feature, it is not necessarily case which drives movement to Spec,TP, but rather the EPP¹⁵. Returning to our raising example from before, the same conclusion holds. If matrix T carries an EPP feature, then the DP *Marta* is the first nominal it will encounter (see below). Both passives and raising can be modeled without recourse to a case feature.

(70) [TP **Marta** [T' T_{EPP} seems __ to be making a gingerbread house today.

Where Movement is concerned, the use of an EPP feature makes case redundant. Nevins (2004), for example, even argues that the Activity Condition, and by extension, the role of case in Movement, should be dispensed with entirely, offering alternative explanation for the effects attributed to it. Both McFadden (2004) and Nevins (2004) are in agreement that case as an uninterpretable feature no longer plays a very important role in determining the distribution of a nominal.

In this final paragraph, we shift gears a little bit, considering issues associated with treating case as a feature on a par with phi-features. The current version of the theory makes no distinction between case and phi-features as uninterpretable features, but there are clear reasons to differentiate these. Let us compare case, the uninterpretable feature of the nominal domain, to phi-features, the uninterpretable features of the verbal domain. The first thing to notice is that while phi-features like person, number, and gender have a clear correlate in both the nominal and verbal domains, case does not. In Polish, for example, person, number, and gender are properties of DPs and are also overtly expressed on Agreeing verbs:

- (71) Dziewczyna widziała psa.
 Girl.3.F.SG.NOM saw.3.F.SG dog.3.M.SG.ACC
 'The girl saw the dog.'
- (72) Chłopiec też widział psa.
 Boy.3.M.SG.NOM also saw.3.M.SG dog.3.M.SG.ACC
 'The boy also saw the dog.'

Cases like nominative and accusative, however, have no clear correlate in the

¹⁵ The standard argument against this is examples like the following (thank you to David Pesetsky for reminding me of such examples):

i. *It was believed Marta to be making a gingerbread house today.

The EPP is satisfied by expletive *it*, and the ungrammaticality is taken to stem from the caselessness of *Marta*. However, both Marantz (1991) and McFadden (2004) offer different solutions, which identify the expletive as the offending element and not *Marta*, thereby making this an EPP problem. See McFadden (2004) for further discussion.

verbal domain; there is no “nominative” or “accusative” marker on tense or verbs. Similarly, case lacks a semantic contribution, unlike phi-features. Thus, case lacks both a morphological and semantic correlate.¹⁶ As a second point, notice that case receives a different treatment from phi-features in Agreement. Phi-features are “exchanged” between a probe and goal, while case is something that is “assigned” by the probe to the goal, the value for case being determined by the category of the probe (e.g. nominative is associated with T and accusative with *v*). Case as an uninterpretable feature is a very different kind of feature, particularly in how it interacts with the syntax.

3.5.2 *Alternative approaches to case assignment*

Case as an uninterpretable feature represents one hypothesis on the nature of case. However, as discussed in the previous section, this hypothesis is not without its issues, and if we take the EPP to be the trigger for Movement (in combination with Agreement), it’s not so clear that case as an uninterpretable feature is even necessary anymore. Furthermore, as discussed in section 3.3, there are reasons to doubt the case-agreement link, and if these are to be divorced, there is no place for case as an uninterpretable feature. In this section, we turn to alternative case assignment mechanisms. These alternatives do not take case to be a feature, and instead, under the dependent case system (section 3.5.2.1), case is part of a mechanism which distinguishes nominals, and under the case stacking system, case is the realization of categorial features on nominals (section 3.5.2.2). In this section, we focus specifically on these alternatives, abandoning the feature-based approach to case assignment altogether.

3.5.2.1 Dependent case assignment

Quirky subjects in Icelandic (a Germanic language) are a well-known problem for theories of case assignment. At first glance, Icelandic seems to be a language very much like English, assigning subjects nominative case and objects accusative case.

- (73) Ég hafði séð hana.
 I.NOM had seen her.ACC
 ‘I had seen her.’ (Zaenen, Maling, and Thráinsson 1985: 445, ex. 6a)

¹⁶ Pesetsky and Torrego (2001, 2004) try to reconcile this. Pesetsky and Torrego (2001) propose that nominative case is actually the expression of a T(ense) feature on DPs and they further extend this to accusative case as an expression of verbal T(ense) (Pesetsky and Torrego 2004). Their approach puts case as a feature on the same level as phi, given that T features are exchanged between probe and goal, this being realized as what we know to be case. Notice that, in a sense, this approach explicitly connects the category of the case assigner to the expression of case, which goes back to an idea by Emonds (1985, 1987) that case is the expression of categorial features; this is also presumably the catalyst for the work of Pesetsky (2013), which takes case to be the realization of categorial features.

However, in some instances, the case of the object appears to be lexically specified. For example, the verb *help* takes a dative object in Icelandic.

- (74) Ég hjálpaði honum.
 I.NOM helped him.DAT
 'I helped him.' (Zaenen, Maling, and Thráinsson 1985: 445, ex. 8a)

What makes Icelandic special is that when a sentence like (74) above is passivized, the subject of the passive (underlyingly an object) remains in the dative case.

- (75) Honum var hjálpað.
 Him.DAT was helped
 'He was helped.' (Zaenen, Maling, and Thráinsson 1985: 442, ex. 1)

Dative subjects such as the one above are termed "quirky subjects." As Zaenen, Maling, and Thráinsson (1985) show, these quirky subjects are indeed subjects, despite not surfacing with the expected nominative case. Furthermore, when we look at passives where there are more arguments involved, we find that the subject can surface as dative, with the object surfacing as nominative instead of the expected accusative (and additionally serving as the target of agreement):

- (76) Konunginum voru gefnar ambáttir.
 the.king.DAT were given.F.PL maidservants.F.PL.NOM
 'The king was given female slaves.'
 (Zaenen, Maling, and Thráinsson 1985: 460, ex. 44a)

The Icelandic data is problematic for the reason that there is a very large discrepancy between the morphological case which appears on the nominal and the abstract Case that the theory would predict it to have. The example in (76) involves a subject which is morphologically dative, but presumably carries abstract nominative Case. Similarly, the object is morphologically nominative, but would carry abstract accusative Case. The morphological distribution of cases in this example runs counter to the predictions of case theory. While some have taken this as evidence that the relation between morphological and abstract case is more complex (Cowper 1988, Freidin and Sprouse 1991, as cited in Bobaljik and Wurmbbrand 2009, Legate 2008), others have taken it to mean that morphological and abstract case should be divorced (cf. Zaenen, Maling, and Thráinsson 1985, Yip, Maling, and Jackendoff 1987, Marantz 1991, Harley 1995, Sigurðsson 1992, 2009, 2012, McFadden 2004).

Zaenen, Maling, and Thráinsson (1985) propose to model case assignment as a mechanism which operates on the grammatical function (GF) of a nominal. Assuming a hierarchy of grammatical functions (subject > direct object > indirect object), they provide the below case assignment mechanism. The term "default" refers to the fact that such case marking applies to nominals which have not been

cased lexically (e.g. by verbs which select for dative or genitive subject/objects).

- (77) “Default case marking: the highest available GF is assigned NOM case, the next highest ACC. (*Universal*)”
(Zaenen, Maling, and Thráinsson 1985: 466, ex. 61d)

In an example like (73) above, with both nominative and accusative case, the subject, being the highest grammatical function, is assigned nominative case and the object, being the next highest grammatical function is assigned accusative case. In an example like (76), on the other hand, the subject has been marked dative lexically, leaving only the object unmarked. Given that it is the next highest available grammatical function, it receives nominative case. This basic idea is continued in Yip, Maling, and Jackendoff (1987), but case assignment is conceptualized in terms of a case tier, where there is a tier of cases (as in autosegmental phonology) which maps grammatical functions to cases.

The case assignment system of Zaenen, Maling, and Thráinsson (1985) brings us to the basic idea of what dependent case assignment is about. Rather than assuming that case is assigned by particular heads, there is a set of cases which are assigned in a particular order according to a certain hierarchy. However, the dependent case system is even more general than the case-tier hypothesis of Yip, Maling, and Jackendoff (1987) or the default case marking system of Zaenen, Maling, and Thráinsson (1985). These systems rely specifically on notions of grammatical function, but in ergative-absolutive languages like Bardi and Nepali, even this breaks down – subjects are marked ergative or absolutive depending on whether the verb is transitive or intransitive. The dependent case system generalizes beyond grammatical function.

Marantz (1991) is generally accredited with proposing the dependent case system, which has been picked up in more recent work, e.g. McFadden 2004, Bobaljik 2008, Preminger 2011, Baker 2015, and Levin 2015. Dependent case assumes that cases are assigned in a particular order, as in the hierarchy below:

- (78) Case disjunctive hierarchy
- a. Lexical / inherent case (case which is assigned lexically or thematically)
 - b. Dependent case (ergative/accusative)
 - c. Unmarked case (absolutive/nominative)

Lexical and inherent case is assigned first according to the needs of specific lexical items. Following this, we have dependent and unmarked case assignment, which is computed on the basis of the structural configuration. When there are two nominals needing case within a particular locality domain, they enter into a case competition, where one of the nominals receives dependent case and the other unmarked case. Ergative case systems are characterized by marking the higher nominal with dependent case and accusative case systems the lower nominal, as

illustrated below. The second nominal in the case competition receives unmarked case, as does a single nominal not competing for case.

- (79) a. Nominative-accusative b. Ergative-absolutive
-

We can summarize this as given below. Note that some accounts explicitly assume that the two nominals are in a c-command relation (cf. Preminger 2011, Levin 2015, Baker 2015).

- (80) Dependent case assignment:
- a. If **two** nominals are present in the same locality domain, mark **dependent** case on one of the nominals, and **unmarked** case on the other. If the higher nominal is marked as dependent, we call it “ergative;” if the lower nominal is marked, we call it “accusative.”
 - b. If **one** nominal is present in the locality domain, it receives **unmarked** case (absolutive/nominative).

Dependent case is assumed to function within a particular locality domain. Marantz (1991) assumes that dependent case functions within the domain governed by V+T. McFadden (2004) takes it instead to be the phase, as do Baker (2015) and Levin (2015). Coon and Preminger (2012) further argue that the locality domain of case assignment can vary, for example, certain heads triggering an additional locality domain. This allows them to account for split ergativity effects, i.e. systems in which case assignment is conditioned by the tense or aspect of the verb. Baker (2015) develops similar ideas, varying the phasal status of certain heads (under the assumption that case assignment is computed within phases). The recent literature seems to agree on the phase as the relevant domain of case assignment, with variation in terms of what counts as a phase-head.

Dependent case assignment assumes a very different system of case assignment, divorced entirely from the set of functional heads within the structure, and likewise, from agreement and grammatical function. Under dependent case assignment, it is the distribution of nominals within a particular locality domain that is most relevant. Whether dependent case assignment belongs to the morphology (cf. McFadden 2004, Bobaljik 2008) or the syntax (cf. Preminger 2011, Levin 2015) continues to be debated, and there are still many aspects of dependent case assignment to be developed (cf. Baker 2015). I follow Preminger (2011) and Levin (2015) and take dependent case to be syntactic.

3.5.2.2 Case stacking and categories

Case stacking is the phenomenon by which multiple case affixes appear on a nominal, a phenomenon which has also been referred to as *Suffixaufnahme* in the typological literature (cf. Plank 1995). Case stacking is found in, for example, Lardil, a Tangkic language spoken in northern Australia (Richards 2013).

- (81) Ngada latha karnjin-i marun-ngan-ku maarn-ku.
 I spear wallaby-ACC boy-GEN-INSTR spear-INSTR
 'I speared the wallaby with the boy's spear.' (Richards 2013: 43, ex. 3)

This example is characterized by the expression of both genitive and instrumental case on the possessive nominal, in line with its function as the possessor (genitive) of an instrument (instrumental). The data suggests that case assignment targets not only nominals in need of case, but also nominals which have already been case-marked, but fall within the domain of case assignment (a problematic phenomenon for the Case Filter).

The phenomenon has been referred to as “case stacking” in the generative literature (cf. Matushansky 2008, 2010, Pesetsky 2013). Richards (2013) develops an account of case stacking involving case-assigning heads in the more traditional sense of case assignment, while Matushansky (2008, 2010) and Pesetsky (2013) propose to view this as a case percolation mechanism, more specifically, the percolation of categorial features from a category to elements in the c-command domain. They share the view that case is the expression of categorial features, an idea which can be traced back to Emonds (1985), who suggests that cases map to particular categories. In Emonds' system, nominative is the expression of I, accusative V, oblique P, and genitive D. Pesetsky (2013) has a slightly different implementation, with genitive being the expression of N (nouns are “born” genitive) and D the expression of nominative (i.e. what a DP will be if it is not embedded under another category head). Under the categorial accounts, there is no distinction between structural or inherent case, all cases being assigned in a similar way, via the percolation of categorial features. Note, however, that in Richards' (2013) discussion of the Lardil data, the distinction between structural and inherent case plays a crucial role in determining the distribution of case stacking suffixes – structural case suffixes can disappear in the course of the derivation, while inherent case suffixes do not, suggesting they must have a different status.¹⁷

While case stacking does seem to exist in some form, as evidenced by the Lardil data, it is not clear that the treatment of case stacking as the percolation of categorial features can be maintained cross-linguistically. At first sight, the fact that not all languages show case stacking overtly seems to present a problem.

¹⁷ The Lardil data presented by Richards (2013) is rather complex, and thus, for the curious readers, I direct them to his work.

However, this issue is easily overcome by making assumptions on the Spell-Out of case. Pesetsky (2013: 11), for example, proposes the One-Suffix Rule.

(82) **One-Suffix Rule:** Delete all but the outermost case suffix.

Thus, if more than one case is assigned to a nominal in a language which can only express one case per nominal, the One-Suffix Rule will delete those “extra” cases. The fact that case-stacking might exist even in those languages without overt case stacking seems to be a valid one, and I direct readers to section 5.4.2.4 for a short example of this with Polish prepositions. A more serious issue for this treatment of case stacking concerns ergative-absolutive languages. While the dependent case mechanism deals effortlessly with patterns of ergative and absolutive case, the case stacking account struggles. What would be the categorial head uniting absolutive objects and intransitive subjects? Why would only a transitive subject be targeted by an ergative head, but not an intransitive subject? These issues are not impossible to overcome, but they do make the cross-linguistic validity of treating case stacking as the percolation of categorial features more difficult to maintain. In this dissertation, I assume that something like case stacking exists, but I will not be explicit as to its source or the mechanism of it. The notion of case stacking will play a vital role in the analysis of Polish numerals in oblique case contexts, but the data I have adds little to the discussion on the cross-linguistic validity of this approach. For this reason, I do not attempt to develop the analysis, but rely on Pesetsky (2013) for analyzing the Polish system.

I now turn to a short discussion of inherent case.

3.5.3 *Inherent case*

Chomsky (1986) distinguishes between structural and inherent case. Structural case corresponds to the nominative and accusative (“objective”), assigned at S-structure by verbs and inflection. Inherent case corresponds to the oblique and genitive cases (in English), assigned at D-structure by prepositions, nouns, and adjectives. The difference in whether a case is assigned at D-structure or S-structure has been utilized to account for certain case alternations, notably in the numeral systems of some Slavic languages (Babby 1987, Franks 1994, Rutkowski 2002b). Such accounts, however, are no longer tenable on the Minimalist assumption that there is only a single level of structure building, and hence, no distinction between D-structure and S-structure (cf. Chomsky 1995).

Chomsky (1986) further relates inherent case to theta role assignment. He proposes that inherent case is assigned to arguments which have also been theta-marked by the respective case assigner. If the relation between theta-assignment and inherent case is a tight one, we might expect the theta-role to determine the case value. For example, Woolford (2006) observes that the theta-role of goal is often realized as the dative (in those languages with a morphological dative).

Icelandic, for example, marks its goals dative, as does Polish:

- (83) Peir gáfu konunginum ambáttina. *Icelandic*
 They.NOM gave the.king.DAT the.slave.girl.ACC
 ‘They gave the king the slave girl.’ (Woolford 2006: 112, ex. 3)
- (84) Dałam książkę Łukaszowi. *Polish*
 Gave.1.F.SG book.ACC Luke.DAT
 ‘I gave the book to Luke.’

Beyond cases like these, however, the relation between case and theta role is usually an ambiguous one. For example, Polish verbs sometimes require a specific case on their complements, e.g. genitive, dative, or instrumental, but it’s not clear how the case relates to the theta role.

- (85) Słucham muzyki. *Genitive-requiring verb*
 Listen.1SG music.GEN
 ‘I’m listening to music.’
- (86) Piotrek kazał nam czekać. *Dative-requiring verb*
 Peter.NOM ordered.3.M.SG us.DAT wait.INF
 ‘Peter ordered us to wait.’
- (87) Iwonka kierowała studentami. *Instrumental-requiring verb*
 Ivona.NOM directed.3.F.SG students.INST
 ‘Ivona directed the students.’

Woolford (2006) proposes that what has been termed “inherent case” actually consists of two types of case: traditional inherent case, as is related to theta roles, and lexical case. Lexical case refers to irregular, idiosyncratic cases which are selected for by certain predicates. Thus, dative goals are presumably a form of inherent case, and many of the genitive, dative, and instrumental objects of Polish (e.g. (85)-(87)) are examples of lexical case.¹⁸ While inherent case and lexical case seem to have different properties in terms of their source, they generally behave together as far as the syntax is concerned (e.g. Klockmann 2014a); for this reason, I will refer to them together as “oblique” case.

A question which has received relatively little attention in the literature is the nature of oblique case assignment. While the mechanism of structural case assignment is well-defined in Chomsky (2000, 2001) and many other works, the mechanism of oblique case assignment is not, and we find various solutions in the literature. Some have assumed that the difference between oblique and structural case concerns whether or not a nominal enters the syntax with a pre-determined

¹⁸ Willim (1990) further attempts to relate such examples of lexical case back to the notion of structural case. She proposes that accusative is the default case which is assigned from a verb to its object, but verbs can also be specified for particular cases; the mechanism of case assignment, however, is the same between the two, making lexical case structural case.

case value. Rappaport (2002, 2003), for example, models case alternations in Polish and Russian numeral systems by suggesting that the numerals come pre-valued for the oblique case in oblique case contexts, but enter the syntax with unvalued case features in structural case contexts. Others assume that all oblique cases are assigned via prepositions or additional structure on top of the DP (e.g. Caha 2009; Řezáč 2008, Pesetsky 2013, Levin 2015). Řezáč (2008), for example, suggests that oblique case is assigned via an Agree relation between a P-head and the nominal. Levin (2015) makes a similar suggestion in attempting to explain why the oblique cases are first in the case disjunctive hierarchy of dependent case assignment (cf. (78)): if oblique case is assigned via Agreement, it will necessarily be assigned before dependent case is calculated. Pesetsky (2013), who relates case to categorial heads, makes the assumption that oblique case is the realization of the categorial feature(s) of P-heads (although genitive is crucially a nominal case in his system, requiring a silent nominal in genitive contexts where there is no other apparent nominal source).

Crucially, each account agrees that there is some aspect to oblique case assignment, such that the system ensures that oblique case is assigned prior to structural case, even without the distinction between D-structure and S-structure. Such ordering effects are evident in the existence of case hierarchies, for example, the disjunctive case hierarchy of dependent case assignment which states that dependent case is calculated only after oblique case has been assigned. Like these accounts, I assume that there is a timing component with regards to oblique case assignment. More specifically, I assume that heads triggering oblique case assignment (e.g. prepositions) do so immediately upon Merge. In this sense, oblique case assignment is comparable to Agreement, which applies immediately when an unvalued feature is Merged into a structure. If Řezáč's (2008) and Levin's (2015) intuitions are correct, it may be possible to connect the mechanism of oblique case assignment to Agreement, with all instances of oblique case assignment applying immediately upon Merge of the relevant head via an Agreement relation. This is not a hypothesis I develop here though, given the lack of relevant data in this work. Note that the approach assumes that all instances of oblique case, and thus, inherent and lexical case alike, can be traced back to a single head in the structure which has triggered the relevant case, an assumption which may require more motivation for inherent case than for lexical case.

3.6 A Theory of Case and Agreement

In this section, I outline the theory of Case and Agreement adopted in this thesis. I base my theory of Agreement on the work of Chomsky (2000, 2001), and the discussion of his agreement mechanism established in the preceding sections. With regards to case, I adopt the dependent case mechanism, with the assumption that it is calculated on bundles of phi-features (see also Frampton and Gutmann

2000). As for inherent case, I assume it is assigned immediately upon Merge of the relevant head. To begin, let us quickly review Chomsky's agreement mechanism.

Chomsky (2000, 2001) adopts the *ATTRIBUTE:VALUE* approach to features, where features sit in bundles on the relevant head. Features are either uninterpretable and unvalued or interpretable and valued. The agreement relation (usually) involves two participants, the probe, which is active by virtue of some unvalued uninterpretable feature(s), and the goal, which carries the valued interpretable counterpart to the feature(s) needed by the probe, as well as some unvalued uninterpretable feature(s) which serves to make it active. In the most common Agree-scenario, it is unvalued uninterpretable phi which makes T active, and unvalued uninterpretable case which makes DPs active. The conditions for establishing an Agree relation are as follows, repeated from (9):

- (88) An Agree relation between a probe P and a goal G is established if:
- a. P and G both have some (possibly unvalued) matching feature(s) in common, where matching is feature identity. (Matching Condition)
 - b. P and G are both active, by virtue of carrying at least one uninterpretable (unvalued) feature. (Activity Condition)
 - c. G is contained in the c-command domain of P. (C-command condition)
 - d. G is the closest possible goal to P, i.e. there is no other X with matching features such that P c-commands X and X c-commands G. (Intervention condition)
 - e. P and G are contained in the same phase. (Phase condition)

If an Agree relation is established, it results in an exchange of features between the probe and goal, where the probe receives the valued interpretable counterpart to its unvalued uninterpretable features from the goal, and the goal is assigned case by the probe. This relation deactivates both the probe and the goal, after which all uninterpretable features are deleted. If the probe also has an EPP feature, this triggers movement of the goal. If no Agree relation is established at all, the derivation crashes.

I start with the theory of Agreement that will be adopted in this thesis and then turn to case assignment.

3.6.1 *A theory of Agreement*

Let us begin with the set of features which will be assumed in this thesis. I adopt the following sets of PERSON and NUMBER features, using brackets [] as indications of feature values. The languages in my sample only involve singular-plural number systems, and 1st, 2nd, 3rd person systems, hence, it is unnecessary to

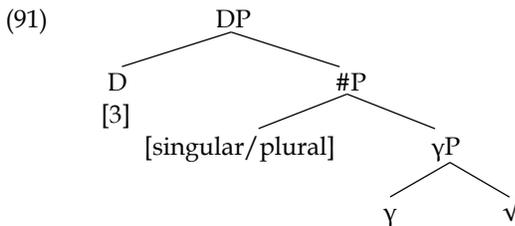
propose anything more complex than what is given below.¹⁹

- (89) NUMBER features (#):
- a. *Singular* = [singular]
 - b. *Plural* = [plural]

- (90) PERSON features (Π):
- a. *1st person* = [1]
 - b. *2nd person* = [2]
 - c. *3rd person* = [3]

GENDER will be an important feature in the data to come, but because each gender system is particular to each language, it makes little sense to outline a set of gender features now. As it becomes relevant for a language, I discuss the set of gender features in play in the language in the chapters to come. I adopt the convention of referring to NUMBER with #, PERSON with Π (pi), and GENDER with γ (gamma).

I assume the following distribution of features in the nominal domain, building on the discussion in chapter 2:



I assume γ to project, represented here as the head γ , which would be filled in by a particular gender value (depending on the language). Gender is not present in all languages, and hence, this projection and the γ head might be absent in a particular language. I take # to be represented in its own projection #P, which dominates the root node; the feature values [singular] and [plural] function as the head of #P. With regards to person, following Danon 2011, Longobardi 2008, among others, I assume that the [3] is a property of DPs, and thus, not relevant below the D-layer.²⁰ [1] and [2] are properties of pronouns, which will not be

¹⁹ Of course, there are many ways these features can and should be complexified to account for the wide range of data we find cross-linguistically (e.g. the number hierarchy, cf. Greenberg 1963, Corbett 2000, and Harbour 2013, 2014 and the person hierarchy, cf. Zwicky 1977). We can think of these features as a short hand for an underlyingly more complex system. See Harley and Ritter (2002) for complexifications involving a feature geometry (and Cowper 2005 and Cysouw 2011 for some criticisms). See Harbour (2013, 2014) for a very elegant approach to systems of NUMBER using bivalent features.

²⁰ There are two ways to conceptualize this. One possibility is that 3rd person is a feature (or set of features) on DPs. Another alternative is that 3rd person is not a feature at all, but

addressed in this thesis (see e.g. Cardinaletti and Starke 1999, Gruber 2013).

Let us now turn our attention to probes. The observation of section 3.4.1.2, that probes skip over elements lacking relevant features, will play a role in the analyses of this dissertation. Thus, while I do not deal with cases of context-sensitive agreement of the type found in Georgian, I do adopt the spirit of the analysis, namely that if some element lacks the feature relevant to the probe, that element will be invisible to the probe, prompting agreement with some other element that fits the specifications of the probe. For example, suppose we have two potential goals G1 and G2 and a probe P. Probe P carries an unvalued feature X, G1 a valued feature Y, and G2 a valued feature X. Given the following configuration between P, G1, and G2, P will ignore G1 and agree with G2.

$$(92) \quad \begin{array}{c} [P \quad [G1 \quad [G2]]] \\ \begin{array}{ccc} [_X] & [Y] & [X] \\ \hline & & \uparrow \end{array} \end{array}$$

I adopt the standard approach that probal features form an unbundled set of unvalued features which are associated with a particular head. I indicate that a feature is unvalued by using two underscores, with the relevant feature in subscripts on the right, as depicted below.

- (93) Unvalued feature representation:
- a. Number: [_#]
 - b. Person: [_n]
 - c. Gender: [_γ]

Thus, for some probe P, carrying unvalued person, number, and gender, merged with some object X, the representation is as follows:

$$(94) \quad \begin{array}{c} \diagup \quad \diagdown \\ P \quad \quad X \\ [_#] \\ [_n] \\ [_γ] \end{array}$$

In line with Pesetsky and Torrego (2007) (cf. section 3.4.1.1), I further assume valuation and interpretability to be divorced. An immediate consequence is that any and all unvalued features in a structure will function as probes regardless of whether they are interpretable or uninterpretable. This makes the question of interpretability a matter for the semantic component and irrelevant for determining whether something is a probe, and thus, I will not be concerned with indicating the interpretability of a feature, unless it is relevant for the analysis.

the default interpretation assigned to things which are not 1st or 2nd person.

In line with Frampton and Gutmann (2000), Pesetsky and Torrego (2007), and Danon (2011), among others, I adopt a mechanism of feature sharing (cf. section 3.4.1.1). When agreement between a probe and goal occurs, matching features will join together as a single feature object. Notice that it is not necessarily the case that unvalued features must agree with their valued matching counterparts; assuming unvalued features probe and coalesce with the matching features they find, two probes might coalesce into a single probe via feature sharing. Assuming a probe P1 with unvalued feature X and a goal G with the valued counterpart of feature X, agreement between P1 and G results in a sharing of X between P1 and G:

$$(95) \quad \left[\begin{array}{c} \text{P1} \quad [\text{G}] \\ \text{[} _x] \quad [\text{X}] \end{array} \right] \rightarrow \left[\begin{array}{c} \text{P1} \quad [\text{G}] \\ \quad \quad \quad \diagdown \quad \diagup \\ \quad \quad \quad [\text{X}] \end{array} \right]$$

If an additional probe P2 with unvalued feature X is inserted into the structure above, it would agree with the shared feature X of P1 and G, resulting in a triply shared feature.

$$(96) \quad \left[\begin{array}{c} \text{P2} \quad [\text{P1} \quad [\text{G}]] \\ \text{[} _x] \end{array} \right] \rightarrow \left[\begin{array}{c} \text{P2} \quad [\text{P1} \quad [\text{G}]] \\ \quad \quad \quad \diagdown \quad \diagup \\ \quad \quad \quad [\text{X}] \end{array} \right]$$

Following Řezáč (2003) and Bejar and Řezáč (2009), I assume that a probe searches cyclically (cf. section 3.4.2.1): when a probe is merged into a structure, it immediately begins probing; if it fails to locate a goal in the first cycle, it will continue by probing successively higher. In the scenario in (96), probing is downwards, and a goal is found on the first cycle. If instead probes P1 and P2 are inserted into the structure before the goal G, the unvalued feature of P1 would agree with P2, resulting in a single shared unvalued feature. Thus, the two probes coalesce into a single probe.

$$(97) \quad \left[\begin{array}{c} \text{P2} \quad [\text{P1}] \\ \text{[} _x] \quad \text{[} _x] \end{array} \right] \rightarrow \left[\begin{array}{c} \text{P2} \quad [\text{P1}] \\ \quad \quad \quad \diagdown \quad \diagup \\ \quad \quad \quad [_x] \end{array} \right]$$

If G is then inserted into the structure, the unvalued feature of P1 and P2 would then probe upwards (second cycle), agreeing with the valued feature of G, creating, again, a triply shared feature.

$$(98) \quad \left[\begin{array}{c} \text{G} \quad [\text{P2} \quad [\text{P1}]] \\ [\text{X}] \end{array} \right] \rightarrow \left[\begin{array}{c} \text{G} \quad [\text{P2} \quad [\text{P1}]] \\ \quad \quad \quad \diagdown \quad \diagup \\ \quad \quad \quad [\text{X}] \end{array} \right]$$

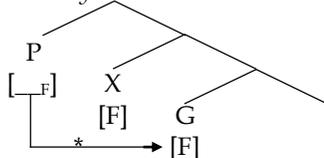
If no goal with matching features is inserted into the structure at all, we have the scenario in which there is an unvalued feature with no matching valued counterpart. Here, I assume with Preminger (2011) that the derivation does not crash (cf. section 3.4.2.2). Probing by unvalued features is obligatory, but if such probing is unsuccessful, there are no consequences in the syntax. Presumably, the unvalued feature will be erased or receive a default value.

With these assumptions in place, the conditions on Agree can be stated as follows:

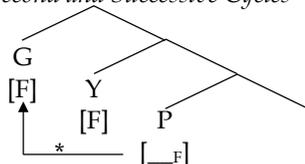
- (99) An Agree relation between a Probe P and a Goal G is established if:
- P has some unvalued feature F, which G also carries (valued or unvalued).
 - G is the closest possible goal to P, where “closest” depends on which cycle of probing P is in (see (100)) – in the first cycle, there is no X with feature F, such that P c-commands X and X c-commands G, and in the second and successive cycles, there is no Y with feature F, such that Y c-commands P and G c-commands Y.
 - P and G are contained in the same phase.

- (100) Violations of the Intervention Condition (99)b:

- a. *First Cycle*



- b. *Second and Successive Cycles*



An unvalued feature F on some element P initiates a probing process. If some goal G is found, meeting the conditions in (99), the features of P and G coalesce into a single feature object. If the phase is completed and no goal G which meets the conditions in (99) has been found, probing ceases.

I summarize Agreement as follows:

- DPs consist of the features person (π) hosted on D, number ($\#$) hosted in a $\#P$, and gender (γ) hosted in a γP .
- Unvalued features are probes, regardless of their status as an interpretable or uninterpretable feature.

- Probes begin probing immediately upon Merge. They can probe both in their c-command domain, and in the structure dominating them (as under Cyclic Agree).
- Probes can only target elements carrying a matching feature (either valued or unvalued). Elements without the relevant feature will be invisible to the probe (as under relativized probing).
- Agreement creates a feature sharing relation, where the feature of the probe coalesces into a single feature object with the feature of the goal.
- If an unvalued probing feature fails to find a value before Spell-Out, the derivation does not crash, and default features are realized instead.

3.6.2 *A theory of Case*

I begin with dependent case assignment and then turn to oblique case assignment.

I adopt the dependent case model for structural case assignment, and furthermore, propose that it functions on sets of phi-features, or “phi-bundles” (which may contain only one feature) as opposed to DPs. I take both types of case assignment to be syntactic. Recall the case hierarchy as given in section 3.5.2.1:

(101)	Oblique case	>	Dependent case	>	Unmarked case
	(Inherent, Lexical)		(ERG, ACC)		(NOM, ABS)

According to the dependent case model, oblique case is assigned first, followed by a computation which assigns dependent case (if applicable) and unmarked case. I repeat the mechanism for dependent case assignment below, changing the terminology to reflect the assumption that dependent case assignment functions on bundles of phi-features as opposed to DPs.

- (102) Dependent case assignment (clausal domain):
- a. If **two** phi-bundles are present in the same locality domain, associate **dependent** case with one of them, and **unmarked** case with the other. If the higher phi-bundle is associated with dependent case, we call it “ergative;” if the lower phi-bundle is associated with dependent case, we call it “accusative.”
 - b. If **one** phi-bundle is present in the locality domain, it is associated with **unmarked** case (absolute/nominative).

Following Baker (2015) and Levin (2015), I assume that dependent and unmarked case can be relativized for a given domain. More specifically, I assume that in the nominal domain, the unmarked case is genitive, while in the verbal/clausal domain, the unmarked case is nominative/absolute.

The decision to consider dependent case assignment as functioning on phi-bundles rather than DPs is a minor change and empirically, very similar to the

original formulation. Crucially, however, it allows case assignment to target elements which may be smaller than a DP. This is something which Brattico (2010, 2011) has independently argued to be necessary, and which we shall see to also be necessary for an analysis of Polish numerals (chapters 4 and 5).

Notice that under this formulation, there is a sense to which case assignment functions on the output of Agreement (contra Bobaljik 2008 who argues specifically that case feeds agreement). If Agreement as a mechanism unites phi-features via feature sharing and case operates on bundles of phi-features, then the result of Agreement will necessarily affect case assignment. I illustrate this below. Assuming goals G1 and G2 with a valued feature X and probes P1 and P2 with an unvalued feature X in the configuration below, the feature X of G1 and P1 will coalesce into a single feature X and the feature X of G2 and P2 will coalesce into a second, separate feature X.

$$(103) \quad \left[\begin{array}{c} \text{P2} \left[\begin{array}{c} \text{G2} \left[\begin{array}{c} \text{P1} \left[\text{G1} \right] \right] \right] \\ \text{[_x]} \rightarrow [X] \end{array} \right] \\ \text{[_x]} \rightarrow [X] \end{array} \right] \right] \rightarrow \left[\begin{array}{c} \text{P2} \left[\text{G2} \left[\text{P1} \left[\text{G2} \right] \right] \right] \\ \text{[_x]} \rightarrow [X] \quad \text{[_x]} \rightarrow [X] \end{array} \right] \right]$$

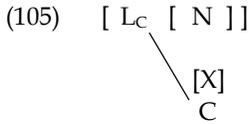
Case assignment operates on bundles of phi-features and therefore, the result of Agreement in this toy example is two sets of features each connected to a probe and goal. Suppose the conditions are right in this scenario for dependent case assignment; we associated one [X] with dependent case and the second [X] with unmarked case. That particular case is now available to both the probe and goal, supposing each is capable of expressing it (e.g. if the probe is an adjective and the goal is a noun, the case will surface on both).

$$(104) \quad \left[\begin{array}{c} \text{P2} \left[\begin{array}{c} \text{G2} \left[\begin{array}{c} \text{P1} \left[\text{G1} \right] \right] \\ \text{[_x]} \rightarrow [X] \\ \text{dependent} \end{array} \right] \\ \text{[_x]} \rightarrow [X] \\ \text{unmarked} \end{array} \right] \right]$$

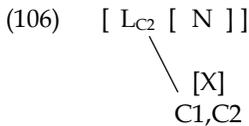
With regards to oblique case assignment, I assume that oblique case is related to the lexical specifications of specific lexical items, and as such, is triggered by a particular head, when it is Merged into a structure (see section 3.5.3). This assumption holds for both inherent and lexical case, and hence, predicts that for every oblique case, a responsible head can be identified, either covert or overt.

I further assume that like dependent case, oblique case assignment targets phi-bundles. Thus, given some lexical element L which requires case C, and Merges into a structure containing some nominal N with feature X, L will trigger assignment of C to X.²¹

²¹ Whether oblique case assignment proceeds via a probing relation or not is unclear, and thus, it remains open as to whether oblique case can target phi-bundles in both its complement and its specifier (if, for example, oblique case assignment were subject to



Note that this is where something akin to case stacking may apply (see section 3.5.2.2). If, for example, the phi-bundle has already been cased via the dependent case mechanism or some other oblique case-assigning head, the oblique case assigner will still assign its case, as per its lexical specification. Such case assignment must proceed if required. Assuming again a case-assigner L with case C2 and a nominal N with feature X, which has already been cased as case C1, upon Merge of L into the structure, it will assign case C2 on top of case C1. The feature X will therefore necessarily be associated with multiple case specifications:



In case-stacking languages, both case specifications will be expressed overtly. In non-case-stacking languages, presumably something like the One-Suffix Rule will ensure that only a single case is realized overtly. Note that once an oblique case has been assigned, that element is no longer eligible for participation in the dependent case mechanism, and hence, we expect case stacking of oblique case on top of structural or other oblique cases, but not case stacking of structural case on top of oblique case or other structural cases (cf. Richards 2013). In other words, we predict the following:

- (107) Acceptable case stacking: OBL > STR, OBL > OBL
 Unacceptable case stacking: *STR > OBL, *STR > STR

I summarize case assignment as follows:

- Both oblique and dependent case function on phi-bundles, and hence, there is an interaction between processes of Agreement and case assignment, such that the result of feature sharing determines the distribution of case.
- Oblique case assignment applies immediately upon Merge of the relevant head, and is assigned to (the nearest) phi-bundle.
- If that phi-bundle has already been assigned oblique or structural case, the new oblique case is assigned on top of the other case specification,

Cyclic Agree). For now, I assume that at least the c-command domain is available, however, this is a matter in need of more research.

and is subject to language-specific constraints on Spell-Out.

- Once enough of a locality domain has been constructed, all remaining uncased phi-bundles are assigned case via the dependent case mechanism. In the event of two phi-bundles, one is assigned dependent case, the other unmarked case, and in the event of a single phi-bundle, it receives unmarked case.

3.7 Conclusion

We started this chapter with the observation that certain elements mark properties of other elements, relations termed agreement and concord, and furthermore, that the morphological form of a nominal can vary as a function of its position in a sentence, this being termed case. These seemingly simple observations require a complex apparatus to model, and this chapter has worked through a number of approaches, with the goal of determining how best to model case and agreement.

Chomsky (2000, 2001) argues that case and agreement are related to a single mechanism, Agreement, which operates on features in the syntax and has the effect of valuing and deleting uninterpretable features. Chomsky (2000, 2001) has often been adopted as the standard approach to case and agreement, but his system makes a number of assumptions which have been challenged. Addressing those challenges leads to an improved agreement mechanism, and the remainder of this chapter carefully discussed both the challenges and their solutions.

I began the discussion of such approaches by challenging the idea that there is a link between case assignment and agreement. While there has been evidence in favor of this position, there is also plenty of evidence which challenges it, and I pursue the position that the two are not linked. I continued the discussion by focusing on particular innovations that have been proposed for the Agreement mechanism, innovations which I similarly adopt. These include: feature sharing (Agreement results in features coalescing into a single feature object), relativized probing (probes ignore elements without matching features), cyclic agree (Agreement targets both its c-command domain and dominating structure), and crash-proof derivations (unvalued features do not crash a derivation).

Following this discussion of Agreement, I turned to a discussion of case. Given the decision not to model case as a product of Agreement, it was necessary to adopt an entirely different mechanism of case assignment. We first studied the reasoning behind treating case as an uninterpretable feature on nominals, and some of the problems with this hypothesis. I then introduced the dependent case mechanism, which assigns case configurationally, based on the distribution of nominals within a particular locality domain. This is the mechanism which I adopted for structural case assignment. Following this, I shortly discussed the notion of case stacking, which empirically must exist, and introduced approaches to inherent case assignment (retermed “oblique case” in combination with lexical

case), which show that inherent case must be assigned early.

Finally, drawing on the extensive discussion of case and Agreement in this chapter, I outlined the mechanisms I adopt, and illustrated how they function. Agreement is a probing mechanism triggered by unvalued features, which results in feature sharing between the probe and the goal. The phi-bundles created by the Agreement process feed case assignment, which functions on phi-bundles. Oblique case is assigned immediately upon Merge of the relevant head, and assignment of an oblique case to a phi-bundle removes that phi-bundle from the dependent case calculation. Once a sufficient locality domain has been constructed, dependent case is computed on the remaining nominals. The result of this system is constant cycles of Agreement, oblique case assignment, and dependent case assignment, which can interact with each other. This makes for a complex system which is, at the very least, robust enough to deal with the semi-lexical data which will be discussed in this dissertation.

Chapter 4

Polish Numerals: A Primer

4.1 Introduction

Slavic numerals are notorious for their complexity, and Polish numerals are no exception. Numerals shift between “noun-like” and “adjective-like” behaviors, depending on, for example, the gender of the noun they combine with and the case context they occur in (see e.g. Corbett 1978, Babby 1987, Franks 1994, Giusti and Leko 2004). Even more troublesome, the numerals do not behave uniformly, neither across the Slavic languages, nor within a single Slavic language. This makes it near impossible to propose a category “numeral” which could capture their behaviors (and this problem extends beyond Slavic, see e.g. Donohue 2005 and Danon 2012). The idiosyncrasies of numerals in Polish and other Slavic languages (Russian being the most well-studied) has garnered much attention in the literature, but every analysis has had to make some set of assumptions to accommodate the numeral-specific patterns. The idiosyncrasies of the Polish numerals make them a prime target for a study of semi-lexicality: it is much simpler to treat their idiosyncrasies as deriving from properties of the numerals themselves, as opposed to properties of the syntax.

In this chapter, I hypothesize that the Polish numerals are semi-lexical, and hence, consist of roots with some featural specification. The task in this chapter is to derive the idiosyncrasies of the numerals from their lexical specifications, using their morphosyntactic behavior as clues. What must the structure of the numeral be to derive these patterns, and how does it relate to its lexical specification? Empirically, I focus on patterns of case and agreement, but I additionally include data from the ability of the numerals to combine with *pluralia tantum* nouns and their behavior with the distributive marker *po*. The chapter consists of two main parts. In section 4.2, I introduce the case and agreement system of Polish, showing how canonical nouns and adjectives behave; this section contains no discussion of Polish numerals, but it serves as the comparison point for the coming discussion of the numerals. In section 4.3, the heart of the chapter, I introduce the numerals. There are three numeral classes I focus on: the numerals 1000 and higher,

numerals 5-10, 20, 30, etc., 100, 200, 300, etc., and numerals 2-4. Each numeral class is successively more semi-lexical, in the sense of carrying more in its lexical specification, hence the choice to approach them in this order. What we produce in this chapter is a characterization of the lexical specifications of the numerals of Polish, and importantly, the ways in which they are semi-lexical. The lexical specifications we work towards are the following:

- (1) *tysiąc* '1000': [$\sqrt{1000}$, (\neg)m[i]_v]
 (2) *pięć* '5': [[_{#P} [$\sqrt{5}$]], $\neg\gamma$, $\neg\#$]
 (3) *trzy* '3': [[_{#P} [$\sqrt{3}$]], $\neg\gamma$, (\neg)_v, $\neg\#$]

These lexical specifications provide evidence for two types of semi-lexicality: semi-lexicality via restrictions on the functional structure of the semi-lexical noun and semi-lexicality via restrictions on the contexts the semi-lexical noun can surface in. We discuss how the features above relate to these different types of semi-lexicality in the coming sections. This chapter only focuses on the lexical specifications, and in chapter 5, I present precisely what these lexical specifications imply for the structure containing the numeral and how the mechanisms of case and agreement operate on those structures.

4.2 Case and Agreement in Polish

Polish is a Slavic language on the West Slavic branch, closely related to Czech, Slovak, Upper and Lower Sorbian, Kashubian, and Silesian (Lewis *et al*, 2015). In this section, I outline the basic systems of agreement (section 4.2.1) and case (4.2.2) in Polish. Understanding how canonical nouns, verbs, and adjectives function with regards to case and agreement will facilitate our discussion of the ways in which Polish numerals differ from the canonical categories. In terms of semi-lexicality, it is only by comparing the numerals to the set of canonical categorial structures that we can see how they are semi-lexical. This section builds that foundation.

4.2.1 Agreement in Polish

Polish is a morphologically rich language, expressing case, gender, number, and person; it distinguishes seven cases (*nominative, accusative, genitive, dative, instrumental, locative, vocative*), two numbers (*singular, plural*), three persons (*1st, 2nd, 3rd*), and between three and nine genders, depending on the analysis of the gender system.¹ This section is aimed at understanding the underlying feature

¹ For example, (based on the discussion in Brown (1998) due to a lack of access to some of these sources), Klemensiewicz (1965) claims there are three genders, Mańczak (1956) five

system of Polish, and how Agreement operates on those features. I start in section 4.2.1.1 with an overview of the morphology we find on nouns, verbs, and adjectives. I focus particularly on the representation of gender, given that it is where most of the complexities lie, and briefly discuss how it interacts with number; person needs no special attention. In section 4.2.1.2, I present the feature system of Polish I adopt and in section 4.2.1.3, I show how features are represented on nouns, adjectives, and verbs.

4.2.1.1 Agreement morphology

Nouns in Polish can be classified into one of three main genders: *masculine*, *feminine*, or *neuter*. Words like *chłopiec* ‘boy’, *stół* ‘table’, and *pies* ‘dog’ are masculine, words like *dziewczyna* ‘girl’, *krowa* ‘cow’, and *koszula* ‘shirt’ are feminine, and words like *dziecko* ‘child’, *bydło* ‘beast’, and *krzesło* ‘chair’ are neuter. The gender of a noun is partly determined by the form (declension class), where nouns ending in consonants are typically masculine, nouns ending in *-a* typically feminine, and nouns ending in *-o* typically neuter. However, form does not entirely predict gender, as there are numerous exceptions: *mężczyzna* ‘man’ is masculine, but ends in an *-a*, *kość* ‘bone’ is feminine, but ends in a consonant, and the loan *muzeum* ‘museum’ is neuter, but lacks an *-o*. Evidence for this division can be found in the morphology on nouns and adjectives in the oblique cases, illustrated in the table below. On singular nouns, the *dative* makes a three-way distinction between *masculine*, *feminine*, and *neuter*, and the *locative* and *instrumental* make a two-way distinction (between *masculine-neuter* and *feminine*). Adjectives modifying singular nouns mark only a *masculine-neuter* and *feminine* distinction. All gender distinctions are obliterated in the plural.

(4) Table 1: Morphology in the *dative*, *locative*, and *instrumental* cases

		Singular			Plural		
NOUN	DAT	LOC	INST	DAT	LOC	INST	
M	-u, -owi	-’e, -u	-em	-om	-ach	-ami	
N	-u						
F	-’e, -y/i		-ą				
ADJ							
M	-emu	-ym		-ym	-ych	-ymi	
N							
F		-ej					-ą

Note: The apostrophe indicates “softening,” a phonological phenomenon whereby the final consonant is palatalized if considered “hard.”

genders, Brooks and Nalibow (1970) and Corbett (1983) six genders, Wertz (1977) seven genders, and Saloni (1976) nine genders. Brown (1998), himself, adopts four genders, with three subgenerals. As the large amount of disagreement might indicate, the Polish gender system is anything but simple.

Subject-verb agreement is also telling. In the past tense, verbs distinguish between masculine, neuter, and feminine gender when agreeing with singular nouns or pronouns; verbs additionally identify the natural gender of the speaker or addressee as male or female, in 1st and 2nd person.

(5) *Być* 'to be' (singular, past)

	M.SG	N.SG	F.SG
1	byłem	–	byłam
2	byłeś	–	byłaś
3	był	było	była

The singular set of verbal gender markers in Polish can be identified as:

(6)

MASCULINE SINGULAR:	-Ø ²
FEMININE SINGULAR:	-a
NEUTER SINGULAR:	-o

Within the masculine gender, we find a number of subdivisions in Polish, relevant particularly to the expression of *nominative*, *accusative*, and *genitive* case, and verbal agreement in the plural. In the masculine gender, Polish distinguishes between human (H), animate (A), and inanimate (I) nouns, this distinction in turn being dependent on the number of the noun, singular or plural. Some, for example, Corbett (1983), have argued for an additional subgender, that being termed “devirilized” or “pejorative” (P); these are nouns which refer to a male human, but are often derogatory, and involve a slightly different paradigm from the other nouns (see the nominative plural). The table below gives the suffixes for the *nominative*, *accusative*, and *genitive* cases for nouns and adjectives; the paradigm for the pejorative is based on the facts presented in Corbett (1983), taken from Wertz (1977), and has not been further verified.

² Evidence for the null nature of the masculine gender comes from the detachability of suffixes in some dialects, mostly in southern Poland. Consider the following examples.

- | | | | | | | |
|----|--------------|-----------------|-------------|-----|-------------------|-----------------|
| i. | Ja- m | widział | dziewczynę. | ii. | Widzia łem | dziewczynę. |
| | I-1SG(M) | saw | girl.ACC | | Saw.1SG(M) | girl.ACC |
| | | ‘I saw a girl.’ | | | | ‘I saw a girl.’ |

The difference between (i) and (ii) concerns whether the suffix *-m*, the marker for 1st singular, occurs on the verb itself (ii), or is detached and reattached to some other preceding element in the example (here the subject pronoun *ja*) (i). Given the distribution of gender suffixes (see (5)), one might suppose that the *-e-* in (ii) is the *masculine* marker. However, when the suffix *-m* is detached, the *-e-* disappears entirely, suggesting that it only functions as part of an epenthesis strategy to break up consonant clusters. Presumably, then, the *masculine* affix is simply null. For more on the phenomenon of “mobile” affixes, see Embick 1995, Borsley and Rivero 1994, and references therein.

(7) Table 2: Morphology in the *nominative, accusative, and genitive* cases

NOUN		Singular			Plural			
		NOM	ACC	GEN	NOM	ACC	GEN	
M	H	-∅	-a		-y/i, -e, -owie	-ów, -y/i		
	P							
	A		-u, -a		-i/y, -e			
	I							
N		-o	-a		-a	-∅		
F		-a	-ę, -∅	-i/y	-i/y, -e		-0, -i/y	
ADJ								
M	H	-y	-ego		-y/i, -y/i		-ych	
	P							
	A		-e		-e			
	I							
N		-e						
F		-a	-ą	-ej				

As might be visible in the table above, Polish mostly uses patterns of syncretism in the accusative to create subgenders. The singular is characterized by an animacy distinction, evident through whether the accusative form is syncretic with the nominative or the genitive. A genitive-accusative syncretism isolates the set of animate nouns, which includes the human and pejorative nouns, while a nominative-accusative syncretism isolates the inanimate nouns. The nominative makes no subgender distinctions (and neither does singular verb agreement, cf. (6)). Note that animacy in the language is not a pure semantic category. There are many “facultative animate” inanimate nouns (Swan 2002: 76-79), or rather, nouns which grammatically function as animate nouns, despite being semantically inanimate; these include, for example, *grzyb* ‘mushroom,’ *guz* ‘bruise,’ and *szampan* ‘champagne.’ The syncretisms are illustrated below with example nouns.

(8) SINGULAR (MASCULINE)

	H	P	A	I
NOM	sąsiad	karzeł	pies	stół
ACC	sąsiad-a	karł-a	ps-a	stół
GEN	sąsiad-a	karł-a	ps-a	stoł-u
	<i>neighbor</i>	<i>dwarf</i>	<i>dog</i>	<i>table</i>

In the plural, the relevant set of syncretisms per subgender shifts, marking instead roughly a human, non-human distinction. Again, the form of the accusative is particularly telling, with a genitive-accusative syncretism identifying the set of human and pejorative nouns and a nominative-accusative syncretism the set of animate and inanimate nouns (the set of non-human nouns). In the plural, the

nominative also makes a human, non-human distinction, which excludes the pejorative. Note that it seems likely the pejorative derives its special “derogatory” flavor from the fact that it straddles the human, non-human boundary. The syncretisms are illustrated in (9) below with example nouns.

(9) PLURAL (MASCULINE)

	H	P	A	I
NOM	sąsiedz-i	karł-y	ps-y	stoł-y
ACC	sąsiad-ów	karł-ów	ps-y	stoł-y
GEN	sąsiad-ów	karł-ów	ps-ów	stoł-ów
	<i>neighbor</i>	<i>dwarf</i>	<i>dog</i>	<i>table</i>

The human, non-human distinction is also represented in the verbal domain. In the plural, past tense verbs mark whether the subject is masculine human or not, termed virile and non-virile respectively.³

(10) *Być* ‘to be’ (plural, past)

	V.PL	NV.PL
1	byliśmy	byłyśmy
2	byliście	byłyście
3	byli	były

The plural set of verbal gender markers in Polish can be identified as:

(11) VIRILE PLURAL: *-i*⁴
 NONVIRILE PLURAL: *-y*

Given this distinction of virile, non-virile, which is relevant for adjectival agreement, verbal agreement, and nominal marking in the plural (particularly the nominative and accusative cases), it is useful to discuss what properties contribute to making a noun virile for case and agreement. Unlike the class of animate nouns, which seems to be purely grammatical (given the numerous semantic exceptions), the class of virile triggering nouns follows strict criteria. According to Rappaport (2011), four conditions must be met to trigger virile agreement: the noun must be (a) plural, (b) grammatically masculine, and (c) refer to a human, which (d) is

³ I will adopt the convention of glossing verbs as either V(irile) or NV(non-virile) in the plural. This simplifies the gloss, given that we do not want to represent all four subenders on the verb. The V-NV distinction can then be seen as being faithful to the morphological form, and not necessarily the gender of the noun which triggered it.

⁴ The morpheme *-i* triggers “softening” (a type of palatalization) of the preceding *-t* consonant, the past tense marker. Softening changes the *-t / w /* into a “soft” consonant *-l / ɫ /*. This process occurs throughout the grammar and has nothing to do with the verb itself, i.e. the sequence *-ti* is simply illicit in a Polish syllable.

biologically male. Thus, nouns which can refer to male humans, but are not grammatically masculine, such as *osoba* ‘person’ or *ciapa* ‘oaf, dullard’ do not trigger virile in the plural; likewise, nouns which are grammatically masculine but refer to a female human, such as *babsztyl* ‘old hag’ or *kopciuch* ‘slut,’ do not trigger virile in the plural either. It is only when each of the properties line up, i.e. a grammatically masculine noun referring to a male human, that virile agreement is triggered. Rappaport models this by treating virile as a composite of features, roughly GENDER (*masculine*), HUMAN (*human*), SEX (*male*), and NUMBER (*plural*).

It should now be clear why gender in Polish presents such a complicated issue – the singular and plural appear to identify different subgenders in the *masculine*, which have no morphological relevance in the other number. Singular marks animacy, while plural marks human-ness, and the two do not interact. This holds for nominal marking, adjectival agreement, and verbal agreement. *Neuter* and *feminine* are much simpler, apparently lacking subgenders; however, they are also relevant for nominal marking, adjectival agreement, and verbal agreement. This concludes our discussion of agreement morphology in Polish; I turn now to the feature system necessary to capture these distinctions.

4.2.1.2 The feature system

Polish makes a three-way person distinction (1, 2, 3) and a two-way number distinction (singular, plural); as discussed in chapter 2, section 2.4.3, I adopt the following representation of Π (person) and $\#$ (number).

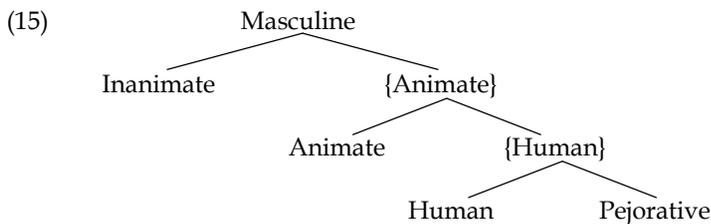
- (12) Person features (Π):
- a. *1st person* = [1]
 - b. *2nd person* = [2]
 - c. *3rd person* = [3]
- (13) Number features ($\#$):
- a. *Singular* = [sg]
 - b. *Plural* = [pl]

Person features are found on agreeing verbs (and on pronouns, which have not been discussed here), and number features are found on nouns, as well as on verbs and adjectives via agreement (and on elements which decline like adjectives, e.g. demonstratives, possessives, etc.).

With regards to gender, we have seen that there are three main genders, *masculine*, *neuter*, and *feminine*, which are reflected in singular verbal agreement, adjectival paradigms, and nominal case inflection. Plausibly then, there is a feature GENDER with three potential values, *masculine*, *feminine*, or *neuter*, as depicted below. This is the feature which verbs are sensitive to in the singular.

- (14) Gender features (GENDER):
- a. *Masculine* = [m]
 - b. *Neuter* = [n]
 - c. *Feminine* = [f]

In addition to gender, we have seen evidence that the *masculine* can be subdivided into four subgenders, *human*, *pejorative*, *animate*, and *inanimate*, these being marked mainly by patterns of syncretism, but also, for the *human* subgender, by nominative morphology, and adjectival and verbal agreement. There are a number of ways we can model this. The simplest is to state that in addition to GENDER, there is some feature SUBGENDER with four potential values, *human*, *pejorative*, *animate*, and *inanimate*. Yet, this ignores the inclusion relations between the subgenders, such as the fact that the set of *human* nouns is necessarily included in the set of *animate* nouns. Borrowing from Corbett (1983: 87), we can schematize the subgender relations as below.



Let us just consider animacy for the moment. The fact that Polish allows many inanimate nouns to pattern with semantically animate nouns would suggest that “animacy” is a property of particular nouns, and not necessarily of their semantics. While there is certainly a strong semantic basis to this subgender (since, as far as I know, all semantically animate nouns are grammatically animate), animacy has spread beyond its initial semantic delineation to also include inanimate nouns; for some interesting discussion on the development of animacy as a category in Polish, see Rappaport (2010) and Janda (1999).⁵ In the synchronic language, then, animacy has become arbitrary to some extent, suggesting that it would also require learning on a case-by-case basis, just like gender. For this reason, it appears necessary to assume a feature ANIMATE, which is valued as either *animate* or *inanimate*. Similarly to gender, this feature would be specified on roots, part of the idiosyncratic information packaged on certain roots. ANIMATE is

⁵ For example, Janda (1999) points out that the marking of animacy in the singular was potentially part of a strategy to remove the ambiguity of subject- and object-hood created by a nominative-accusative syncretism in the masculine gender. Janda claims that the innovation, that being an accusative-genitive syncretism for nouns higher on the Animacy Hierarchy (cf. Silverstein 1976), was triggered by the unambiguous verbs of perception, which governed genitive objects. This innovation then spread down the Animacy Hierarchy, settling roughly on an animate-inanimate distinction in modern-day Polish.

the feature which drives the accusative case syncretisms in the singular (the only indication of the animacy distinction).

- (16) Animacy features (ANIMATE):
 a. *Animate* = [a]
 b. *Inanimate* = [i]

Now, let us turn our attention to the notion of “human.” There are two types of human subgenera, *human* and *pejorative*. With regards to the accusative-genitive syncretism, *human* and *pejorative* nouns behave alike, triggering the syncretism. They differ for nominative morphology on nouns and adjectives and verbal agreement. One solution is to introduce a feature HUMAN into the system, which differentiates the humans from the non-humans. However, unlike ANIMATE, which is not fully predictable from the form or meaning, the HUMAN-ness of a noun is fully predictable; there are no exceptions. This suggests that a feature HUMAN would be entirely redundant. Furthermore, there is evidence that the notion of HUMAN is also available to feminine nouns. For example, the conjunction of a feminine human noun with a masculine animate noun triggers virile verbal agreement, whereas the conjunction of a feminine animate noun with a masculine animate noun does not:⁶

- (17) Dziewczyna i kot spali / *spali.
 Girl.F.SG.NOM and cat.MA.SG.NOM slept.V.PL / *NV.PL
 ‘A girl and cat were sleeping.’

⁶ The situation with conjunction is actually even more complicated. For example, it also seems possible to trigger virile agreement if both conjuncts are human, but neither are masculine (i), if both conjuncts are masculine animate but pursue a human activity (personification?) (ii), or if both are masculine inanimate nouns which denote collections of humans (iii) (and surely there are more possibilities). The examples below are taken from the National Corpus of Polish (Przepiórkowski *et al* 2011).

- i. Żeby **Agnieszka** i **dziecko** **mieli** najlepsze warunki!
 So.that **Agnieszka.FH.SG** and **child.NH.SG** **have.V.PL** best conditions
 ‘So that Agnieszka and the child will have the best conditions!’
- ii. **Koń** i **żółw** **grali** w kości...
Horse.MA.SG and **turtle.MA.SG** **played.V.PL** at dice...
 ‘A horse and turtle placed dice.’
- iii. ...by **rząd** i **Sejm** **zajęli** się sprawami ludzi bez...
 COND **government** and **parliament** **took.up** SIE business people.GEN without
 ‘the government and parliament would take up the affairs of people without...’

Note that the system seems to resist conjunction under an adjective, unless conjuncts have matching features; this is a difference between adjectival and verbal probes, given that verbs are capable of resolving the conflict. Some further work on conjunction in Polish can be found in Ruda (2011), Bogucka (2014), and Willim (2012), with some preliminary comments on virile agreement. More research is needed in this area, but it would take us too far afield in the present work. (Note, *się* is a reflexive marker, obligatory with certain verbs.)

- (18) Krowa i kot spały / *spali.
 Cow.F.SG.NOM and cat.MA.SG.NOM slept.NV.PL / V.PL
 ‘A cow and cat were sleeping.’

It seems likely that the human of the feminine noun is combining with the masculine gender of the second noun to produce virile agreement. “Humanness” does not seem to be a property particular to masculine nouns, *per se*, but rather something derived from the meaning of the noun, which can be manipulated in the syntax. If we combine this with the fact that the notion of human also requires knowledge of whether the natural gender is male (recall that human female-denoting, grammatically masculine nouns do not behave as “masculine human”), then it seems plausible to capture the quirks of *human* and *pejorative* nouns by assuming that what makes them “human” is that they come equipped with natural gender in addition to grammatical gender. Natural gender, then, is taken to be a grammatically relevant notion in the Polish system.⁷ This is not so strange, considering that verbs are required to express the natural gender of the speaker or hearer in the past tense (cf. (5), (10)), suggesting that it is an important concept for Polish grammar. We can represent natural gender as a feature SEX (following Rappaport 2011) which takes two values, *male* or *female*.⁸

- (19) Natural gender features (SEX):
 a. *Male* = [male]
 b. *Female* = [female]

I will generally not gloss this feature, unless necessary, assuming instead that it can be inferred from the meaning of the noun.

What then, about the *pejorative* nouns? They are grammatically masculine, and naturally male, and they also partially participate in the virile pattern, by taking the accusative-genitive syncretism, as opposed to the accusative-nominative syncretism. If the virile pattern is sensitive only to grammatical and natural gender, then *pejorative* nouns should not exist. Thus, to model these nouns,

⁷ An important assumption here is that animals do not have a grammatically relevant natural gender. Although we know animals also have gender, presumably, that fact has no bearing internal to the language system, aside from the formation of lexical pairs, e.g. *klacz* ‘mare’ and *ogier* ‘stallion’ (horses), *byk* ‘bull’ and *krowa* ‘cow’ (cattle).

⁸ Given that natural gender (and humanness) lacks exceptions, it is a bit strange to assume it to be a syntactic feature, as syntactic features do not usually show a 1-1 relation between the value of the feature and the semantic interpretation. Notice, however, that if we do not treat it as a syntactic feature, we face the question of how an agreeing probe is capable of agreeing with the interpretation of a nominal. This is a more general problem involving what has been termed “semantic agreement,” i.e. agreement for semantic properties of nominals, as opposed to syntactic features. Making the offending feature syntactic is one solution, but it amounts to a stipulation, a necessary one given the current state of the theory. For more on semantic agreement, see e.g. Smith 2015a.

an additional diacritic or feature is necessary to block a virile pattern in the nominative. I would like to point out that there seems to be a more general mechanism of pejoratization in Polish, which can take a generally *human* noun, and conjugate it as a *pejorative* noun. For example, taking the nouns *chuligan* ‘hooligan,’ *blażen* ‘clown,’ *oszust* ‘swindler,’ and *bękart* ‘bastard’ (each nouns which Swan (2002) indicates as potentially being *pejorative*), a look into the National Corpus of Polish (Przepiórkowski et al. 2011) finds that while they consistently involve an accusative-genitive syncretism, they seem to have two possible nominative forms, one which would be considered the *human* form and the other which would be considered the *pejorative* form (which Swan claims should trigger virile and non-virile agreement respectively). The table below provides counts, based on searches for GENDER, NUMBER, CASE combinations; hits have not been verified to be true hits, so there may be false positives. All instances of accusative case are syncretic with the genitive and not the nominative, as is expected of a masculine human noun, but their nominative form varies between the special virile form (NOM(H)) and non-virile form (NOM(P)).

(20) Table 3: Counts of four potentially *pejorative* nouns

	ACC=NOM	ACC=GEN	NOM(H)	NOM(P)
<i>chuligan</i>	0	44	1000+	11
‘hooligan’	–	<i>chuliganów</i>	<i>chuligani</i>	<i>chuligany</i>
<i>blażen</i>	0	2	57	144
‘clown’	–	<i>blażnów</i>	<i>blażni</i>	<i>blażny</i>
<i>oszust</i>	0	39	1000+	34
‘swindler’	–	<i>oszustów</i>	<i>oszuści</i>	<i>oszusty</i>
<i>bękart</i>	0	1	18	314
‘bastard’	–	<i>bękartów</i>	<i>bękarci</i>	<i>bękarty</i>

This shows that some nouns can do a double-duty as both *human* and *pejorative*, although they may have a preference towards one or the other. Now, some nouns have been claimed to exist only in the *pejorative* paradigm, motivating this subgender (e.g. *karzeł* ‘dwarf’, Swan 2002, Wertz 1977 as reported in Corbett 1983). However, given that there is also a process of pejoratization, I would like to suggest that, perhaps, such nouns are *pejorative* only by convention, i.e. the linguistic community tends to use certain nouns only in the *pejorative* conjugation, but this does not exclude the possibility that they could similarly undergo “humanization” and pattern with the *human* nouns; the *human* option still exists for these nouns, but it is simply unrealized (see Barbiers (2009) for more on this notion of something being “ungrammatical” versus “unrealized”). Thus, assuming speakers have some way of putting a kind of diacritic on *pejorative* nouns which prevents the noun from functioning as *human* in nominative environments (consequently blocking viral verbal and adjectival agreement), some speakers have conventionalized the diacritic for a particular noun, simply

ceasing to ever remove the diacritic for that noun.⁹ If we adopt this approach, *pejorative* is not really a subgender, but rather a creative strategy for expressing emotional content (see e.g. Corver 2016).

Summarizing, we have three features which are relevant to the gender system of Polish: GENDER (m, f, n), ANIMATE (a, i), and SEX (male, female). In the singular, verbal and adjectival agreement are sensitive to GENDER, and adjectival agreement and nominal case-number-gender portmanteaux's are furthermore sensitive to ANIMATE. In the plural, verbal agreement, adjectival agreement, and the nominative are sensitive to a combination of GENDER and SEX, taking virile morphology only if the values of GENDER and SEX are *m* and *male*, respectively, and otherwise, taking non-virile morphology. A pejorative diacritic can be added, which blocks the usual virile nominative form, and likewise, agreeing adjectival and verbal virile forms. Putting the whole system together, we have the following features in Polish:

- (21) PERSON (π): {1, 2, 3}
 NUMBER (#): {sg, pl}
 GENDER: {m, f, n}
 ANIMATE: {a, i}
 SEX: {male, female}

I turn now to a short discussion of how these features are realized on nouns and in adjectival and verbal agreement.

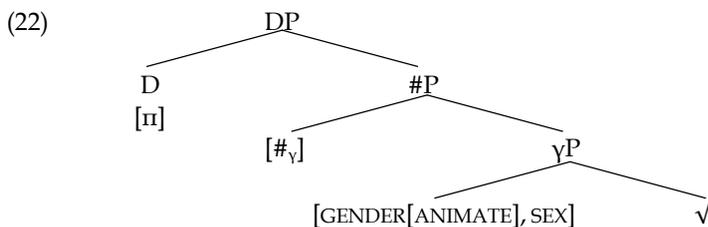
4.2.1.3 Features on nouns, verbs, and adjectives

I start with the representation of features on nominals. As discussed in section 2.4.3, I assume a basic structure involving DP, #P, γP, and the root. These various projections are also host to the differing features. Person features are hosted on D, number features on #, and gender features on γ. More specifically, I adopt the assumption that # and γ and their values are the heads of their respective projections, #P and γP. The representation of γ is the most complex, given that it consists of a composite of three features: GENDER, ANIMATE, and SEX. GENDER is found with all nouns, while ANIMATE and SEX are found only with a subset of nouns. ANIMATE is a subfeature of the GENDER-value *m* (since it is only relevant for masculine nouns) and SEX is presumably present on all nouns which have natural gender (since it seems to show effects on nouns denoting humans of either

⁹ As far as I know, the set of *pejorative* nouns is also a fluid set, and can vary from speaker to speaker. For example, *karzeł* 'dwarf' is the most often cited example of a *pejorative* noun. However, checking with my informant, *karzeł* is neither *human* nor *pejorative*, but simply *animate*; similarly, he treats *blazen* 'clown' and *bękart* 'bastard' as *animate*, and *chuligan* 'hooligan' and *oszust* 'swindler' as *human*, rejecting the *pejorative* paradigms altogether. More differences likely exist among speakers for these nouns.

gender), and hence is not a subfeature of anything. Such features are presumably part of a more complex feature structure (cf. Harley and Ritter 2002), but for our purposes here, it is enough to assume that they form a bundle which sits in γ and behaves together as a unit for Agreement. In other words, Agreement for γ results in feature sharing of GENDER, ANIMATE, and SEX, if each is present; these act together as a complex γ -value.¹⁰

Polish shows a conspiracy, such that throughout the grammar, the plural is sensitive to virility and the singular to animacy; the result is that the two numbers systematically make different gender distinctions. In the system so far, we can express all genders and numbers, but have not captured the relation between γ and #. The Polish gender system seems to be unique, given that the norm cross-linguistically is to remove gender distinctions in the plural, rather than add new ones (Corbett 1991). What is needed to model this is γ information on #, such that when # is valued as *singular*, it marks γ -features related to animacy (GENDER, ANIMATE) and when it is valued as *plural*, it marks γ -features related to virility (GENDER, SEX). The obvious way to model this is through an Agreement relation between # and γ (along with some PF feature-deletion rules), but this is incorrect intuitively, as it predicts that if a noun lacks γ in its structure (suppose it is semi-lexical), # could agree with the γ -value of some noun lower (or higher) in the structure, assuming no phase boundary intervenes; in fact, I will argue numeral 1000 to be a γ -less noun, but as we shall see, its # does not Agree with the γ of the quantified noun. The relation between # and γ seems to require a form of adjacency, preventing # from “agreeing” with the γ of another noun. I lack the tools to model this relation, and will simply assume # also carries γ -information, depicted as $\#_\gamma$. This gives us the following structure for a Polish nominal:



Thus, a canonical noun in Polish consists of a root, dominated by γ P, #P, and DP,

¹⁰ There are good reasons for assuming the three features behave together as one feature γ , rather than three separate, probe-able features. If they were probed separately, we would have to assume verbs and adjectives carry separate ANIMATE and SEX probes, in addition to GENDER. But, while all nouns have GENDER, not all nouns have ANIMATE or SEX, and thus, we would predict default agreement when a noun is not specified for all three features; all feminine and neuter nouns (no ANIMATE features) and all non-human nouns (no SEX feature) would be expected to trigger the same default agreement. Taking there to be a single γ probe which shares GENDER, ANIMATE, and SEX for free bypasses this issue.

with composite γ -features situated in γP , a number value in the # of #P, and a person value in D of DP. The feature γ is a composite feature, consisting of GENDER, ANIMATE (a subfeature of the GENDER value m), and SEX, which participates as a single unit in Agree relations; finally, # also carries γ -information.

Turning to verbs and adjectives, these will function only as a diagnostic for the feature content of nominals in this chapter, and thus, their internal structure is irrelevant. Instead, I focus on their set of probes (unvalued features). Verbs mark person, number, and gender, and thus, I take them to carry unvalued π , #, and γ , e.g. $_\pi$, $_\#$, and $_\gamma$, respectively. Adjectives mark gender and number, and thus, I take them to carry unvalued # and γ , e.g. $_\#$ and $_\gamma$. Finally, in line with the feature sharing account of Danon (2011) discussed in section 3.4.1.1. I assume that the highest projection of the nominal domain, in this case D, also agrees for # and γ , thereby making D a phi-complete goal for any external probing. Thus, D carries unvalued # and γ , e.g. $_\#$ and $_\gamma$. I summarize these categories and their features (both unvalued and valued) below.

- (23) Verbs: $[_\pi, _\#, _\gamma]$
 D: $[\pi, _\#, _\gamma]$
 Adjectives: $[_\#, _\gamma]$

This concludes the discussion of the Polish agreement system. I turn now to case.

4.2.2 Case in Polish

Polish has seven cases: *nominative*, *accusative*, *genitive*, *dative*, *locative*, *instrumental*, and *vocative*. In this section, I give a brief overview of the case system of Polish, focusing on its realization in the clausal and nominal domains, and how case is assigned. The vocative is not usually included in treatments of Polish case, given that it does not occur sentence internally, and I similarly ignore it. For a more in depth discussion of Polish case, I direct readers to Przepiórkowski (1999, ch. 5).

Przepiórkowski (1999) argues that the nominative, accusative, and some instances of the genitive, e.g. the genitive of negation and the genitive of nominalization, are structural cases. By the case system developed in chapter 3 (section 3.6.2), this implies that these cases are assigned via the dependent case assignment mechanism. In contrast, the locative, instrumental, dative, and some instances of the genitive are oblique cases; in our system, these are assigned immediately upon Merge by the head which triggers them (e.g. a verb, preposition, etc.) (see section 3.5.3).

Nominative and accusative are the canonical cases of the clausal domain. Nominative case surfaces on subjects and accusative case on objects.

- (24) Dziewczyna widziała krowę.
 Girl.NOM saw.F.SG cow.ACC
 'The girl saw the cow.'

In negated contexts, the case of the object is replaced by genitive case, a phenomenon termed the genitive of negation.

- (25) Dziewczyna nie widziała krowy.
 Girl.NOM not saw.F.SG cow.GEN
 'The girl did not see the cow.'

Przepiórkowski (1999) argues the genitive of negation to be a structural case, given that the oblique cases, namely locative, dative, instrumental, and some instances of genitive, are not affected by the genitive of negation. For example, the verb *ufać* 'trust' selects for a dative object. When negated, it remains dative:

- (26) Ufam krowie.
 Trust.1.SG cow.DAT
 'I trust the cow.'
- (27) Nie ufam krowie.
 No trust.1.SG cow.DAT
 'I don't trust the cow.'

Przepiórkowski (1999) also shows that nominals with structural case, but not oblique case can be predicated of by instrumentals. We see this below, for example, where in (28), a predicative instrumental is permitted, but in (29) not.

- (28) Pamiętam go głupcem. *Structural accusative*
 Remember.1.SG him.ACC fool.INST
 'I remember him (as) a fool.' (Przepiórkowski 1999: 120, ex. 5.88)
- (29) *Brakowało mu oglądy królem. *Oblique dative*
 Lacked.3.N.SG him.DAT luster king.INST
 (Intended: 'He lacked luster as a king.')
- (Przepiórkowski 1999: 121, ex. 5.98)

The genitive of negation allows for predicative instrumentals, suggesting it to be structural.

- (30) ...a nie lubiłem jej prezydentem.
 and not like.1.M.SG her.GEN president.INST
 '...but didn't like (her) as the president.'
- (based on Przepiórkowski 1999: 120, ex. 5.92)

According to the dependent case mechanism of chapter 3, when there are two phi-

bundles in the same locality domain, one is assigned dependent case, the other unmarked case. In Polish, the lower nominal takes the dependent case, realized as accusative or genitive, according to the polarity of the environment, and the higher nominal takes the unmarked case, realized as nominative.

- (31) Polish case assignment, clausal domain:
- | | | | | |
|------------------|-----------------|-----|---|---|
| [locality.domain | DP ₁ | ... | DP ₂ |] |
| | Φ ₁ | | Φ ₂ | |
| | | | | |
| | [NOM] | | [ACC _{Pol:+} /GEN _{Pol:-}] | |

This seems to be another example of domain relativization, where nominals in the scope of negation realize a different dependent case from nominals not in the scope of negation.¹¹

Turning to the nominal domain, genitive seems to be the default case in binominal constructions, also argued to be structural by Przepiórkowski (1999). For example, nominalizations preserve oblique case ((32), (33)), but not structural accusatives; accusative objects become the adnominal genitive ((34), (35)).

- (32) Janek pomaga Tomkowi. *Oblique dative*
 John.NOM help.3.SG Tom.DAT
 'John is helping Tom.'
- (33) Pomaganie Tomkowi (przez Janka)
 Help.GERUND Tom.DAT by John
 'John's helping Tom' (Przepiórkowski 1999: 108, ex. 5.32a&b)
- (34) Janek uderzył Marię. *Structural accusative/genitive*
 Jan.NOM hit.3.M.SG Mary.ACC
 'John hit Mary.'

¹¹ Assuming that the genitive of negation is part of the dependent case mechanism is not without its problems, though the complexities fall beyond the scope of this thesis. One problem, for example, is the fact that the genitive of negation can trigger genitive on multiple arguments, for instance, objects of embedded infinitives:

- i. Mam ochotę uczyć Marię lepić garnki.
 Have.1.SG liking.ACC teach.INF Mary.ACC mold.INF pots.ACC
 'I feel like teaching Mary how to make pottery.'
- ii. Nie mam ochoty uczyć Marii lepić garnków.
 Not have.1.SG liking.GEN teach.INF Mary.GEN mold.INF pots.GEN
 'I don't feel like teaching Mary how to make pottery.'

(Przepiórkowski 1999: 149, ex. 5.199)

Potentially, the case computation proceeds without marking the higher nominal as unmarked, until the edge of the locality domain is reached (supposing this is one big locality domain), an assumption I adopt for case assignment in the nominal domain to capture the fact that the highest nominal receives an external case. If so, each nominal, except the highest, will be marked dependent, e.g. accusative (POL:+) or genitive (POL:-).

- (35) Uderzenie Marii (przez Janka)
 Hit.GERUND Mary.GEN by John
 'John's hitting Mary' (Przepiórkowski 1999: 108, ex. 5.31a&b)

The structural nature of the adnominal genitive is further confirmed by the instrumental predication test (Przepiórkowski 1999), where adnominal genitives permit predication by an instrumental (36), but oblique arguments do not (37):

- (36) Pamiętanie go głupcem *Adnominal genitive*
 Remember.GERUND him.GEN fool.INST
 'Remembering him as a fool'
- (37) *Banie się go prezydentem *Oblique genitive*
 Fear.GERUND SIE him.GEN president.INST
 'Being afraid of him as the president'
 (Przepiórkowski 1999: 121, ex. 5.105 & p. 122: ex. 5.106)

If the genitive case used in binominal constructions is indeed a structural case, we expect that like the other structural cases, it is assigned via the dependent case mechanism. I assume that the lower nominal receives dependent case, which in the nominal domain is realized as genitive, and the higher nominal remains uncased, to be assigned case either by a successive application of dependent case assignment within the nominal domain (in the case of multiple embeddings), or external case assignment either by some oblique case assigner or the dependent case mechanism.

- (38) Polish case assignment, nominal domain:

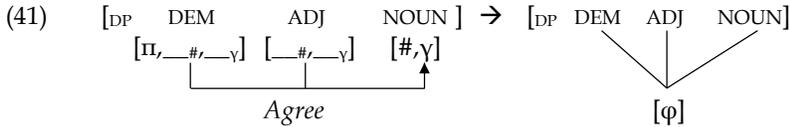
$$\begin{array}{c} [\text{locality.domain DP}_1 \quad \dots \quad \text{DP}_2] \\ \varphi_1 \qquad \qquad \qquad \varphi_2 \\ \qquad \qquad \qquad \qquad \qquad | \\ \qquad \qquad \qquad \qquad \qquad \text{[GEN]} \end{array}$$

A final point to be made concerns processes of case concord in the Polish nominal domain. Polish exhibits a substantial amount of concord, with demonstratives, possessives, and adjectives all marking the features of the nominal they modify. They track the gender, number, and case of the head noun.

- (39) Ta mała dziewczyna
 DEM.F.SG.NOM small.F.SG.NOM girl.F.SG.NOM
 'That small girl'
- (40) Z moim ładnym samochodem
 With_{INST} my.M.SG.INST pretty.M.SG.INST car.M.SG.INST
 'With my pretty car'

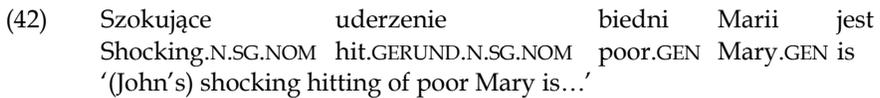
As described in chapter 3 (section 3.6.2), such concord is the result of interspersed

Agreement and case processes. For example, in (39), we expect that first the demonstrative and adjective agree with the noun for gender and number, joining their features into a single phi-bundle, as depicted below:

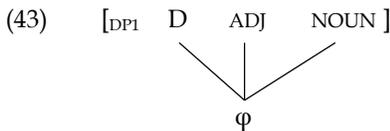


Given that the nominal in (39) is realized as nominative, it is presumably assigned case via the dependent case mechanism, and realizes the unmarked case (nominative). This case is assigned to the phi-bundle, hence the fact that each of the agreeing terminals is marked nominative, despite not carrying a case feature. The same analysis applies to (40), the difference being that an oblique case assigner is responsible for case assignment to the phi-bundle.

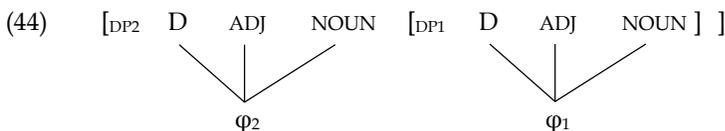
More interesting is an example in which there are multiple levels of embedding and hence, multiple applications of Agreement and dependent case. I repeat example (35) below, with additional modifiers and a verb.



Suppose the DP constitutes a locality domain. This particular DP is constructed out of two DPs, each with an accompanying agreeing adjective. The lower DP would be constructed first, creating a single phi-bundle via Agreement between the adjective, D, and the noun (assuming Agreement is triggered immediately upon Merge).

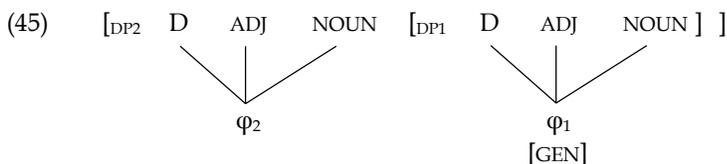


This DP is then embedded inside another DP, which has its own Agreement relations between its D, adjective, and noun.

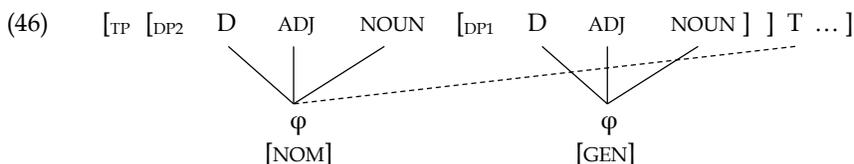


Given two phi-bundles within a single locality domain, we apply the dependent case assignment mechanism which assigns the lower phi-bundle genitive, this

surfacing on each of the terminals. The higher phi-bundle remains uncased.



In our example, the entire DP functions as a subject, also being targeted by Agreement with T and surfacing as nominative. Thus, embedding the DP in Spec,TP, Agreement by T would target the higher phi-bundle, and a subsequent application of the dependent case mechanism would assign nominative case to it, and hence, to each of its terminals.



Case assignment in Polish, particularly in the nominal domain, functions on the output of Agreement. Structural cases (nominative, accusative, some instances of genitive) are assigned via the dependent case mechanism, while oblique cases are assigned by a head immediately upon its Merge in the structure. This concludes our discussion of the case system of Polish.

4.3 Numerals in Polish: The Paradigm

This section investigates the morphosyntactic properties of three cardinal numeral classes in Polish: numerals 1000 and higher (1000+) (section 4.3.1), numerals 5-10 and 100 (5+) (section 4.3.2), and numerals 2-4 (section 4.3.3). Numeral 1 is briefly discussed in the Appendix (section 4.5).

With this section, we begin our first case study of semi-lexicity. Our goal is to identify the lexical entries of each numeral class, deducing their format based on how those numerals interact with case, agreement, *pluralia tantum* nouns, and the distributive marker *po*. Within each numeral class we will identify *deficiencies*, i.e. the inability of the numeral to project a certain piece of nominal functional structure. These deficiencies are the result of semi-lexicity, captured via restrictions in the lexical specification on what the numeral root can and cannot project in the syntax. The semi-lexical effect of such deficiencies is default agreement. The Polish numerals also provide evidence for a second type of semi-lexicity, which concerns restrictions on the syntactic environment the numeral

can surface in. Such restrictions are again the result of semi-lexicality, captured via restrictions in the lexical specification on where the numeral can be inserted. The semi-lexical effect of this type of semi-lexicality is the inability of certain numerals to combine with *pluralia tantum* nouns.

4.3.1 Numerals 1000, 1,000,000, etc.

The numerals 1000 and higher show complex patterns of agreement, which form the main motivation for the lexical specification to be proposed here, given below:

$$(47) \quad \textit{tysiąc} \text{ '1000': } [\sqrt{1000}, (\neg)\text{m}[\text{i}]_{\gamma}]$$

The numerals will be argued to optionally allow the projection of gender (γ P) in the syntax, with consequences for Agreement. In this section, I begin with the morphosyntactic properties of the numerals (4.3.1.1), focusing on their agreement properties (4.3.1.2), eventually proposing the lexical specification above (4.3.1.3).

4.3.1.1 The morphosyntax of numerals 1000, 1,000,000, etc.

The numeral 1000 and higher numerals, like 1,000,000 and 1,000,000,000, are the most nominal of numerals. Numeral 1000 declines like a masculine inanimate noun, taking both singular and plural morphology. The paradigm for 1000 is given below, with the masculine inanimate noun *miesiąc* 'month' (chosen for its similarity in form) added for comparison. *Milion* 'million' and *miljard* 'billion' inflect similarly.¹² I use 1000+ as a shorthand to refer to these numerals together.

(48) Table 4: Paradigm for numeral 1000 and noun *miesiąc* 'month'

	SG	PL
NOM	tysiąc	tysiąc-e
ACC	miesiąc	miesiąc-e
GEN	tysiąc-a miesiąc-a	tysięc-y miesięc-y
DAT	tysiąc-owi miesiąc-owi	tysiąc-om miesięc-om
LOC	tysiąc-u miesiąc-u	tysiąc-ach miesięc-ach
INST	tysiąc-em miesiąc-em	tysiąc-ami miesięc-ami

¹² Even higher numerals presumably do so as well. After *miljard*, there is also *bilion* 'trillion,' *biljard* 'quadrillion,' and *trylion* 'quintillion.' A complete list can be found on Wikipedia, at: https://pl.wikipedia.org/wiki/Liczebni_ki_główn_e_potęg_tysiąca.

Examining the morphological paradigm of numerals 1000+, there is no *a priori* reason to treat them any differently from nouns. They inflect morphologically identically to a masculine inanimate noun, in both singular and plural.

Syntactically, they also resemble nouns. They trigger genitive case on the quantified noun, in both structural (49) and oblique contexts (50), identical to how the masculine inanimate noun *klucz* ‘key/flock’ behaves.

- (49) Tysiąc ptaków / Klucz ptaków
 Thousand.NOM birds.GEN / Key.NOM birds.GEN
 ‘A thousand birds / A flock of birds (flying in a V)’
- (50) Z { tysiącem ptaków / kluczem ptaków }
 With_[INST] { thousand.INST birds.GEN / key.INST birds.GEN }
 ‘With a thousand birds / a flock of birds (flying in a V)’

These numerals inflect morphologically as singular or plural. The plural is used in two ways. One use is to indicate some large quantity which numbers in the thousands or millions, etc.

- (51) Tysiące ptaków
 Thousands.NOM birds.GEN
 ‘Thousands of birds’

The second use is to create complex numerals, in combination with the lower numerals 2-9. When functioning as a multiplier (e.g. 2000 = 2x1000), numerals 1000+ surface as plural. Numerals 2-9 always require the noun they combine with to be plural, and hence, the required plurality of the numerals 1000+ can be seen as another similarity to a noun (we return to numerals 2-9 in 4.3.2 and 4.3.3).

- (52) a. Dwa { tysiące / klucze } ptaków
 Two.M.NOM thousands.PL.NOM keys.PL.NOM birds.GEN
 ‘Two thousand birds / two flocks of birds (flying in a V)’
- b. Pięć { tysięcy / kluczy } ptaków
 Five.NOM thousands.PL.GEN keys.PL.GEN birds.GEN
 ‘Five thousand birds / five flocks of birds (flying in a V)’

This data suggests that the numerals 1000+ are indistinguishable from nouns; however, these numerals do show some semi-lexical behaviors. This becomes more apparent once we consider their patterns of agreement, our next topic.

4.3.1.2 Agreement with numerals 1000+

Like nouns, numerals 1000+ trigger verbal agreement. However, unlike nouns, the success of agreement is subject to a number of constraints. In this section, we consider verbal agreement and conditions on verbal agreement, drawing from the

literature, judgments and the Polish National Corpus (Przepiórkowski et al. 2011).

The numerals 1000+ have garnered less attention in the literature than the other numerals, and reports of how these numerals behave for agreement are conflicting. Swan (2002), for example, reports that they trigger neuter singular agreement (53), unless modified by an adjective like *cały* 'whole' (54).

- (53) Tysiąc żołnierzy zginęło.
 Thousand soldiers.GEN perished.N.SG
 'A thousand soldiers perished.'
- (54) Cały tysiąc żołnierzy zginął.
 Whole.M.SG.NOM thousand soldiers.GEN perished.M.SG
 'A whole thousand soldiers perished.' (Swan 2002: 197)

This neuter singular agreement appears to be an instance of default agreement. If we coordinate two neuter singular nouns, the verb is plural:

- (55) Krzesło i biurko rozbiły się.
 Chair.N.SG and desk.N.SG broke.NV.PL SIE
 'A chair and a desk broke.'

If we coordinate two bare 1000+ numeral-noun complexes, however, the verb still surfaces as neuter singular. This suggests agreement is default.

- (56) Tysiąc ptaków i milion motyli zginęło.
 Thousand birds.GEN and million butterflies.GEN perished.N.SG
 'A thousand birds and a million butterflies perished.'

Miechowicz-Mathiasen (2011) reports, differently from Swan, that the numerals 1000+ optionally trigger agreement in their unmodified form:

- (57) Tysiąc listów przyszło / przyszedł do Piotra.
 Thousand letters.GEN came.N.SG / came.M.SG to Peter
 'A thousand letters came to Peter.'

(Miechowicz-Mathiasen 2011: 5, ex. 6a)

She further reports that if they are accompanied by an agreeing demonstrative, they obligatorily show masculine singular agreement.¹³

¹³ The set of pre-modifiers which can agree with the numeral seems to be subject to inter-speaker variation. My informant, for example, accepts agreeing *cały* 'whole' (cf. (54)), but rejects agreeing demonstratives (cf. (58)).

- (58) Ten tysiąc listów *przyszło / przyszedł do Piotra.
This.M.SG.NOM thousand letters.GEN came.N.SG/came.M.SG to Peter
'These thousand letters came to Peter.'
(Miechowicz-Mathiasen 2011: 5, ex. 6b)

Rutkowski (2006b) reports a similar example, but in addition, he shows that the verb can surface with neuter singular agreement when a modifier is present.

- (59) **Niecały** milion Koreańczyków **wyemigrował** do
Incomplete.M.SG.NOM million Koreans.GEN emigrated.M.SG to
Polski.
Poland
'Almost one million Koreans emigrated to Poland.'
- (60) **Niecałe** milion Koreańczyków **wyemigrowało** do Polski.
Incomplete million Koreans.GEN emigrated.N.SG to Poland
'Almost one million Koreans emigrated to Poland.' (Rutkowski 2006b)

Assuming we are looking at default agreement on the verb in (60), the form of the adjective is quite curious. Morphologically, the form *niecałe* is used in nominative-accusative non-virile plural contexts (see e.g. Table 2, section 4.2.1.1). Thus, if Agreement by the pre-modifier is actually taking place in (60), we expect it to have agreed with something which is non-virile plural. Yet, nothing in the example carries that exact set of features. The numeral is non-virile, but singular, while the noun is plural, but virile.¹⁴ I hypothesize that the adjective is showing default agreement, with the adjectival default being expressed as non-virile plural. The example below also supports this hypothesis:

- (61) Te tysiąc / tysiące chłopców spało.
DEM.NV.PL thousand.SG / thousands.PL boys.GEN slept.N.SG(DEF)
'These thousand / thousands of boys slept.'

Here, it does not matter if the numeral is singular or plural: the demonstrative surfaces with the same form, *te*. Morphologically, *te* expresses non-virile plural, and thus, it is difficult to see how it agrees for non-virile plural both with a

¹⁴ A confounding factor is that the form *niecałe* is also used with neuter singular nouns. Based on the example, a plausible hypothesis would be that *niecałe* has agreed for neuter singular features, perhaps with the numeral. Demonstratives, however, show that this cannot be true. Demonstratives distinguish between a neuter singular form (*to*) and a non-virile plural form (*te*). The form *te* is permitted, but not the form *to*:

- i. **Te** / ***To** milion Koreańczyków **wyemigrowało** do Polski.
DEM.NV.PL / *DEM.N.SG millionKoreans.GEN emigrated.N.SG to Poland
'Those one million Koreans emigrated to Poland.' (Rutkowski 2006b)

Thus, the adjective and demonstrative must express non-virile plural features and the problem of the text remains: nothing in the example carries that exact set of features.

singular and a plural numeral. This issue is solved if we analyze the features of the demonstrative as default features. The form is the same because in neither case has agreement been successful. Thus, the adjective and verb of (60) are characterized by default agreement, which shows that agreement of both the verb and the pre-modifier can be successful (59), or agreement of both the verb and the pre-modifier can fail (60).

A bare numeral may indeed require default agreement, contra Miechowicz-Mathiasen (2011). My informants (n=5), for example, reject sentences in which a bare numeral is accompanied by an agreeing verb (cf. (57)), aligning with the characterization of Swan (2002), rather than Miechowicz-Mathiasen (2011). A look into the Polish National Corpus (using the balanced NKJP subcorpus of 300 million words) also seems to point in this direction. Taking examples where 1000 is not preceded by an adjective, there are 88 hits for neuter singular verbal agreement (=default) and 7 hits for masculine singular verbal agreement (=agreeing).¹⁵ Of the 7 “agreeing” hits, none are genuine, but there are genuine hits for default agreement (not all examples have been verified). Two default agreement examples are included below.

- (62) Przez ciebie **tysiąc kijów spadło** na mój grzbiet!
 By you thousand sticks.GEN fell.N.SG on my back
 ‘Because of you, a thousand sticks fell on my back!’
- (63) Wokół niego **tysiąc gwiazd migotało** na niebie ...
 Around him thousand stars.GEN flickered.N.SG on heavens
 ‘Around him, a thousand stars flickered in the heavens...’

Together, these results suggest that if no pre-modifier is present, verbal agreement is necessarily default.

The second claim in the literature concerns the pre-modifier. If it agrees, the verb must as well (the agreeing pattern, e.g. (59)), but both it and the verb can also be default (the non-agreeing pattern, e.g. (60)). Turning to the Polish National Corpus, the agreeing pattern seems to occur more frequently (returns 187 hits, including false positives) than the non-agreeing pattern (returns 33 hits, again, including false positives).¹⁶ Examples of agreeing ((64)-(66)) and non-agreeing (67) pre-modifiers are given below, with accompanying verbal agreement:

¹⁵ The following searches were used here. The search excludes adjectival material from a pre-numeral position and only identifies examples with verbs immediately following the numeral-noun complex.

i. [pos!=adj] tysiąc [pos=subst] [pos=verb & number=sg & gender=m3]

ii. [pos!=adj] tysiąc [pos=subst] [pos=verb & number=sg & gender=n]

¹⁶ The following searches were conducted to find agreeing and non-agreeing pre-modifiers:

i. Agreeing premodifiers: [pos=adj & gender=m3 & number=sg] tysiąc

ii. Non-agreeing premodifiers: [pos=adj & gender=m3 & number=pl] tysiąc

- (64) ...i **dobry** **tysiąc** kamieni **przemknął** nam
 and good.M.SG thousand.NOM rocks.GEN flew.M.SG us
 nad karkami.
 over necks
 ‘and a good thousand rocks flew over our heads (lit. necks).’
- (65) Do Albanii **dotarł** **pierwszy** **tysiąc** żołnierzy
 To Albania reached.M.SG first.M.SG thousand.NOM soldiers.GEN
 sił międzynarodowych.
 force.GEN international.GEN
 ‘The first thousand soldiers from the international forces reached Albania.’
- (66) Ponieważ **ten** **tysiąc** **zawierał** prawie całą
 Because DEM.M.SG thousand.NOM contained.M.SG almost all.ACC
 śmietankę polskiego towarzystwa...
 cream.ACC Polish.GEN society.GEN
 ‘Because this thousand contained almost all the cream of Polish society’
- (67) **Te** **tysiąc** złotych **przeznaczone** **było** na
 DEM.NV.PL thousand.NOM gold.GEN designed.NV.PL was.N.SG for
 jakiś cel i już **zostało** **wydane**.
 some purpose and already was.N.SG spent.NV.PL
 ‘These thousand gold(Polish currency) were designed for some purpose and have already been spent.’

This is in line with the claim of Miechowicz-Mathiasen (2011) that agreeing pre-modifiers necessitate agreeing verbs. The claim further predicts that if the pre-modifier shows agreement, the verb should not surface with default features. This prediction seems to be confirmed by native speakers and the corpus alike. Native speakers find the pattern only marginally acceptable (accepted by one out of five speakers), and similarly, only one genuine example surfaced in the corpus:¹⁷

- (68) %**Dodatkowy** tysiąc osób **dał-o-by** się
 Additional.M.SG thousand people.PL allow-N.SG(DEF)-COND SIE
 upchnąć w prywatnych pensjonatach.
 push.INF in private.LOC pensions.LOC
 ‘An additional one thousand people would allow themselves to be pushed into private pensions.’

If agreeing pre-modifiers facilitate agreement, we might also expect that the absence of agreement on a pre-modifier blocks verbal agreement. Thus, the

¹⁷ The search was expanded to the 1800m word corpus, given that no relevant examples surfaced in the 300m word corpus. The search was the following:

i. [pos=adj & gender=m3 & number=sg] tysiąc [pos=subst] [pos=praet]

combination of a non-agreeing pre-modifier with an agreeing verb should be unacceptable, a prediction which is confirmed. Speakers (n=5) reject the combination, and similarly, no genuine examples surface in the corpus.¹⁸

- (69) ***Dodatkowe** tysiąc osób **dał-by** się
 Additional.NV.PL(DEF) thousand people.PL allow.M.SG-COND SIE
 upchnąć w prywatnych pensjonatach.
 push.INF in private.LOC pensions.LOC

These results suggest a one-to-one relation between agreement on the pre-modifier and agreement on the verb. If the pre-modifier agrees, the verb necessarily does so as well; if the pre-modifier does not agree, the verb necessarily surfaces as default. There is one further pattern (and to my knowledge unreported). As is shown below, pre-modifiers do not necessarily have to agree with the numeral, and can instead agree into the numeral-noun complex, with the quantified noun. When this happens, verbal agreement is necessarily default.

- (70) **Kolejnych** tysiąc **osób** **przyszło** osobiście albo
 Another.GEN thousand people.GEN came.N.SG in.person or
 zadzwoniło.
 called.N.SG
 ‘Another thousand people came in person or called.’
- (71) **Że tych** tysiąc **górników** od razu **poszło** się...
 that DEM.GEN thousand miners.GEN at once went.N.SG SIE
 ‘...that a thousand miners went at once (to...)’

Based on the literature, the corpus, and speaker judgments, we have established that the availability of masculine singular verbal agreement with numerals 1000+ is dependent on the presence of an agreeing pre-modifier. If no pre-modifier is present, or if the pre-modifier shows default agreement or has agreed with the quantified noun, verbal agreement is necessarily default. I summarize this below, with the expectation that the patterns of numeral 1000 can be extended to numerals 1000+.

- (72) **Conditions on verbal agreement with singular 1000+:**
- a. If the numeral is accompanied by a pre-modifier agreeing with the numeral for masculine singular, verbal agreement is masculine singular.
 - b. If not, verbal agreement is default (e.g. no pre-modifier, pre-modifier surfaces as default, or agrees with the quantified noun).

¹⁸ The search was also expanded to the 1800m word corpus. The search was the following:
 i. [pos=adj & number=pl] tysiąc [pos=subst] [pos=praet]

As a final aside, I would like to note that this condition applies specifically to numeral 1000 in the singular. Swan (2002: 197-198) reports that plural 1000 is most naturally accompanied by default agreement, but normatively, both default and agreeing verbs are acceptable. In line with this, my informant accepts the example below, modified from the corpus, with both plural and default agreement.

- (73) Tysiące pytań przychodziło/przychodziły mi do głowy.
 Thousands questions.GEN came.N.SG /came.NV.PL me to head
 ‘Thousands of questions came to my head.’

Both patterns are fairly common in the corpus, with 103 hits surfacing with an agreeing verb, and 190 hits with default agreement (hits not verified).¹⁹ The morphological marking of plurality seems to facilitate agreement in a similar way as a pre-modifier with singular 1000 does, thus, allowing for optional agreement when the numeral is plural.

This concludes the discussion of agreement with numerals 1000+.

4.3.1.3 Lexical specification of numerals 1000+

In this section, I draw on the preceding discussions and develop the lexical specification of the numerals 1000+. This section relates the behavior of the numerals to the semi-lexicality hypothesis: numerals 1000+ are lexically specified for the availability of gender, with consequences for their morphosyntax.

There are two basic patterns with singular numerals 1000+. If an agreeing pre-modifier is present (74), verbal agreement targets the numeral, surfacing as masculine singular; I call this Pattern 1. If no pre-modifier is present (75)a, or if the pre-modifier is default (75)b or agreeing with the quantified noun (75)c, verbal agreement is default; I call this Pattern 2. I omit plural 1000+ here, which shows both Patterns 1 and 2 when bare.

- | | | |
|------|---|------------------------------|
| (74) | Cały tysiąc ptaków spał.
Whole.M.SG thousand birds.GEN slept.M.SG
‘A whole thousand birds slept.’ | <i>Pattern 1</i>
AGREEING |
| (75) | a. Tysiąc ptaków spało.
Thousand birds.GEN slept.N.SG
‘A thousand birds slept.’ | <i>Pattern 2</i>
DEFAULT |

¹⁹ The following searches were conducted in the 300m word corpus:

- i. Agreeing verbs: [base=tysiąc & number = pl & case=nom] [pos=subst & case=gen] [pos=verb & number=pl]
- ii. Non-agreeing verbs: [base=tysiąc & number = pl & case=nom] [pos=subst & case=gen] [pos=verb & number=sg]

- b. Całe tysiąc ptaków spało.
 Whole.NV.PL thousand birds.GEN slept.N.SG
 'A whole thousand birds slept.'
- c. Całych tysiąc ptaków spało.
 Whole.GEN thousand birds.GEN slept.N.SG
 'A whole thousand birds slept.'

The first puzzle is why the verb must show agreement if the pre-modifier has agreed, as in Pattern 1. The answer is rather simple. If we assume that the numeral itself is responsible for triggering Patterns 1 and 2 (and not the pre-modifier²⁰), then in those cases where a pre-modifier has successfully agreed, it is because the features of the numeral (presumably masculine singular) are available for Agreement. If the pre-modifier can access those features via Agreement, then we similarly expect that the verb can too, hence the fact that agreement on the pre-modifier predicts agreement on the verb. If the pre-modifier does not agree with the numeral, we can conclude that the features of the numeral are not available for Agreement, and thus, neither the pre-modifier nor the verb are predicted to show agreement. If this is the right approach, then it suggests that we are dealing with two versions of the 1000+ numerals, one which can be masculine singular (like a canonical noun) and another which is deficient in some way. Both options are available for use in the grammar, but they have a slightly differing, yet overlapping distribution.²¹

As a base hypothesis, let us assume that we are dealing with two lexical entries for the numeral 1000. Numeral 1000 either projects as a canonical noun, carrying masculine gender and projecting singular or plural number in the syntax, or it projects semi-lexically, the exact conditions to be determined here. Numeral 1000 is morphologically indistinguishable from a canonical noun and also behaves like one for case; furthermore, under Pattern 1, numeral 1000 allows for full Agreement on pre-modifiers, and by extension, agreeing verbs. Let us assume Pattern 1 corresponds to one lexical entry, which involves a root for 1000, specified for the GENDER value *masculine* and the ANIMATE subgender value *inanimate*.

²⁰ There is the intuition that pre-modifiers make the numeral "more nominal," an approach adopted in Jackendoff (1977) for related data. However, while intuitively the numeral seems more nominal (given that it can trigger agreement), this lacks a technical sense, and hence, is not very useful for understanding the semi-lexicity of the numeral.

²¹ Speakers differ with regards to which pre-modifiers allow agreement and which pre-modifiers do not, suggesting that the pre-modifier itself plays a role in facilitating Agreement, rather than just being a diagnostic of the features available on the numeral, as is argued for in the text. However, I have not collected systematic data on the individual grammars of speakers and their use of pre-modifiers, which could be useful for determining whether there are any syntactic differences between those pre-modifiers which facilitate Agreement and those that do not. If such a difference exists, it would argue that Agreement on the pre-modifier is still a "diagnostic," albeit one which applies only under certain circumstances. I leave this issue open.

(76) *tysiąc_A* '1000': [$\sqrt{1000}$, $m[i]_{\gamma}$]

This lexical entry shows the numeral to be no different from a canonical masculine inanimate noun in Polish, which would also consist solely of a root and a gender specification for masculine inanimate, i.e. *m[i]*.

The lexical entry of 1000 which creates Pattern 2 is presumably semi-lexical, given that it does not conform to what we find with canonical nouns, despite otherwise resembling a canonical noun (in terms of form, plurality, and case). This version of numeral 1000 differs only with regards to Agreement, triggering default agreement on the pre-modifier and the verb or allowing the pre-modifier to agree with the quantified noun, which also produces default agreement on the verb. As discussed in chapter 3, section 3.4.2.2, for default agreement to occur, Agreement must have failed, meaning at least one of the unvalued features on the probe remains unvalued. As shown in section 4.2.1.3, Polish verbs carry unvalued person (π), number ($\#$), and gender (γ), and Polish adjectives unvalued number ($\#$) and gender (γ). For default agreement to be possible on both adjectives and verbs, at least one of the features $\#$ or γ must remain unvalued on the probe after Agreement. In the plural, the numeral is capable of triggering both plural and default agreement on the verb.

(77) Tysiące pytań przychodziło/przychodziły mi do głowy.
 Thousands questions.GEN came.N.SG /came.NV.PL me to head
 'Thousands of questions came to my head.'

We can conclude that the plural form of the numeral instantiates both Pattern 1 and Pattern 2; in other words, the plural form corresponds to a canonical plural form or a deficient semi-lexical entry, suggesting that the deficient lexical entry can host $\#$. This leaves γ as the offending feature. Our second lexical entry for numeral 1000 must be deficient, lacking γ and furthermore, preventing γ from being projected at all in the syntax. Because the structure which is projected above deficient numeral 1000 lacks γ , Agreement is predicted to fail on probes carrying unvalued γ . We can represent this as follows, with a negative γ -feature.

(78) *tysiąc_B* '1000': [$\sqrt{1000}$, $\neg\gamma$]

What this lexical entry captures is the fact that the numeral 1000 *is* deficient in its functional structure, while a canonical noun *is not*. Suppose we take a bare root which is not specified for γ . If that root is to be used as a noun, the syntax will build functional structure above it in a particular order, according to the functional sequence (see discussion in chapter 2, section 2.4.2). Thus, a bare root would be Merged with γ to form a γ P, and the γ P would be Merged with $\#$ to form a $\#$ P, and so on, up the structure. If the root is bare and carries no γ -value, the syntax would still build a γ P, given that the canonical nominal structure

includes γ P. Because it has no γ -value, a default value would be assigned to the structure (presumably masculine); a root with a γ -value, on the other hand, would provide its lexically specified γ -value to the γ P. In both cases, whether γ is or is not specified on the root, a γ P will still be projected in a nominal context. Polish numeral 1000 is different. It projects a #P, but it is *blocked* from projecting a γ P. This forced deficiency must be represented in some way. The use of a negative feature depicts this. Deficiency arises because the semi-lexical head is incapable of projecting a certain piece of functional structure. This deficiency is idiosyncratic to the semi-lexical head, and must be related to its lexical specification. The negative feature achieves this.

With that said, we have two lexical entries for 1000, *tysiąc_A* (76) and *tysiąc_B* (78). These are nearly the same, differing only with regards to whether γ is specified, or blocked from projecting; otherwise, the two entries share the same phonology, morphology, and semantics. Aside from the differences in Agreement, there is no further motivation for assuming separate lexical categories. For this reason, I propose that the two actually form a single lexical entry, but whether or not γ is blocked is variable. I represent this with parentheses around the negative part of the feature. If it is blocked, no γ P is included in the structure, with consequences for Agreement; if it is not blocked, a γ P is included in the structure, triggering full agreement.

(79) *tysiąc* ‘1000’: [$\sqrt{1000}$, (–)m[i] _{γ}]

There are two pieces of evidence to support the idea that numeral 1000 can appear in two syntactically different forms. The first comes from the distributive marker *po*, roughly meaning ‘each.’ It obligatorily marks nouns as locative, but acts as transparent to case-marking with “numerals,” which can be taken as evidence that syntactically there are multiple *po*’s (Przepiórkowski 2010, 2013, Przepiórkowski and Patujek 2013). In the example below, the noun obligatorily surfaces with locative case, and not with the accusative of its case environment. With *po*, a noun is obligatorily assigned locative case.

(80) Dałam im po jabłku / *jabłko
 Gave.1SG.F them DIST apple.LOC / *apple.ACC
 ‘I gave them an apple each.’

With numeral 1000, however, there is optionality. *Po* either assigns locative case (as if 1000 is a noun), or acts as transparent to external case assignment (as if 1000 is a “numeral”).²² Both the locative and accusative case forms are acceptable.

²² Notice that the *po*-alternation does not require a pre-modifier for locative case assignment, unlike how Agreement requires an agreeing pre-modifier for successful agreement. I return to this in the following section.

- (81) Dałam im **po** tysiąc / **tysiącu** jabłek.
 Gave.1SG.F them DIST thousand.ACC / thousand.LOC apples.GEN
 ‘I gave them a thousand apples each.’

Przepiórkowski (2010, 2013) and Przepiórkowski and Patujek (2013) argue that there are at least two different types of *po*: one, a locative-assigning preposition found with nouns, and the other, an adnumeral operator, which is restricted to occurring with elements of the category “numeral.”²³ They take prepositional *po* to be free in its distribution, but assume that the more specific adnumeral *po* takes precedence in the context of a numeral. The availability of both a locative and accusative form of numeral 1000 in the example above suggests that both prepositional *po* and adnumeral *po* can combine with 1000; presumably, prepositional *po* is used when 1000 has both γ and # in its structure, and adnumeral *po* when γ is lacking. This suggests that we are indeed dealing with two different numeral 1000s.

A second piece of evidence comes from the conjunction of verbs. We predict that if 1000 is built in a certain way, i.e. either with or without γ , then all things which Agree with 1000 should agree similarly. We have already seen that if numeral 1000 projects γ , both adjectival and verbal agreement necessarily succeed, and if 1000 does not project γ , both adjectival and verbal agreement necessarily fail; mismatches do not occur. We expect the same with conjoined verbs. Both conjuncts should succeed or fail together. This appears to hold true.

- (82) a. *Całe tysiąc ptaków jadł i spało.
 Whole.DEF thousand birds.GEN ate.M.SG and slept.N.SG
 ‘A whole thousand birds ate and slept.’
 b. *Całe tysiąc ptaków spało i jadł.
- (83) a. *Cały tysiąc ptaków jadł i spało.
 Whole.M.SG.NOM thousand birds.GEN ate.M.SG and slept.N.SG
 ‘A whole thousand birds ate and slept.’
 b. *Cały tysiąc ptaków spało i jadł.

Summarizing, we can trace the two patterns of agreement back to properties in the lexical entry of numeral 1000. Numeral 1000 is specified for masculine inanimate gender, but this gender only optionally projects. When γ is projected, numeral 1000 behaves fully like a canonical noun; when γ is not projected, numeral 1000 still behaves like a canonical noun in terms of its case assignment properties and morphology, but it differs with regards to Agreement, triggering default agreement as a result of its deficiency.

²³ Adnumeral *po* is further divided into a case-assigning and a case transparent *po*, in order to account for the lack of genitive case in a genitive of negation context; our discussion of *po* will not address the behavior of adnumeral *po* in different case contexts, and hence, I refer simply to the *po* of numerals as “adnumeral *po*” throughout the text.

4.3.1.4 Speculations on the distribution of gendered 1000+

We have determined that numeral 1000 can be built in two ways in the syntax, projecting γ in one form and omitting γ in the other; this is related to its lexical specification which optionally blocks γ . However, the optionality is not entirely free, and bare 1000 was shown to necessarily trigger default agreement:

- (84) Tysiąc żołnierzy zginęło / *zginął.
 Thousand soldiers.GEN perished.N.SG(DEF) / perished.M.SG
 'A thousand soldiers perished.'

In this section, I speculate on the conditions for the projection of γ . I do not yet have a very satisfactory solution and much of this section is preliminary,

When singular, numeral 1000 can only project γ if a pre-modifier is present; with a pre-modifier, the projection of γ is optional, as both non-agreeing and agreeing pre-modifiers are permitted.

- (85) a. Całe tysiąc żołnierzy zginęło.
 Whole.DEF thousand soldiers.GEN perished.N.SG
 'A whole thousand soldiers perished.'
 b. Cały tysiąc żołnierzy zginął.
 Whole.M.SG.NOM thousand.NOM soldiers.GEN perished.M.SG
 'A whole thousand soldiers perished.'

When plural, γ can freely project or not project, hence both agreeing and non-agreeing verbs.

- (86) Tysiące żołnierzy zginęły / zginęło.
 Thousands soldiers.GEN perished.NV.PL / perished.N.SG
 'Thousands of soldiers perished.'

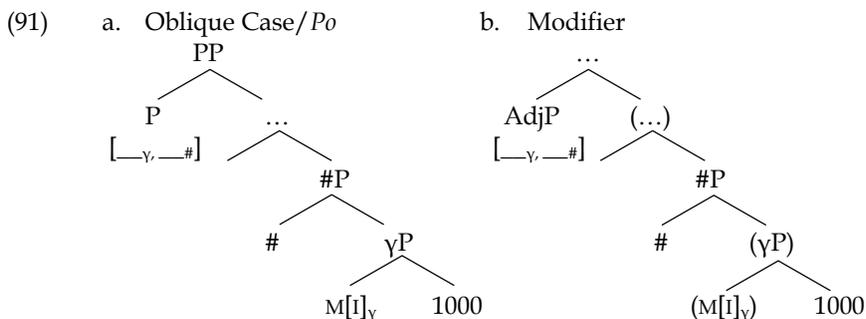
Similarly, when accompanied by *po*, γ seems to optionally project, hence the optionality in terms of case marking (see discussion in 4.3.1.3).

- (87) Dałam im po tysiąc / tysiącu jabłek.
 Gave.1SG.F them DIST thousand.ACC / thousand.LOC apples.GEN
 'I gave them a thousand apples each.'

Thus, we have three situations where γ projects in free optionality - in the presence of a pre-modifier, when 1000 is plural, and when 1000 is preceded by the distributive marker *po*; if 1000 is singular and bare, γ cannot project.

In addition to these environments, there is one environment in which γ necessarily projects, and that is with oblique case assigners. To see this, we need to examine the form of pre-modifiers in oblique contexts. In nominative contexts,

prepositions can agree (Řezáč 2008) and oblique case is assigned by prepositions, silent or overt, in Slavic (Pesetsky 2013). Very roughly, we get the following representations.



It seems to be the case that having additional material above the numeral in some way licenses the projection of γ . However, this cannot be the case with plural 1000, since it is presumably structurally the same as singular 1000; I leave this open.²⁴ As to why oblique contexts require γ to project, this could be related to the nature of oblique case, which seems to have different requirements from non-oblique cases, a question we return to briefly in chapter 5, section 5.4.2.4. For example, oblique case is always assigned at the expense of non-oblique case, which is what we see with oblique objects that should receive accusative or genitive case based on their position (cf. (26) and (27) above; see also Babby 1987). In Serbian, another Slavic language, we also see that indeclinable nouns are blocked from occurring in oblique positions (but not in non-oblique positions), presumably because the oblique case cannot be morphologically realized (Wechsler and Zlatić 2001), and in Russian, oblique case affects the realization of number on nouns quantified by 2, 3, or 4, for example, forcing plural on the noun as opposed to singular (or numberless) (Pesetsky 2013, see also chapter 5, section 5.4.2.4). Together, this suggests a privileged (and manipulative) position of oblique case in the grammar, and this may play a role in forcing numeral 1000's γ to project in oblique contexts.

²⁴ I am not entirely convinced that this is a syntactic process. Under a bottom-up approach to structure building, anything above the numeral will be too "late" to affect whether γ is included or not. Dotlačil (2015) argues that parsing involves both bottom-up and top-down structure building, interlaced together; it seems plausible to me that this simultaneous top-down, bottom-up structure building could provide the window for speakers to insert γ , specifically when additional material dominates the numeral (whereas the numeral is stuck as γ -less otherwise). There may also be a morphological component to this phenomenon, as plural 1000 allows both default and agreeing verbs, even without a pre-modifier. Here, it seems to be the plural morpheme which is the cue that γ can be inserted. (Alternatively, the plural could be subsumed under the class of "projecting" contexts, if the plural projects and the singular does not).

4.3.1.5 Summary

In the following tables, I summarize the patterns of the 1000+ numerals. The numeral is compared to the behavior of an adjective and noun.

Table 5 concerns patterns of Agreement found with the numerals. “Full” refers to full γ and # agreement, and “def” refers to default agreement, neuter singular on verbs and non-virile plural on pre-modifiers. The table reports the agreement patterns of both pre-modifiers (adjectives, demonstratives) and verbs for configurations involving a numeral and noun (Num + N) or two nouns (N1 + N2). With γ , numeral 1000 behaves like a canonical noun, triggering agreement with the numeral; without γ , numeral 1000 is deficient, triggering default agreement and allowing the pre-modifier to agree with the quantified noun.

(92) Table 5: Patterns of Agreement

	PRE-MODIFIER Agrees with	as	VERB Agrees as
1000 γ + N	Num	Full (Num)	Full (Num)
1000 _(no γ) + N	Num N	Def GEN	Def
N1 + N2	N1	Full (N1)	Full (N1)

Table 6 address patterns of case. If case on an element corresponds to the case of the external environment, a checkmark ✓ is used; otherwise, the case which appears in that environment is indicated. Numeral 1000 behaves like a canonical noun with regards to case.

(93) Table 6: Patterns of case assignment

	NOM/ACC environment		OBL environment	
	Num	N	Num	N
Adj	✓	✓	✓	✓
1000+	✓	GEN	✓	GEN
N1 of N2	✓	GEN	✓	GEN

Finally, Table 7 concerns the combinatory ability of the numeral, here focusing on its use with prepositional and adnumeral distributive *po*. Use of a ✓ indicates that the combination is possible, while use of * indicates that it is illicit. Numeral 1000 allows both prepositional and adnumeral *po* showing its ability to pattern with canonical nouns or as a numeral.

(94) Table 7: Combinatory abilities

	Preposition <i>po</i>	Adnumeral <i>po</i>
Adj	✓	*
1000+	✓	✓
Noun	✓	*

Based on these diagnostics, I proposed the following lexical entry for the numeral 1000, which is optionally blocked from projecting γ .

(95) *tysiąc* '1000': [$\sqrt{1000}$, (-)m[i] _{γ}]

Numerals 1000+ illustrate the first type of semi-lexicality we have considered in this dissertation: deficiency. These numerals are specified for a gender value, but they are optionally blocked from projecting a γ P in the syntax, this creating a deficiency in their projection of functional structure. This deficiency in turn creates semi-lexical effects, namely the default agreement that surfaces on pre-modifiers and verbs. When the numerals do project gender, they look identical to canonical nouns in their morphosyntax. However, in the lexicon, they are still semi-lexical (e.g. still specified in some way), but they do not create semi-lexical effects; this makes them identical to a canonical lexical noun.

Semi-lexicality in the form of a deficiency is a type of semi-lexicality we will see repeatedly in this dissertation. Polish numerals 1000+ present our first example of the types of semi-lexical effects that can occur with a semi-lexical head which projects a deficient functional structure.

4.3.2 Numerals 5-10 and 100

I turn to numerals 5-10 and 100, which I call 5+ for short. Other semi-complex numerals which generally pattern the same are numerals 11-19, the tens (20, 30, 40, etc.), and the hundreds (200, 300, 400, etc.); in addition, a number of quantifiers show a similar pattern, including *ile* 'how many,' *wiele* 'many,' *kilka* 'several,' *parę* 'a few,' and *tyle* 'so much, as much' (Swan 2002: 194).

The morphological paradigm is given in (96), with examples in (97). The column labels "non-virile" and "virile" refer to the gender of the noun the numeral quantifies.

(96) Table 8: Paradigm of numerals 5-10 and 100 (5+)

	NON-VIRILE	VIRILE
NOM	-Ø	
ACC		
GEN	-u ²⁵	
LOC		
DAT		
INST	-oma, -u	

- (97) 5: *pięć, pięci-u, pięci-oma / pięci-u*
 10: *dziesięć, dziesięci-u, dziesięci-oma / dziesięci-u*
 100: *sto, st-u, st-oma / st-u*
 ile: *ile, il-u, il-oma / il-u* 'how many'

The paradigm of 5+ numerals is distinct from the paradigms of nouns, adjectives, and verbs, making far fewer distinctions. Most obvious is the lack of a singular, plural paradigm, which was present with the 1000+ numerals. The paradigm of the 5+ numerals is unique, and as a result, the paradigm has been interpreted in different ways, with consequences for the set of possible analyses. In this section, we start with a discussion of the literature (section 4.3.2.1), focusing on interpretations of the case value of the numerals, which has consequences for how we interpret the morphology. We then turn to the morphosyntax of the numerals (section 4.3.2.2), and finish off with a discussion of the semi-lexicality of the 5+ numerals (section 4.3.2.3). Based on a comparison with semi-lexical 1000, I propose the lexical specification given below:

- (98) *pięć* '5': [[_{#P} [$\sqrt{5}$]], $\neg\gamma$, $\neg\#$]

The numerals 5+ are prevented from projecting either γ or $\#$, and similarly, they must occur in the context of a $\#P$, which is provided by the quantified noun (or numeral, if 1000+). The contextual specification introduces us to a second type of semi-lexicality: restrictions on the context in which a semi-lexical root can be inserted.

4.3.2.1 Interpreting the morphology: Approaches in the literature

Of the Polish numerals, the 5+ numerals are the most well-studied, and even today, their synchronic status is a matter of debate (e.g. Doroszewski 1952, Schenker 1971, Franks 1994, 2002, Przepiórkowski 1999, 2004, Rappaport 2003,

²⁵ While syncretic with some case-number-gender portmanteaux's in modern-day Polish, the *-u* suffix is historically borrowed from the genitive dual suffix for nominals (Dziubała-Szrejbrowska 2014: 93), and is therefore presumably independent of them.

Rutkowski 2002b, Miechowicz-Mathiasen 2012a, Willim 2015, among others). The system of syncretism in the nominal and adjectival domains makes determining the case or gender values of the numerals rather difficult. As discussed in section 4.2.1, plural adjectives and nouns show a nominative-accusative syncretism for non-virile nouns and a genitive-accusative syncretism for virile nouns. The 5+ numerals partially recreate this system, but the virile nominative is not distinct as would be expected. The syncretisms are indicated below with shading.

(99)

	<u>Noun</u>		<u>Adjective</u>		<u>Numeral</u>	
	NV	V	NV	V	NV	V
NOMINATIVE						
ACCUSATIVE						
GENITIVE						

Most of the controversy revolves around the question of how to interpret the case value of the non-distinct virile nominative cell – is it syntactically nominative with the nominative form coincidentally being syncretic with the accusative and genitive? Or is the syncretism informative, with the numeral being either syntactically accusative or genitive when in a nominative context? This choice has consequences for the analysis of these numerals, and hence, we will spend some time sifting through the alternatives.

Przepiórkowski (1999), among others, easily discards the “syntactically nominative” hypothesis. In a system where case and agreement are linked, successful agreement is necessary for case assignment. This predicts that if the numeral is truly nominative, the verb will have agreed with the numeral, a prediction which is easily falsified. In both virile and non-virile nominative contexts, the verb surfaces as neuter singular.

(100) Pięć ptaków spało.
 Five.NV.NOM/ACC birds.GEN slept.N.SG
 ‘Five birds slept.’

(101) Pięciu chłopców spało.
 Five.V.NOM/ACC/OBL boys.GEN slept.N.SG
 ‘Five boys slept.’

The neuter singular is an instance of default agreement, something which can be shown by the fact that the conjunction of two numeral-noun constructions (103) does not allow the same agreement as the conjunction of two neuter singular nouns (102), nor is a neuter singular pre-modifier demonstrative permitted (104).

(102) Krzesło i biurko rozbiły się.
 Chair.N.SG and desk.N.SG broke.NV.PL SIE
 ‘A chair and a desk broke.’

- (103) Pięć krzeseł i sześć biurk rozbiło się.
 Five chairs.GEN and six desks.GEN broke.N.SG SIE
 'Five chairs and six desks broke.'
- (104) *To pięć dziewczyn / pięci-u chłopców
 DEM.N.SG five girls.GEN / five-OBL boys.GEN

Note that in our system, where case and agreement are not linked, there is no reason to expect that these numerals cannot be nominative, especially since their case morphology is not directly linked to their Agreement properties.

There are two main alternatives in the literature: the Accusative Hypothesis, AH for short (Schenker 1971; Franks 1994, 2002; Przepiórkowski 1999; Rutkowski 2002b; Miechowicz-Mathiasen 2012a; and many others) and the Nominative-Genitive Hypothesis, NGH for short (Doroszewski 1952; Klockmann 2012, 2014b, 2015). The AH takes the numerals to be accusative in nominative case contexts, whereas the NGH assumes that in a nominative context they are nominative with non-virile nouns and genitive with virile nouns.

The AH takes the syncretism in the virile column to be meaningful, and given that neither virile nor non-virile nouns trigger verbal agreement, assumes them to have identical case properties. The nominative-accusative syncretism in the non-virile column is taken as evidence that nominative in the virile column must be syncretic with the accusative rather than the genitive. Thus, the numerals are marked accusative rather than nominative in a nominative context, as depicted below. The accusative prevents the numerals from triggering agreement when functioning as subjects.

(105)

		Numeral 5					
		NV	V				
NOMINATIVE				} →	ACC		
ACCUSATIVE		pięć	pięciu			} →	GEN
GENITIVE		pięciu					

The AH requires the numerals to be sensitive to the gender of the quantified noun, in order to correctly realize the *pięć* / *pięciu* distinction. This is modeled via an Agreement relation by e.g. Willim 2015, with the numerals carrying unvalued γ .

The challenge for the AH is explaining the accusative case on the numeral in nominative contexts. Rutkowski (2002b) suggests that the numerals lack nominative in their paradigm, accusative being the next best alternative. This suggestion is problematic in light of the fact that nominative is the default case in Polish, rather than accusative.²⁶ Franks (1994, 2002) takes it as a given, suggesting

²⁶ The examples below illustrate nominative as the default case.

- i. a. Ja? Nie chce mi się iść dzisiaj.
 1SG.NOM Not want.3SG me.DAT SIE go.INF today
 'Me (lit. I)? I don't feel like going today.'

in a footnote (2002: 157, fn. 15) that there may be a silent preposition assigning accusative case or perhaps that no case licensing is necessary at all. Miechowicz-Mathiasen (2012a) develops the prepositional hypothesis, arguing that there is a silent light preposition *p* which assigns accusative case in structural case positions, but remains transparent to case assignment in oblique case positions (a necessary assumption to capture the behavior of numerals in oblique environments, see example (116)). While her approach is descriptively adequate, it does not answer the question of why there would be an obligatory null accusative-assigning preposition in the first place.²⁷ Furthermore, Przepiórkowski (1999: 175) reports that Polish lacks accusative subjects, despite having dative and genitive subjects, making it surprising that numerals would be the one exception (see Miechowicz-Mathiasen 2005 for evidence that numerals are subjects). All in all, the motivation for the accusative on the numeral is weak, and an alternative is more desirable.

The second hypothesis, the NGH, also takes the syncretism in the virile column to be meaningful, signifying that the numeral is genitive. Numerals with non-virile nouns are taken to be nominative. This is depicted in (106) below.

(106)

		<u>Numeral 5</u>	
		NV	V
NOMINATIVE		pięć _{NOM}	pięciu _{GEN}
ACCUSATIVE		pięć _{ACC}	pięciu _{ACC}
GENITIVE		pięciu _{GEN}	pięciu _{GEN}

There are two main objections to this hypothesis. The first asks why agreement should fail if the numeral with a non-virile noun is nominative. We've already seen a potential answer to this with the numeral 1000, where its failure to project γ triggers default agreement. Thus, if the numeral is deficient, default agreement is expected; this is the type of approach adopted in Klockmann (2012, 2014b, 2015), Willim (2015), and Ionin and Matushansky (2016). Again, in a system where case and agreement are not linked, being nominative does not necessarily guarantee successful Agreement.

The second objection concerns the relation between case and gender, where the gender of the quantified noun apparently affects the case the numeral receives. While unusual, a correlate of this very phenomenon occurs with the numerals 2-4. Let us peek ahead, and consider the paradigm of numeral 3.

-
- b. On / *go? Nie chce mu się iść dzisiaj.
 3SG.M.NOM/*.GEN/ACC Not want.3SG him.DAT SIE go.INF today
 'Him (lit. he)? He doesn't feel like going today.'

Regardless of gender (virile or non-virile), the default case form is nominative in Polish.

²⁷ See also Willim (2015: 321) for empirical and theoretical objections against this approach.

(107) Numeral 3

	NV	V
NOMINATIVE	trzy	trzej / trzech
ACCUSATIVE	trzy	trzech
GENITIVE	trzech	trzech

Focusing on the nominative cells, the non-virile numeral has only a single form *trzy* while the virile numeral has two forms *trzej* and *trzech*. The *trzech* form imitates the nominative-accusative-genitive syncretism found with the 5+ numerals, while the *trzej* form creates a distinct virile nominative, as is found with nouns and adjectives. The forms correlate with differences in Agreement and case, *trzej* allowing for full agreement and nominative case, and *trzech* only default agreement and a genitive-accusative form of the quantified noun. Under the NGH, we might expect *trzech* to instantiate the genitive (with *trzej* likely functioning as a nominative virile form).

(108) Trzej chłopcy spali.
 Three.V.NOM boys.M.PL.NOM slept.V.PL
 ‘Three boys slept.’

(109) Trzech chłopców spało.
 Three.GEN/ACC boys.GEN/ACC slept.N.SG(DEF)
 ‘Three boys slept.’

The same dual pattern is not available in a non-virile nominative context, which shows only one pattern of Agreement and case, namely the *trzej* pattern.

(110) Trzy dziewczyny spały / *spało.
 Three.NV.NOM/ACC girls.NOM/ACC slept.NV.PL / slept.N.SG
 ‘The three girls slept.’

There is clearly something special about a virile context, virility appearing to license *trzech*, a separate case form from *trzej*. Here, case must be licensed by gender, as virile nouns allow a non-nominative form whereas non-virile nouns do not. In light of this, the NGH requirement that case be conditioned by gender is not a stipulation, but an empirical necessity. The similarities between 2-4 and 5+ argue towards the NGH. That said, the challenge for the NGH is explaining why virile nouns should be genitive in a nominative case context.

Recent approaches deal with this question by making a distinction between the abstract case assigned to the numeral, and the morphological realization of that case, the NGH applying at the level of morphology. Rappaport (2003), for example, assumes an abstract Quantitative case in structural case positions which is realized morphologically as genitive with virile nouns and nominative with non-virile nouns. This approach is a hybrid of the AH and the NGH -

At the same time, they show a number of non-noun-like behaviors. They consistently trigger default agreement (see above), and unlike canonical nouns, pre-modifiers and predicative adjectives have the option of agreeing with the quantified noun in addition to the numeral (114), something impossible in a canonical binominal construction (115).

- (114) a. Te / tych pięć ptaków
 DEM.NV.PL.NOM / DEM.GEN five_{NOM} birds.GEN
 'Those five birds'
 b. Pięć ptaków zostało zjedzone / zjedzonych.
 Five_{NOM} birds.GEN were.N.SG eaten.NV.PL.NOM / eaten.PL.GEN
 'Five birds were eaten.'
- (115) a. Ten / *tej student fizyki
 DEM.M.SG.NOM / DEM.F.SG.GEN student.M.SG physics.F.SG.GEN
 'That student of physics'
 b. Student fizyki był zmęczony/*zmęczonej.
 Student.M.SG physics.F.GEN was.M.SG tired.M.SG/.F.SG.GEN
 'The student of physics was tired.'

Presumably, like with numerals 1000+, the *te* form of the demonstrative and the *zjedzone* form of the adjective is indicative of default agreement.

Another property of the 5+ numerals is that the genitive marking of the quantified noun is necessarily lost in an oblique case environment, being replaced by the oblique case (116). This is ungrammatical with binominals (117), and similarly, with numerals 1000+ (118).

- (116) Z pięcioma studentami
 with_[INST] five.INST students.INST
 'with five students'
- (117) Ze studentem fizyki /*fizyką
 with_[INST] student.INST physics.GEN /*physics.INST
 'with a student of physics'
- (118) Z tysiącem studentów /*studentami
 with_[INST] thousand.INST students.GEN /*students.INST
 'with a thousand students'

Unlike 1000+ and nouns, the 5+ numerals can only combine with adnumeral *po* and not prepositional *po* (see discussion in 4.3.1.3 on *po*). Prepositional *po* assigns locative case and occurs with canonical nouns (and gendered 1000), while adnumeral *po* is transparent for case assignment and occurs with deficient 1000. Numerals 5+ do not allow locative case marking with *po*, which shows that they only combine with adnumeral *po*, and not prepositional *po*.

- (119) Dałam im po pięć jabłek /*pięciu jabłkach.
 Gave.1SG.F them.DAT PO five_{ACC} apples.GEN / five_{LOC} apples.LOC
 'I gave them five apples each.'

The numerals 1000+ were shown to combine with both prepositional *po* and adnumeral *po*, this correlating with whether the numeral projected both γ and # in the syntax, or only #. The behavior of numerals 5+ with regards to *po* suggests that it too is deficient, and possibly, in a similar way to numeral 1000.

The similarities between the numerals 5+ and deficient 1000+ are rather striking: they both produce genitive on the quantified noun, consistently trigger default agreement, allow for agreement with the quantified noun as well as the numeral, and take adnumeral *po*. They differ with regards to oblique case, but this difference is irrelevant given that it does not compare the 5+ numerals to deficient 1000 - only gendered 1000 surfaces in an oblique position (cf. 4.3.1.4). The comparison then could suggest that the numerals are deficient in a similar way, both blocking γ from projecting. However, there are certain areas in which the deficient form of numeral 1000 and the 5+ numerals differ, and these differences prove insightful for understanding the composition of numerals 5+. I now turn to a discussion of those differences.

4.3.2.3 Lexical specification of numerals 5+: Building on deficient 1000

In section 4.3.1.3, I proposed that the deficient form of numeral 1000 was deficient in the sense that it projected #, but not γ . This was supported by the fact that it could be pluralized, and hence, must carry at least #; given that default agreement is triggered by an absence of features, this left γ as the only possible missing feature. The numerals 5+ and deficient 1000 both seem to behave identically with regards to Agreement, and thus, plausibly, the numerals are also deficient. The question then is: in what way are they deficient?

As an initial hypothesis, we might suppose that like deficient 1000, the numerals 5+ carry #, but not γ . However, there are some immediate problems with this hypothesis. We have no evidence that these numerals have access to a #P of their own, given that they lack a singular-plural paradigm (unlike deficient 1000), and seem only to care about the plural-specific virile/non-virile distinction, as opposed to the singular-specific animate/inanimate distinction. This instead suggests that, if anything, these numerals are tied to one # value: *plural*. Another difference concerns their relation to γ . As mentioned in section 4.3.2.1, in order to properly spell-out the numeral in the morphology, the spell-out mechanism must have access to the gender of the quantified noun. No such restriction applies to deficient numeral 1000. Whereas numerals 5+ vary their form according to the gender (virility) of the quantified noun (120), the numeral 1000 does not (121); I include a verb with numeral 1000 to ensure we are dealing with its deficient form.

- (120) Pięciu chłopców, pięć dziewczyn
 Five.V boys.GEN, five.NV girls.GEN
 'Five boys, five girls'
- (121) Tysiąc chłopców / dziewczyn spało.
 Thousand.NOM boys.GEN / girls.GEN slept.N.SG
 'A thousand boys / girls slept.'

This shows that (a) # with the 5+ numerals does not freely project in the same way as it does with deficient 1000 and (b) γ with the 5+ numerals cannot be completely absent as it is with deficient 1000. The deficiency must differ.

As I will argue, the key to this puzzle lies in their differences when combining with *pluralia tantum* nouns. *Pluralia tantum* nouns are those nouns which must project as plural, and, as discussed in chapter 2, are presumably semi-lexical. In Polish, *pluralia tantum* nouns like *drzwi* 'door' and *sanie* 'sleigh' (Swan 2002: 174) are responsible for plural agreement on adjectives, verbs, and even the adjective-like numeral 1 (for more on numeral 1, see the Appendix in section 4.5 of this chapter).

- (122) Te jedno duże drzwi otworzyły się.
 DEM.NV.PL one.NV.PL big.NV.PL door.PL opened.NV.PL SIE
 'That one big door opened.'

The 5+ numerals cannot combine with *pluralia tantum* nouns (Swan 2002, Kim 2009, Saloni 2009), (123)a, and instead, require a different form of numeral, termed the collective (123)b.²⁸ Deficient 1000 shows no such problem (124).

- (123) a. *Pięć sań / drzwi
 Five.CARD sleighs.GEN / doors.GEN
 'Five sleighs / doors'
- b. Pięcioro sań / drzwi
 Five.COLL sleighs.GEN / doors.GEN
 'Five sleighs / doors'
- (124) Tysiąc sań / drzwi zepsuło się.
 Thousand sleighs.GEN / doors.GEN broke.N.SG SIE
 'A thousand sleighs / doors broke.'

²⁸ In addition to *pluralia tantum* nouns, the set of collective numerals are used for human groups of mixed gender (including virile nouns like *student* 'student,' if used to indicate a group of male and female students), paired body parts (e.g. *oczy* 'eyes'), and children and young animals (Swan 2002, Kim 2009, Saloni 2009). Saloni (2009) argues that the collective numerals should be included in the set of cardinal numerals, as an expression of gender agreement. In his view, *pluralia tantum* nouns have their own gender, as do certain neuter nouns denoting humans and young animals; the collective numerals are taken to be an instantiation of agreement with such genders.

Both numeral types are perfectly capable of combining with a canonical plural, suggesting that there is some issue in the combination of a 5+ numeral and *pluralia tantum* noun which does not occur for the deficient 1000. In the rest of this section, we explore why this might be the case, the answer helping us to understand the feature composition of the 5+ numerals.

Pluralia tantum nouns are inherently plural (see Borer 2005: 206, Acquaviva 2008: 5, Kramer 2009: 173, fn. 5, Alexiadou 2011, and Smith 2015a). In this thesis, I have suggested that this means that *pluralia tantum* nouns are semi-lexical and specified for plurality in the lexicon. This specification acts as instructions for the syntax to project a plural in the structure. We can imagine the lexical entry for a *pluralia tantum* noun as follows, using *drzwi* ‘door’ as an example:

(125) *Drzwi* ‘door’: [$\sqrt{\text{door}}$, pl_#, γ]

In a nominal context, both gender and number are obligatorily projected with a *pluralia tantum* noun.²⁹ As a result, a *pluralia tantum* noun is only permitted in those contexts where it can project its features, in the order γ , #. Assuming this, the question remains: why can deficient 1000 combine with a *pluralia tantum* noun but 5+ not? The answer, I propose, lies in the obligatory nature of the projecting plural feature of a *pluralia tantum* noun. With a 5+ numeral, the noun is not able to project its plural feature in a #P as necessary, whereas with deficient numeral 1000, it is.

Morphosyntactically, deficient numeral 1000 is capable of projecting its own #P, which can host singular or plural morphology. As a result, it is possible for the numeral to carry a different number specification from the noun, for example, where the numeral is singular, but the noun plural.

(126) Tysiąc ptaków
 Thousand.NOM birds.GEN
 ‘A thousand birds’

The same option does not exist for the 5+ numerals. They are only sensitive to plurality, as evidenced by their marking of the plural-specific virility; they resemble something which is inherently plural. The numeral and the noun never differ in the number feature they represent – the noun is obligatorily marked plural and the numeral is inherently plural, despite lacking overt plural morphology. As compared to the numeral 1000, the 5+ numeral and noun always involve plurality. Suppose we interpret this to mean that the number features of the two are never independent of each other. In other words, there is only one plural number feature which is “shared” between the numeral and the noun. We can model this relation via a #P which dominates both the numeral and the noun:

²⁹ The identity of the gender value is difficult to determine with *pluralia tantum* nouns. As far as I can tell, they all trigger non-virile agreement, but this tells us nothing about their GENDER or ANIMATE specifications.

(127) [... [#P PL_γ [numeral [noun ...

In essence, the numeral projects between the #P and γP of the noun.³⁰ This could be motivated in a number of ways, but I propose that the numeral is dependent on the #P of the quantified noun for its realization. Suppose the 5+ numerals have a #P in their lexical specification, but are incapable of projecting a #P on their own; instead, they become parasitic on some other element for that needed #P. The noun provides its #, thereby licensing the projection of #P above the numeral.

Returning to the question of a *pluralia tantum* noun, in the environment given in (127), it is not possible for a noun to project its plural feature *under* the numeral. The number feature of the noun instead must come *above* the numeral. This configuration is incompatible with the lexical specification of a *pluralia tantum* noun, which would need to project its #P immediately, i.e. below the numeral. If a classifier-like canonical plural noun is inserted, however, the problem is alleviated.³¹

(128) Pięć *(par) spodni
 Five pairs.GEN pants.PL.GEN
 ‘Five pairs of pants’

In this example, the classifier-like noun takes the *pluralia tantum* noun as its complement, allowing it to project its plural #P as needed. Because the classifier-like noun is a canonical plural, it has no problem combining with the numeral, thus, licensing the construction. As for deficient 1000, in contrast to the 5+ numerals, it has an independent #P, and thus, no need to “borrow” or “share” the #P of the quantified noun. It is presumably Merged in a higher position in the structure, and as a result, can freely combine with *pluralia tantum* nouns.

The proposed structure further gives us a handle on the facts of virility with the 5+ numerals. Recall from section 4.3.2.1 that these numerals vary their form according to the gender of the quantified noun, surfacing in what looks like a genitive form with virile nouns and a nominative form with non-virile nouns.

(129) Pięciu chłopców, pięć dziewczyn
 Five.V(GEN/ACC) boys.GEN, five.NV(NOM/ACC) girls.GEN
 ‘Five boys, five girls’

³⁰ Pesetsky (2013), in his book on Russian numerals, proposes that the numerals 2-4 are Merged in a low position in the nominal domain, numerals 5+ being Merged higher. Interestingly, only the numerals 2-4 are prevented from surfacing with *pluralia tantum* nouns, the 5+ numerals not. This correlation suggests that, like in Polish, the lowness of the numeral prevents it from combining with *pluralia tantum* nouns.

³¹ This is identical to the English facts – numerals do not combine with *pluralia tantum* nouns unless a classifier-like element is inserted, e.g. *one *(pair of) pants, two *(pairs of) pants.*

Under the current approach, the shared #P allows us to model the case alternation, without the need to assume that the numeral carries a gender feature of its own. As mentioned in section 4.2.1.3, there are reasons to believe that # in Polish is also sensitive to γ . Thus, we expect the #P to also carry the γ -information of the quantified noun, i.e. # γ . Assuming the spell-out of the numeral is sensitive to the # and γ information hosted in the #P dominating the numeral, it follows that when gender is specified as virile, the numeral will pattern as virile and when gender is specified as non-virile, it will pattern as non-virile. In other words, it is not necessary for the numeral to have a γ -feature of its own to model the case alternation – the shared nature of the #P is enough to account for this.³²

We started this section with the question of how the 5+ numerals are deficient. After considering their similarities to deficient 1000, and in particular, their differences with regards to *pluralia tantum* nouns, I proposed that these numerals project above the γ P of the quantified noun, sharing its #P. This immediately accounted for their inability to combine with *pluralia tantum* nouns and furthermore, gave us insight on the origin of the gender-based case alternation, which is not present with deficient 1000. In terms of feature composition, these numerals show no evidence of having an independent # or γ value of their own; furthermore, the structure accounts for their relation to plurality and the gender of the quantified noun, and thus, there is no motivation for assigning them agreeing # or γ either. Instead, these numerals seem to be featureless roots, but not simply featureless as a canonical noun would be, but resistant to hosting their own γ and #. We can adopt the following feature representation of these numerals, using 5 as an example.

$$(130) \quad \text{pięć '5':} \quad [[\#P [\sqrt{5}]], \neg\gamma, \neg\#]$$

Again, I make use of negative features to indicate the inability of the numeral to project either γ or #. The numeral is deficient for both features, and hence, is semi-lexical in a deficient way, as the numeral 1000 was. In addition, it is specified for a #P which must occur above the root. This feature captures the dependence of the numeral on a #P in its immediate environment. This is a new type of semi-lexicality, and involves restrictions on the contexts where the numeral can surface. By making the numeral dependent on a canonical #P, we capture the fact that it cannot occur with a *pluralia tantum* noun.

4.3.2.4 Summary

I summarize the patterns of the 5+ numerals, adding to the tables given previously. I start in Table 9 with the patterns of Agreement. Verbal agreement

³² Ora Matushansky (p.c.) points out that under the standard semantic account of cardinals, it will still be necessary to generate the *-operator (semantic plurality) between the numeral and the noun. This implies that the morphological and semantic locus of plurality differ.

with a 5+ numeral is always default and agreement on a pre-modifier varies between agreeing with the numeral as default or the quantified noun as genitive.

(131) Table 9: Patterns of Agreement

	PRE-MODIFIER Agrees with	as	VERB Agrees as
5-10, 100 + N	Num N	Def GEN	Def
1000 _v + N	Num	Full (Num)	Full (Num)
1000 _(no v) + N	Num N	Def GEN	Def
N1 + N2	N1	Full (N1)	Full (N1)

"Full" indicates full agreement for γ and #; "Def" indicates default agreement.

Patterns of case assignment are indicated in Table 10. I indicate the morphological case we find on the numeral, hence, the distinction between virile (v) and non-virile (NV) 5+ numerals. Virile numerals surface morphologically as genitive in a nominative/accusative environment. In nominative/accusative contexts, the numeral triggers genitive on the quantified noun, whereas in oblique contexts, both numeral and noun agree in the oblique case.

(132) Table 10: Patterns of case assignment

	NOM/ACC environment		OBL environment	
	Num	N	Num	N
Adj	✓	✓	✓	✓
5-10, 100 _{NV}	✓	GEN	✓	✓
5-10, 100 _v	GEN	GEN	✓	✓
1000+	✓	GEN	✓	GEN
N1 of N2	✓	GEN	✓	GEN

A checkmark ✓ indicates the case of the case environment surfaces. Otherwise the case which appears in that environment is indicated.

Table 11 indicates the combinatory abilities of these numerals. The 5+ numerals can only combine with adnumeral *po*, not prepositional *po*, and they are prevented from surfacing with *pluralia tantum* nouns, unlike numerals 1000+ and nouns.

(133) Table 11: Combinatory abilities

	Preposition <i>po</i>	Adnumeral <i>po</i>	<i>pluralia tantum</i>
Adj	✓	*	✓
5-10, 100	*	✓	*
1000+	✓	✓	✓
Noun	✓	*	✓

Use of a ✓ indicates that the combination is possible, while use of * indicates that it is illicit.

Based on these diagnostics, I proposed the following lexical entry for the 5+ numerals. They require a #P to project, but are incapable of projecting one on their own. Likewise, they are prevented from projecting their own γ .

$$(134) \text{ pięć '5': } [[\#_P [\sqrt{5}]], \neg\gamma, \neg\#]$$

Our study of semi-lexicality has now identified two ways of being semi-lexical: through deficiency or through contextual restrictions. Both are specified in the lexical entry, given that they are idiosyncratically related to the lexical item.³³ The feature types have different effects in the syntax. The lack of # and γ is related to the default agreement that occurs, as we will discuss in chapter 5. The context specification affects what the numeral can and cannot combine with. It directly interacts with the distribution of the numeral, preventing it from surfacing in those contexts where a canonical noun would. Together, the feature specifications constrain the numeral, contributing to its idiosyncratic paradigm.

4.3.3 Numerals 2-4

Numerals 2-4 decline for gender like adjectives do, but they differ from adjectives in their inflection and for numeral 2, in the distinctions they make. Numeral 2 makes an additional distinction namely, *feminine* gender in the plural. The table in (135) presents the morphological paradigms of the numerals 2-4, and (136) highlights how they differ from the set of adjectival endings (ignoring the accusative which is defined by syncretism). The quantificational elements *obydwa* and *oba* 'both' decline similarly to numeral 2 (see Swan 2002: 190).

(135) Table 12: Paradigms of numerals 2 (*dw-*), 3 (*trz-*), and 4 (*czter-*)

	NON-VIRILE		VIRILE
	F	M/N	V
NOM	dwie	dwa	dwaj, trzej, cztery
ACC	trzy, cztery		
GEN	dwóch, trzech, czterech		
LOC			
DAT	dwom/dwóm, trzem, czterem		
INST	dwie	dwoma	
	trzema, czterema		

Note: Numeral 2 additionally allows the use of *dwu* in oblique cases (GEN, LOC, DAT, INST)

³³ An open question is why a sequence of numerals behaves together, presumably carrying identical lexical specifications. If the system is idiosyncratic, we expect random differences within the numerals. Instead, all the numerals behave identically. Languages may have a preference for sequences of numerals to behave together, but this remains open.

(136)		Adj(PL)	vs.	2, 3, 4
	INSTRUMENTAL:	-ymi	vs.	-ema/oma/iema
	DATIVE:	-ym	vs.	-em/om/óm
	LOCATIVE/GENITIVE:	-ych	vs.	-ech
	NOM.VIRILE:	-y/i, 'y/i	vs.	-j
	NOM.NONVIRILE:	-e	vs.	-y/ie/a

Viewed from a historical perspective, the morphological differences from adjectives are not so surprising. Dziubała-Szrejbrowska (2014: 84-93) notes that numerals 3 and 4 developed from Proto-Slavic nouns, and numeral 2 from a Proto-Slavic demonstrative declension; eventually, guided by the loss of the dual for numeral 2, and the development of dedicated masculine animate forms (later to become the virile forms) in numerals 3 and 4, and subsequently 2, the numerals coalesced into a single class in modern-day Polish. Their morphological paradigms are evidence of their varied and dynamic past, retained against processes of regularization.

The discussion in this section builds towards the following lexical specification. The numerals 2-4 are identical to the 5+ numerals, but have one additional feature: an optional gender probe.

(137) *trzy* '3': [[#P [√3]], ¬γ, (—γ), ¬#]

4.3.3.1 The morphosyntax of numerals 2-4

I start with patterns of case and Agreement, using a nominative context to illustrate their Agreement properties. The numerals 2-4 show a single case-agreement pattern with non-virile nouns and two case-agreement patterns with virile nouns. With non-virile nouns, the numeral agrees with the noun for gender, and both the numeral and noun are marked nominative. Verbal agreement tracks the gender and number of the quantified nominative noun. Here, the numerals 2-4 behave like canonical adjectives.

(138) *Dwie* *małe* *dziewczyny* *spały*.
 Two.F.NOM small.NV.PL.NOM girl.F.PL.NOM slept.NV.PL
 'Two little girls slept.'

This same pattern is available to the numerals in a virile context. The virile nominative has a distinct form, and hence, the numerals are clearly nominative when surfacing as *dwaj* 'two,' *trzej* 'three,' or *czterej* 'four.'

(139) *Dwaj* *mali* *chłopcy* *spali*.
 Two.V.NOM small.V.NOM boys.M.PL.NOM slept.V.PL
 'Two small boys slept.'

The second virile pattern is identical to what the 5+ numerals would do with a virile noun. The numeral surfaces in a form syncretic with the genitive and accusative, and agreement is necessarily default.³⁴

- (140) Dwóch chłopców spało.
Two.GEN/ACC boys.GEN slept.N.SG
'Two boys slept.'
- (141) Pięciu chłopców spało.
Five.GEN/ACC boys.GEN slept.N.SG
'Five boys slept.'

Together, this suggests optionality in the context of a virile noun, which is not present with non-virile nouns.

In an oblique environment, this optionality disappears. The numeral declines for the case of the oblique context, as does the quantified noun, regardless of the gender of the noun. This pattern is similar to what is found with an adjective and also the 5+ numerals: the oblique case surfaces on both elements.

- (142) Z dwiema dziewczynami / dwoma chłopcami
With_[INST] two.F.INST girls.F.INST / two.M.INST boys.M.INST
'With two girls / two boys'
- (143) Z mądrymi dziewczynami / chłopcami
With_[INST] smart.INST girls.INST / boys.INST
'With smart girls / boys'
- (144) Z pięcioma dziewczynami / chłopcami
With_[INST] five.INST girls.INST / boys.INST
'With five girls / boys'

Despite their resemblance to canonical adjectives in the agreeing pattern, the behavior of 2-4 with the distributive marker *po* suggests that they cannot be assigned the feature structure of a canonical adjective. Unlike adjectives, the numerals 2-4 cannot combine with prepositional *po*, and instead, only permit adnumeral *po*. This is shown below, with an adjective+noun combination surfacing as locative (145) and a numeral+noun combination as nominative (notice the accompanying verbal agreement). This holds true both for the non-virile (146) and virile (147) adjective-like uses of the numerals.

- (145) Dałam im **po małym jabłku**.
Gave.1SG.F them PO small.LOC apple.LOC
'I gave them each a small apple.'

³⁴ Swan (2002) remarks that agreeing 2-4 appear more often in written Polish, and genitive 2-4 in spoken Polish.

- (146) Na ławkach **leżały po trzy arkusze** papieru.
 on benches lay.NV.PL PO three.NV.NOM sheets.NOM paper.GEN
 ‘There lay three sheets of paper on each bench.’
 (Przepiórkowski and Patujek 2013: 487, ex. 18)
- (147) Do Senatu **wybierani są po dwaj senatorzy** z
 To Senate elected.V.PL are.PL PO two.V.NOM senators.NOM from
 każdego stanu.
 each state
 ‘Two senators from each state are elected to the Senate.’
 (Przepiórkowski and Patujek 2013: 489, ex. 23)

It also holds true for the virile 5+ like pattern of these numerals.

- (148) Do Senatu **wybierane jest po dwóch**
 To Senate elected.NV.PL is PO two.V.ACC/GEN/LOC
senatorów z każdego stanu.
 senators.GEN from each state
 ‘Two senators from each state are elected to the Senate.’

Adnumeral *po* is required, as opposed to prepositional *po*. This is a little more difficult to see given the accusative-genitive-locative syncretism on the numerals in a virile context. However, we saw in example (142) above that oblique case assigned to numerals 2-4 surfaces both on the numeral and the noun, regardless of the gender of the noun. If preposition *po* is also an oblique case assigner (cf. (91)), then the fact that the quantified noun is not locative is evidence that *po* cannot be assigning locative case here. This is another similarity with the 5+ numerals, which also only combined with adnumeral *po* and not preposition *po*.

Despite showing two patterns of case and agreement, the numerals 2-4 are only compatible with adnumeral *po*, suggesting that despite their adjective-like nature, they are not canonical adjectives.

4.3.3.2 Lexical specification of numerals 2-4

There are two patterns to account for with the numerals 2-4: the adjective-like agreeing pattern found with virile and non-virile nouns alike and the 5+ like non-agreeing pattern found only with virile nouns. In this section, we draw on our understanding of numerals 5+ in determining the feature composition of the numerals 2-4. Like with the other numerals, I assume that these are semi-lexical numerals, and thus, contain a root.

As mentioned at the beginning of this section, these numerals have similar distinctions and syncretisms as adjectives in the plural *do*, aside from an additional form for *feminine* gender. This shows two things. First of all, like adjectives, numerals 2-4 presumably have a gender probe in the agreeing pattern. This gender probe is what creates the resemblance to adjectives, and presumably

is related to the availability of full agreement with these numerals; we address this in more detail in chapter 5. Secondly, like the 5+ numerals, numerals 2-4 are only sensitive to virility and not animacy; this suggests they are related to a single # value: *plural*. Their behavior with *pluralia tantum* nouns also mirrors what we found with the 5+ numerals: numerals 2-4 cannot combine directly with *pluralia tantum* nouns and instead require the mediation of a canonical plural (149) or must surface in the form of a collective numeral (150) (Swan 2002, Kim 2009, Saloni 2009):³⁵

- (149) Trzy pary spodni
 Three.NV pairs pants.GEN
 ‘Three pairs of pants’
- (150) Troje / *trzy drzwi / sań
 Three.COLL / three.NV door.PL.GEN / sleigh.PL.GEN
 ‘Three doors / sleighs’

Presumably, the underlying motivation is the same as we saw for the 5+ numerals: number is “shared” between the numeral and the noun, the numeral being dependent on the noun for the projection of number. The configuration is the following:

- (151) [... [_{#P} PL_γ [numeral [noun ...

I assume this holds for the 2-4 numerals regardless of whether the noun they combine with is virile or non-virile. The incompatibility of *pluralia tantum* nouns and 2-4 numerals relates to the structure above, where the *pluralia tantum* noun does not have the space to project its #P immediately above γP, as it should.

Using the above structure, we can easily model the difference between the agreeing and non-agreeing pattern of the numerals 2-4. In the agreeing pattern, the numerals come equipped with a γ probe, which Agrees with the quantified noun for gender. Carrying a γ probe further correlates with successful verbal agreement, and I will illustrate how this works in chapter 5. In the non-agreeing, virile pattern, the numeral is indistinguishable from a 5+ numeral, both structurally and in terms of feature-content. This is a desirable result, given that there are no differences between the numeral types in the virile pattern. Thus, drawing on our study of the 5+ numerals, I propose the following lexical specification of the numerals 2-4, with an optional γ probe.

- (152) *trzy* ‘3’: [[_{#P} [√3]], ¬γ, (—_γ), ¬#]

The optionality of the γ probe is gender specific, such that it can be omitted with

³⁵ To my knowledge, there are no *pluralia tantum* nouns in the virile paradigm, and thus, it is not possible to verify whether this holds in the virile non-agreeing pattern.

virile nouns, but not with non-virile nouns; I do not have a clear answer as to why this might occur, but expect that it could be a way of emphasizing the virile gender, or an initial step of grammaticalization which affects only a single gender. Note this this requires the numeral to have some information about the gender of the quantified noun, a relation which will be discussed in 5.4.2.3 of chapter 5

The lexical specification involves some familiar and some not so familiar features. The familiar features include the negative features for γ and #, which we have already seen with numeral 1000 and numerals 5+, and the #P embedding the root node, which captures the dependence of the numeral on a canonical #P. The specification includes one new feature, namely the optional gender probe. If the numeral enters the syntax with this feature, it is forced to probe for gender and Agree; if the numeral enters the syntax without this feature, it behaves identically to a 5+ numeral. This feature is similar in nature to the plural specification of a *pluralia tantum* noun: it forces something to be included in the structure of the numeral.

4.3.3.3 Summary

I summarize the patterns of the 2-4 numerals, building on the tables developed previously. Table 13 highlights the Agreement patterns. Numerals 2-4 are distinguished based on the agreeing (virile, non-virile) and non-agreeing (virile only) pattern. The agreeing pattern results in full verbal agreement and what is clearly nominative case on both the numeral and the noun. The non-agreeing pattern resembles what we find with the 5+ numerals.

(153) Table 13: Patterns of Agreement

	PRE-MODIFIER Agrees with	as	VERB Agrees as
2-4 _{NV,V} + N	Num+N	Full	Full
2-4 _V + N	Num+N	GEN	Def
5-10, 100 + N	Num N	Def GEN	Def
1000 _{γ} + N	Num	Full (Num)	Full (Num)
1000 _(no γ) + N	Num N	Def GEN	Def
N1 + N2	N1	Full (N1)	Full (N1)

“Full” indicates full agreement for γ and #; “Def” indicates default agreement.

Table 14 addresses patterns of case. I indicate the morphological case forms that we find. The numerals in non-virile contexts allow only case which matches the case environment, and numerals in virile contexts optionally allow a genitive form on the numeral and the noun.

(154) Table 14: Patterns of case assignment

	NOM/ACC environment		OBL environment	
	Num	N	Num	N
Adj	✓	✓	✓	✓
2-4 _{NV,V}	✓	✓	✓	✓
2-4 _V	GEN	GEN	✓	✓
5-10, 100 _{NV}	✓	GEN	✓	✓
5-10, 100 _V	GEN	GEN	✓	✓
1000+	✓	GEN	✓	GEN
N1 of N2	✓	GEN	✓	GEN

A checkmark ✓ indicates the case of the case environment surfaces. Otherwise the case which appears in that environment is indicated.

Finally, Table 15 concerns the combinatory ability of the numerals. The 2-4 numerals combine only with adnumeral *po*, not prepositional *po*. They do not combine with *pluralia tantum* nouns, like the 5+ numerals.

(155) Table 15: Combinatory abilities

	Preposition <i>po</i>	Adnumeral <i>po</i>	<i>pluralia tantum</i>
Adj	✓	*	✓
2-4	*	✓	*
5-10, 100	*	✓	*
1000+	✓	✓	✓
Noun	✓	*	✓

*Use of a ✓ indicates that the combination is possible, while use of * indicates that it is illicit.*

Based on these diagnostics, I proposed the following lexical entry for the numeral 2-4, which optionally projects probing γ .

(156) *trzy* '3': [[_{#P} [$\sqrt{3}$]], $\neg\gamma$, ($_ _ _$), $\neg\#$]

We have now seen a number of ways of being semi-lexical, and the lexical entry for the numerals 2-4 combines these different ways. The use of a negative feature creates a deficiency in the functional structure of the numeral: unlike a canonical noun, it is prevented from projecting either γ or $\#$ in the structure dominating it. This is semi-lexicality in terms of a deficiency, and creates semi-lexical effects related to deficiency (e.g. default agreement). The use of a $\#P$ embedding the numeral root adds a contextualizing factor to the numeral: it cannot surface in positions where it is not possible to project a $\#P$ in its immediate environment. This feature affects the distribution of the numeral, and makes it dependent on the plural $\#P$ supplied by the quantified noun. Finally, there is the optional gender probe. This feature *adds* something to the structure of the numeral, in contrast to the negative feature, which *takes* something out. These feature types are inverses

of each other, showing that it is possible both to force something to be present (here a gender probe) and to block something from occurring (# and γ).

4.4 Conclusion

We started this chapter by specifying exactly how case and Agreement function in Polish, focusing on the behavior of nouns, adjectives, and Agreeing verbs. Canonical nouns and adjectives were taken as the point of comparison for the Polish numerals, assuming that such a comparison could inform us on how the Polish numerals differ from canonical lexical entries. We then turned to the numerals, carefully detailing the idiosyncrasies of each class of Polish numerals, starting with the numerals 1000+, and then moving towards the numerals 5+ and 2-4. Based on their behavior and the comparison with nouns and adjectives, I proposed the following lexical specifications for the three classes of numerals:

- (157) *tysiąc* '1000': [$\sqrt{1000}$, (\neg)m[i] $_{\gamma}$]
 (158) *pięć* '5': [[$\#_P$ [$\sqrt{5}$]], $\neg\gamma$, $\neg\#$]
 (159) *trzy* '3': [[$\#_P$ [$\sqrt{3}$]], $\neg\gamma$, ($_\gamma$), $\neg\#$]

Each of the numerals is semi-lexical, albeit semi-lexical in different ways. The class of Polish numerals has given us evidence for two main ways of being semi-lexical. It is possible to be semi-lexical via a negative feature. Negative features create deficiencies in the functional structure of the numeral. This type of semi-lexicality is found in each numeral class, with numeral 1000 optionally being deficient for γ , and numerals 2-4 and 5+ showing deficiencies both for γ and for #. We have also seen the inverse of deficiency, namely an additional feature in the syntax. Numerals 2-4 showed this kind of semi-lexicality, with an optional γ probe. This is also the semi-lexicality which characterizes *pluralia tantum* nouns, which obligatorily project a #P. Negative features and additional features are both types of semi-lexicality which affect the functional structure of the semi-lexical head, forcing some feature to be present or absent from the structure of the numeral. I termed semi-lexicality of this type "restrictions on the semi-lexical noun" in chapter 1, section 1.3.2. This is a type of semi-lexicality which we will also encounter in chapters 6 and 7. The second main way of being semi-lexical concerns a feature specification which affects the context which the numeral can be inserted in. Both numerals 2-4 and 5+ are characterized by an inability to surface if no #P can be projected above them. This type of semi-lexicality does not involve deficiency, but it affects the distribution of the numeral. We will also see an example of this type of deficiency in chapter 6. Together, this chapter has found evidence for two of the main types of semi-lexicality presented in chapter 1: restrictions on the semi-lexical noun and restrictions on the context of the semi-lexical noun. In chapter 5, I turn to an illustration of how these lexical

specifications interact with structure building, case, and agreement.

4.5 Appendix: Adjectival Numeral 1

Morphologically, numeral 1 looks very much like an adjective. It makes the same case, number, gender, and subgender distinctions adjectives do, and only differs slightly in its morphological expression of the nominative singular for the masculine and neuter genders (bolded). The table below illustrates the similarities between numeral 1 and a sample adjective *biedny* ‘poor.’

(160) Table 16: Paradigm of numeral 1 *jeden* and adjective *biedny* ‘poor’

	SG				PL	
	MA	MI	N	F	V	NV
NOM	jeden biedn-y		jedn-o biedn-e	jedn-a biedn-a	jedn-i biedn-i	jedn-e biedn-e
ACC				jedn-ą biedn-ą	jedn-ych biedn-ych	
GEN	jedn-ego biedn-ego			jedn-ej biedn-ej		jedn-ym biedn-ym
DAT	jedn-emu biedn-emu					
LOC	jedn-ym biedn-ym				jedn-ych biedn-ych	
INST				jedn-ą biedn-ą		jedn-y biedn-y

The “special” masculine and neuter singular forms can be found in the demonstrative paradigm, which aside from the masculine and neuter singulars also takes the same set of endings adjectives do.³⁶

³⁶ The nominative feminine singular is an exception, taking an *-ę*, instead of *-q*; according to Swan (2002: 171), however, despite the spelling as *tę*, it is often pronounced as *tq*, suggesting the exception may be orthographic.

(161) Nominative form of demonstratives, *jeden*, and adjective *biedny* 'poor'

	DEM	1	'poor'
a. Masculine singular:	ten	jeden	biedny
b. Neuter singular:	to	jedno	biedne
c. Feminine singular:	ta	jedna	biedna
d. Virile plural	ci ³⁷	jedni	biedni
e. Nonvirile plural:	te	jedne	biedne

Notice that the numeral 1 has a plural paradigm, despite referring to a singularity. The plural paradigm is used with *pluralia tantum* nouns, for instance; this contrasts with what we saw for the numerals 2-4 and 5+.

(162) Jedne drzwi / sanie
One.PL door.PL / sleigh.PL
'One door / sleigh'

The same is true of adjectival *każdy* 'every,' another singular-requiring element (163), which uses the same set of portmanteaux suffixes adjectives do. *Każde* also appears in the plural with *pluralia tantum* nouns (164).

(163) *Każde dziewczyny
Every.PL girls.PL
'Every girls'

(164) Każde drzwi / sanie
Every.PL door.PL / sleigh.PL
'Every door / sleigh'

In addition to its use as a numeral, *jeden* can also mean 'some,' in which case we find it in the plural even without a *pluralia tantum* noun.

(165) Jedni chłopcy
One.V.PL boys.M.PL
'Some boys'

(166) Jedne dziewczyny
One.NV.PL girls.F.PL
'Some girls'

Syntactically, numeral 1 behaves no differently from an agreeing demonstrative, possessive, or adjective. It agrees with the quantified noun for γ , #, and case, and triggers verbal agreement in the expected features when in subject position.

³⁷ The virile *-i* morpheme triggers a type of palatalization effect, thus producing a change of *t* to *c* on the demonstrative.

- (167) Jeden chłopiec spał.
 One.M.SG.NOM boy.M.SG.NOM slept.M.SG
 'One boy slept.'
- (168) Jedne drzwi otworzyły się.
 One.NV.PL.NOM door.PL.NOM opened.NV.PL SIE
 'One door opened.'

In oblique positions, it agrees for case, γ , and # with the quantified noun.

- (169) Z jednym chłopcem
 With_[INST] one.M.SG.INST boy.M.SG.INST
 'with one boy'
- (170) Z jednymi drzwiami
 With_[INST] one.PL.INST door.PL.INST
 'with one door'

With regards to the distributive marker *po*, numeral 1 takes prepositional *po* and not adnumeral *po*, suggesting that it is adjectival where *po* is concerned.

- (171) Dałam im po jednym jabłku.
 Gave.1SG.F them.DAT PO one.N.SG.LOC apple.N.SG.LOC
 'I gave them one apple each.'

Based on these diagnostics, we see that the numeral 1 behaves no differently from an adjective for case, Agreement, *pluralia tantum* nouns, and distributive *po*. This suggests that we have little reason to treat it any differently. Assuming Polish adjectives are bare roots in the lexicon which are associated with probing γ and # in the syntax, Polish numeral 1 is also a bare root in the lexicon.

- (172) *Jeden* '1': [$\sqrt{1}$]

This concludes our discussion of numeral 1.

Chapter 5

Polish Numerals: An Analysis

5.1 Introduction

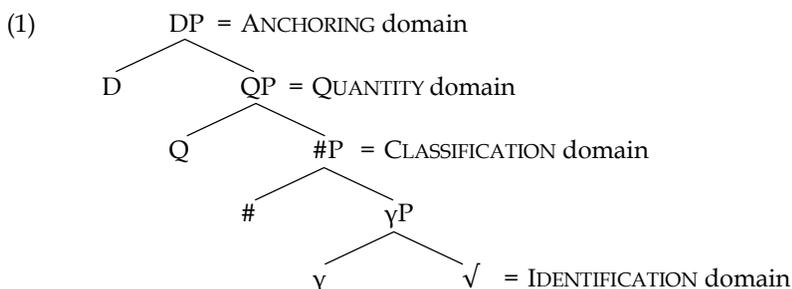
In chapter 4, I developed lexical specifications for the semi-lexical numerals 2-4, 5+ (5-10 and 100), and 1000+ (1000, 1000000, etc.). This was based on a discussion of their morphosyntactic properties, including their paradigms, the case and agreement patterns they trigger, and their behavior with the distributive marker *po* and *pluralia tantum* nouns. Based on the discussion, I proposed the numerals to be semi-lexical in two ways: via restrictions on their projection of functional structure and restrictions on the contexts they can be inserted in. In the current chapter, I illustrate precisely how the lexical specifications of the numerals relate to their syntactic structure, both the structure of the numeral itself and the structure of the numeral in the context of the noun it quantifies. Using these structures, I illustrate how the patterns of case and agreement found with these numerals is derived. This is a matter of applying the case and agreement mechanisms developed in chapter 3 to the structures developed in this chapter.

The chapter is structured as follows. I begin with a general discussion on the position of numerals within the DP, addressing the question of whether they function as heads or specifiers (section 5.2). I adopt the head-analysis, and in the following sub-sections identify the structure of each numeral type, based on its lexical specification, and provide derivations for the case and agreement phenomena. The order in which I address the numerals mirrors the order of chapter 4, and hence, I begin with numerals 1000+ (section 5.3) and then turn to numerals 2-4 and 5+ (section 5.4), which are addressed together. In section 5.5.1, I briefly discuss the analysis in the context of complex numerals, and make suggestions as to how it may apply in other Slavic languages, touching on Russian and Serbian. Section 5.6 discusses the semi-lexicality of the Polish numerals and concludes. The appendix in 5.7 briefly discusses grammaticalization in relation to the analysis presented here.

5.2 Numerals in the structure

5.2.1 Numerals in the quantity domain

In chapter 2, section 2.4.3, I sketched a basic structure for DPs cross-linguistically, which included an identification domain, a classification domain, a quantity domain, and an anchoring domain. In Polish, these correspond roughly to the root, the phi-features of the root (γ P (gender), #P (number)), quantificational elements such as quantifiers or numerals (e.g. QP), and the DP, respectively. This structure is represented below.



Following Wiltschko (2014) and Hachem (2015), I took these domains to be universally available, with the possibility that the categories which instantiate a domain could vary from language to language. This captures, for example, word order effects within the DP cross-linguistically, which appear to follow a template, despite the rampant variation in morphology, word classes, etc. within a DP (see discussion in chapter 2, section 2.4.2; also Greenberg 1963, Cinque 2005, Abels and Neeleman 2006). If this approach is correct, it implies that quantificational elements in a language will appear in the quantity domain, and therefore, they will dominate the classification domain but be dominated by the anchoring domain (and any exceptions will have to be explained). For Polish, the implication is that no matter how semi-lexical, functional, or lexical numerals might be, we expect to find them in the quantity domain.

A second implication of the system is that not all quantificational elements must be Qs. The system is defined in terms of domains, this allowing the space to capture the fact that languages are creative in the categories they use. As such, we would not want to assume that the set of categories used in a particular domain is specified in UG – this would recreate the problem of language-specific categories which the domain-system is intended to avoid (e.g. if categories are pre-specified for domain, then all categories are necessarily pre-specified, and hence, all categories in all languages exist, as in Cartography or Nanosyntax). Instead, we expect that individual languages might define the types of elements which can appear in a particular domain, or, alternatively, it might be enough for

something to surface in the relevant domain to be interpreted as such. This second possibility is highly desirable for the quantity domain, as otherwise the system would have no way of creating new quantifiers or numerals.¹

There is the question of how the system knows what goes in the quantity domain if there isn't necessarily something like a QP. I have two proposals in this regard. The first, as hinted at in the previous paragraph, is that by placing a non-quantificational element in the quantity domain (with the right morphosyntax to indicate its position), it can be interpreted as a quantity; this is a possibility we briefly explore in chapter 6, section 6.4.4.4. The second is that those already established quantificational elements (e.g. "canonical" numerals and quantifiers) have been defined as quantificational by the language system. More explicitly, we can assume a feature "Q" (for quantificational) which indicates that some element has a quantity interpretation and can be used in the quantity domain to say something about the quantity of the noun.² The feature is *ad hoc*, but perhaps future research can say a little more about how elements know where they belong in a sentence. In line with this hypothesis, I add the feature "Q" to each of the lexical entries proposed for the numerals in chapter 4.

- (2) *tysiąc* '1000': [$\sqrt{1000}$, (\neg)m[i]_Y, Q]
 (3) *pięć* '5': [[_{#P} [$\sqrt{5}$]], $\neg\gamma$, $\neg\#$, Q]
 (4) *trzy* '3': [[_{#P} [$\sqrt{3}$]], $\neg\gamma$, ($_$)_Y, $\neg\#$, Q]

Q is a functional feature and connects the numeral to the quantity domain.

5.2.2 Numerals as Heads or Specifiers

There are two main hypotheses on the position of numerals in a structure: either they are generated as heads which select for the quantified noun or they are generated as specifiers. The head-complement structure has been argued for on the basis of, e.g. complex numerals in the Slavic languages (Ionin and Matushansky 2006), processes of case assignment (Brattico 2010, 2011), and word order facts (Rutkowski and Maliszewska 2004, Abney 1987, see also Borer 2005).

¹ Note that this formulation does not exclude the possibility that there is a universal set of features from which categories are constructed. A universal inventory may exist, but again the question is whether the entire feature inventory is universal, or if only part of it is, with other features being deduced on the basis of the input.

² I say *can* here because there are cases of numerals no long functioning in a quantificational way, for instance, *the number three*, *a high five*, *bus six*, and so on. My working hypothesis is that because these elements have a root at their core, the language system can choose to use them as roots without their functional features (crucially without Q), with the result being that they acquire a fully nominal syntax. In Polish, "nominal" numerals can be identified by a special form, e.g. the nominal *piątka* vs. cardinal *pięć* '5' or the nominal *jedynka* vs. cardinal *jeden* '1' (Swan 2002); nominal numerals seem to have a morpheme *-ka*. Further research is needed on the relation between nominal and cardinal uses of numerals.

The specifier analysis has had its fair share of attention as well, from the perspective of, e.g. English (Selkirk 1977, Jackendoff 1977, Zabbal 2005, Kayne 2010), Dutch (Corver and Zwarts 2006), and the Slavic languages (Franks 1994, Bošković 2006, Willim 2015). Certain analyses further assume that both configurations are available, even within a single language, e.g. Giusti 1997, Giusti and Leko 2005, Zweig 2005, Danon 2012.

In the literature on Slavic, we find both specifier and head analyses, as well as combinations of the two. Bailyn (2004), for example, takes numerals in Russian to function as heads in oblique contexts and specifiers of a silent Q-head in structural (nominative, accusative) contexts, an approach also adopted by Pereltsvaig (2006). This is intended to capture the distinction between what Babby (1987) has termed heterogeneous and homogeneous case, i.e. the phenomenon in which the quantified noun of a 5+ numeral appears in the genitive in structural case positions, but oblique in oblique case positions; relevant examples from Polish are repeated below.

- | | | | |
|-----|--|-----------------------------|---|
| (5) | Pięciu studentów
Five.V students.GEN
'Five students came' | przyszło.
came.N.SG | <i>Heterogeneous case</i>
(Structural case contexts) |
| (6) | Z pięcioma
with _[INST] five.INST
'with five students' | studentami
students.INST | <i>Homogeneous case</i>
(Oblique case contexts) |

Bailyn (2004) argues that only empty Q-heads can assign genitive case to the noun, hence the distribution of the numeral as a Q-head (oblique) or a Q-specifier (structural). A conceptual disadvantage to this type of approach is that it requires the numeral to “know” what sort of context it will be embedded in to determine where it surfaces in the structure; basically, it suffers from a look-ahead problem (although a generate-and-filter approach would remedy this).³

Alternative analyses attempt to argue for a consistent structure across case contexts (cf. Babby 1987), whether it be for a head-analysis (cf. Rutkowski and Maliszewska 2004, Ionin and Matushansky 2006, Brattico 2010, 2011, Miechowicz-Mathiasen 2012, Przepiórkowski 1999, among others) or along the lines of a specifier analysis (cf. Babby 1987, Franks 1994, Bošković 2006, and Willim 2015, among others), or some combination of the two, according to properties of the numeral (Giusti and Leko 2005, Veselovská 2001). Both analysis types have their share of advantages and disadvantages, and in this text, I adopt the head analysis.

Arguments for the specifier analysis range from comparisons of the numerals with their historical forms (Babby 1987), to intricate arguments built on

³ Other analyses allow the numeral to vary in its structure, but not necessarily in correlation with the case context (cf. Pesetsky 1982, Franks 1994, 2002, Pereltsvaig 2006). Such analyses are intended to account for agreement effects, interpretational distinctions, etc., and do not have the same look-ahead problem.

the very idiosyncratic behavior of elements like distributive *po* in Russian (Franks 1994). Those very same phenomena have also been used to argue for the head analysis, cf. Rutkowski (2007b) on Old and Modern Polish numerals and Harves (2003) on Russian distributive *po*, suggesting that they do not necessarily constitute evidence in favor of either analysis. Willim (2015), building on Bošković's (2005) study of left branch extraction in the Slavic languages (mostly Serbo-Croatian, but also Russian, cf. Bošković 2006), argues that left branch phenomena in Polish (illustrated below) constitutes a reason for adopting the specifier analysis. Left branch extraction is claimed to target only phrasal constituents (cf. Bošković 2005, 2006, 2008), and thus, the ability of the numeral to be extracted to the exclusion of the noun is an argument in favor of treating it as a phrasal specifier.

- (7) Jak mam mało czasu, nawet dwadzieścia potrafię
 When have.1SG little time.GEN even twenty can.1SG
 poprawić < dwadzieście prac > w godzinę.
 mark twenty papers.GEN in hour
 'When I do not have much time, I can mark as many as twenty
 papers in an hour.'⁴ (Willim 2015: 329, ex. 25)

Arguments for the head analysis often stem from considerations of case assignment. Brattico (2010, 2011), Nelson and Toivonen (2000), and Ionin and Matushansky (2006), for example, come to the conclusion that the distribution of case in the context of a numeral can best be modeled if the numeral is a head, not a specifier. In Inari Sami, a Uralic Sami language with numeral patterns very similar to those in Slavic, numerals 2-6 trigger accusative case on the quantified noun and numerals 7 and higher partitive (Nelson and Toivonen 2000). The choice of case appears to be tied to the value of the numeral, and under a head analysis, this is easily accommodated. Under the specifier analysis, however, the numeral is presumably powerless to affect the case morphology, and instead, this falls to the silent Q-head. To model the right case assignment, the Q-head would need to vary its properties as a function of the value of the numeral in its specifier, a solution which requires a complicated relationship between the numeral, the silent Q-head, and the case value of its complement. Much simpler is to claim that the numeral is directly involved (Nelson and Toivonen 2000, Ionin and Matushansky 2006).

Przepiórkowski (1999) also argues for the head analysis of Polish numerals, citing patterns of ellipsis. He notes that in numeral constructions, ellipsis targets the quantified noun rather than the numeral:

⁴ If only I could!

- (8) a. Pięciu facetów przyszło.
 Five.V guys.GEN came.N.SG
 'Five guys came'
 b. Pięciu przyszło.
 Five.V came.N.SG
 'Five came.'
 c. *Facetów przyszło.
 Guys.GEN came.N.SG
 'Guys came.' (Przepiórkowski 1999: 177-8, ex. 5.273 & 5.274)

In other domains, ellipsis targets the argument of the head. Przepiórkowski (1999) illustrates this for verbal and prepositional complements, the verbal example given below.

- (9) Janek kopnął Tomka, a Maria go pocałowała.
 John.NOM kicked Tom.ACC, and Mary.NOM him.ACC kissed.F.SG
 'John kicked Tom and Mary kissed him.'
 (Przepiórkowski 1999: 178, ex. 5.275)

Based on this parallel, Przepiórkowski (1999) suggests that numerals might likewise be heads.

A final argument concerns adjectival agreement. Polish demonstratives and adjectives with numerals 5+ and deficient numeral 1000 can target the numeral or the noun, surfacing with default non-virile plural morphology in agreement with the numeral or genitive plural morphology in agreement with the noun:

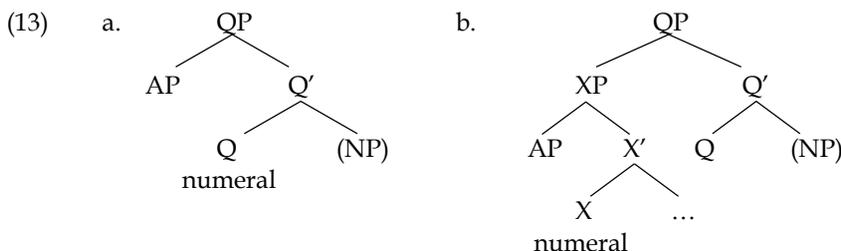
- (10) Te / tych tysięcy dziewczyn
 DEM.NV.PL.NOM/ACC / DEM.PL.GEN thousand girls.GEN
 'Those thousand girls'

Demonstratives like in the example above presumably sit in the DP. However, there are also adjectives which modify the numeral directly, for example *cały* 'whole' which can surface above the numeral, but not below it. Its distribution suggests it could be a specifier of QP (or the highest projection of the quantity domain).

- (11) Całe / całych tysięcy dziewczyn
 Whole.DEF / whole.PL.GEN thousand girls.GEN
 'A whole thousand girls'
 (12) *Tysiąc całych dziewczyn

This adjective is capable of agreeing with both the numeral and the noun. This implies that the configuration is such that the probe of the adjective is in a position to target both elements. By the Agreement mechanism developed in chapter 3,

this requires a c-command relation (see sections 3.4.2.1 and 3.6.1). If the numeral is a head along the main spine of the noun, the adjective can surface in a specifier position to the numeral, thereby sitting in a c-command relation with both the numeral and the noun (13)a. If, however, the numeral sits in a specifier, and the adjective is a specifier to it, then it c-commands only the numeral and not the noun, predicting agreement with the noun to be ungrammatical (13)b. The structures below illustrate the possible relations, but note that the coming analysis of numerals will involve more structure in the place of QP.



Willim (2015) circumvents this issue by assuming multiple specifiers within the QP, one for the numeral, the other for the adjective. If Polish does indeed allow for both a numeral and an adjectival specifier in the same phrase, and crucially enforces an ordering relation between the two (adjective > numeral), then the argument does not hold. However, if such a configuration is problematic, it argues in favor of the head analysis.

In this text, I adopt the head analysis for the numerals considered in this chapter. I leave it open as to how the left branch phenomena cited by Willim (2015) should be accounted for.⁵ I turn now to a syntactic analysis of the case and agreement properties of the numerals, starting with numeral 1000.

5.3 Polish numerals 1000+

5.3.1 *The structure of numeral 1000*

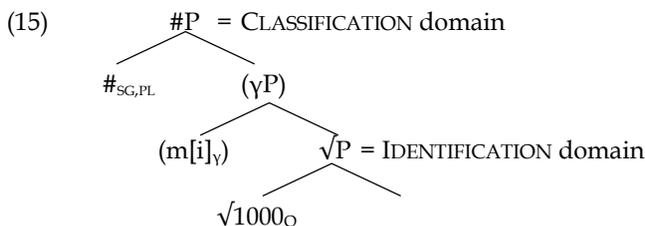
I proposed the following lexical specification of the numeral 1000:

$$(14) \quad \textit{tysiqc} \text{ '1000': } [\sqrt{1000}, (-)m[i]_V, Q]$$

This states that numeral 1000 consists of a root, which carries a Q-feature and optionally projects gender. When gender is projected, it takes the value of

⁵ Possible solutions include remnant movement (Franks and Progovac 1994) or scattered deletion (Fanselow and Ćavar 2002). See also Citko (2006) and Corver (2006).

masculine inanimate, $m[i]$. The lexical specification corresponds to two syntactic structures, according to whether gender is projected in the syntax or not. I assume the following structure for numeral 1000, where the γP may or may not be present:



The structure above only introduces the functional structure of the numeral itself, and not how the numeral should be positioned in the larger structure of quantified noun, a point I return to shortly. Notice that the numeral does not form a QP. I assume that the numerals 1000+ are not QPs, the Q-feature (and its position in relation to the noun) sufficing to mark the numeral as a quantifier.

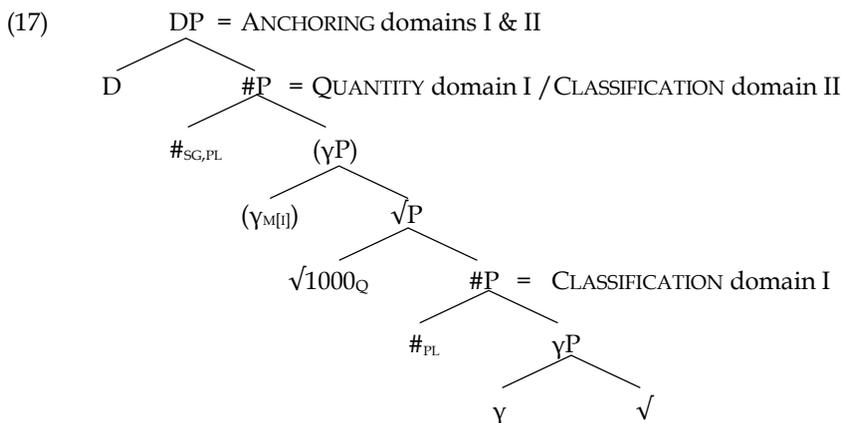
There are a few further points to be made on this structure. Firstly, I assume that the γP and $\#P$ dominating the root form the classification domain of the numeral, just as they would with a canonical noun. Thus, like any nominal, we are dealing with a root and its functional structure. This gives the intuition that the numeral is “nominal,” since it projects canonical nominal structure. Secondly, I have chosen to represent the projection dominating the root node as \sqrt{P} . This choice represents a bigger issue in the syntax of roots, namely, how roots combine with the arguments they select (see e.g. Marantz 1997, 2005, Borer 2005, 2014, Harley 2014, Alexiadou, Borer and Schäfer 2014). There is a notion of argument structure, where the complement of some head must adhere to certain structural and semantic constraints. Very simply, for example, the intransitive verb *sleep* in English does not take an internal argument, while the transitive verb *hit* must combine with a DP argument (*hit the wall*). Assuming that there is some root HIT, it necessarily combines with a complement, and the question is how that should be represented; does the root combine directly with its complement (Marantz 1997, Harley 2014), or is there some functional projection mediating that combination (Borer 2005, Marantz 2005, Alexiadou and Lohndal 2013)?



The same question applies to the numeral 1000. Numeral 1000 selects for a plural nominal, suggesting that the numeral also has restrictions on what it combines

with.⁶ For simplicity, I represent this relation using \sqrt{P} – the numeral root combines with a complement, and I take it to be direct complementation as in (16)a above.

Given the Q-feature of the numeral (illustrated here via a subscript Q), the numeral belongs to the quantity domain of the nominal. Assuming the numeral is a head in the extended projection of the noun, it therefore projects its own classification domain within the quantity domain of the noun:



As regards the selectional properties of the numeral, it combines directly with a plural #P. While this appears like a case of structural selection, the structure does not necessarily follow from the selectional properties of the numeral (though the need for a plural feature does). As for the functional sequence, the construction of the quantity domain necessarily follows the construction of the classification domain. Given that the classification domain “ends” with a #P, the structure is, in fact, conforming to the demands of the functional sequence. Thus, it is not necessary that the numeral selects for a #P, as this is what we expect to be built according to the functional sequence.⁷ The second comment concerns the absence of a QP in the structure, as mentioned previously. Here, the position of the numeral with its Q-feature seems to be sufficient to guarantee its interpretation as a quantificational element.

The projection of a second classification domain (belonging to the numeral)

⁶ Whether the requirement for plurality is encoded as a property of the root, or can be derived from the semantics of the numeral remains open, and I have not encoded the plurality requirement of the numeral in its lexical specification.

⁷ The requirement that the structure under the numeral project to a #P again may be related to the semantics of the numeral itself, in relation to its Q-feature. Borer (2005), for example, conceptualizes numerals as “counters,” which function on divisions to produce sets of a particular quantity. The division, which requires plurality, is a prerequisite for a numeral counter. Something along these lines may be responsible for the fact that the structure under the numeral projects to a #P and cannot, for instance, be mass.

within the extended projection of the noun suggests that a process of domain embedding is possible. Thus, we find that the numeral and its functional structure form the quantity domain of the noun, with the numeral projecting its own identification and classification domains. The functional sequence seems to have been “restarted” within the extended projection of the noun. This is further supported by the behavior of adjectives and other quantifiers in combination with the numeral 1000. A quantity domain can usually be projected on top of a classification domain, and as it turns out, this is possible within this embedding of domains with numeral 1000. Thus, numeral 1000 can combine with other numerals and quantifiers:

- (18) Dwa tysiące ptaków
Two.M.NOM thousands.NOM birds.GEN
‘Two thousand birds’
- (19) Pięć tysięcy ptaków
Five_{NOM} thousands.GEN birds.GEN
‘Five thousand birds’
- (20) Kilka / wiele / ile tysięcy ptaków
Several / many / how.many thousands.GEN birds.GEN
‘Several thousand birds / (how) many thousands of birds’

The projection of a quantity domain above the classification domain of the numeral (within the quantity domain of the noun) predicts that we should also be able to find adjectives which occur in the classification domain of the numeral before its quantity domain has been projected. In other words, we expect comparable examples to (18)-(20) above, in which the sequence of numeral + numeral or quantifier + numeral is interrupted by an adjective. A search in the Polish National Corpus does find such examples; these have been verified by a native speaker to be acceptable.^{8,9}

- (21) **Tych kilkanaście nędznych tysięcy dolarów**
DEM.PL.GEN tens(11-19) miserable.PL.GEN thousands.GEN
ustawiało ich finansowo...

⁸ Search: [pos=num] [pos=adj & base!="jeden"] [base=tysiąc]

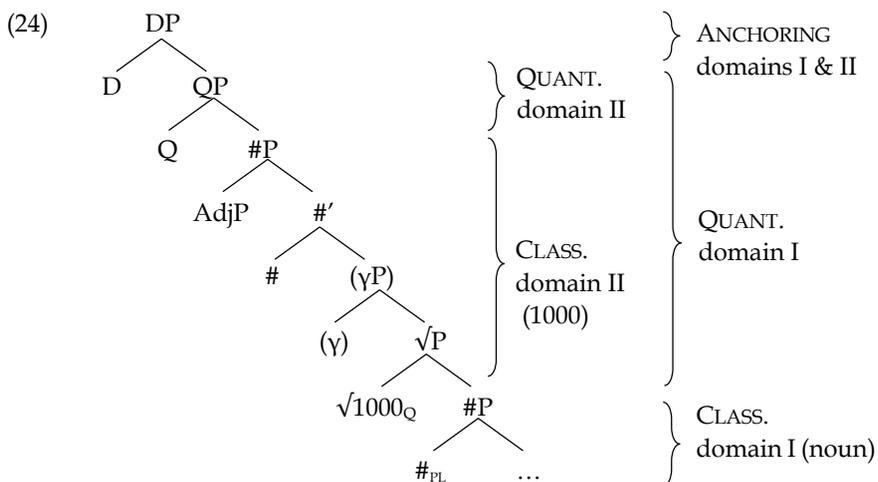
⁹ Rutkowski (2007b: 97, ex. 25c) reports the configuration to be ungrammatical, providing the following example:

- i. *Pięćset niecałych tysięcy rowerów
Five.hundred.NV.NOM incomplete.GEN thousands.GEN bicycles.GEN
(Intended: ‘An incomplete five hundred thousand bicycles’)

This is confirmed by my native speaker consultant; however, if we replace the adjective *niecałych* ‘incomplete.GEN’ with the adjective *dodatkowych* ‘additional.GEN,’ the example becomes acceptable again. This suggests that the problem lies in the choice of adjective, rather than the construction itself. Potentially, *niecały* ‘incomplete’ must surface higher in the quantity domain, e.g. in the specifier of the highest QP layer.

- dollars.GEN set.up.N.SG them financially...
- ‘Those miserable several/many thousands of dollars (\$11,000-\$19,000) set them up financially.’
- (22) **Kilka kolejnych tysięcy** świętowało udział
 Several_{NOM} next.NV.PL.GEN thousands.GEN celebrated.N.SG participation
 ich faworytów w finale na ulicach hiszpańskiego miasta.
 their favorites in final on streets Spanish city
 ‘The next several thousand celebrated the participation of their favorites in the final on the streets of a Spanish city.’
- (23) Gdyby panu, nie daj Bóg, coś się stało,
 If you NEG give.IMP God something SIE happened.N.SG
 to z **trzydziestoma dodatkowymi tysiącami** ...
 DEM.N.SG with_[INST] thirty.INST additional.INST thousands.INST
 ‘If God forbid anything happened to your additional thirty thousand’

Structurally, we expect the following, where the preceding numeral or quantifier is realized in QP, and the adjective in a position between the QP and the numeral 1000. Here, numeral 1000 projects both a classification domain (its # and optional γ) and a quantity domain (the host of other numerals or quantifiers, as in (18)-(23)). These domains are embedded *inside* the quantity domain of the noun.



Numerals 1000+ effectively restart the functional sequence within the extended projection of the noun. This creates a situation in which the numeral and noun form a single extended projection or DP (with the numeral and its functional structure constituting the quantity domain of the noun); at the same time, the structure is binominal as there are two nouns (as evidenced by two classification domains). The many debates in the literature on whether some construction is mono-projectional or biprojectional may originate from similar configurations

(e.g. the N-of-an-N construction, Bennis, Corver, and den Dikken 1998, den Dikken 1998, 2006, Matushansky 2002, among others, or pseudopartitives, van Riemsdijk 1998, Corver 1998, Stavrou 2003, Alexiadou, Haegeman, and Stavrou 2008, among others; quantificational pseudopartitives are treated in chapter 6).

5.3.2 Case, agreement, and numeral 1000

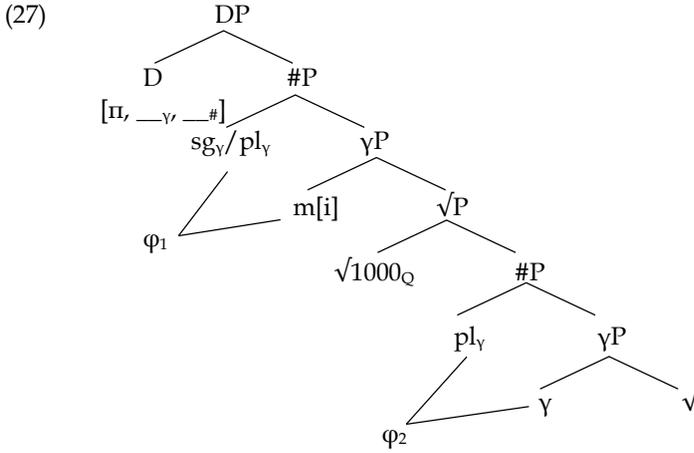
Let us now turn to an illustration of how case and agreement function on the proposed structure of the numeral. I have used case and agreement as arguments for the lexical specification of the numeral, and in this section, I illustrate precisely how those patterns are derived. There are two structures of interest, one in which γP is projected and one in which it is not. The morphosyntactic patterns we find in these two contexts are repeated below:

- | | | |
|------|--|-----------------------|
| (25) | Cały tysiąc ptaków spał.
Whole.M.SG thousand birds.GEN slept.M.SG
'A whole thousand birds slept.' | Pattern 1
AGREEING |
| (26) | a. Tysiąc ptaków spało.
Thousand birds.GEN slept.N.SG
'A thousand birds slept.' | Pattern 2
DEFAULT |
| | b. Te tysiąc ptaków spało.
DEM.NV.PL.NOM/ACC thousand birds.GEN slept.N.SG
'Those thousand birds slept.' | |
| | c. Tych tysiąc ptaków spało.
DEM.PL.GEN thousand birds.GEN slept.N.SG
'Those thousand birds slept.' | |

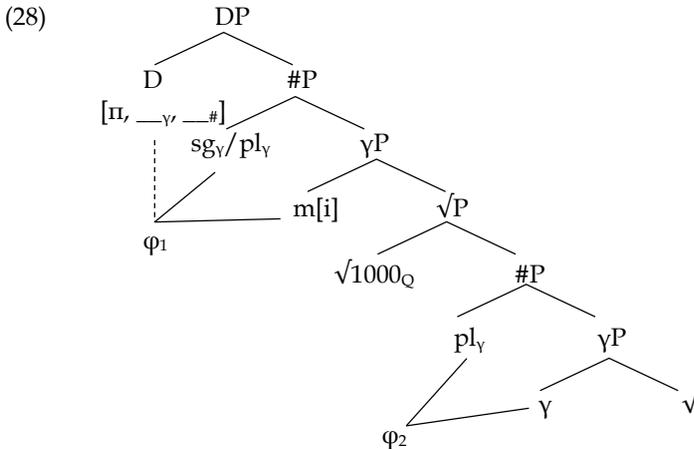
Pattern 1 corresponds to numeral 1000 when γP is projected and pattern 2 to numeral 1000 when γP is omitted. I begin with pattern 1.

5.3.2.1 Gendered 1000

Structure building proceeds according to the functional sequence. This means that the identification and classification domains of the nominal are projected first (the root, γP , and #P), followed by the quantity domain, which in this case, consists of an identification and classification domain for the numeral (the root, γP and #P). The anchoring domain (DP) is merged last. I assume that the phi-features of the numeral and the noun correspond to phi-bundles, indicated here as φ_1 and φ_2 , respectively; the lines illustrate the source of the features contained in the phi-bundle. The structure is depicted below.



As discussed in section 3.6.1 of chapter 3, I also assume that the highest head, here D, carries unvalued probing γ and $\#$ in addition to π (person). The Agreement mechanism outlined in chapter 3, section 3.6.1, requires that immediately upon Merge, the γ and $\#$ probes initiate a search for a phi-bundle carrying γ and $\#$. In this example, the numeral presents such a goal, and thus, the numeral becomes the Agreement target of the probes on D. Because Agreement is a feature sharing process, D connects its features to the phi-bundle of the numeral, φ_1 . The Agreement relation is indicated with a dotted line.



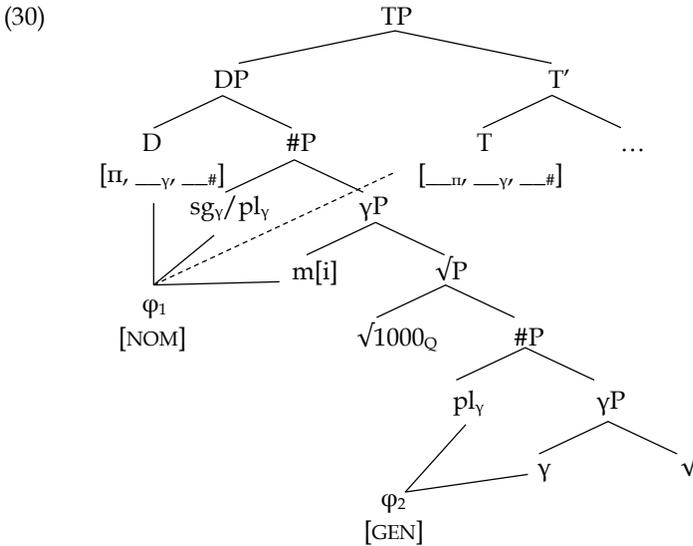
This structure involves two independent phi-bundles within the same nominal domain. According to the dependent case mechanism developed in chapter 3, section 3.6.2, if there is more than one phi-bundle in a particular locality domain, dependent case assignment occurs, which, in the nominal domain, involves the genitive (under the assumption that case is relativized to a particular domain, see

section 3.5.2.1 of chapter 3, and the discussion on Polish case assignment in chapter 4, section 4.2.2). In the example above, taking the DP to constitute a single locality domain, the presence of two phi-bundles triggers the dependent case mechanism. The lower phi-bundle, φ_2 , is assigned genitive case. The higher phi-bundle, φ_1 , remains uncased for the moment. The dependent case assignment mechanism associates φ_2 with genitive, and does not yet associate φ_1 with case.

- (29) φ_1 : ____
 φ_2 : GEN

By virtue of the phi-bundle, the genitive case will appear on each φ_2 -feature-sharing element which can morphologically express it, for example, any adjectives which have been associated to the phi-bundle via Agreement.¹⁰

This structure can be inserted into any position which calls for a DP. Let us first consider the derivation of the construction when inserted in Spec,TP, i.e. as a subject. T is a probe in Polish, carrying π , #, and γ probes, i.e. $_{\pi}$, $_{\#}$, and $_{\gamma}$. The first set of full phi-features it encounters are the features in φ_1 . This results in feature sharing of the features of T and the features of the numeral (and D) (with the dotted line indicating the new agreement relation). At the level of the clause, the dependent case assignment mechanism applies a second time. Given the position of the DP as a subject, the phi-bundle φ_1 will be assigned nominative case.



¹⁰ Having multiple phi-bundles within a single domain does not necessarily seem to correlate with having multiple phases, and it's not clear that this would be desirable either. As we shall see in section 5.4.2.4, the genitive assigned by the dependent case mechanism can be overwritten by oblique case, suggesting that even though the lower phi-bundle has been associated with genitive case, its features are still accessible to the computation.

This derives pattern 1, repeated below:

- (31) Cały tysiąc ptaków spał.
 Whole.M.SG thousand birds.GEN slept.M.SG
 'A whole thousand birds slept.'

Verbal agreement is with the numeral, which additionally receives nominative case. The quantified noun receives genitive due to its embedding.

In an oblique position, the numeral receives oblique case, and the noun is marked genitive.

- (32) Z tym tysiącem ludzi
 With_[INST] DEM.M.SG.INST thousand.M.SG.INST people.GEN
 'With those thousand people'

Only the fully specified numeral is permitted in an oblique context (cf. section 4.3.1.4). The same structure as in (27) would be inserted in an oblique context (with the embedded noun already marked GENITIVE), but the case value of the higher phi-bundle, ϕ_1 , would be determined by the oblique case assigner.

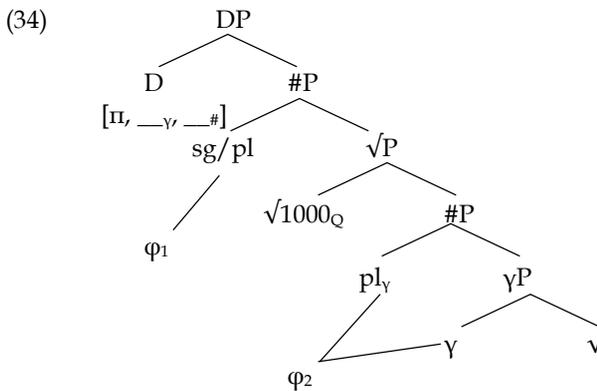
Gendered 1000 is semi-lexical, given that it is built from a root which is specified for gender and carries a Q-feature. This Q-feature contributes to the function of 1000 as a numeral in the quantity domain of the quantified noun. However, because gendered 1000 has a gender value and projects a canonical nominal functional structure, it looks and behaves just like a lexical noun. It is associated with a phi-bundle via its phi-features, and as a result, interacts with Agreement and case. The phi-bundle makes the numeral a Goal for Agreement relations, and furthermore, triggers the dependent case mechanism, which is sensitive to phi-bundles. Together, this creates a situation in which the numeral is simultaneously a noun and a numeral. It is a numeral in the sense that it functions as a numeral and says something about the quantity of the quantified noun, but it is a noun in the sense that it has a canonical nominal functional structure and carries a phi-bundle which interacts with Agreement and case. The example of gendered numeral 1000 illustrates what it is to be semi-lexical if no deficiencies are present and the semi-lexical head fulfills a semantic function (quantification).

5.3.2.2 Genderless 1000

I turn now to pattern 2, which is what we find when the numeral fails to project γ in the syntax. Verbal agreement is necessarily default and demonstrative (and adjectival) agreement can target either the quantified noun or the numeral. The paradigm from (26) for demonstrative agreement is repeated below.

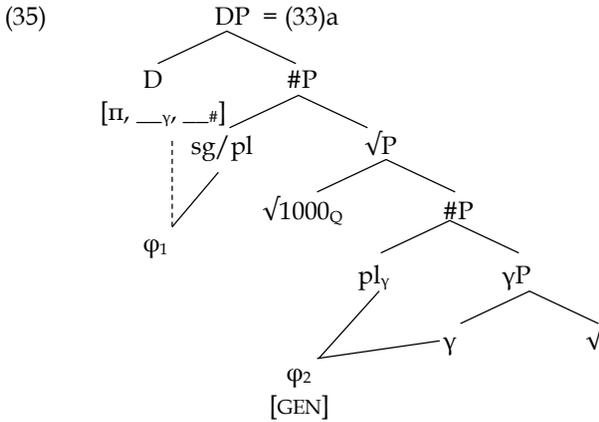
- (33) a. **Te** **tysiąc** ptaków spało.
 DEM.NV.PL.NOM/ACC thousand birds.GEN slept.N.SG
 'Those thousand birds slept.'
- b. **Tych** tysiąc **ptaków** spało.
 DEM.PL.GEN thousand birds.GEN slept.N.SG
 'Those thousand birds slept.'

The derivation proceeds much the same as previously, the main difference being that γ P is omitted from the structure of the numeral. Phi-bundles are associated both with the numeral and the noun. Note that the phi-bundle of the numeral φ_1 is deficient (i.e. lacking some piece of functional structure, in comparison to a canonical noun). It contains only #, while φ_2 of the noun contains # and γ .



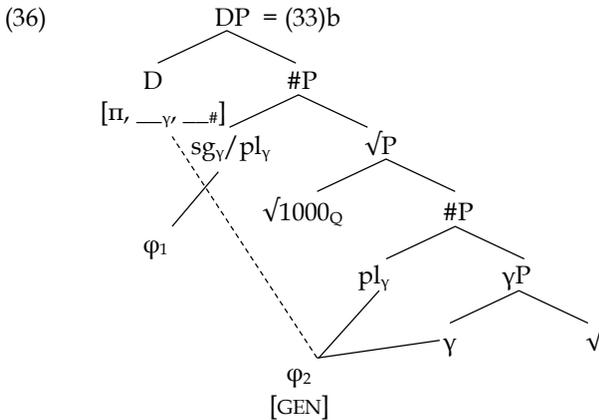
The D head contains a probe, and the question is how Agreement proceeds. Based on the examples in (33), D must be capable of targeting either the numeral, surfacing in a default non-virile plural nominative-accusative form (*te*, (33)a), or the noun, surfacing in a genitive plural form (*tych*, (33)b).

I begin with (33)a. The morphological evidence implies that D agrees with the higher phi-bundle, φ_1 , which must function as an intervener. The Agreement relation is marked by a dotted line. Notice that because there are two phi-bundles within the DP, the dependent case assignment mechanism will assign genitive to the lower phi-bundle, φ_2 .



Recall from the discussion in chapter 4, section 4.3.1.2 that the features realized on the demonstrative are default features, the result of failed Agreement. We can suppose that the default agreement arises from the fact that ϕ_1 lacks gender, and hence, cannot value the gender of the probe. Thus, the phi-bundle is deficient, and as a result, Agreement must fail.¹¹ This predicts default agreement on D.

In (33)b, the morphological evidence implies that D agrees with the lower phi-bundle, ϕ_2 . The Agreement relation is again indicated with a dotted line. By dependent case assignment, the lower phi-bundle is assigned genitive case.¹²



¹¹ The default agreement on the verb is the clue that Agreement fails completely, as opposed to partially. Why that might be is not predicted in the current account. One reason might be that languages differ in allowing and not allowing partial agreement (see the relativized probing of Bejar 2003, section 3.4.1.2), and Polish simply disallows it.

¹² Determining which is the higher phi-bundle and which is the lower phi-bundle becomes more complex once lines start crossing as in the following structure. The system seems to be sensitive to what the “lowest” connected projection of the phi-bundle is in determining the distribution of case, but more research is necessary here.

Notice that in the example in (33)b, the demonstrative is marked genitive. This follows from the feature sharing and case assignment system developed in chapter 3. By Agreeing with the lower phi-bundle, the features of D join the phi-bundle of the quantified noun; since case is assigned to phi-bundles, the assignment of genitive to φ_2 implies that both the quantified noun and the agreeing demonstrative will be morphologically genitive.

The question that remains is how it is possible for D to Agree both with the numeral (= (33)a = (35)) and the noun (= (33)b = (36)). I propose that this alternation can be modeled if we assume that a probe searches using # or γ (see Ionin and Matushansky 2016 for the source of this idea). If it searches using #, the numeral is the first goal it finds, and hence what it agrees with, as in (33)a/(35). Agreement with the deficient numeral necessarily triggers default agreement on D. If it searches using γ , it will probe past the numeral (which lacks gender), instead finding the quantified noun, as in (33)b/(36). This will trigger full agreement for # and γ , but the case will be genitive, in line with the principles of case assignment.

Under both scenarios, default agreement surfaces on the verb. Given the agreement processes in the DP, D either carries an incomplete set of phi-features (in agreement with the numeral, φ_1 , (33)a/(35)), or a full set of phi-features which is assigned genitive case (φ_2), (33)b/(36). Agreement of T with φ_1 via D can only lead to default agreement on T, given that φ_1 is deficient. Agreement with φ_2 via D also seems to necessarily lead to default agreement. Presumably, the genitive case makes the phi-features of φ_2 illegible to DP-external probes.¹³

Under this analysis, it is the deficiency of the numeral which allows D to probe past the numeral, hence the possibility of genitive case on the demonstrative in (33)b/(36). Regardless of which phi-bundle D agrees with, however, verbal agreement is necessarily default.

Genderless 1000 is semi-lexical, and in this case, its semi-lexicality creates deficiency in its functional structure. This deficiency is responsible for the patterns of case and Agreement we find. Because the numeral has a phi-feature, it is associated with a phi-bundle, and thereby, necessarily triggers the dependent case mechanism; this explains the genitive case on the noun. However, because that phi-bundle is deficient, Agreement with it can only fail. Furthermore, the deficiency of the phi-bundle allows the probe on D to probe past the numeral and Agree with the noun. This leads to optionality, where D either Agrees with the numeral (and has default agreement) or the noun (and surfaces as genitive). This optionality stems from the deficiency in the functional structure of the numeral. Thus, we see a clear case of how semi-lexical deficiencies can interact with grammatical processes.

¹³ The question of why T cannot Agree with a genitive argument is an interesting one, albeit orthogonal to the point at hand (if there is some rule such that T cannot Agree with genitive arguments, it does not affect the analysis at hand, though it may have implications for our conceptualization of case and agreement, as in chapter 3).

5.4 Polish Numerals 2-4 and 5+

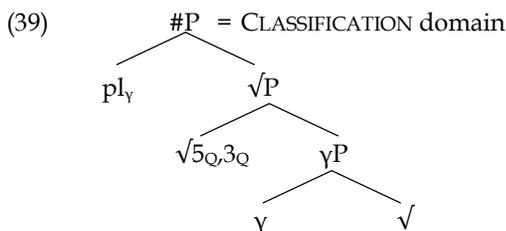
5.4.1 The structure of numerals 2-4 and 5+

I proposed the following lexical specifications for the numerals 2-4 and 5+:

- (37) *pięć* '5': [[#P [√5]], ¬γ, ¬#, Q]
 (38) *trzy* '3': [[#P [√3]], ¬γ, (¬γ), ¬#, Q]

Neither numerals 2-4 nor 5+ can project their own γ or #, but both are crucially dependent on the #P of the noun they combine with. Numerals 2-4 optionally carry a γ probe (although this is obligatory if the noun they combine with is non-virile; see discussion in chapter 4, section 4.3.3.1). Both numeral types carry a Q-feature, and hence, function as numerals. Based on the lexical specifications ((37) and (38)), the numerals 5+ and probe-less 2-4 necessarily lack phi-features; gender probing 2-4 carry only a gender probe, but otherwise lack phi-features.

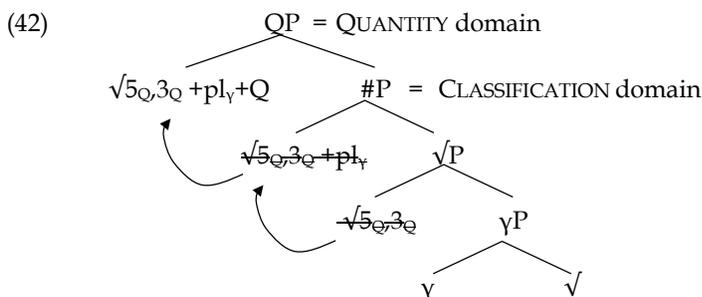
In chapter 4, section 4.3.2.3, I argued that these numerals Merge under the #P of the quantified noun. Structurally, this places them between the γP and #P of the quantified noun, as depicted below:



This captures the fact that these numerals cannot combine with *pluralia tantum* nouns, which would necessarily project their number underneath the numeral. However, contra what we saw with the numeral 1000, this implies that the numeral is inserted not in the quantity domain of the quantified noun, but rather, within the classification domain itself. Furthermore, it predicts that the numerals should follow adjectives, which the examples below show to be false.

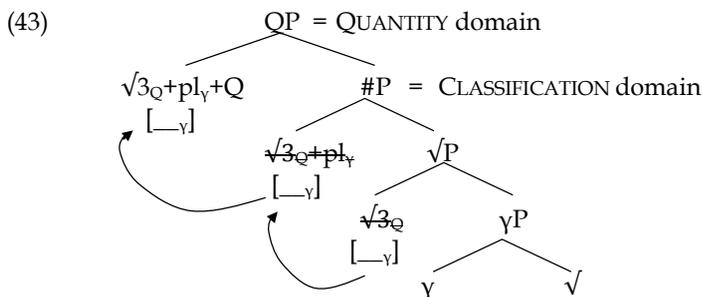
- (40) Pięć mądrych dziewczyn
 Five.NV smart.GEN girls.GEN
 'Five smart girls'
 (41) Trzech mądrych chłopców
 Three.V smart.GEN boys.GEN
 'Three smart boys'

This suggests that the numeral moves from the classification domain of the quantified noun to the quantity domain.¹⁴ Suppose in this case that there is a silent QP, which attracts the Q-numeral to its head position. The numeral moves via the head of #P to the head of QP, as depicted below.



This puts the numeral in the correct domain and furthermore, ensures that adjectives modifying the quantified noun (presumably near #P) will surface under the numeral as opposed to above it. As depicted above, we can label the QP here as the quantity domain and the #P as the classification domain.

The structure of a probing numeral 2-4 is identical to the one above, the only difference being that the numeral enters the structure with a gender probe (which Agrees immediately upon Merge - not depicted here), and carries this probe upwards as it moves.



In both cases, it appears that the structural requirements of the numeral (be dominated by a #P) override the Q-feature, which would otherwise place these numerals in the quantity domain. Instead, the requirements of the Q-feature are satisfied syntactically, via movement.

¹⁴ Pesetsky (2013) assumes a very similar type of movement for the Russian paucal numerals (2-4). He takes them to Merge in a low position, under the Merge position of adjectives (presumably parallel to our Merge position), and argues that they move to DP. Interestingly, his low Merged paucals are also banned from co-occurring with *pluralia tantum* nouns.

Unlike numeral 1000 which projected its own classification domain and quantity domain, the numerals 2-4 and 5+ do not. While these numerals can combine with some adjectives (and presumably these are adjectives which sit in the specifier of QP, given their relation to quantity, e.g. *cały* 'whole'), they are prevented from co-occurring with other numerals or quantifiers. This is best argued with numeral 100, which given its ability to form complex numerals 200, 300, 400, etc., might lead one to believe that it too has a quantity domain. I present the basic paradigm of these numerals below:

(44) Paradigm of numerals 100 – 900 (Swan 2002)

	NOM/ACC	OBL	INST
100	sto	stu	stoma
200	dwieście	dwustu	dwustoma
300	trzysta	trzystu	trzystoma
400	czterysta	czterystu	czterystoma
500	pięćset	pięćsiuset	*pięćsiomaset
600	sześćset	sześćsiuset	*sześćsiomaset
700	siedemset	siedmiuset	*siedmiomaset
800	osiemset	ośmiuset	*ośmiomaset
900	dziewięćset	dziewięćsiuset	*dziewięćsiomaset

The form of 100 used in the numerals 100-900 in the nominative/accusative and in 500-900 in the oblique does not seem to be compositional. Dziubała-Szrejbrowska (2014: 86-88) has studied the grammaticalization of Polish numerals, and shows that numeral 100 was historically a neuter noun which declined for case in the singular, dual, and plural. Its historic forms are maintained in modern-day Polish numerals. For example, the dual of numeral 100 was *ście* and the neuter form of 2 was *dwie* (which is the feminine form in modern Polish). The form *dwieście* '200' in modern Polish carries both the 2-component and the 100-component in a frozen form. The same can be seen in 300 and 400, where *sta* was historically the nominative plural form of 100. The genitive plural of numeral 100 was *set*, which is visible in the numerals 500-900. The forms *ście*, *sta*, and *set* do not seem to exist outside the complex numerals in modern-day Polish,¹⁵ and this is also visible in the paradigm of bare 100, which declines very differently from the forms found in the complex numerals (excluding 200-400). Historically, numeral 100 had a nominal morphosyntax like the numeral 1000 does today (e.g. its case and number properties were determined by the numeral it combined with). This suggests that historically, the numeral had a quantity domain and declined

¹⁵ Although, forms like *kilkaset* 'several hundred' are possible (but not *wiele set* 'many hundreds' or *ile set* 'how many hundreds', *wiele* 'many' and *ile* 'how many' being quantifiers with an identical syntax to *kilka* 'a few'). Potentially, this is also a historical form and not a modern innovation, but I do not have the data to verify this.

according to the required case and number of the numeral or quantifier it combined with. Today, this no longer seems to be the case, and the numerals have become frozen to some extent, with a limited expression of case.¹⁶ If numeral 100 lacks a quantity domain, it is likely that the other numerals do too. This further argues for their structural deficiency.

5.4.2 Case, agreement, and numerals 2-4 and 5+

I turn now to an illustration of how case and agreement function on the proposed structure of the numerals. There are two main cases to consider, depending on whether the numeral carries a gender probe or not. The morphosyntactic patterns are repeated below. Only numerals 2-4 can carry a gender probe, and when they do, both the numeral and the noun are in subject position and verbal agreement is successful. This is shown below for a non-virile and virile noun.

- (45) Dwie małe dziewczyny spały.
Two.F.NOM small.NV.PL.NOM girl.F.PL.NOM slept.NV.PL
'Two small girls slept.'
- (46) Dwaj mali chłopcy spali.
Two.V.NOM small.V.NOM boys.M.PL.NOM slept.V.PL
'Two small boys slept.'

When no gender probe is present, which is the case for numerals 5+ and numerals 2-4 in combination with a virile noun, verbal agreement is necessarily default, and we see a nominative-genitive case alternation in the morphology on the numeral. This is illustrated below for a 2-4 numeral with a virile noun, and a 5+ numeral with virile and non-virile nouns.

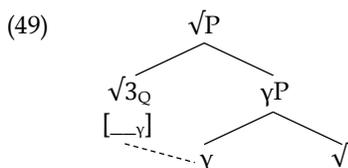
- (47) Dwóch chłopców spało.
Two.GEN/ACC boys.GEN slept.N.SG
'Two boys slept.'
- (48) Pięciu chłopców / pięć dziewczyn spało.
Five.V(GEN) boys.GEN / five.NV(NOM) girls.GEN slept.N.SG
'Five boys, five girls slept.'

I start with the derivation of a 2-4 numeral with a gender probe and then turn to the probe-less numerals.

¹⁶ In the numerals 200-400, inflection targets the 100-component, and even resembles bare 100 in oblique and instrumental contexts (but not nominative/accusative). These seem more amenable to a syntactic analysis than 500-900, but it is not clear why the numerals could compose syntactically if the multiplier is 2, 3, or 4, but not 5-9. The internal inflection on the oblique numerals 500-900 (e.g. *pięćset* / *pięciuset* '500') is also puzzling.

5.4.2.1 Gender probing 2-4

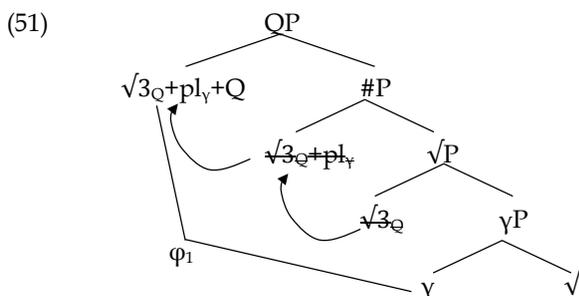
Structure building starts with the γP of the quantified noun, followed by the numeral with its gender probe, as depicted below. The unvalued feature of the gender probe begins probing immediately upon Merge, finding and Agreeing with the γ of the quantified noun. This results in feature sharing. Agreement is indicated with a dotted line.



The result of this agreement relation is a numeral which matches for gender with the quantified noun:

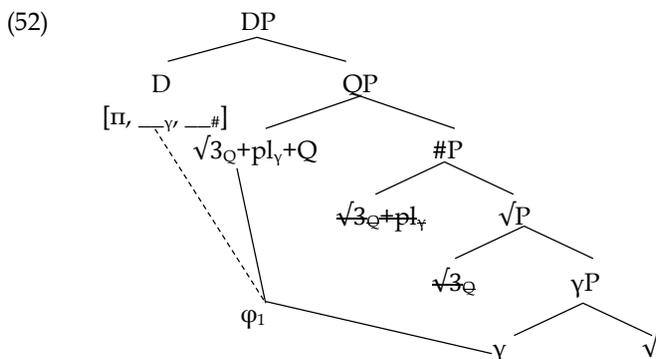
- (50) Dwie dziewczyny, dwa stoły, dwaj chłopcy
 Two.F girls.F, two.M tables.M, two.V boys.MH
 'Two girls, two tables, two boys'

Structure building continues, and with the Merge of the Q-head, the numeral moves to Q in a two-step movement process, from # to Q. In this structure, there is only a single phi-bundle of γ and #, φ_1 , which is associated with both the numeral and the noun. The gender probe $_ \gamma$ has facilitated the feature sharing relation between the numeral and the noun, hence the single phi-bundle.



The existence of only a single phi-bundle in the structure is significant as it implies that the structure does not meet the requirements for genitive case assignment. Genitive case assignment requires at least two phi-bundles within a locality domain. In addition, the numeral and noun are connected via agreement, and we always expect them to surface with the same case (which they do). In other words, it is because they Agree that they look like adjectives for case and agreement.

Continuing the derivation, D is Merged, which probes for γ and $\#$. The phi-bundle associated with the numeral and noun, φ_1 , is phi-complete via the noun's γ and $\#$. The probes on D Agree successfully, and are phi-complete.



This DP can be Merged into any position which allows for a DP. When the DP is used as a subject, the fact that D is phi-complete will ensure that Agreement on T will always be successful, hence examples like the one below:

- (53) Dwie dziewczyny spały.
 Two.F.NOM girls.F.NOM slept.NV.PL
 'Two girls slept.'

When the DP is inserted in an oblique environment, the phi-bundle, φ_1 , will be assigned the required oblique case. Oblique case is expressed on all terminals connected to the phi-bundle, hence the case agreement on numerals and nouns in oblique positions:

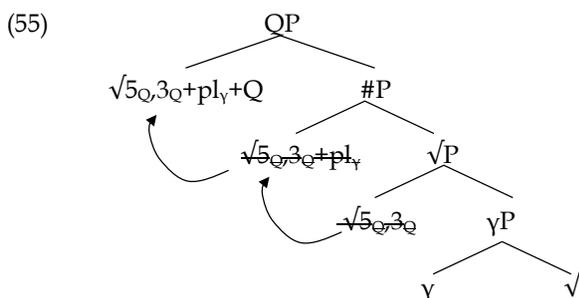
- (54) Z dwiema dziewczynami
 With_{INST} two.F.INST girls.F.INST
 'With two girls'

While agreeing 2-4 seem lexical and resemble adjectives, their lexical specification is the most complex of the ones proposed here. They are incapable of projecting either γ or $\#$, are dependent on the quantified noun for a $\#P$, and carry an agreement probe. In this case, the agreement probe makes all the difference. Through this probe, they enter into a feature sharing Agreement relation with the quantified noun, together forming a single phi-bundle. The phi-bundle is phi-complete, predicting successful agreement. Furthermore, because there is only one phi-bundle in the DP, no genitive case is assigned. Thus, the Agreement probe creates the right conditions for Agreement to succeed and additionally, prevents the dependent case mechanism from assigning genitive within the DP. These numerals are semi-lexical via a deficiency, an added Agreement probe, and

contextual restrictions. Despite this, the way these features interact in the syntax creates the semblance of lexicality. This shows that semi-lexicality can resemble lexicality in the syntax to a certain extent.¹⁷

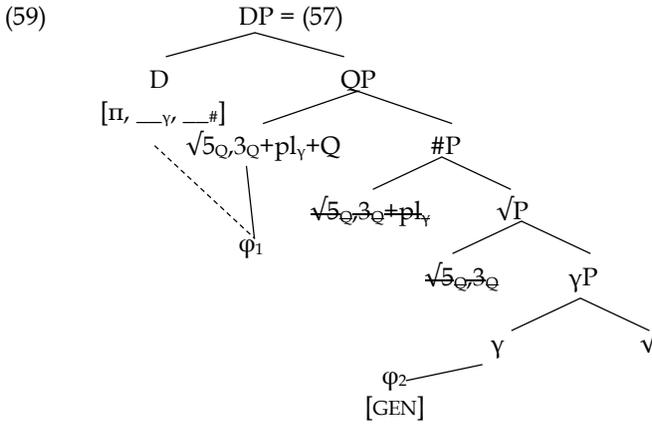
5.4.2.2 Probe-less and featureless 2-4 and 5+

Initial structure building for the probe-less and featureless 2-4 and 5+ numerals proceeds the same as we saw before, a difference being that the numeral does not carry a probe which connects it to the noun via feature sharing. At the QP stage, the numeral moves from # to Q, thereby sitting in the quantity domain.



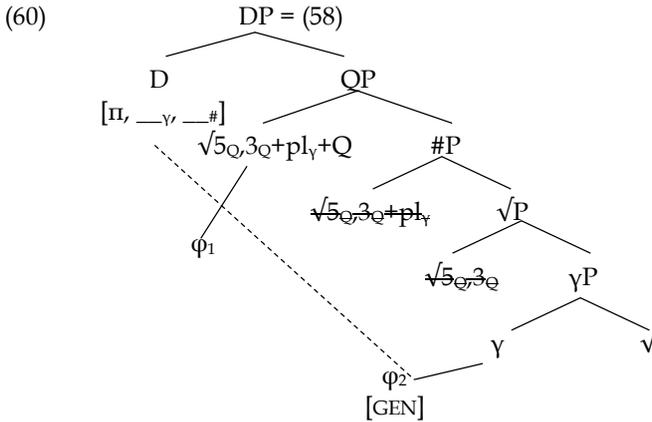
The crucial difference with the previous case is the distribution of phi-bundles. In contrast to the examples with agreeing 2-4 we just examined, in this structure, the # and γ provided by the quantified noun (the lower root) do not sit adjacent in the structure, nor are they connected via feature sharing. In addition, the numeral has moved to Q via #, pied-piping the #-head to the Q-position, as depicted in (55). I propose that the result is that the # and γ features of the quantified noun cannot be unified in a single phi-bundle. Instead, they form two separate, deficient phi-bundles, as depicted in (56) below. The first phi-bundle, ϕ_1 , is associated with the numeral and carries only number; the second phi-bundle, ϕ_2 , is associated with the noun and carries only gender.

¹⁷ There is an interesting correlation which may or may not be significant. The agreement probes in Polish reflect the phi-features which have been generated under them. For example, numerals 2-4 only agree for gender, and they occur in a position in which only gender has projected. Similarly, adjectives and demonstratives agree for both gender and number, and they occur in a position in which both gender and number (but not person) have projected. Finally, verbs agree for person, number, and gender, and they occur outside the DP, after person has been projected. An observation of the literature has been that adjectives agree for gender and number and verbs for person and number. If this correlation is significant, it may suggest that this has to do with the DP-internal nature of adjectives, where no person yet exists. Something further must yet be said on predicative adjectives.



The phi-bundle ϕ_1 carries only #, and therefore, Agreement by D will necessarily fail, predicting default agreement. As discussed in chapter 4, section 4.3.1.2, the non-virile plural form of the demonstrative is an instance of default agreement.

If D probes using γ , then it should probe past the phi-bundle of the numeral and target the phi-bundle of the noun, ϕ_2 .



The phi-bundle ϕ_2 carries only γ . This predicts default agreement on D. In addition, the feature sharing relation with ϕ_2 predicts genitive on the D-element.

In the scenario in (57)/(59), Agreement on D will be default, predicting default agreement on external probes, such as T. In the scenario in (58)/(60), not only should the probe have undergone default agreement, but it is associated with genitive case. This configuration also predicts that T cannot agree with D, and will similarly surface as default. Together, this gives the obligatory default verbal agreement found with the 5+ numerals and virile non-agreeing 2-4.

- (61) Pięć dziewczyn / pięciu chłopców spało.
 Five.NV girls.GEN / five.V boys.GEN slept.N.SG(DEF)
 'Five girls / five boys slept.'
- (62) Trzech chłopców spało.
 Three.GEN/ACC boys.GEN slept.N.SG(DEF)
 'Three boys slept.'

The semi-lexicality of these numerals surfaces in two main ways: they are deficient in their functional structure, projecting neither γ P nor #P, and they are dependent on the #P of the quantified noun for their realization. The position of the numeral in relation to the noun and its need to be expressed in the quantity domain are responsible for the very idiosyncratic patterns found with these numerals. In effect, these numerals “steal” the #P of the quantified noun, pied-piping the #-head to Q. The result is that the phi-bundle of the quantified noun is split in two, forming two separate phi-bundles. This triggers the dependent case mechanism, leading to genitive case on the quantified noun, and because neither phi-bundle is phi-complete, all Agreement processes are necessarily default.

5.4.2.3 A morphological alternation

There is a morphological puzzle which remains with the non-agreeing numerals 2-4 and 5+, discussed in chapter 4, section 4.3.2.1. While these numerals have not been assigned a gender probe and carry no gender of their own, they express the gender of the quantified noun:

- (63) Pięć dziewczyn, pięciu chłopców
 Five.NV girls.GEN, five.V boys.GEN
 'Five girls, five boys'

As discussed in chapter 4, section 4.3.2.1, this is a morphological phenomenon, with the numerals receiving a single case in the syntax, which is spelled-out in the morphology according to the gender of the quantified noun. Rappaport (2003) assumes the numerals to have a Quantitative case and Willim (2015) and Ionin and Matushansky (2016) take them to be caseless. In the current approach, there is no reason to expect that the numeral would not be assigned nominative in a nominative context, given the rules of dependent case assignment. Thus, I assume that the dependent case mechanism treats the phi-bundle associated with the numeral, ϕ_i , as it would any other phi-bundle, assigning nominative case in subject position and accusative case in object position. The variation in form associated with the numeral must then result from the spell-out of the numeral in its nominative and accusative case forms.

As discussed previously, the numeral moves through #P on its way to QP. As a result, it combines with the #-head, pulling this up on its way to Q. This leads to a complex head structure in the Q-head position:

$$(64) \quad \sqrt{5_Q, 3_Q + pl_V + Q}$$

In the morphology, the gender information of the quantified noun is accessible to the numeral via the relation between # and γ , indicated by the subscript on #, i.e. # $_{\gamma}$ (see section 4.2.1.3).¹⁸ This gender information is utilized in the spell-out of the numeral. I propose that when the numeral combines with a virile plural, a morphological rewrite rule changes the nominative of the numeral to genitive:

$$(65) \quad \text{Numeral} + pl_V + Q, \text{NOM} \rightarrow \text{GEN}$$

This accounts for the fact that in the context of a virile noun, the numeral is morphologically virile and not non-virile (5: *pięciu* as opposed to *pięć*). This rule targets the nominative, and no such rule seems necessary for the ACC case, given that the accusative of a virile is usually syncretic with the genitive (cf. 4.2.1.1). Similarly, a parallel rule for numerals with a non-virile numeral also seems unnecessary, given that the syntactic case of the numeral (nominative) coincides with the morphological case (nominative).

One final (stipulatory) assumption is necessary to capture the full range of case and agreement properties of these numerals in structural case contexts. The rule in (65) changes the nominative case of the numeral to genitive. However, this rule must be expanded to target the case value associated with the phi-bundle of the numeral, rather than the case value of the numeral itself. In a non-virile context, we saw that the demonstrative could alternate in form, agreeing nominative but default with the numeral or genitive (but default) with the noun:

$$(66) \quad \begin{array}{l} \text{Tych} \quad / \quad \text{Te} \quad \quad \quad \text{pięć} \quad \text{dziewczyn} \\ \text{DEM.PL.GEN} / \text{DEM.NV.PL.NOM(DEF)} \quad \text{five.NV} \quad \text{girls.GEN} \\ \text{'Those five girls'} \end{array}$$

We would therefore expect the same alternation in a virile context, with the demonstrative surfacing either as nominative (*te*) or genitive (*tych*). However, in a virile context, only the genitive form is available to the demonstrative:

$$(67) \quad \begin{array}{l} \text{Tych} \quad / \quad *Te \quad \quad \quad \text{pięciu} \quad \text{chłopców} \\ \text{DEM.PL.GEN} / \text{DEM.NV.PL.NOM(DEF)} \quad \text{five.V} \quad \text{boys.GEN} \\ \text{'Those five boys'} \end{array}$$

¹⁸ The γ marking on # does not appear to function as a true gender feature, hence, why it is not available in the syntax for Agreement processes. As discussed in chapter 4, section 4.2.1.3, there are systematic relations between number and gender in Polish, such that the relevant class of subgender differs between singular (animate/inanimate) and plural (human/non-human). What is marked on # seems to relate to this system, but is not a full γ -feature.

The demonstrative is syntactically nominative, and thus, we also expect it to be morphologically nominative. Under an analysis in which only the case value of the numeral is rewritten as genitive (as in (65)), the example above is surprising. Instead, where the numeral varies its case form, agreeing demonstratives and adjectives do too. Under an analysis in which the rewrite rule targets the case assigned to the phi-bundle, rather than just the numeral, however, this can be captured. When the case of the phi-bundle is rewritten to genitive, all feature sharing terminals are affected – the demonstrative included. Thus, I propose that the phi-bundle associated with the numeral is reassigned to genitive, this affecting all terminals connected to the phi-bundle.

$$(68) \quad \text{Numeral+pl}_V+\text{Q} \\ \quad \quad \quad \downarrow \varphi \\ \quad \quad \quad [\text{NOM}] \quad \quad \rightarrow \quad [\text{GEN}]$$

In contrast to the previous rule in (65), which applied only to the numeral and not its pre-modifiers, this rule applies to the phi-bundle associated with the numeral. The result is that all pre-modifiers agreeing with the numeral should also be affected. This derives the apparent agreement relation on demonstratives.

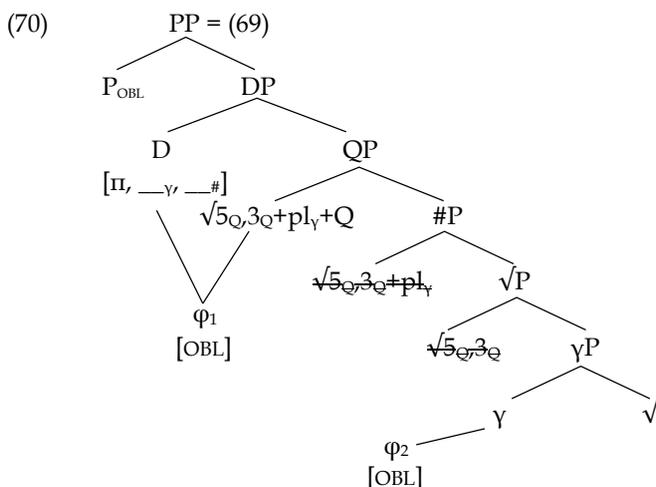
5.4.2.4 Numerals 2-4 and 5+ in oblique positions¹⁹

We have one final case pattern to deal with in our treatment of the numerals 2-4 and 5+ and that is their behavior in oblique case positions. Unlike in structural case positions (nom, acc), in an oblique position, the quantified noun surfaces in the oblique case rather than genitive; the numeral is likewise oblique:

$$(69) \quad \begin{array}{lll} Z & \text{pięcioma} & \text{studentami} \\ \text{with}_{[\text{INST}]} & \text{five.INST} & \text{students.INST} \\ & \text{'with five students'} & \end{array}$$

Focusing on the 5+ numerals and the probe-less 2-4 numerals, the externally assigned oblique case appears to be associated with both the phi-bundle of the numeral and the phi-bundle of the noun. I illustrate this below using a P_{OBL} case-assigner (representative of oblique-assigning prepositions).

¹⁹ The analysis in this section is based on a previously published paper, and more discussion can be found in Klockmann (2014a).



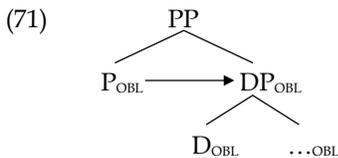
What is intriguing about these examples is that our dependent case mechanism does not appear to be assigning genitive case to ϕ_2 as predicted. (For the behavior of agreeing 2-4 with an oblique case assigner, see discussion in 5.4.2.1.)

This phenomenon has received a lot of attention in the Slavic literature, and additionally in works on Finnish (Brattico 2010, 2011), Inari Sami (Nelson and Toivonen 2000), and Estonian (Norris 2014), all Uralic languages which show an identical phenomenon. One approach is to take the structure to differ between structural and oblique contexts (Bailyn 2004; Pereltsvaig 2006), an approach which suffers from a look-ahead problem (see section 5.2.2). Another approach is to adopt some form of a case hierarchy, where the genitive case competes with the oblique case for its realization. Babby (1987), for example, assumes a hierarchy of cases where some cases are assigned at D-structure and others at S-structure; oblique cases are assigned at D-structure and the genitive at S-structure, hence the fact that the oblique case surfaces in these examples. Brattico (2010, 2011), instead, proposes that there are “strong” cases and “weak” cases, where strong cases take precedence over weak cases (Brattico determines the structural-oblique case divide to be insufficient for Finnish data, where not all structural cases behave alike for case assignment with numerals). In the nanosyntactic framework, Caha (2009, 2013) develops a system of structural inclusion relations between cases, where the genitive case is necessarily included in the representation of any oblique case. Thus, the quantified noun is simultaneously genitive and oblique (see also Caha 2015, Witkoś and Dziubała-Szrejbrowska 2016).

What these accounts acknowledge is a need for the possibility that both the genitive and the oblique case can be assigned to the quantified noun. If we want to maintain the assumption that the DP the quantified noun is embedded in is built without any foresight as to where it will be embedded, we must assume that the genitive has been assigned in the DP as per the dependent case assignment,

despite not surfacing overtly. Thus, what we need to account for is the fact that we cannot see the genitive case on the quantified noun. The approach of Babby (1987) is unattainable in this respect, given the elimination of D-structure and S-structure. The strong vs. weak case approach of Brattico does not solve the issue either, as it is not clear why some cases are weak and others strong. Instead, I follow the approach of Pesetsky (2013) who assumes a phenomenon of case stacking and what has been termed the One-Suffix Rule. The One-Suffix Rule states that the last assigned case is realized overtly in languages which do not allow overt case stacking (cf. chapter 3, section 3.5.2.2).

Drawing on the work of Richards (2013), Pesetsky (2013) suggests that Russian is a case stacking language, and such case stacking is evident in the numeral system. More specifically, he argues that case is the realization of categorial features, and when new categorial heads are inserted into the structure, their categorial features percolate downwards. Thus, for example, P features are realized as oblique case, and when a P-head is merged into a structure, its categorial features (e.g. oblique case) will percolate to all accessible terminals in its c-command domain:



Being the last assigned case, the oblique case will be realized overtly. This is the basic analysis Pesetsky (2013) gives for case alternations with Russian numerals, which highly resemble the Polish type. DP-internal processes produce genitive case on the quantified noun in a numeral-noun construction, but when an external head is Merged with the DP (such as in the configuration above), its categorial features (a.k.a. case) percolate to the numeral, overwriting the genitive case. Pesetsky assumes that all features of the categorial head are copied onto c-commanded terminals, which captures the quirky fact that in Russian, combining with a P-head not only affects the case of the quantified noun, but also the expression of number with the paucal numerals (2-4). In structural case positions, quantified nouns with numerals 2-4 surface in a paucal / singular / numberless form (depending on which account we follow).

- (72) Dva stol-a, tri dnj-a, četyre stakan-a
 Two table-GEN.SG, three day-GEN.SG, four glass-GEN.SG
 ‘Two tables, three days, four glasses’ (Pesetsky 2013: 21, ex. 20)

In an oblique case environment, the number on the noun is realized as plural:

- (73) Dv-um stol-am, tr-ëm dnj-am,
 Two-DAT.PL table-DAT.PL, three-DAT.PL day-DAT.PL,
 czter-ëm stakan-am
 four-DAT.PL glass-DAT.PL
 ‘Two tables, three days, four glasses (DAT)’
 (adapted from Pesetsky 2013: 31, ex. 31)

In Pesetsky’s account, this follows from the overwriting triggered by the P-head. Not only is the genitive overwritten, but so is the number of the quantified noun.

Turning back to Polish, a similar account seems warranted. Before addressing the numerals, I first give independent evidence for the idea that Polish has case stacking. Polish has a set of prepositions where the interpretation is affected by the case that they assign, the relevant set of prepositions including *między* ‘between,’ *nad* ‘above,’ *pod* ‘under,’ *poza* ‘beyond,’ *przed* ‘before,’ and *za* ‘behind’ (Swan 2002). Instrumental case indicates a static position of the object, accusative case movement towards the object, and genitive case, movement from the object; the accusative and genitive cases treat the object as a goal or source, respectively. I provide some examples using the instrumental and accusative below, but the crucial examples involve the genitive.

- (74) Między sklepami, nad stołem, pod sofą
 Between stores.INST above table.INST under sofa.INST
 ‘Between the stores, above the table, under the sofa’
- (75) Między sklepy, nad stoł, pod sofę
 Between stores.ACC, above table.ACC, under sofa.ACC
 ‘to between the stores, to above the table, to under the sofa’

To indicate movement away from an object, the genitive case is used, but in addition, the form of the preposition differs slightly. Each preposition is preceded by a suffix *s/z-*: *spomiędzy*²⁰ ‘from between,’ *znad* ‘from above,’ *spod* ‘from under,’ *spoza* ‘from beside,’ *sprzed* ‘from before,’ and *zza* ‘from behind’ (Swan 2002), which varies according to whether the following consonant is voiced or not. Crucially, this additional morpheme resembles the clitic-like genitive-assigning preposition *z* in Polish, which similarly indicates a source, assigns genitive, and varies its phonology according to the following consonant. Taking this to be meaningful, we can analyze the source prepositions as complex, consisting of the preposition *z* and the locational preposition, e.g. *s-pomiędzy*, *z-nad*, *s-pod*, *s-poza*, *s-przed*, *z-za*. Under this analysis, the new question is: what happens with case assignment? We seem to be dealing with two case-assigning prepositions, given their behavior in isolation, but only a single case surfaces on the noun. Under case stacking, this is easily accounted for. The inner preposition assigns instrumental case, and the

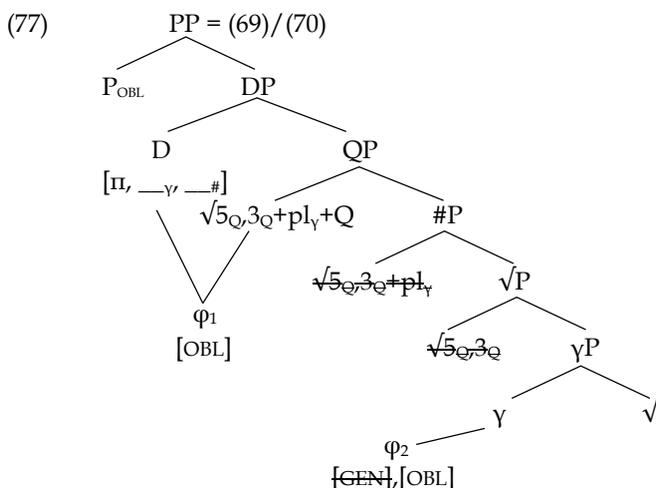
²⁰ This preposition is further characterized by an intervening *-po-*, an element which can also function independently as a preposition.

outer preposition *z* assigns genitive case. Given that genitive is the last assigned case, the One-Suffix Rule of Pesetsky (2013) predicts that genitive will surface:

- (76) *Z-nad* *stółu*
 From_{GEN}-above_{INST} table._{INST.GEN}
 'From above the table'

This paradigm provides evidence for case stacking in Polish.

Turning back to the numerals, we can assume a similar mechanism occurs with the 2-4 and 5+ featureless numerals. The dependent case mechanism properly assigns the quantified noun genitive case, but that genitive case is overwritten by the external case assigner, as illustrated below:²¹



This solves the question of why we do not see genitive on the quantified noun in oblique contexts. The oblique case, being the last assigned case prevents the genitive from being expressed by the One-Suffix Rule. However, one problem remains. With numeral 1000, which similarly consists of a DP with two phi-bundles, the oblique case stops at the numeral. With our featureless 2-4 and 5+, the oblique case seems to spread to both phi-bundles, despite the configuration being nearly identical. I repeat the relevant examples below, with their configurations illustrated underneath:

²¹ This is potentially an argument for the syntactic status of dependent case. Oblique case, which is presumably syntactic given that it is triggered by a head, is assigned over dependent case. If dependent case were assigned after syntax (in the morphology), then it would be expected to overwrite the oblique case (unless we make assumptions about its inability to “see” things with oblique case). Instead, dependent and oblique case seem to interact with each other, suggesting that they are applied in the same component: syntax.

in a structure (and this could be the unifying factor between the Slavic and Uralic numerals in relation to this phenomenon).

5.5 Issues for further research

In the preceding sections, we have seen how an analysis of the semi-lexicality of the numerals allows us to model and account for their behavior with regards to case and agreement. In this section, we turn to some open questions this account creates for our understanding of numerals. I discuss complex numerals (section 5.5.1 and briefly introduce numerals in other Slavic languages, which show similar patterns and presumably, deserve a similar treatment (section 5.5.2).

5.5.1 *Complex numerals*

Ionin and Matushansky (2006) argue that complex numerals are compositional, with multiplicative numerals (e.g. $2 \times 1000 = 2000$) involving a head-complement structure and additive numerals (e.g. $20 + 5 = 25$) conjunction. Their analysis predicts that the syntax of complex numerals should follow from the syntax of its parts. We have already seen this for numeral 1000 when operating as a multiplicative base. In combination with the numeral 2, it inflects as nominative plural (in subject position), and in combination with numeral 5, it inflects as genitive plural. It behaves as any other noun would in that position.

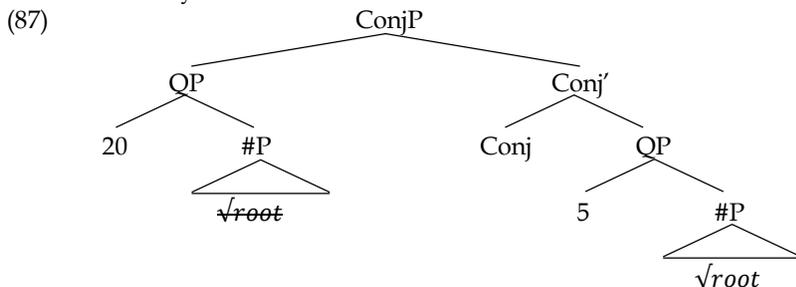
- | | | | |
|------|-----------------------|---------------|-----------|
| (84) | Dwa | tysiące | ptaków |
| | Two.M.NOM | thousands.NOM | birds.GEN |
| | 'Two thousand birds' | | |
| (85) | Pięć | tysięcy | ptaków |
| | Five.NV.NOM | thousands.GEN | birds.GEN |
| | 'Five thousand birds' | | |

While the multiplicative numerals behave as expected,²² the additive numerals of Polish are somewhat surprising. Ionin and Matushansky (2006) propose that additive numerals involve the conjunction of two numeral-noun constructions, with either right-node raising or PF deletion of the first conjunct (to model the fact that the noun surfaces only once). Thus, for example, for the complex numeral in (86), we would expect a structure as in (87), which is depicted with PF deletion of the left conjunct (Ionin and Matushansky 2006: 341, ex. 44); Ionin and Matushansky (2006) are not specific on the level of conjunction and I have

²² This conclusion applies for the numerals 1000 and up. Numeral 10 and numeral 100 do not behave in predictable ways and seem to have frozen morphology from a period in which they did inflect more productively. A short discussion of this for numeral 100 was given in section 5.4.1.

depicted it as a conjunction of QPs.

- (86) Dwadzieścia pięć kotów
 Twenty five cats.GEN.PL
 'Twenty five cats'



They propose the PF deletion account for Russian to account for the fact that in Russian, it appears to be the rightmost conjunct which determines properties of the quantified noun. For example, in a complex numeral with the numeral 1, the quantified noun surfaces as nominative singular (88), exactly as it would if quantified only by the numeral 1 (89).

- (88) Ёт-и последн-ие двадцат' один-ъ стол-ъ
 DEM-NOM.PL last-NOM.PL twenty.NOM one-M.NOM.SG table-NOM.SG
 'these last twenty-one tables' (Pesetsky 2013: 143, ex. ia)

- (89) Один-ъ красив-yj стол-ъ
 one-M.NOM.SG beautiful-M.NOM.SG table-NOM.SG
 'one beautiful table' (Pesetsky 2013: 61, ex. 73a)

This is easily accounted for by assuming that only the right-hand noun surfaces, the left-hand noun being deleted.

In Polish, the account requires modification. The numerals 1 and 2-4 do not show the same patterns in additive numerals as they do when simplex, suggesting that a left-hand PF deletion account will not suffice. Let us consider numeral 1. As briefly discussed in 4.5, numeral 1 behaves like an adjective, agreeing for case, number, and gender with the quantified noun in structural and oblique contexts:

- (90) Jedna osoba Structural context
 One.F.SG.NOM person.F.SG.NOM
 'One person'
- (91) Z jedną osobą Oblique context
 With_{INST} one.F.SG.INST person.F.SG.INST
 'With one person'

I proposed that in its lexical entry, it is just a root, albeit one which is used with

adjectival syntax in a QP. Like with the other numerals, I assume a Q-feature.

- (92) *jeden* '1': [$\sqrt{1}$, Q]

When used in an additive numeral, numeral 1 ceases to behave like a canonical adjective. Instead, it becomes frozen in its masculine singular form and fails to agree with the quantified noun in number, gender, or case (Swan 2002). We see this in the examples below where the numeral surfaces as *jeden* both in a structural and an oblique environment. Notice also that the quantified noun in a structural environment is marked genitive, contrary to what we see with simplex 1.

- (93) Dwadzieścia jeden osób
 Twenty.NV.NOM one.N.SG.NOM persons.F.PL.GEN
 'Twenty-one people'
- (94) Autobus z dwudziestu jeden pasażerami²³
 Bus with_{INST} twenty.INST one.M.SG.NOM passengers.INST
 'A bus with 21 passengers' (Swan 2002: 199)

Numeral 1 in an additive numeral is very different from what we see in Russian (cf. (88)). Its inability to decline suggests that it no longer functions as a canonical adjective, and more specifically, does not carry # and γ probes. Its probal deficiency can also be linked to the genitive case which surfaces in structural case environments – if the numeral does not Agree with the noun, it does not join the phi-bundle of the noun via feature sharing and instead, remains separate. This configuration appears to be sufficient to trigger dependent case (genitive) on the quantified noun. As an initial hypothesis, let us suppose that for whatever reason, additive numerals prevent the numeral from carrying an Agreement probe.

Turning to the numerals 2-4, we see a slightly different pattern. As per our hypothesis, the agreeing pattern of numerals 2-4 with a virile noun is blocked, only the non-agreeing pattern surfacing. Thus, we never find virile agreeing *dwaj* '2', *trzej* '3', or *czterej* '4' in an additive numeral, only the genitive forms. This is consistent with the hypothesis that the numeral has lost its probe in an additive numeral, the result being that it behaves like a 5+ numeral.

- (95) a. Dwudziestu trzech chłopców spało.
 Twenty.GEN three.GEN boys.M.PL.GEN slept.N.SG
 'Twenty-three boys slept.'
- b. *Dwudziestu / dwadzieścia trzech chłopcy
 Twenty.GEN / twenty.NOM three.V.NOM boys.NOM

²³ Complex numerals involving numeral 1 seem difficult to form even for native speakers, attesting to its complexity. My consultant, for example, has difficulty finding a way to express numeral 1 in a complex numeral in oblique environments.

We thus expect that in the context of a non-virile noun, the agreeing pattern should similarly be unavailable, and instead the numeral should surface in a nominative-accusative form with genitive on the quantified noun (as a 5+ numeral would). This, however, is impossible. The agreeing pattern is the only pattern available, contra our hypothesis.

- (96) Dwadzieścia trzy dziewczyny spały.
 Twenty.NOM three.NOM girls.F.PL.NOM slept.NV.PL
 'Twenty-three girls slept.'

Summarizing, we see that with numeral 1 and with numerals 2-4 in a virile context, the Agreement probe necessarily disappears. With 2-4 in a non-virile context, the Agreement probe necessarily remains, despite sitting in an additive numeral. We can adjust our hypothesis slightly to capture this. Suppose instead that the Agreement probe in an additive is deleted, but, only if it does not interfere with the lexical specification of the numeral itself. I reproduce the lexical specifications below, distinguishing virile and non-virile contexts for illustration.

- (97) *jeden* '1': [$\sqrt{1}$, Q]
 (98) *trzy_V* '3': [[_{#P} $\sqrt{3}$]], $\neg\gamma$, ($_ _ _$), $\neg\#$, Q]
 (99) *trzy_{NV}* '3': [[_{#P} $\sqrt{3}$]], $\neg\gamma$, $_ _ _ _ _$, $\neg\#$, Q]

N numeral 1 is not lexically specified for an agreement probe, but seems to acquire its probe in the same way adjectives would (however that should be defined). In this case, blocking the agreement probe does not interfere with the lexical specification. Similarly, in a virile context, the numerals 2-4 are equally capable of carrying a probe or not carrying a probe. For this reason, surfacing without a probe is unproblematic. However, for the numerals 2-4 in a non-virile context, where an agreement probe is required by the lexical specification, surfacing without the required agreement probe is problematic. The need to delete the Agreement probe appears to be overridden by the requirements of the numeral, hence that fact that only these numerals show agreement in a complex additive numeral. The requirements of the numeral seem to block whatever mechanism would otherwise remove the probe.

Suppose the characterization provided so far is accurate: additive numerals prefer to delete Agreement probes if possible. Why might this be? As a tentative answer, such deletion might be triggered by the conjunction itself. Conjunction often conjoins elements of a similar category, e.g. nouns with nouns and verbs with verbs. This property has been termed the Law of the Coordination of Likes (cf. van Koppen and Rooryck 2006), though it is subject to a number of exceptions. Potentially, in Polish, having a featureless numeral in one conjunct is not compatible with having a probe-bearing numeral in the other conjunct, leading the probe to be dropped where possible. This could imply that coordination has

stricter rules in Polish than in Russian (e.g. enforcing featural symmetry), or alternatively, that the syntax of Russian numerals does not create the same discrepancy in like-ness as equivalent numerals in Polish do. Without having systematically studied the Russian numerals or Polish coordination, it is difficult to say which holds (if either). The hypothesis requires more development and I leave it open for future research.

5.5.2 Numerals in other Slavic languages

Similar patterns of case and Agreement are found in the numeral systems of other Slavic languages (see Pesetsky 1982, Franks 1994, Pereltsvaig 2006, Šarić 2014, and many others). However, no two numeral systems are fully identical. This makes for an interesting opportunity to compare the semi-lexicality of Polish numerals to other Slavic numerals. In the space of this short section, it is impossible to do justice to the wide array of variation between and within Slavic numeral systems. For this reason, I focus my attention on 5+ numerals in Serbo-Croatian and Russian, and highlight some of the interesting similarities and differences for further study into the Slavic numeral systems. This section only touches on a subset of those differences, but it gives a window into the existing possibilities.

Šarić (2014) and Klockmann and Šarić (2015) discuss the paradigm of numerals 5+ (5-20, complex numerals, 100, 1000) in Serbo-Croatian. Like the Polish numerals, the Serbo-Croatian 5+ numerals trigger default agreement:²⁴

- (100) Pet satova / slika / ogledala je
 Five clock.M.PL.GEN / picture.F.PL.GEN / mirror.N.PL.GEN is
 visilo na zidu.
 hung.N.SG on wall
 'Five clocks/pictures/mirrors hung on the wall.'

That this is default agreement is evidenced by the fact that the coordination of two numeral-noun constructions does not produce masculine plural agreement on the verb (102), while the coordination of two neuter singular nouns does (101):

- (101) Mače i pile su trčali / *je trčalo.
 Kitten.NOM.N.SG and chicken.NOM.N.SG are run.M.PL/ *is run.N.SG
 'A kitten and a chicken ran.'
- (102) Pet pevačica i pet glumica je pevalo / *su pevali.
 Five singers.GEN and five actresses.GEN is sung.N.SG / *are sung.M.PL
 'Five singers and five actresses sang.'

Like in Polish, the default agreement suggests that there is some deficiency in the

²⁴ The Serbo-Croatian data presented in this section is taken from Klockmann and Šarić (2015), gathered in Šarić (2014). These conclusions are indebted to Šarić (2014)'s work.

structure, such that verbal agreement cannot be successful. If we examine adjectival agreement in Serbo-Croatian, adjectives which precede the numeral necessarily agree with the quantified noun and not the 5+ numeral.

- (103) Pretrčao je dobrih / *dobro pet milja.
 Run-he is good.GEN.F.PL / *good.NOM.N.SG five mile.GEN.F.PL
 'He ran a good five miles.'

This is a difference from Polish, which allowed pre-modifiers to target both the numeral and the noun. In Serbo-Croatian, the numeral does not seem to be an agreement target at all, adjectival agreement bypassing the numeral in favor of the noun. This is an important clue for the default verbal agreement illustrated in (100). If the noun is necessarily the target, then we can relate the impossibility of successful agreement to the genitive case on the noun. As was shown for Polish, if verbal agreement targets the genitive noun, it is default (see section 5.3.2.2), and the same seems to hold in Serbo-Croatian. This conclusion further suggests that the numerals must be featureless, not carrying phi-bundles of their own. If 5+ numerals are fully featureless in Serbo-Croatian, and furthermore, lack any phi-bundle, it follows that they will not be a target for Agreement. This is also corroborated by the observation of Šarić (2014) that this set of numerals does not decline for gender, number, or case. Together, this implies that, like Polish, they are semi-lexical in a deficient way. However, there must be further differences. Polish 5+ numerals were also taken to be featureless, but they interacted with the #P of the quantified noun, thereby acquiring a phi-bundle, and making themselves an Agreement target. Serbo-Croatian numerals do not seem capable of acquiring a phi-bundle (and Šarić 2014: 52 reports that the numerals can combine with *pluralia tantum* nouns, in line with this difference). This shows that while both Polish and Serbo-Croatian numerals are semi-lexical in a deficient way, their semi-lexicality is not exactly the same.

Taking the numerals to be featureless, however, cannot be the whole story, and further study of how Agreement and case interact in the Serbo-Croatian system is needed. By taking the Serbo-Croatian numerals to be featureless, we create a problem for case assignment: if the dependent case mechanism functions on phi-bundles, and the 5+ numerals have no phi-bundle, then genitive case should *not* surface on the N2. This is false:

- (104) Pet satova / slika / ogledala je.
 Five clock.M.PL.GEN / picture.F.PL.GEN / mirror.N.PL.GEN is
 visilo na zidu.
 hung.N.SG on wall
 'Five clocks/pictures/mirrors hung on the wall.'

Franks (1994) argues that the genitive of Serbo-Croatian numerals is not structural

but rather inherent (in contrast to Polish). We see this in the fact that in oblique case environments, the genitive of the quantified noun remains genitive, this being a difference from Polish.

- (105) za osam dana
 in eight days.GEN.PL
 'in eight days' (Franks 1994: 605, ex. 10b)

This suggests that the status of the genitive case assigned in the context of the numeral differs between Polish and Serbo-Croatian (or alternatively, the case assignment mechanism differs). To truly understand how semi-lexicity interacts with the patterns of case and Agreement, it is necessary to study precisely how features are realized in Serbo-Croatian and how case and Agreement operate on those features. The discussion so far indicates that semi-lexicity is a plausible direction, but a careful study of the properties of the numerals in relation to the language system is needed to fully diagnose their semi-lexicity.

The 5+ numerals in Russian show similar patterns, but in addition, Agreement optionally succeeds. This is illustrated below.²⁵

- (106) P'yat' koróv spálo / spáli
 Five cow.F.PL.GEN sleep.PAST.N.SG / sleep.PAST.PL
 'Five cows slept.'

Pereltsvaig (2006) argues that the numerals differ in structure when agreement is and is not successful (see also Pesetsky 1982, Franks 1994). If Agreement occurs, the numeral is embedded inside a DP. This correlates with a number of properties, including being referential and serving as an antecedent or controller of PRO. If no Agreement occurs, Pereltsvaig (2006) proposes that the construction projects only up to a QP, terming these "small nominals." A small nominal lacks a referential interpretation and cannot serve as an antecedent or controller. The success of Agreement also correlates with the position of the construction (Pesetsky 1982, Franks 1994). If the construction precedes the verb, Agreement tends to be successful, whereas if the construction follows the verb, agreement tends to be default.

What this discussion shows is that the patterns of verbal agreement in Russian involve a more complex set of properties than the patterns of verbal agreement in Serbo-Croatian and Polish. In Serbo-Croatian and Polish, it is possible to connect default agreement to a deficiency induced by the numeral. In Russian, however, this conclusion, in its simple form, seems less likely. If the lexical specification of the numeral induces a deficiency, then it should do so regardless of whether the construction projects to a DP or only to a QP. The fact

²⁵ The Russian examples below were gathered by Anton Nguyen, during an internship in the project "The Uniformity of Linguistic Variation." I thank Anton for the examples.

that it does not show that there must be more factors in play. These blur the picture and show that we cannot attain an accurate characterization of the semi-lexicity of the numerals, without carefully studying the properties of the construction in the context of the language.

This section has been brief, but it has shown some of the variation in the Slavic numeral systems. While at a very broad level, there are many similarities between the numeral systems of the Slavic language, there are also many minor differences, which suggest that an analysis which works in one language cannot be applied straight to another language. There are complex intervening factors which must first be understood to accurately diagnose precisely in what way the numerals are semi-lexical. The Slavic numeral systems provide a nice opportunity to further explore issues of semi-lexicity and the notion of a numeral.

5.6 Discussion and Conclusions

In this chapter, we explored how the structure of a DP containing a numeral in Polish interacts with case and Agreement. The semi-lexicity of the numerals places restrictions on how the DP is built, with direct consequences for case, agreement, and the distribution of the numeral.

Numeral 1000 optionally projects a γP , but always projects a #P in the quantity domain of the quantified noun. Because the numeral always has *some* phi-feature associated with it, it has a phi-bundle, which triggers genitive case marking on the quantified noun via the dependent case mechanism. However, depending on what is contained in that phi-bundle, Agreement either succeeds or fails. If the numeral has γ , Agreement is successful and necessarily with the numeral. If the numeral does not have γ , its phi-bundle is phi-deficient, and Agreement relations with it either fail, or probe past it and Agree with the quantified noun (which results in default agreement on T). The semi-lexicity of numeral 1000 involves deficiency, and this deficiency has predictable effects on case and Agreement.

Numerals 2-4 are also phi-deficient, but in addition, they require a #P to immediately dominate them, and furthermore, optionally carry a gender probe. The required #P accounts for their inability to surface with *pluralia tantum* nouns. The gender probe has significant, but predictable effects on how the numeral interacts with case and Agreement. Because the numeral has a gender probe, it necessarily Agrees, and given its position in the structure, it Agrees with the quantified noun. Agreement is a feature sharing relation, and the consequence is that the numeral and the quantified noun are associated with the same phi-bundle. This means there is only one phi-bundle in the DP, which cannot trigger the dependent case mechanism (hence, the lack of genitive), and furthermore, is phi-complete, carrying the γ and # of the quantified noun. This predicts all Agreement relations to be successful with the DP. In this example of semi-

lexicity, the gender probe plays a crucial role in the patterns which occur. These numerals are not lexical (e.g. not bare roots), but the combination of features on the root create the semblance of lexicity.

When no gender probe is available, the numerals 2-4 behave the same as 5+. The numerals are deficient for both γ and #, and in addition, are Merged under the #P of the quantified noun (hence their unacceptability with *pluralia tantum* nouns). The position of the numeral is not in the quantity domain, and thus, these numerals move to QP, pulling up the #-head of the quantified noun as they do. This splits the phi-features of the quantified noun which form two separate, phi-deficient phi-bundles. This is the source of the case and Agreement patterns. Because there are two phi-bundles, the dependent case mechanism is triggered, assigning genitive to the quantified noun. However, because both phi-bundles are phi-deficient, Agreement necessarily fails. This further relates to the oblique case patterns, which prefer a phi-complete phi-bundle, leading to case percolation past the numeral. The semi-lexicity of the numerals has a very idiosyncratic set of effects, which are responsible for the case and Agreement patterns which occur.

The paradigms of the Polish numerals are complex, but if we make the right assumptions about the lexical specifications of the numerals and how those translate into structure, then the case and Agreement facts are fully predictable. The semi-lexicity approach promoted here explicitly acknowledges the very idiosyncratic character of these numerals and takes the numerals to be responsible for the semi-lexical effects. The advantage is that no special assumptions about the mechanisms of case or Agreement are needed: syntax simply functions “as usual,” but the input it is fed is not so usual. Idiosyncratic input produces idiosyncratic output. The semi-lexicity hypothesis makes this account possible.

The results of this chapter also have implications for our conceptualization of a category “numeral.” Polish does not seem to have something like a category “numeral,” but rather classes of elements which share the function of indicating the cardinality of the set denoted by the noun. Each class has its own individual morphosyntax, and makes use of the tools of the nominal domain (phi-features) and the adjectival domain (probing phi-features), in addition to the quantificational Q-feature (which may be a universal feature). The numerals seem to be composites of what is found in other categories, suggesting that they could be constructed categories (Wiltschko 2014). There is no evidence for a category numeral in Polish, and potentially this conclusion can be extended beyond Polish.

5.7 Appendix: Grammaticalization

In this section, I briefly discuss the grammaticalization path of Polish numerals, in relation to other work on grammaticalization with cardinals. Polish numerals seem to have developed out of lexical nouns into the semi-lexical nouns they are today. What is interesting to consider is how their grammaticalization relates to

their current-day semi-lexical status. This section briefly discusses this.

Von Mengden (2008) outlines a general path of grammaticalization for cardinal numerals, with five steps for transitioning from a numeral-less language to a language capable of expressing nearly any quantity. He identifies subitization as a first step, subitization being “a nearly instantaneous process that allows us to discriminate sets of different sizes” (Wiese 2003: 95). Subitization is limited to quantities of up to three or four elements, and beyond that, a general counting mechanism is necessary (Wiese 2003, Spelke 2011). This process has been shown to be available to both animals and pre-linguistic infants, leading to its treatment as a core knowledge system (Spelke 2011). Von Mengden hypothesizes that subitizable quantities are the starting point in the development of a numeral system, and cross-linguistically, we do find plenty of examples of languages which do not have numerals extending beyond these quantities. For example, Mangarayi (Australian) has numerals only for 1-3, Yidiny (Australian) 1-5, and Hixkaryana (Carib language in Brazil), numerals 1-5 and 10 (Comrie, n.d.). Awa Pit (Awa language on the border of Columbia and Ecuador) only has native numerals up to 4, and has borrowed from Spanish for higher quantities (Curnow 1997). Presumably, before the arrival of the Spaniards, speakers did not express exact quantities higher than 4. Under von Mengden’s hypothesis, such languages are at an initial stage in the development of their numeral systems.

The second step is to expand beyond the subitizable quantities. Von Mengden (2008) suggests that the initial representation of numerosities involves some indexation of body parts, which eventually become conventionalized. We can find traces of this in the numeral systems of many languages, and in what have been termed extended body-part numeral systems (cf. Comrie 2013c), where specific numerals are associated with body parts in a particular order. Kobon (Trans-New Guinea), for example, refers to the numerals 1-5 using fingers on the hand (counting from the left pinky to the thumb), numeral 6 the wrist, 7 the forearm, and so on (Comrie 2013c).²⁶ We can also trace the origins of some numerals in Western languages back to body part terms. For example, Jagodziński (2016) reports that Polish 5 may have originated from a noun meaning ‘hand’ and numeral 10 from something meaning ‘the whole of hands,’ i.e. all ten fingers. In such languages, the relation between body part and numerosity has long been conventionalized, to the point where it is not immediately recognizable.

Von Mengden’s third and fourth steps both involve the creation and development of complex numerals, which allow for the use of basic arithmetic (mostly addition and multiplication, but also subtraction and division, Comrie n.d.) to refer to new quantities. The third step is termed serialization, which refers to the introduction of complex numerals, and the fourth step is conceptualized as

²⁶ Comrie (n.d.) notes that base 10 systems can be related to finger counting (ten fingers), base 20 systems to finger and toe counting, base 8 systems to the counting of the spaces between the fingers, and base 12 systems to counting of the knuckles, excluding the thumb.

the functionalization of those complex numerals, e.g. *-ty* in *fifty* (5x10) and *-teen* in *fifteen* (5+10) as functionalizations of the numeral 10.

The system of complex numerals has its limits without the introduction of new base numerals. For example, in a system with numerals only for 1 to 10, how would speakers express the quantity 1000? ‘Ten tens of tens’ or ‘ten of a ten of tens’ or perhaps even ‘ten ten tens?’ The inclusion of a numeral for the quantity 100 would simplify the system, and this is what von Mengden names as a final step: the addition of higher bases to the numeral system. The source for such bases can vary, but von Mengden notes that higher bases are often intensifications of lower bases. Jagodziński (2016), for example, suggests that the numeral 1000 in Polish can be traced back to something like ‘a powerful hundred’ (thus making 1000 an intensification of numeral 100), and von Mengden (2008) provides for the source of *million* in English the Old Italian *milli-one*, which meant ‘great thousand.’ Potentially, new bases will only enter a language when needed by the community, and we might expect that very high bases such as *million*, *billion*, and *trillion* in English, for example, have been necessary only more recently in human history.²⁷ The addition of new bases into the numeral system makes for a powerful system, potentially capable of expressing any needed quantities.

Given the lexical specifications proposed for Polish, it is possible to identify a grammaticalization cline, which moves from numerals as nouns, to numerals as featureless, more functional Q-heading elements. Let us examine the evidence in favor of this and then consider how it relates to the proposal of von Mengden.

The lexical specifications for numerals 2-4 (non-agreeing), 5+, and 1000+ create three structural possibilities for the functional structure contributed by the numeral. Either the numeral lacks its own features in the syntax (2-4 and 5+) or it carries some features of its own, just # or both # and γ .

(107)	2-4, 5+:	[5]	(featureless)
	1000+:	[_{#P} # [1000]]	(only #)
	1000+:	[_{#P} # [_{γP} γ [1000]]]	(both # and γ)

²⁷ We can show this using the Corpus of Historical American English (Davies, 2010-), which has English data from the 1810s onwards. Numeral 100 rises in frequency from 1810 (224 hits = 189.64 hits per million words) to 1860 (5457 hits = 319.97 hits per million words), then seems to more or less continuously decline in frequency. *Million*, on the other hand, shows a steady increase, from 24 hits in the 1810s (20.32 hits per million words) to 9496 hits in the 2000s (321.16 hits per million words). As for numerals *billion* and *trillion*, these do not seem to even exist before the 1840s, and don’t really take off until the second half of the 1900s. I think it’s fairly accurate to say that in the early 1800s there was little use for such high quantities as *billion* and *trillion*, and it is quite possible that these lexical items didn’t even exist yet in the linguistic community; however, as the need arose to count larger and larger quantities, these numerals entered the lexicon. Fun fact: The frequency of *trillion* doubles from the 1970s to the 1980s, this coincidentally correlating with the moment American debt rose above 1 trillion dollars (1981); the numeral presumably became much more useful at that moment.

Numerals 1000+ can function as canonical nouns, though they can also omit γ , and numerals 5+ function as featureless heads.

If we consider the history of numerals 5-10, they functioned as *i*-stem nouns, as evidenced by their ability to trigger feminine singular verbal agreement in Old Polish (Rutkowski 2007b, Miechowicz-Mathiasen 2012b, Dziubała-Szrejbrowska 2014).

- (108) Pięć lat minęła. (Old Polish)
 Five.F.SG years.GEN passed.F.SG
 'Five years passed.'
- (109) Jako minęła dziesięć lat
 As passed.F.SG ten.F.SG years.GEN
 'As ten years passed.' (Dziubała-Szrejbrowska 2014: 103, ex. 132)

Miechowicz-Mathiasen (2012b: fn. 13) reports that numerals 5-9 also had plural forms, although they were extremely rare. It was more common to find a dual or plural form with the numeral 10, which as a multiplicative base, inflected as dual or plural as dictated by context (e.g. dual with numeral 2, plural with 3+). For example, following numeral 5, which required the quantified noun to surface as genitive plural (see above), numeral 10 would inflect as genitive plural:

- (110) Z pięci-ą-dziesiąt synów (15th-16th cent. Polish)
 With_[INST] five-SG.INST-ten.GEN.PL sons.GEN
 'With fifty sons' (Miechowicz-Mathiasen 2012b: 7, ex. 1b)

The ability to inflect as plural, more common with 10 than 5-9 historically, is a behavior that in modern Polish is limited to the numerals 1000+. This suggests that, like modern 1000, historical 5-10 also projected a #P.

In oblique contexts, the numerals also behaved like canonical nouns. Regardless of case context, the noun was marked genitive (cf. (110) and (111)).²⁸

- (111) Z pięćią synów (15th-16th cent. Polish)
 with_[INST] five.SG.INST sons.GEN
 'with five sons' (Miechowicz-Mathiasen 2012b: 7, ex. 1a)

Altogether, historically, numerals 5-10 behaved like canonical nouns, and presumably, like numeral 1000 today, projected both γ and #.

²⁸ Also interestingly, according to Dziubała-Szrejbrowska (2014: 98), locative was the first case context where 5+ genitive marking was lost, this spreading to dative and instrumental case contexts. The same seems to currently be true for numeral 1000, (cf. fn. 29), where the majority of hits occur with locative case. (However, Miechowicz-Mathiasen and Dziubała-Szrejbrowska 2012 report dative as being the first case to undergo the change.)

(112) Old Polish 5-10: [#P # [γ P γ [5]]]

In their “initial” state, numerals 5-10 were canonical nouns. In their “final” state, they are featureless numerals. This suggests that we can identify a pattern of grammaticalization from canonical # and γ -bearing nouns to featureless Q-heads.

If we consider numeral 1000, it seems to be undergoing a similar change, hundreds of years later. We’ve seen that it has a canonical nominal form (with # and γ) and also a deficient nominal form (no γ). Ewa Willim (p.c.) further points out that numeral 1000 is becoming more like 5, some speakers failing to mark the noun genitive in oblique environments, or marking the numeral genitive in combination with a virile noun. We find evidence of this first possibility in the Polish National Corpus, where the quantified noun fails to surface as genitive.²⁹

(113) %I rozmawiamy o **tysiącu** **sprawach**.
 And discuss.2PL about_[LOC] thousand.LOC things.LOC
 ‘And we are talking about a thousand things.’

This suggests that numeral 1000 is currently in the process of grammaticalizing into a featureless numeral like 2-4 and 5+ for some speakers. In the synchronic language, this gives us three structural possibilities, not all of which are necessarily present in a single speaker.

(114) 1000: [1000] *(featureless)*
 1000: [#P # [1000]] *(only #)*
 1000: [#P # [γ P γ [1000]]] *(both # and γ)*

If we combine this with the grammaticalization path of 5-10, we can identify the following path of grammaticalization for Polish numerals:³⁰

(115) Canonical Noun > Deficient Noun > Featureless Numeral

²⁹ I lack examples of the numeral surfacing as genitive with a virile noun; morphologically, it is no different from what we expect to find in a genitive environment, making it very time-consuming to find a relevant example. With regards to oblique case, however, a search in the 1800m word subcorpus identified 15 hits with instrumental case on the quantified noun, 17 hits with dative case, and 139 hits with locative case. Interestingly, Dziubała-Szrejbrowska (2014: 98) reports that historically locative was the first case context where genitive marking was lost with the numerals 5-10, this spreading to dative and instrumental case contexts. This seems to be true for numeral 1000, where the majority of hits occur with locative case. (However, Miechowicz-Mathiasen and Dziubała-Szrejbrowska 2012 report dative as being the first case to undergo the change.)

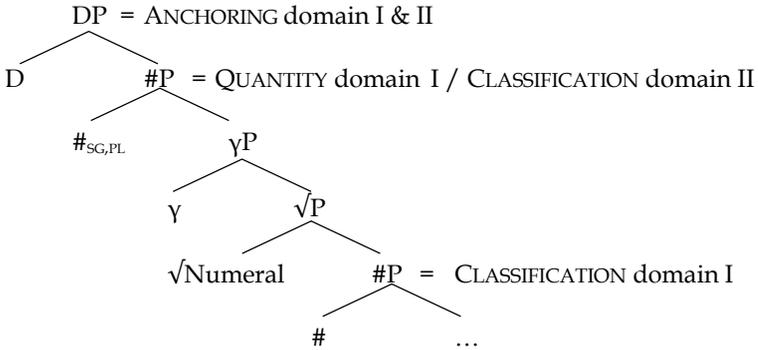
³⁰ This predicts numerals 5-10 may have had an intermediate γ -less state, which may or may not have overlapped with its nominal or numeral status. I do not have the resources to test this hypothesis at the moment.

More specifically, there is a process of losing phi-features, which first targets γ and then targets #.

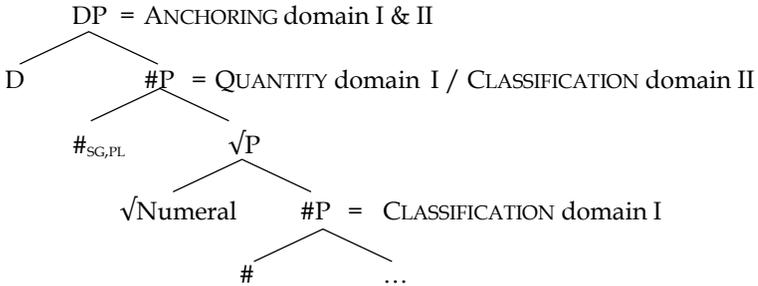
(116) $[\#, \gamma] > [\#] > []$

As quantificational elements, these numerals always sit in the quantity domain of the noun, regardless of how much structure they have lost. The difference between the numeral types concerns the amount of functional structure they project, with predictable consequences for processes of case and agreement, as illustrated in this chapter.

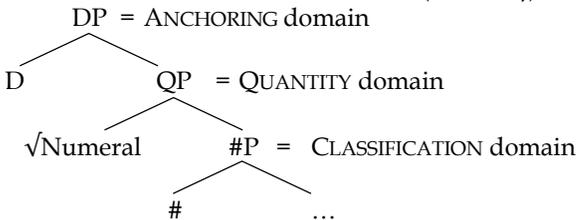
(117) “Initial State”: Numeral as a canonical noun (both # and γ)



(118) “Intermediate State”: Numeral as a deficient noun (# only)



(119) “Final State”: Numeral as featureless (no # or γ), *movement omitted*



Miechowicz-Mathiasen and Dziubała-Szrejbrowska (2012) argue that the rise of virile gender played a crucial role in the “numeralization” of numerals, i.e. the transformation of the 5+ numerals from nouns to their current form. Nouns were unable to morphologically express the developing virile gender, and instead, this task fell to numerals and pronouns, which marked it through an accusative-genitive syncretism (as opposed to the nominative-accusative syncretism of before). They propose that the use of the numerals to express the new virile gender facilitated the loss of γ on the numeral itself, and with the loss of its functional structure, the numeral instead came to represent functional structure of the noun (#P in their account). This is consistent with the facts as presented here, although, under the current approach, the numeral always instantiated functional structure of the noun (the quantity domain), but the amount of structure projecting above the numeral has changed. Their account provides a motivation for the grammaticalization process which resulted in the loss of both γ and #.

Interestingly, the initial state of the Polish numerals tends to be nominal (cf. historical 5-10, 100 as a neuter noun historically, 1000 currently as a masculine noun), and the grammaticalization process goes in the direction of shedding this nominality. Corbett (1978) and Hurford (2003) similarly remark that higher numerals cross-linguistically tend to be noun-like. The consistency of this is surprising, but I think if we consider it from the perspective of von Mengden (2008), it follows as a logical consequence.

In the system outlined by von Mengden (2008) (discussed above), there are a few points in which we expect new numerals to enter the language. Recall that step one was to name the subitizable quantities (1-4) and step two was to add more numerosities beyond these. Steps three and four concerned the creation of complex numerals, and step five concerned the introduction of new base numerals into the system. Complex numerals presumably involve their own syntax, given that they are constructed out of existing numerals in the system (see e.g. Ionin and Matushansky 2006). Thus, this leaves steps one, two, and five as points in which new numerals enter the system, for example, as the very low quantities (e.g. 1-9 in a base 10 system) or the high quantities (e.g. base numerals 10, 100, 1000, etc.). The question is, when new numerals enter the linguistic system, how is the lexical item used to represent the numerosity chosen?

Von Mengden (2008) proposed that the low numerosities tend to come from body part words. Assuming that body parts are usually referred to with nominals, it follows that if the initial source for a low numeral is something which has the syntax of a noun, then the numeral very plausibly would inherit that nominal syntax even if used to refer to a quantity. This is presumably the story for numeral 5 in Polish, which according to Jagodziński (2016) can be traced back to the word for ‘hand.’ The connection between the numeral and the body part has long been severed, but if there is nothing pushing change in the system, there is no reason for the numeral to cease to have a nominal syntax. If Miechowicz-Mathiasen and Dziubała-Szrejbrowska (2012) are correct, it was the introduction of a new gender

distinction in the language system which triggered the grammaticalization of 5. Based on this, if the source for a numeral is something nominal, we can plausibly expect that that numeral would have a nominal syntax, and similarly, processes of grammaticalization would affect its status as a canonical noun.

The fifth step von Mengden (2008) proposes is the introduction of higher numerals, i.e. those numerals which usually function as bases; von Mengden (2008) suggests the source for these to be intensifications of lower numerals. Such numerals have often been remarked to be more nominal than the lower numerals (cf. Corbett 1978, Hurford 2003). I have a few comments with regards to the nominality of such higher numerals. Firstly, if, as suggested by von Mengden (2008), many higher numerals are intensifications of lower numerals (etymologically), then we expect the higher numerals at their point of creation to have inherited the syntax of that lower numeral. This could in part account for the nominal status of such higher numerals, if they are introduced at a time when the relevant lower numeral is still canonically nominal. The second point concerns the “age” of certain higher numerals. Supposing that higher numerals and bases are added into the language as needed, the higher a numeral base is, the more likely it is to be a recent innovation.³¹ If such numerals also enter the numeral system with the syntax of a noun, like the lower numerals can, it is simply a fact that they will have had less time to undergo grammaticalization. The “more nominal” flavor of the higher numerals might simply be an artifact of this – they are more recent innovations in the language and have had fewer opportunities to be grammaticalized. This does not mean they are any less susceptible to it, as modern Polish numeral 100 can attest.

This gives us a potential answer as to why the initial state for the Polish numerals is nominal. If they enter the system as nominals, for example, drawing on body part nouns, then we fully expect them to have a nominal syntax. Furthermore, this also gives us a handle on the nature of their grammaticalization, via the loss of γ and subsequently $\#$. What makes them nominal is the fact that they project nominal functional structure, including γ and $\#$, despite surfacing in the quantity domain. Thus, if grammaticalization would affect them at all, their ability to project phi-features seems the right place to start. They become subsequently “less” nominal with each phi-feature that they lose. As to why γ is the first to go, there is no easy answer here. It could be that the numerals have a more tight-knit relation with $\#$ as opposed to γ , making γ more susceptible to loss, or alternatively, the rise of the virile affected the numeral’s ability to project γ , but not $\#$. At any rate, we can conclude that the path grammaticalization might take

³¹ *Googolplex* is a nice example of this in English, where the numeral is purported to have been introduced in 1940 by the mathematician Edward Kusner. The quantity this numeral refers to is so high as to be utterly useless for the average speaker ($10^{10^{100}}$ ‘ten to the ten to the hundred’). Similarly, there are plenty of other numerals in English which were presumably created by and for scientists in recent centuries (e.g. *vigintillion* 10^{63} , *decillion* 10^{33}). Such numerals are not very old in the history of the language.

with a particular numeral is presumably heavily dependent on what sort of structure is associated with that numeral, and the nominal initial state of the Polish numerals makes their phi-features prime targets for grammaticalization. An implication of this is that many cases of semi-lexicality that we find, might similarly be the result of grammaticalization processes, where the semi-lexical element is at an intermediate stage on its way from a lexical to a functional element (assuming it can become fully functional).³²

³² While numerals appear able to grammaticalize into bare roots in the structure (cf. 2-4 and 5+), it seems unlikely that they could ever fully grammaticalize into functional features, *in their capacity as numerals* (e.g. we might expect that a particular numeral can functionalize into something else, for example, the numeral 1 grammaticalizing into an indefinite article, but in that case, it ceases to be a numeral). Any numeral system carries the theoretical possibility of expressing an infinity of quantities. Functional features, by nature, express a limited set of possibilities (*singular/plural, definite/indefinite, etc.*) and thus, capturing the infinity of numerals via a feature system would presumably require an infinity of features. Instead, languages take the more economical root of combining existing numerals to express other quantities (complex numerals). This suggests that while grammaticalization often leads to something functional, there are still restrictions on this process, with numerals stopping short of full functionalization.

Chapter 6

English Q-noun pseudopartitives

6.1 Introduction

In chapters 4 and 5, we took a look at the Polish numerals, exploring how patterns of semi-lexicality arise from the lexical specifications of the numerals. We found evidence for semi-lexicality in terms of deficiencies, contextual restrictions, and additional gender probes, with identifiable effects on case, Agreement, and the distribution of the numeral. In this chapter, we turn to English, and in particular, a construction which has semi-lexical properties and has been previously identified as semi-lexical in the literature (van Riemsdijk 1998, Stavrou 2003, Alexiadou, Haegeman and Stavrou 2008): pseudopartitives with quantifying nouns. This chapter continues the study of quantificational words introduced in the chapters on Polish numerals, but by moving to English, allows us to consider how semi-lexicality arises in a language with limited morphosyntactic capabilities. Through this study, we are able to explore how languages differ in their manifestation of semi-lexicality, and whether they differ in *how* semi-lexicality is achieved. The chapter focuses on four quantificational nouns (Q-nouns): *lot*, *ton*, *number*, and *bunch*. Q-nouns share with numerals and quantifiers the function of quantifying, but differ in their morphosyntactic expression of that function. In this chapter, we explore the range of semi-lexicality with Q-nouns. This chapter can also be seen as a contribution to the discussion on pseudopartitives.

I begin with the distinction between the pseudopartitive and the partitive, two superficially identical, but structurally different constructions (section 6.2). I then turn to the morphosyntax of the four Q-nouns (section 6.3). I draw on judgments and on the Corpus of Contemporary American English (COCA, Davies 2008-) in the discussion. Q-nouns show a number of minor differences which make it impossible to propose a category “Q-noun.” Instead, they must be dealt with individually, which argues in favor of semi-lexicality: Q-nouns are specified for how they interact with syntactic structure. In section 6.4, I present an analysis of the Q-nouns, which proposes a single basic structure for the quantificational

pseudopartitive, but allows for that structure to be manipulated according to the requirements of the individual Q-noun. In this chapter, we see evidence of semi-lexicity in terms of deficiency, where none of the semi-lexical nouns is capable of controlling Agreement, and furthermore, in terms of contextual restrictions on where Q-nouns can be inserted. Some Q-nouns are incompatible with definiteness and this is encoded on the Q-noun itself.

6.2 Pseudopartitives versus partitives

Let us start the discussion with canonical partitives and not-so-canonical pseudopartitives, namely numerals and quantifiers like *many* and *three* in their quantifying function. I show in this section why it is warranted to treat numerals and quantifiers with the canonical pseudopartitives, the comparison supporting the treatment of Q-nouns as complex quantifiers.

In their quantifying function, English numerals and quantifiers surface adjacent to the noun (referred to here as N2), saying something about the quantity of the set denoted by the N2.

- (1) Quantifying function:
- a. Many books
 - b. Some books
 - c. Three books

There is some set of books, and its quantity is MANY or SOME or THREE (this is a very naïve representation of whatever semantics underlies the quantification). Syntactically, such quantificational elements are usually taken to occur in the extended projection of the noun, for example, in a QP or in D (cf. Abney 1987, Giusti 1991, 1997, Zamparelli 2000, among others). In our approach, we expect them to sit in the quantity domain, perhaps in a QP (but the actual label is not so important). Crucially, they form part of the functional structure of the noun.

These quantifiers and numerals also participate in the partitive construction. As partitives, they are necessarily followed by the particle *of*¹, and the N2 often occurs with a definite determiner, although, in general, partitives also allow for demonstratives, possessives, indefinite articles, quantifiers, and numerals on the N2 (cf. Jackendoff 1977, Keizer 2007).² Partitives cannot occur

¹ I refer to *of* as a particle to avoid saying anything about its status syntactically (yet).

² Early approaches to partitives initially proposed the Partitive Constraint (Jackendoff 1977: 113), which stated that the N2 must be accompanied by a definite element, for example, a definite determiner, demonstrative, or possessive. This was later replaced by the Revised Partitive Constraint (Ladusaw via Keizer 2007), after it was noted that partitives could also surface with indefinites, quantifiers, and numerals on the N2 (see below). The Revised Partitive Constraint instead requires the N2 to be specific.

with bare plural N2s (**Two of international festivals in India*). The partitive is used to indicate the quantity of a subset of the set denoted by the N2.

- (2) Partitive function:
- a. Many of the books
 - b. Some of the books
 - c. Three of the books

There is some set of books, and the quantifier and numeral pick out a subset from that set, the subset having a quantity of MANY, SOME, or THREE. The interpretation of the partitive involves two sets: the set denoted by the N2, and a subset of that set, denoted by the partitive construction (see also Alexiadou, Haegeman, and Stavrou 2008, fn. 1, Koptjevskaja-Tamm 2001: 527, and Keizer 2007: 69). With regards to the structure, a dominant view is that we are dealing with two nouns, one silent, associated with the quantifier, the other overt, our N2 (e.g. Jackendoff 1977, Zamparelli 1998, Stickney 2009, among others).^{3,4} This implies a very different structure from what we get with the quantifying function, where there is only a single noun present. Both semantically and syntactically, the quantifying and partitives usages differ with these numerals and quantifiers.

Expanding our consideration of quantifiers and numerals to also include those which require the indefinite article, e.g. *a few, a hundred, a dozen, etc.*, a similar distinction is made between the quantifying and partitive usages:

- (3) Quantifying function:
- a. A few books
 - b. A hundred books
 - c. A dozen books

- (4) Partitive function:
- a. A few of the books

-
- i. That the object is **one of a class commonly or even universally found** is alien to the theory of property rights. (Keizer 2007: 68, ex. 17)
 - ii. Let me ask then **the first of a few questions**. (Keizer 2007: 68, ex. 18)
 - iii. Her cottage was **one of three small terraces** that had originally been labourers' cottages for one of the local farms. (Keizer 2007: 68, ex. 19)

³ The alternative is that we are dealing with only a single noun, a view espoused by Girbau (2010), among others.

⁴ We find some evidence for this view from the behavior of *each* and *every*. *Each* and *every* are often taken to be D-level quantifiers, *each book, every book* (e.g. Zamparelli 2000), but they behave very differently when it comes to the partitive function - as a partitive, only *each* is permitted: *each of the books, *every of the books*. This could relate to the fact that *each* can occur pronominally (or with a silent noun), while *every* cannot, e.g. *Each/*every ate his own slice*. If partitives involve some silent nominal component, this difference could be explained as the inability of *every* to be pronominalized or take a silent complement, thus, explaining its inability to be used in partitives. This supports the two-noun approach to partitives.

- b. A hundred of the books
- c. A dozen of the books

The partitive necessarily requires the presence of *of* and evokes a multiset reading, while the quantifying function does not need *of* and involves only a single set. The addition of the indefinite article does not appear to have any detectable effect on the quantifying and partitive uses, aside from the superficial difference in form. This suggests that the quantifying and partitive functions are available independent of the idiosyncratic morphosyntax of the quantificational element in question (although there may be further factors in play, cf. fn. 4).

Let us finally turn to canonical pseudopartitives. Like the quantifiers and numerals we just looked at, pseudopartitives seem to represent the quantifying function. Despite the obligatory *of*, the Q-noun says something about the quantity of the set denoted by the N2, and does not introduce a second set into the interpretation. This suggests that Q-nouns are just quantifiers with a more complex form, i.e. quantifiers which occur both with an indefinite and an *of*. The pseudopartitive contrasts with the partitive, which necessarily involves a multiple set interpretation. Superficially, it is only the definite determiner which distinguishes between the two uses, but if the quantifier and numeral data we saw previously is any indication, there is also a structural difference.

- (5) Pseudopartitive (quantifying function):
 - a. A lot of books
 - b. A ton of books
 - c. A bunch of books
 - d. A number of books

- (6) Partitive function:
 - a. A lot of the books
 - b. A ton of the books
 - c. A bunch of the books
 - d. A number of the books

This suggests that Q-nouns function in a very similar way to numerals and quantifiers, despite differing in form. While they require an *of* in both quantifying and partitive contexts, the information they convey is equivalent to what we find with quantifiers and numerals. The differences among Q-nouns, quantifiers, and numerals seems to be superficial, related to idiosyncratic properties of the quantificational elements themselves. Assuming this is a case of semi-lexicality, the task we face is identifying the source of the morphosyntactic differences.

As a further diagnostic to illustrate the similarities between Q-noun pseudopartitives, quantifiers, and numerals, we can apply the “daffodil test.” Using nonrestrictive relative clauses modifying the noun *daffodils*, Selkirk (1977: 307-308) shows that there are interpretational differences between partitives and

pseudopartitives. More specifically, with pseudopartitive Q-nouns, the relative clause only modifies the construction as a whole and not the N2 or Q-noun itself. For example, in (7), there is only one reading, namely the reading in which among the set of daffodils purchased, there are two faded ones. This reading necessarily says something about [a number of daffodils] and not just [daffodils].

- (7) She bought him **a number of daffodils**, only two of which were faded.

When we look at the partitive, we find ambiguity. The relative clause can modify either the whole, [a number of those daffodils], in which case, we get the same meaning as the pseudopartitive (namely that two of the daffodils she bought were faded), or, it can modify just the N2, [daffodils], in which case we get the reading that among the entire set of daffodils, those she bought and those she didn't, exactly two of them were faded. This second interpretation is compatible with a scenario in which she didn't actually buy any of the faded daffodils.

- (8) She bought him **a number of those daffodils**, only two of which were faded.

When we look at our quantifiers and numerals, we see the very same kind of difference, which is irrespective of the morphosyntax of the quantifier or numeral.

- (9) She bought him **many / some / three / a few / a dozen / a hundred daffodils**, only two of which were faded.

- (10) She bought him **many / some / three / a few / a dozen / a hundred of those daffodils**, only two of which were faded.

In the quantifying function, (9), the two faded daffodils can only be among the daffodils that she bought; in the partitive function, (10), the two faded daffodils either belong to the set of daffodils she bought (thus, modifying the partitive as a whole) or to the set of daffodils she bought from (thus, modifying the N2), meaning she may or may not have bought the faded ones. We can bring this intuition out more strongly, if we play with numerals, e.g.:

- (11) #She bought **three daffodils**, seven of which were faded.
 (12) She bought **three of those daffodils**, seven of which were faded.

The example in (11) is infelicitous, since there cannot be more faded daffodils than there are daffodils, while the example in (12) makes sense if we assume that the faded seven are in the set of daffodils she was buying from. This shows clearly that the quantifying function only allows modification of the construction as a whole, while the partitive function allows modification of both the [N1 (of) N2] and the N2. This suggests that in terms of the interpretation, the quantifying

function does not allow the quantifying element to be treated as distinct from the N2, while it does in the partitive. This holds for each of the quantifying elements we have looked at, Q-nouns, numerals, and quantifiers. We see clear semantic similarities across the three types of elements, suggesting that they are related semantically, if not necessarily morphosyntactically.

What sets the Q-nouns apart from the numerals and quantifiers is the obligatory presence of the particle *of*. In terms of the interpretation, the Q-nouns, quantifiers, and numerals allow similar distinctions between quantifying (single set) and partitive (multiple set) uses, despite their different morphosyntactic properties. Morphosyntactically, there seems to be a cline: Q-nouns occur with both an indefinite article (or plural morphology) and particle *of*, certain quantifiers and numerals with the indefinite article, but not *of*, and other quantifiers and numerals with neither the indefinite nor *of*. Each of these elements functions to indicate the quantity of the set denoted by the N2, but they differ in the morphological expression of that function:

- (13) Morphological expression of the quantifying function:

A	B	C	D
a	lot / ton / bunch / number	of	books
a	few / hundred / dozen		books
	many / some / three		books

Each of these elements presumably belongs in the quantity domain of the DP. This shows that expressions of the quantity domain can vary widely, albeit, in a way which almost looks predictable, suggesting we might be seeing evidence for a grammaticalization path from noun to quantifier.⁵ In particular, if this is grammaticalization, it affects the availability of *of* before the indefinite.

What this section has shown is that there is ample reason to group the Q-noun pseudopartitives with the set of quantifiers and numerals in English. The puzzle with regards to Q-nouns is explaining why they look so similar to nouns (indefinite article, particle *of*) despite being quantifiers. In the next section we turn to a careful discussion of their morphosyntactic properties, which will help in taking us towards an analysis.

6.3 Quantificational Nouns (Q-nouns)

We consider three types of data in this section, focusing on the morphosyntax of

⁵ The Q-noun *couple* might be on that path, with many (younger) speakers exhibiting free variation between *a couple of X* and *a couple X*. Similarly, looking at the Corpus of Historical American English (Davies 2010-), there are entries for *a dozen of X*, *dozen* being one of those elements which in modern-day English does not usually permit *of*, like *a few*.

bunch, *ton*, *number*, and *lot* in the pseudopartitive construction (taking this to be the Q-noun equivalent of simple quantification with quantifiers and numerals). We look at the behavior of these Q-noun pseudopartitives with regards to Agreement-related phenomena (e.g. subject-verb agreement and co-indexed pronouns, reciprocals, and reflexives) (section 6.3.1), movement (section 6.3.2), and construction-internal properties (e.g. availability of plurality, adjectival modification, etc.) (section 6.3.3). This gives a broad overview of their properties.

6.3.1 Q-noun pseudopartitives and number

For the following diagnostics, the four Q-nouns considered here behave alike. In short, they show that number sensitive processes only track the number feature of the N2 and not the Q-noun. In other words, regardless of whether the Q-noun is preceded by an indefinite article or inflects for plural, the N2 controls number.⁶

We see this first of all with subject-verb agreement. Q-nouns behave as if transparent to Agreement whether in a singular form (*a lot*, *a ton*, *a bunch*, *a number*) or a plural form (*lots*, *tons*). N2s which are plural command plural verbs and mass N2s command singular verbs despite the number of the Q-noun. This is shown here with a subject-verb word order.

- (14) Verbal agreement, SV order:
- a. A lot of **people were/*was** invited to the party.
 - b. A ton of **people were/*was** invited to the party.
 - c. A bunch of **people were/*was** invited to the party.
 - d. A number of **people were/*was** invited to the party.
 - e. Lots of **power is/*are** necessary to cool the building.
 - f. Tons of **power is/*are** necessary to cool the building.

If we invert the order of the subject and verb, the conclusion remains the same: the N2 controls the number of the whole construction. This is illustrated below for inverted *yes-no* questions, expletive *there*-constructions, and inverted locative constructions. Note that some examples are pragmatically odd (e.g. (15)d), or otherwise, more difficult to form than others (hence the ?s).

- (15) Inverted *yes-no* questions, VS order:
- a. **Were/*was** a lot of **people** invited to the party?
 - b. **Were/*was** a ton of **people** invited to the party?
 - c. **Were/*was** a bunch of **people** invited to the party?
 - d. **?Were/*was** a number of **people** invited to the party?
 - e. **Is/*are** lots of **power** necessary to cool the building?

⁶ As a disclaimer, these constructions can be subject to prescriptivist rules which state that since the first noun is singular, agreement must be singular (contrary to what most people actually do). This may interfere with the judgments of some native speakers.

- f. **Is/*are** tons of **power** necessary to cool the building?
- (16) Expletive *there* constructions, VS order:⁷
- There **were** a lot of **questions** about recent events.
 - There **were** a ton of **celebrities** attending the party.
 - There **were** a bunch of **calls** to the police that night.
 - There **were** a number of **problems** with her hypothesis.
 - There **is/*are** lots of **blood** on the floor.
 - There **is/*are** tons of **evidence** implicating her in the crime.
- (17) Locative inversion, VS order:⁸
- On the street **were** a lot of **fire trucks**, ready to put out the fire.
 - Around the building **were** a ton of **people** waiting to get in.
 - On the lake **were** a bunch of **ducks** swimming happily.
 - On the water **were** a number of **big boats** with bright sails.
 - ?Under the table **was/*were** lots of **food** from the baby's dinner.
 - ?On the furniture **was/*were** tons of **dust** from the endless construction.

Beyond agreement, reciprocals, reflexives, and pronouns are sensitive to the number denoted by the N2, as opposed to the Q-noun. If the N2 is plural, reciprocals, plural reflexives, and plural pronouns occur. If the N2 is mass, reciprocals do not occur, and only singular reflexives and pronouns are permitted. This corroborates the agreement data.

- (18) Reciprocals
- A lot of **cars** crashed into **each other**.
 - A ton of **cars** crashed into **each other**.
 - A bunch of **cars** crashed into **each other**.
 - A number of **cars** crashed into **each other**.
 - *Lots of **water** crashed into **each other**.
 - *Tons of **water** crashed into **each other**.
- (19) Reflexives
- A lot of **cats** were cleaning **themselves**.
 - A ton of **cats** were cleaning **themselves**.
 - A bunch of **cats** were cleaning **themselves**.
 - A number of **cats** were cleaning **themselves**.

⁷ Expletive *there*-constructions are known to allow default agreement (cf. Sobin 1997, Schütze 1999), as well as first conjunct agreement (David Pesetsky p.c.), in addition to full agreement. The singular in (a)-(d) is not ungrammatical. Plural in (e) and (f), however, is.

⁸ Examples (a)-(d) are not necessarily bad with singular agreement, while examples (e) and (f) are. Examples (a)-(d) might also be characterized by optional default agreement, as in *there*-expletives, though I am unaware of discussion of this in the literature.

- e. Lots of **sand** caved in on **itself**.
- f. Tons of **sand** caved in on **itself**.

(20) Pronouns

- a. I saw a lot of **cats** the other day. **They** were sleeping.
- b. I saw a ton of **cats** the other day. **They** were sleeping.
- c. I saw a bunch of **cats** the other day. **They** were sleeping.
- d. I saw a number of **cats** the other day. **They** were sleeping.
- e. I spilled lots of **sugar** yesterday. **It** covered the floor.
- f. I spilled tons of **sugar** yesterday. **It** covered the floor.

Despite the apparent singularity or plurality of the Q-noun, it fails to control number sensitive processes external to the construction. This suggests that the apparent number features of Q-nouns are transparent to external syntactic computation. Furthermore, the fact that N2 can be agreed with tells us that the presence of *of* does not interfere with the accessibility of the N2 to Agreement. In short, these diagnostics illustrate that the Q-noun is not capable of controlling the number of the construction.

The table below summarizes these properties.

(21) Table 1: Properties of Q-nouns

	<i>lot</i>	<i>lots</i>	<i>ton</i>	<i>tons</i>	<i>bunch</i>	<i>number</i>	N
<i>Number Agreement</i>							
Agreement	N2	N2	N2	N2	N2	N2	N1
Reciprocals	N2	N2	N2	N2	N2	N2	N1
Reflexives	N2	N2	N2	N2	N2	N2	N1
Pronouns	N2	N2	N2	N2	N2	N2	N1

I turn now to a discussion of movement tests with Q-nouns.

6.3.2 Q-nouns and movement

Selkirk (1977) and others following her (e.g. Stickney (2009), Keizer (2007), etc.) illustrate a difference between lexical nouns and semi-lexical Q-nouns with regards to movement. The conclusion is that whereas two nouns in a presumably lexical binominal construction behave as two units for these processes, the pseudopartitive behaves as a single unit (precisely what this means should become clear with examples). This conclusion is in line with section 6.2, where it was shown that pseudopartitive Q-nouns are interpretationally comparable to numerals and quantifiers in their quantifying function.

Selkirk (1977: 309, ex. 86) gives the following paradigm for a lexical noun (N1) which has a complement (N2) with a complement (N3). Extraposition of the N2 and its complement is permitted (22)b, but not extraposition of N3 (22)c:

(22) Lexical example: *A review*

- a. A review_{N1} of answers_{N2} to your argument_{N3} was given.
- b. A review_{N1} was given of answers_{N2} to your argument_{N3}.
- c. *A review_{N1} of answers_{N2} was given to your argument_{N3}.

Judgments are reversed with Q-nouns. Extraposition of the N2 and its complement is not permitted, while the extraposition of N3 is. I show this individually for each of the Q-nouns in the singular and plural (where applicable).

(23) *A lot / Lots*

- a. A lot_{N1} / Lots_{N1} of answers_{N2} to your argument_{N3} were given.
- b. *A lot_{N1} / Lots_{N1} were given of answers_{N2} to your argument_{N3}.
- c. A lot_{N1} / Lots_{N1} of answers_{N2} were given to your argument_{N3}.

(24) *A ton / Tons*

- a. A ton_{N1} / Tons_{N1} of answers_{N2} to your argument_{N3} were given.
- b. *A ton_{N1} / Tons_{N1} were given of answers_{N2} to your argument_{N3}.
- c. A ton_{N1} / tons_{N1} of answers_{N2} were given to your argument_{N3}.

(25) *A bunch*

- a. A bunch_{N1} of answers_{N2} to your argument_{N3} were given.
- b. *A bunch_{N1} were given of answers_{N2} to your argument_{N3}.
- c. A bunch_{N1} of answers_{N2} were given to your argument_{N3}.

(26) *A number*

- a. A number_{N1} of answers_{N2} to your argument_{N3} were given.
- b. *A number_{N1} were given of answers_{N2} to your argument_{N3}.
- c. A number_{N1} of answers_{N2} were given to your argument_{N3}.

To replicate the pattern of a lexical noun, a fourth noun (N4) is required. This N4 appears to function as the N3 of a lexical noun, with the N2 and Q-noun jointly forming a single unit. Again, I show this individually for each Q-noun, in their singular and plural forms (where applicable).

(27) *A lot / Lots*

- a. A lot_{N1} / Lots_{N1} of answers_{N2} to your argument_{N3} against
abortion_{N4} were given.
- b. A lot_{N1} / Lots_{N1} of answers_{N2} were given to your argument_{N3}
against abortion_{N4}.
- c. *A lot_{N1} / Lots_{N1} of answers_{N2} to your argument_{N3} were given
against abortion_{N4}.

(28) *A ton / Tons*

- a. A ton_{N1} / Tons_{N1} of answers_{N2} to your argument_{N3} against

- abortion_{N4} were given.
- b. A ton_{N1} / tons_{N1} of answers_{N2} were given to your argument_{N3} against abortion_{N4}.
- c. *A ton_{N1} / tons_{N1} of answers_{N2} to your argument_{N3} were given against abortion_{N4}.
- (29) *A bunch*
- a. A bunch_{N1} of answers_{N2} to your argument_{N3} against abortion_{N4} were given.
- b. A bunch_{N1} of answers_{N2} were given to your argument_{N3} against abortion_{N4}.
- c. *A bunch_{N1} of answers_{N2} to your argument_{N3} were given against abortion_{N4}.
- (30) *A number*
- a. A number_{N1} of answers_{N2} to your argument_{N3} against abortion_{N4} were given.
- b. A number_{N1} of answers_{N2} were given to your argument_{N3} against abortion_{N4}.
- c. *A number_{N1} of answers_{N2} to your argument_{N3} were given against abortion_{N4}.

Together, these results suggest that Q-nouns and their N2s function as a single unit where extraposition is concerned. The Q-noun does not have the same independent status as a lexical noun in a binominal construction.

Wh-movement replicates these facts. Taking a lexical noun, it is not possible to extract the complement of the lexical noun's complement (N3), while it is possible to extract just the complement (N2):⁹

- (31) Lexical noun: *a review*
- a. What_{N2} did you give a review_{N1} [of ___]?
- b. *What_{N3} did you give a review_{N1} of your answers_{N2} [to ___]?

For Q-nouns, the opposite pattern holds. N3 can be extracted, but not N2. I illustrate this for each Q-noun, in its singular and plural form (where applicable).

⁹ Not all cases of subextraction from the nominal domain are acceptable (e.g. **Who did you destroy a picture of ___?*), and a discussion in the literature can be found as to whether the *of*-phrase belongs inside the noun phrase or not (see Bach and Horn 1976, Chomsky 1977, Koster 1987). Chomsky (1977) argues that because the noun cannot be replaced by a pronoun such as *it* to the exclusion of the *of*-phrase, the *of*-phrase must be internal to the noun phrase. This also holds in the example above: **What did you give it of ___?* Across-the-board extraction is also acceptable, e.g. *What did you give reviews of ___ and answers to ___?* attesting to the internal position of the *of*-phrase.

(32) *A lot / Lots*

- a. * What_{N2} did you give a lot_{N1} / lots_{N1} [of ___]?
 b. What_{N3} did you give a lot_{N1} / lots_{N1} of answers_{N2} [to ___]?

(33) *A ton / Tons*

- a. * What_{N2} did you give a ton_{N1} / tons_{N1} [of ___]?
 b. What_{N3} did you give a ton_{N1} / tons_{N1} of answers_{N2} [to ___]?

(34) *A bunch*

- a. * What_{N2} did you give a bunch_{N1} [of ___]?
 b. What_{N3} did you give a bunch_{N1} of answers_{N2} [to ___]?

(35) *A number*

- a. * What_{N2} did you give a number_{N1} [of ___]?
 b. What_{N3} did you give a number_{N1} of answers_{N2} [to ___]?

As with extraposition, an additional noun is necessary to replicate the lexical pattern. This noun (N4) functions as the N3 of a lexical noun.

(36) *A lot / Lots*

- a. What_{N3} did you give a lot_{N1} / lots_{N1} of answers_{N2} [to ___]?
 b. * What_{N4} did you give a lot_{N1} / lots_{N1} of answers_{N2} to your argument_{N3} [against ___]?

(37) *A ton / Tons*

- a. What_{N3} did you give a ton_{N1} / tons_{N1} of answers_{N2} [to ___]
 b. * What_{N4} did you give a ton_{N1} / tons_{N1} of answers_{N2} to your argument_{N3} [against ___]?

(38) *A bunch*

- a. What_{N3} did you give a bunch_{N1} of answers_{N2} [to ___]
 b. * What_{N4} did you give a bunch_{N1} of answers_{N2} to your argument_{N3} [against ___]?

(39) *A number*

- a. What_{N3} did you give a number_{N1} of answers_{N2} [to ___]
 b. * What_{N4} did you give a number_{N1} of answers_{N2} to your argument_{N3} [against ___]?

Both extraposition and *wh*-movement show that for processes of movement, the Q-noun and N2 form a unit. Furthermore, across each of the grammatical examples, we see that the Q-noun and N2 are always adjacent, suggesting that they cannot be separated. I propose that we can understand these facts by assuming that the Q-noun surfaces in the extended projection of the N2, and not

in its own independent projection. This predicts, for example, that Q-nouns should pattern with numerals and quantifiers as regards these diagnostics. This is true. I illustrate this for quantifier *many* and numeral *three* below.

- (40) Extraposition with *many*
- a. Many answers to your argument (against abortion) were given.
 - b. *Many were given answers to your argument (against abortion).
 - c. Many answers were given to your argument (against abortion).
 - d. *Many answers to your argument were given against abortion.
- (41) Extraposition with *three*
- a. Three answers to your argument (against abortion) were given.
 - b. *Three were given answers to your argument (against abortion).
 - c. Three answers were given to your argument (against abortion).
 - d. *Three answers to your argument were given against abortion.
- (42) *Wh*-movement with *many*
- a. ?What did you give many answers to?^{10,11}
 - b. *What did you give many answers to your argument against?
- (43) *Wh*-movement with *three*
- a. ?What did you give three answers to?
 - b. *What did you give three answers to your argument against?

It is an uncontroversial assumption to take numerals and quantifiers to sit in the functional structure of the noun. The comparison here suggests that the same analysis can be applied to pseudopartitive Q-nouns. In line with this and the results of section 6.2, I propose that these Q-nouns necessarily sit in the noun's functional structure. This is an assumption also adopted more-or-less by Stickney (2009), Hankamer and Mikkelsen (2008), van Riemsdijk (1998), Vos (1999), Stavrou (2003), and Tănase-Dogaru (2008), among others.

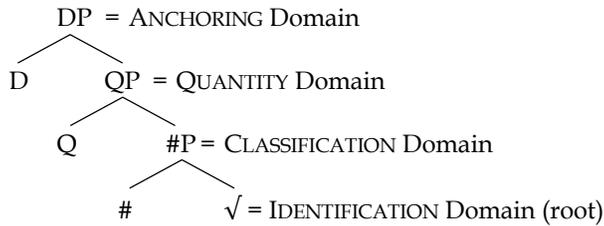
Recall the division of the nominal domain proposed in chapter 2, section 2.4.3 for English:

¹⁰ The questions with *many* and *three* are slightly odd, unless treated as a type of echo question. The (b) examples cannot be repaired in this way. This suggests that the internal syntax of quantifiers/numerals and Q-nouns differs in some way, an unsurprising result.

¹¹ We can use nominalization and across-the-board extraction to verify that the *to*-phrase is indeed internal to the nominal domain (see fn. 9).

- i. *What did you give them (=many/three answers) to __?
- ii. What did you give reviews of __ and answers to __?

- (44) Basic structure of the English nominal domain:



In line with the Q-noun's function of indicating the quantity of the N2, I propose that the Q-noun sits in the quantity domain of the noun. This implies that the N2 in this construction consists of the classification domain, and thereby forms an #P or smaller (in the case of a mass noun) under the Q-noun. This predicts that D-level and Q-level material cannot surface between the Q-noun and the N2, a prediction which seems to hold true. Inserting D-level material necessarily triggers a partitive interpretation (which as discussed in section 6.2 involves a different structure from the partitive):

- (45) D-material insertion (partitive interpretation only):
- A lot / Lots of the / these / those people
 - A ton / Tons of the / these / those people
 - A bunch of the / these / those people
 - A number of the / these / those people

That these are partitives and not pseudopartitives is confirmed by the daffodil test discussed in section 6.2. The apposition *only two of which were faded* can target both the N2 in addition to the Q-noun+N2. Only partitives allow this.

- (46) She bought him **a lot/ton/bunch/number/lots/tons of those daffodils**, only two of which were faded.

The insertion of Q-material is also ungrammatical:

- (47) Q-material insertion (ungrammatical)
- *A lot / lots of many / three / some / a few people
 - *A ton / tons of many / three / some / a few people
 - *A bunch of many / three / some / a few people
 - *A number of many / three / some / a few people

This is in line with the hypothesis that the N2 is maximally a #P under the Q-noun and hence, lacks the functional structure to host such material.

Summarizing, we see that with regards to extraposition and *wh*-movement, Q-noun pseudopartitives behave as a single unit, the equivalent of the N1 in a

lexical binominal construction. Separating the Q-noun and its N2 results in ungrammaticality (although this is not the only route to ungrammaticality). Given that quantifiers and numerals show an identical pattern, I proposed that like numerals and quantifiers, Q-nouns sit in the functional structure of the noun. Being quantificational, we expect them to sit in the quantity domain, a proposal which is supported by the inability of the N2 to host D-level or Q-level material underneath the Q-noun. With these facts in hand, I now turn to a consideration of construction-internal properties of Q-noun pseudopartitives.¹²

I summarize our results thus far with the table below:

(48) Table 2: Properties of Q-nouns

<i>Number Agr.</i>	<i>lot</i>	<i>lots</i>	<i>ton</i>	<i>tons</i>	<i>bunch</i>	<i>number</i>	<i>many</i>	<i>three</i>	N
Agreement	N2	N2	N2	N2	N2	N2	N2	N2	N1
Reciprocals	N2	N2	N2	N2	N2	N2	N2	N2	N1
Reflexives	N2	N2	N2	N2	N2	N2	N2	N2	N1
Pronouns	N2	N2	N2	N2	N2	N2	N2	N2	N1
<i>Movement</i>									
Extrapos. N2	x	x	x	x	x	x	x	x	✓
Extrapos. N3	✓	✓	✓	✓	✓	✓	✓	✓	x
Extrapos. N4	x	x	x	x	x	x	x	x	N/A
<i>Wh</i> -ext. N2	x	x	x	x	x	x	x	x	✓
<i>Wh</i> -ext. N3	✓	✓	✓	✓	✓	✓	✓	✓	x
Q on N2?	x	x	x	x	x	x	x	x	✓
D on N2?	x	x	x	x	x	x	x	x	✓

6.3.3 Construction-internal properties

So far, we have looked at Q-noun constructions rather holistically, exploring ways in which they all behave the same. However, each individual Q-noun appears to carry its own set of idiosyncrasies when it comes to its ability to pluralize, combine with adjectives, demonstratives, and so on, which suggests that examining individual properties of the Q-nouns is necessary. In this section, I address each Q-noun individually, discussing its interpretation, morphological capabilities, and combinatory abilities (e.g. determiners, adjectives, etc.). I start with Q-noun *lot*, then turn to *ton*, *number*, and *bunch*. *Bunch* is perhaps the most complicated of the Q-nouns as its quantificational use is easily confused with a collective use, and I address this (this also holds with *lot*, but to a lesser extent). The data in these sections is gathered from judgments, the literature, and examples in the Corpus

¹² I do not provide an analysis for the extraposition and *wh*-movement data. The point can be made without such an analysis, and instead, I direct readers to Stickney (2009) for an analysis compatible with the conclusions here.

of Contemporary American English (Davies 2008-), abbreviated as COCA. Corpus examples are marked in the following way: (COCA: Source Year_of_source).

6.3.3.1 *Lot*

The Q-noun *lot* is the only Q-noun discussed here to lack a clear lexical counterpart. There are homophones, e.g. *lot* as in some open area of land (*vacant lot, parking lot*), a group of people (*Out! The lot of you!*), a shipment or sale of sorts (*I paid \$82 for a lot of five machines*), or even one's fortunes or future (*drawing lots, the lot of the disadvantaged*) (Oxford Dictionary), but there does not seem to be a direct relation between these meanings of *lot* and the one carried by *lot* as a quantifying element. Instead, *lot* as a quantifier only means 'a large number or amount; a great deal.' This means that *lot* is not a multifunctional Q-noun, and instead, only functions as a quantifier. Note that *lot* combines with both plural and mass nouns (e.g. *a lot / lots of water, a lot / lots of people*).

Morphologically, *lot* inflects as both singular and plural (*a lot, lots*). Superficially, we expect *a lot* to be a singular indefinite noun and *lots* its plural indefinite counterpart, similar to the contrast between *a dog* and *dogs*. However, if we examine the meaning of these forms, *lots* does not appear to be a typical plural, if it is a plural at all. *A lot* refers to a quantity, something like 'many,' but *lots* does not refer to 'a plural of the quantity denoted by *a lot*' (if this even makes sense conceptually). This suggests that *lots* is not semantically the plural of *a lot*. Instead, both seem to indicate 'many,' with *lots* potentially being more informal (and aside from this, it's difficult to detect any interpretational differences). If *lots* is not semantically the plural of *a lot*, then it follows that the *-s* we see may not be a true plural marker hosted in a #P. This conclusion seems to be supported by the inability of *lots* to combine with plural-requiring quantifiers or numerals:¹³

(49) *Two/many/some lots of people

The *-s* on *lots* may have a different function than plurality. Norbert Corver (p.c.), for example, suggests that the *-s* could be an indication of the nouniness of that element (and in Corver 2015, he relates such elements to the realization of a little *n* categorial head). We can find similar cases of an *-s* morpheme which does not seem to contribute plurality, but does make the difference between some element functioning as a noun or not. For example, some English nouns seem to have an adjectival origin and an obligatory *-s* marker (which may or may not originate from the plural morpheme *-s*; more careful study is needed here). These include

¹³ Although note that this does not definitively show that *lots* does not have a #P, given the inability of numerals to combine directly with *pluralia tantum* nouns either (e.g. *two pants, *one scissors). It does show that the *-s* is not what a canonical plural would have. Unlike *pluralia tantum* nouns, however, *lots* cannot control the number of the construction, and in this regard differs from a *pluralia tantum* noun.

news, valuables, brights, blinds, goods, specifics, etc. The *-s* morpheme is crucial for the noun-hood of these elements, and without it, they cease to be nouns (*new, valuable, bright, blind, good, specific*). For some, the *-s* triggers plurality (e.g. *blinds*, as in *the blinds are/*is*), but for others not (e.g. *news*, as in *the news is/*are*). It is possible that the *-s* we find with *lots* and some adjectives was a marker of plurality at some stage of the language (and potentially the sole indicator of nominality), but has now been reanalyzed purely as a marker of nominality (whatever that may require syntactically). In short, this discussion shows that it is implausible to assume *lots* to be a syntactically and semantically plural counterpart to *a lot*. The existence of *lots* does not immediately argue for a #P with *lot*.

In its (seemingly) singular form, *lot* combines with what looks like an indefinite article. As an initial observation, there is a tendency for speakers to analyze *a* and *lot* as forming a unit, as reflected in the slang spelling *alot*. However, *a* and *lot* are clearly compositional given that adjectives can surface between them (though the class of adjectives surfacing here is rather small). Intensifying adjectives like *awful, whole, and helluva* ('hell of a'), which emphasize the "many-ness" of the quantity, are permitted. Searches in the COCA also identify intensifiers such as *real, goddamn, fat, tremendous, powerful, mighty, bloody*, etc.

- (50) He spent **an awful lot of money**.
- (51) He drank **a whole lot of beer** that night.
- (52) There were **a helluva lot of people** there that evening.

There are a number of examples where adjectives which appear to be modifying the N2 surface to the left of *lot*, as illustrated below.

- (53) ...that our clergy are **a disreputable lot of pedophiles** (COCA: USAToday 2013)
- (54) Indeed, I had assembled **a fine lot of volunteers**. (COCA: Bk:Snowbound 2010)
- (55) They resembled **a tired-looking lot of bipedal and emaciated six foot-tall greyhounds**. (COCA: Analog 1998)

Such uses of *lot* seem to differ from quantificational *lot* and instead correlate with *lot* as denoting a collective (i.e. *lot* as referring to a group of individuals). The difference is subtle, but replacing *lot* in the examples above by *many* does not preserve the meaning, while replacing it by *set* or *group* does:

- (56) *Lot* ≠ *many*
 - a. Our clergy are many disreputable pedophiles.
 - b. I had assembled many fine volunteers.
 - c. They resembled many tired-looking bipedal and emaciated six foot-tall greyhounds.

- (57) *Lot = set/group*
- a. Our clergy are a disreputable group of pedophiles.
 - b. I had assembled a fine group of volunteers.
 - c. They resembled a tired-looking group of bipedal and emaciated six foot-tall greyhounds.

Notice also the following example, which is incompatible with *lot* as a Q-noun but not as a collective. *Lot* here necessarily refers to a set of books (which is small).

- (58) I am getting together quite a **little lot of books**. (COCA: Smithsonian 2014)

I do not have the space to consider both collective *lot* and quantificational *lot* and hence, set aside such cases.

Given the ability of adjectives to surface between the indefinite article and *lot*, we might suppose that this indefinite article is a regular indefinite article and sits in D. However, *lot* shows an incompatibility with D-material, suggesting that the indefinite may not be in the D-layer. The use of determiners, demonstratives, and possessives is not permitted in combination with Q-noun *lot*:

- (59) *The lot of people
 (60) *This / that lot of people
 (61) *My lot of friends / people

Again, counterexamples involving collective *lot* can be identified in the COCA. These lack a 'many' interpretation.

- (62) Old maids, **the lot of you** (COCA: Bk:IrishBlood 2015)
 (63) I would prefer to damn **this lot of unsufferable bores** to the netherworld (COCA: Bk:MyLordVampire 2012)
 (64) ...to try and assign some sort of martyrdom to David Koresh and **his lot of criminals** (COCA: NPR_TalkNation 1999)

If no D-level material can surface (aside from our apparent indefinite article), then we lack evidence for the presence of a D-layer.¹⁴ The use of *lot* seems to interact

¹⁴ Another semi-piece of evidence comes from coordination. Nouns can coordinate under an indefinite, whereas *lot* does not, neither with other Q-nouns, nor with canonical nouns.

- i. I'd like **a coffee and tea** please.
- ii. *A lot of pens and bunch of notebooks, *A bunch of pens and lot of notebooks
- iii. *A lot of pens and notebook, *A notebook and lot of pens

However, this evidence is weak, considering that a look in the COCA for coordination under an indefinite shows that the majority of (frequent) examples include nouns which could be considered semantically related (e.g. *a suit and tie, a gin and tonic, a brother and sister, a bow and arrow, a mother and child, a washer and dryer, a pen and paper, a mortar and pestle*, etc.).

with the representation of the anchoring domain, and potentially the indefinite is not hosted in D.¹⁵

Turning to *lots*, we've seen that it has what looks like a plural form, despite failing to carry plural semantics. Similarly, *lots* is incapable of combining with material which would require it to be plural, e.g. numerals and quantifiers:

(65) *Two / one / many lots of books

In fact, *lots* seems to be incapable of combining with any pre-modificational material. *Lots* does not surface with adjectives:^{16,17}

(66) *Whole / awful / helluva lots of butter

Similarly to *lot*, it does not surface with D-level material:

(67) *The lots of butter

(68) *These / those lots of butter

(69) *Our lots of butter

(70) *Two lots of butter

This shows that *lots*, in contrast to *a lot*, necessarily occurs bare. It appears as if the compositionality of *a* and *lot* provides the space for adjectival material to be inserted. Notice that this is very similar to the phenomenon we saw with Polish numeral 1000 in section 4.3.1.4, where use of a γ P was licensed by additional structure above the numeral. The structure the indefinite article represents appears to license the insertion of adjectives with *lot*.

We've considered the morphosyntax of *lot*, and in particular, its interpretation, expression of morphology, and combinatorial abilities. Both *a lot* and *lots* mean 'many' (and don't differ much in this). Morphologically, it is not necessarily true that *lots* is plural (and we could similarly question the singularity of *a lot*). In terms of combinatory ability, *a lot* shows some compositionality,

If there is a condition on such coordination, then the inability to coordinate may not be related to the structure, but rather the incompatibility of the conjuncts.

¹⁵ Sadock (1990) discusses Q-noun *bunch* and claims that it lacks existential quantification, drawing on scope relations. If the same facts hold for *lot(s)*, then this might further support the non-D-like nature of the indefinite article that surfaces with Q-noun *lot*.

¹⁶ A few examples surface in the corpus (58 hits total, only 2 genuine). These may indicate variation in the construction:

- i. And I will tell you with an army that had **whole lots of more years** of training and support (COCA: PBS_Newshour 2005)
- ii. **Possible lots** of fatalities. We have cars flipped. (COCA: ABS20/20 2009)

¹⁷ David Pesetsky (p.c.) suggests that the plural-marker on *lots* might belong to the class of intensifiers, similar in status to *awful* and *helluva*. If so, the inability of *lots* to surface with intensifying adjectives would be a simple case of complementary distribution.

allowing adjectives in a position between *a* and *lot*; *lots* does not allow adjectives. Neither *a lot* nor *lots* permit D-level material or Q-level material. Together, this suggests that (a) *a lot* and *lots* lack a classification domain (#P), (b) neither *a lot* nor *lots* has a quantification domain, and (c) the use of *a lot* and *lots* affects the anchoring domain; we explore exactly what this means in 6.4.4.

I summarize these results in the following table.

(71) Table 3: Properties of Q-noun *lot*

	<i>lot</i>	<i>lots</i>
Multifunctional?	NO	
Morphological Plural?	✓	
Adj. Insertion?	✓	✗
Numerals?	✗	
D-level material?	✗	

6.3.3.2 *Ton*

The Q-noun *ton* is similar to *lot*, a difference being that there is a more obvious source in the synchronic language for *ton* as a Q-noun. As a Q-noun, *ton* means ‘very many’ or ‘a large amount’ (Cambridge Dictionary). This makes it very similar to *lot*, but the quantity is generally imagined to be greater and more of an exaggeration; the use of this Q-noun is considered to be even more informal than the use of *lot*. As a lexical noun, *ton* means ‘a unit of weight equal to 2000 pounds’ (Cambridge Dictionary). This is presumably the source for Q-noun *ton*, but it is different enough to cast doubt on treating the two as a case of polysemy (a single entry in the lexicon with two meanings), as opposed to a case of homophony (separate entries in the lexicon). This is a question as to the relation between Q-noun *ton* and lexical *ton* in an individual speaker’s mind. Speakers may do different things in this regard, with some positing homophony and others polysemy. This is not problematic, as it means that *ton* should either be treated with multifunctional *bunch* and *number*, or with non-multifunctional *lot*. Note that like *lot*, *ton* combines with plural and mass nouns (*a ton / tons of water*; *a ton / tons of people*).

Similarly to *lot*, *ton* does not show a straightforward relation between its apparent singular (*a ton*) and plural (*tons*) forms, outside of the morphology. We can contrast lexical and Q-noun *ton* to illustrate this. As shown in (72), the difference between singular and plural lexical *ton* is a difference in terms of the total weight of the N2, either 2000 pounds, which is one ton-unit, or 4000 pounds, which is two ton-units (note that (72) can be interpreted as a Q-noun).

(72) I bought a ton of bricks. (= 2000 pounds of bricks)

(73) I bought two tons of bricks (= 4000 pounds of bricks)

With Q-noun *ton*, this judgment disappears. The distinction between the two examples below is not one of plurality (i.e. *tons* does not seem to mean ‘a plurality of a very large number or amount’) and both similarly imply a large amount of homework (and in truth, it is very difficult to pinpoint exactly what differs between them). Let us suppose, following the discussion of *lot*, that the *-s* on *tons* is not a marker of plurality, but relates to the apparent nominality of *tons*.

- (74) I have a ton of homework.
 (75) I have tons of homework.

Ton, like *lot*, combines with the indefinite article in its singular form. The combination of *a* and *ton* also seems to be compositional, given that adjectival material can surface in that position. Such examples are rare in the corpus, but the adjectives *whole*, *fucking*, and *big* do occur.

- (76) My sense is that there’s **a whole ton of people** interested in sports teams and **a whole ton** who aren’t. (COCA: Denver 2013)
 (77) Okay, we get some towels, **a fucking ton of towels**. (COCA: NewEnglandRev 2007)
 (78) If they proposed a settlement in which the tobacco companies pay **a big ton of money**... (COCA: CBS_FaceNation 1997)

The form *tons* differs from *lots* with regard to adjectival modification. Whereas adjectives do not surface with *lots*, they do with *tons* (although not very often).

- (79) I could blab about the subsequent meeting with Smith, Jones, and **assorted tons of other officials** (COCA: Analog 2010)
 (80) All over the ranch beside fields, inside various barns, on whole lots dedicated to storage are **uncounted tons of stuff** needed for farming. (COCA: Esquire 2015)

Another way in which *ton* differs from *lot* is its ability to surface with D-level material. To differentiate Q-noun *ton* from lexical *ton*, I restrict myself to nouns which we do not usually talk about in terms of weight, or which have no weight (e.g. *people* or *mistakes*); this should exclude lexical *ton* from the discussion.

Q-noun *ton* does not appear to allow other quantificational material. If we add a numeral or quantifier, the quantificational interpretation disappears, to be replaced by the lexical interpretation. This creates an expression which tries to quantify the weight of something which has no weight:

- (81) # One ton of mistakes
 (82) # Two tons of mistakes

Q-noun *ton* does not permit the use of other quantificational material when it itself

is functioning as a quantifier. This suggests the lack of a quantification domain.

Turning to D-level material, at first glance, *ton* seems to be awkward when preceded by a demonstrative, possessive, or definite determiner.

- (83) ?? This / that ton of mistakes
- (84) ?? These / those tons of mistakes
- (85) ?? Our ton of mistakes
- (86) ?? Our tons of mistakes
- (87) ?? The ton of mistakes
- (88) ?? The tons of mistakes

On the basis of this, we might conclude that the use of D-level material is unacceptable with Q-noun *ton*, much like *lot*. However, if we look for examples in the corpus, a number of fully acceptable counterexamples surface. Presumably, D-level material requires a sufficient context to be licensed with *ton* (something which did not seem to save *lot*, given the lack of examples). In each of the examples below, *ton* indicates ‘an excessive quantity,’ not weight.

- (89) Definite determiner (*ton/tons*):
 - a. I quite frankly was very surprised that despite **the ton of hype** and all the excitement over Howard’s debut, the ratings weren’t much bigger than they were. (COCA: CNN_Showbiz 2012)
 - b. Take some tennis lessons, join a book club, go to a movie, or simply occupy yourself with **the ton of stuff** I’m sure you generally leave undone. (COCA: Parenting 2004)
 - c. Had I looked into a crystal ball and seen **the tons of extra stress** this would cause, well, frustration is getting the upper hand now. (COCA: AssocPress 2007)
 - d. And judging from **the tons of tickets** they issue to cab drivers, they relish their job. (COCA: WashPost 1992)
- (90) Demonstrative (*ton/tons*):
 - a. I don’t know who helped this fellow take out **this ton of junk food**. (COCA: SatEvenPost 2008)
 - b. the “hundreds of thousands of people” who wrote to CBS and all **those tons of nuts**... (COCA: WashPost 2007)
 - c. As **those tons of graduates** with studio art degrees cosied up to sleazy gallery owners... (COCA: AntiochRev 2004)
- (91) Possessive (*ton/tons*):
 - a. ...those smug French nihilists with **their ton of language theory** (COCA: SouthernRev 2006)
 - b. I could hardly breathe from pushing **my tons of junk** around. (COCA: AmerScholar 2002)
 - c. The officers tried to figure what to do with all these soldiers and

their tons of gear. (COCA: Bk:Missing 2009)

This suggests that in contrast to *lot*, the quantificational meaning of *ton* is not incompatible with there being definite content in the D-layer.¹⁸

Finally, there is an interesting construction which is allowed with *ton* but not *lot*, and may attest to the more canonical nature of *ton* over *lot*. Q-noun *ton* allows for the phrase *and a half* to be inserted, this producing an exaggerated, emphatic reading of the ‘many-ness.’

- (92) I have a ton and a half of homework.

The same is not permitted with *lot*, nor with *bunch* or *number*:

- (93) *I have a lot and a half of homework.
 (94) *I have a bunch and a half of homework.
 (95) *I have a number and a half of homework.

Q-nouns *ton* and *lot* seem very similar, given that both have apparent singular and plural forms and both combine with plural and mass nouns to indicate a large or exaggerated quantity. However, there are subtle differences which suggest they deserve a different treatment. In its seemingly plural form, Q-noun *tons* permits adjectival modification, whereas Q-noun *lots* does not. Similarly, Q-noun *ton* allows for the inclusion of D-level material, whereas Q-noun *lot* does not. Finally, Q-noun *ton* can combine with a phrase like *and a half*, whereas Q-noun *lot* cannot. Each of these differences is presumably related, and a possible explanation is that *ton* has more functional structure than *lot*, this allowing it to host more complex expressions. If these Q-nouns are on a grammaticalization path from noun to quantifier, this could indicate the more recent status of *ton* as a Q-noun over *lot*.

The table below combines our findings so far.

(96) Table 4: Properties of *lot* and *ton*

	<i>lot</i>	<i>lots</i>	<i>ton(s)</i>
Multifunctional?	NO		YES
Morphological Plural?	✓		✓
Adj. Insertion?	✓	✗	✓
Numerals?	✗		✗
D-level material?	✗		✓
An X and a half?	✗		✓

¹⁸ Note that like *lot*, *ton* does not allow coordination under the indefinite:

- i. *A ton of homework and bunch of exercises, *A bunch of exercises and ton of homework
- ii. *A ton of homework and exercise, *An exercise and ton of homework

6.3.3.3 *Bunch*

Like *ton* and *lot*, *bunch* also means ‘a large number’ or ‘many,’ though its “many-ness” is reduced. If we were to order the three Q-nouns in terms of their degree of many-ness, we would get:

- (97) *ton* > *lot* > *bunch* *Degree of many-ness*

While they mean more or less the same thing, there are presumably contexts where one would be more appropriate than another. Like *lot* and *ton*, *bunch* is also considered to be informal, and it can combine with both plural and mass nouns (e.g. *a bunch of people*, *a bunch of water*).

Q-noun *bunch* is a multifunctional Q-noun with a closely related lexical interpretation. The lexical interpretation of *bunch* is ‘a number of things, typically of the same type, growing or fastened together’ (Oxford Dictionary). It denotes a collection of things which are physically connected in some way, for example, a bouquet of flowers (*a bunch of flowers*), a set of keys on a key ring (*a bunch of keys*), grapes growing together on a vine (*a bunch of grapes*), or a set of cables bundled together (*a bunch of cables*). In addition to this lexical interpretation, *bunch* can also be used to indicate ‘a group of people’ (Oxford Dictionary). This represents an extension of the previous definition to also include things which are not naturally bunched together, such as people. In both cases, *bunch* indicates a collection, but the nature of the collection differs (literal vs. metaphorical). *Bunch* as referring to a literal collection of objects (flowers, grapes, keys, cables) seems to be lexical, while *bunch* as referring to a metaphorical collection of people or objects does not; instead, it seems to belong with the set of pseudopartitive collection nouns (*group*, *herd*, *crowd*), which have their own set of idiosyncrasies. I do not go into collection nouns here, but the distinction is important as the three senses of *bunch* can start to blend together, making them difficult to differentiate. I refer to *bunch* as a collection of physically connected objects as ‘literal *bunch*’ and *bunch* as a metaphorical collection of people or objects as ‘metaphorical *bunch*.’

In our study of *lot* and *ton*, we saw that they had what looked like singular and plural counterparts. Curiously, *bunch* does not have a plural counterpart in its Q-noun meaning. Plural *bunches* is unacceptable as a Q-noun:

- (98) *Bunches of people/books/stuff

This conclusion may be subject to variation, as examples surface in the corpus:

- (99) I don’t have **bunches of time** left. (COCA: CBS_Morning 1992)
 (100) Well, I’ve had **bunches of different kinds of memory loss**. (COCA: NPR 2013)

This suggests that for some speakers, *bunch* is becoming similar to *lots* and *tons*.

Literal *bunch* easily inflects as plural, syntactically and semantically:

- (101) She hung more crystals and **bunches of herbs** throughout the room.
(COCA: LiteraryRev 1990)
- (102) Angelo purchased two **bunches of cut flowers**. (COCA: Bk:Blindsight 1992)

The inability of *bunch* to surface with *-es* cannot be related to the form, given that literal *bunch* has a plural. This must be a property of *bunch* as a Q-noun.

Bunch, like *ton* and *lot*, combines with the indefinite article. Similarly to *lot* and *ton*, this combination appears to be compositional. *Bunch* permits adjectival material between the indefinite and the Q-noun, although such material seems to be restricted to more emphatic adjectives, such as *whole* or *big*.¹⁹

- (103) A whole bunch of people
(104) A big bunch of money

Q-noun *bunch* does not combine with the definite determiner. Examples with a definite determiner are necessarily interpreted in a literal sense. I use nouns compatible with literal *bunch* to avoid interference from metaphorical *bunch*.

- (105) He plucks a dark-blue fruit from **the bunch of grapes** he is holding and puts it up to his lips. (COCA: Horticulture 1990)
- (106) **The bunch of keys** that felt so heavy in my jacket pocket was totally

¹⁹ We also find examples with qualitative adjectives, as shown below.

- i. **A pale bunch of teenagers** sit on the curb outside Big Bat's licking icecream cones.
(COCA: Atlantic 1999)
- ii. She also fell in with **a wild bunch of friends**. (COCA: NYTimes 2015)
- iii. "It's a murderers' row over there," says one experienced consultant. "I have to give them credit for collecting **a mean bunch of people** in one place." (COCA: AmSpect 2000)

These qualitative adjectives are necessarily modifiers of the members of N2, given that bunches cannot be pale or wild or mean. We seem to be dealing with metaphorical *bunch* here (and it is very similar to how collective *lot* allowed N2 modification in a pre-*lot* position, cf. (53)-(55)), although the intuition is rather subtle. Replacing *bunch* with *group* seems to preserve the meaning better than replacing it with *many* does (though both feel true), suggesting this is metaphorical collection *bunch*, and not quantificational *bunch*.

- iv. A pale bunch of teenagers sit on the curb = a pale group of teenagers
≠ many pale teenagers
- v. She fell in love with a wild bunch of friends = a wild group of friends
≠ many wild friends
- vi. Collecting a mean bunch of people in one place = a mean group of people
≠ many mean people

Whether this is correct or not, Q-noun *bunch* at least allows adjectival modification.

- unnecessary. (COCA: ChicagoRev 2002)
- (107) With **the bunch of flowers** in her hands, she resumed her post behind the curtain. (COCA: Bk:FuneralNoon 1996)

The unacceptability of Q-noun *bunch* with a definite determiner becomes more obvious when we consider cases like the following:

- (108) He ate a/#the bunch of grapes one-by-one.
 (109) He dropped a/#the bunch of keys into the water one-by-one.

Here, *one-by-one* attempts to access the individual members of the set denoted by N2. For a quantifier, we expect those members to be accessible to a phrase like *one-by-one*, given that there is no packaging of the members. For a collection, however, we expect the packaging of the members into a collection to remove access to them. In other words, we predict that *one-by-one* should be fine with Q-noun *bunch*, but not with collection *bunch*. The infelicitousness of the definite article in the examples above shows that when the definite article is present, the quantificational interpretation is inaccessible, whereas when the indefinite is present, that interpretation is accessible. The definite article necessitates the collection reading with *bunch*, suggesting Q-noun *bunch* cannot be definite.

The same holds for demonstratives, possessives, and numerals. These elements seem to restrict the interpretation to literal *bunch*.

- (110) I didn't have to use **all that bunch of scallion** I bought when I was at the market there. (COCA: CBS_SatMorn 1998)
- (111) She took out **her bunch of keys**, clinked through them, and unlocked the door. (COCA: Bk:Brimstone 2005)
- (112) **One bunch of live basil** often contains between 20 and 40 individual plants. (COCA: MotherEarth 2015)

Again, using *one-by-one*, we can show that demonstratives, possessives, and numerals are incompatible with Q-noun *bunch*.

- (113) #He ate that / her / one bunch of grapes one-by-one.
 (114) #He dropped that / her / one bunch of keys in the water one-by-one.

This data suggests that the Q-noun interpretation is restricted to *bunch* with an indefinite article, much like we found for *lot* (but not *ton*). As with *lot*, we can conclude that the indefinite article is not a typical indefinite, and also, that the use of Q-noun *bunch* interacts with the representation of the anchoring domain.

The examples presented above have been restricted to nouns which are compatible with literal *bunch* but not metaphorical *bunch*. If we consider nouns involving groups of people, animals, and non-bunchable objects, the judgments become less sharp. Consider the following examples, each involving humans with

a determiner, demonstrative, possessive, and numeral:

- (115) When we took the floor, my friends started passing out like **the bunch of overly stoned dinks** they were. (COCA: Esquire 2012)
- (116) As if **this bunch of multinational nimrods** could be Ukrainians. (COCA: Bk:LastPlaneHeaven 2014)
- (117) True, it was really good to have the bar and **our bunch of guys** there at night. (COCA: AntiochRev 2004)
- (118) **One bunch of dissenters** signed the Declaration of Independence here. (COCA: CNN_LiveSun 2000)

The intuition between the Q-noun and collection reading is extremely weak. Taking example (116), for instance, we could imagine two possibilities. Either *multinational nimrods* refers to a set of individuals which is packaged into a group when it combines with collection *bunch* (=metaphorical *bunch*), or the set of individuals referred to as *multinational nimrods* has been quantified with *bunch* (=Q-noun *bunch*) and then referred to with a demonstrative, which, via its referentiality, has the effect of inducing a group sense to the quantity. Both seem possible *a priori*. However, if we take the results of our previous comparison seriously, it tells us that Q-noun *bunch* cannot combine with determiners, demonstratives, possessives, or numerals. If those results hold regardless of the denotation of the N2, then the examples above cannot involve Q-noun *bunch* and must involve metaphorical *bunch*, despite the unclarity of the judgment.

Notice that like Q-noun *bunch*, metaphorical *bunch* seems (more or less) to allow *one-by-one* to pick out individual members of the collection.

- (119) ?One-by-one, the bunch of overly stoned dinks started passing out.
- (120) ?One-by-one, this bunch of multinational nimrods proved themselves to actually be Ukrainians.
- (121) ?One-by-one, our bunch of guys made their way to the bar.
- (122) ?One bunch of dissenters signed the Declaration of Independence, one-by one.

This is not necessarily an argument against treating these instances of *bunch* as collection *bunch*. The acceptability could be related to the fact that it is generally easier to access the members of collections of humans rather than collections of inanimates (see, e.g. the Animacy Hierarchy, de Vries 2015, Henderson 2017). In this regard, we are still dealing with metaphorical collection *bunch*, but the collection itself is simply more accessible; this may also contribute to the difficulty in separating Q-noun *bunch* and collection *bunch* with animates.

Summarizing, once we isolate ourselves to Q-noun *bunch*, we see that it does not inflect as plural, and does not combine with definite determiners, possessives, or numerals (unlike collection *bunch*); it does, however, allow adjectives in a position between *a* and *bunch*. Q-noun *bunch* seems to be more

similar to *lot* than *ton*, given the lack of D-level material. This strongly suggests that the two should be analyzed in a similar way.²⁰

I summarize these various diagnostics below:

(123) Table 5: Properties of Q-nouns *lot*, *ton*, and *bunch*

	<i>lot</i>	<i>lots</i>	<i>ton(s)</i>	<i>bunch</i>
Multifunctional?	NO		YES	YES
Morphological Plural?	✓		✓	✗
Adj. Insertion?	✓	✗	✓	✓
Numerals?	✗		✗	✗
D-level material?	✗		✓	✗
An X and a half?	✗		✓	✗

6.3.3.4 *Number*

The Q-noun *number* is multifunctional. As a Q-noun it means ‘some indefinite unspecified quantity.’ Semantically, this makes *number* a very different type of Q-noun from *lot*, *ton*, and *bunch* which each denoted a degree of many-ness. In contrast, the Q-noun *number* does not seem to indicate some range of values which qualifies as a variant of ‘many,’ but rather indicates some particular quantity, which remains unnamed. The Q-noun *number* seems to be a kind of indefinite numeral.²¹ As a lexical noun, *number* means ‘an arithmetic value, expressed by a word, symbol, or figure, representing a particular quantity’ (Oxford Dictionary). By this definition, *number* is the name for the values represented by numerals, e.g.

²⁰ As a final comment, I have treated literal *bunch* as a canonical noun (lexical), a reason being that it combines with as wide an array of pre-modifiers as other canonical nouns do and shows the same morphological properties. However, literal *bunch* does not seem to combine with a full DP, much like Q-noun *bunch* (e.g. **a bunch of the grapes/keys/cables* (partitive Q-noun reading only)). This might suggest that even literal *bunch* is semi-lexical. However, there are plenty of nouns in English which combine with N2s which seem to be smaller than a full DP. Keizer (2007), for instance, discusses qualifying NP constructions, in which the N1 is a fully lexical noun and the N2 acts as a modifier of sorts of the N1. Examples include *a book of comics*, *a novel of suspense*, *a word of gratitude*, *a linguist of far greater eminence*, *a writer of novels*, etc. None of these examples permit D-level material on the N2. “Smaller” nominals seem to be a more general phenomenon, and not just a property of literal *bunch*. In this sense, it still seems accurate to treat literal *bunch* as canonical (lexical) (although Norbert Corver, p.c. points out that predicate inversion does not allow definite determiners either, and could be connected to these examples).

²¹ Numerals and quantifiers differ in the sense that numerals indicate precise points on some cardinality scale (e.g. numeral 1 refers to a cardinality of 1, numeral 2 to a cardinality of 2, etc.), whereas quantifiers tend to refer to ranges on a scale (e.g. *many* refers to some range towards the upper bound of a contextually defined scale and *few* refers to some range towards the lower bound of a contextually defined scale, cf. Solt 2009, 2015). *Number* could be seen as indicating a point on the scale rather than a range (albeit an undefined point), and in this sense is more similar to a numeral than a typical quantifier.

three, four, five, six, etc. Notice the strong similarity between the Q-noun interpretation and the lexical interpretation, which both stand in for a quantity, either an indefinite, unnamed (and possibly unknown) quantity (Q-noun) or an arithmetic value (lexical). Note that unlike *lot, ton, and bunch*, Q-noun *number* only combines with plural nouns; this seems to be in line with its more numeral nature.

To properly discuss *number*, we need to differentiate between its Q-noun and its lexical usage. To accomplish this, we can manipulate the predicate. Lexical *number* requires predicates which deal strictly with quantity, such as *increase, grow, or decline*. Q-noun *number*, on the other hand, does not control the predicate, this instead, falling to the N2; this follows from its status as a quantifier. I provide examples below. Notice also the correlation with verbal agreement.

- (124) A number of students were sleeping in my class yesterday.
 (125) The number of students sleeping in class has increased significantly.

In the first example, we are dealing with Q-noun *number*, given that students can sleep, but not numbers. In the second example, we are dealing with lexical *number*, given that numbers can increase, but students do not. We can make use of the predicate to distinguish between the two senses of *number*.

Turning to the morphological properties of Q-noun *number*, it cannot inflect as plural when bare:

- (126) *Numbers of students were sleeping.

However, if the Q-noun is modified, a plural form becomes acceptable:

- (127) Large numbers of students were sleeping.

This need for an adjective to license plurality is very similar to what we saw with Polish numeral 1000 in section 4.3.1.4, where use of a γ P was licensed by plurality on the numeral. Here, the availability of apparent plural-marking on *number* is dependent on the presence of an adjective. Note that the incompatibility of Q-noun *number* in its bare form with plurality must be directly related to the Q-noun usage, given that bare lexical *number* has no problem in expressing plurality.

- (128) Terrorism, measured in terms of **numbers of acts** committed, declined in the second half of the 1980s. (COCA: WashMonth 1990)

Any semantic distinction between the singular and plural form of Q-noun *number* is difficult to discern. In the following pair of examples, (130) does not seem to mean ‘a plural of the quantity denoted in (129).’ This suggests that the *-s* with

number deserves a similar treatment to *-s* with *lots* and *tons*.²²

- (129) A large number of students failed the exam.
 (130) Large numbers of students failed the exam.

Like the other Q-nouns, *number* in its apparent singular form surfaces with the indefinite article. The combination must be compositional, as adjectives can surface between the indefinite and *number*. We find quantity-related adjectives (*large, small, increasing, growing, huge, significant, vast, equal, substantial, untold, sheer*) and evaluative adjectives (*good, unprecedented, overwhelming, impressive, staggering, surprising*), but not intensifying adjectives (*whole, awful, bloody*).²³ Both the singular form and the plural form permit these types of adjectives.

- (131) Quantity-adjectives (*number / numbers*)
- a. A **large number of suits** were filed by U.S. military service members (COCA: PBS 2015)
 - b. The Times reports a **growing number of restaurants** are experimenting with no tipping policies. (COCA: CBS 2015)
 - c. **Vast numbers of Maine lobster** (*Homarus americanus*) are likely to flood the market in mid-July. (COCA: MensHealth 2015)
 - d. The obvious fear is that **untold numbers of people** will be challenged to prove their legal status in our country. (COCA: America 2010)
- (132) Evaluative adjectives (*number / numbers*)
- a. It seems that for a **good number of cadets**, the feeling is just a

²² A short discussion can be found on the English Stack Exchange (<http://english.stackexchange.com/questions/244789/a-large-number-of-large-numbers-of-whats-the-difference>), which compares a *large number* to *large numbers*:

- i. Tests are hard to solve for a large number of users.
- ii. Tests are hard to solve for large numbers of users.

The observation is that (ii) involves a more general notion of users and (i) refers to users of a specific type of application. This suggests that (ii) has a generic interpretation (which may be absent in (i)), in line with what we find with English bare plurals (Carlson 1977).

²³ This could be related to the status of *number* as numeral-like. When we use *whole* with Q-nouns like *bunch* or *lot*, it has the effect of making the quantity seem greater, e.g. intensifying or exaggerating the quantity. This seems possible because *bunch* and *lot* function on ranges, and moreover, ranges which are not predefined; as such it is possible to push that range higher. When we consider numerals, the application of an intensifier seems incompatible with a numeral – if the value of the numeral is already set, it should not be possible to push that value higher (or lower). This could be the source of the problem for *number* with intensifiers like *whole* or *awful*. (Note that it is not ungrammatical to say *a whole three people*, but in this example, *whole* seems to function not as an intensifier, but as an evaluative adjective, sarcastically commenting on the quantity as being below the expectation). This is a preliminary suggestion and more study into the relation between numerals and intensifiers could shed light on the inability of *number* to combine with intensifiers.

feeling, the surge in the chest after a movie. (COCA: RollingStone 1999)

- b. **A staggering number of American families** now rely on food stamps to feed their children. (COCA: NBC_RockCenter 2011)
- c. A sudden spring flood or cold snap can kill **unusual numbers of eggs or larvae** outright. (COCA: FieldStream 1995)
- d. Well, nationwide, **surprising numbers of grandparents** have been forced into just that situation. (COCA: ABC_20/20 1990)

- (133) *Intensifying adjectives (*number / numbers*)
- a. *A whole / an awful number of cadets
 - b. *Whole / awful numbers of cadets

Neither Q-noun nor lexical *number* permit numerals:

- (134) *One number of people increased / were sleeping.
 (135) *Two numbers of people increased / were sleeping.

Concerning D-level material, Q-noun *number* does not permit D-level material, while lexical *number* does. In fact, there seems to be a complementary distribution between the two such that the absence of D-material (excluding the indefinite) necessitates the Q-noun interpretation and the inclusion of D-material necessitates the lexical interpretation. This is a difference from *bunch* and *ton*, for which the lexical interpretations were also accessible when the indefinite article was present. The complementary distribution of the two is illustrated below, where *number* with an indefinite behaves only as a Q-noun, as in (136), and *number* with a definite behaves only as a lexical noun, as in (137). The lexical nature of the construction with a definite article is further corroborated by verbal agreement which targets the N1, as in (138).

- (136) A number of students #increased / could drive.
 (137) The number of students increased / #could drive.
 (138) The number of students has / *have increased.

The conclusion that *number* in its capacity as a Q-noun cannot combine with the definite article is further corroborated by the COCA, where in a sample of 100 examples, there were no exceptions; all definite article examples involved predicates associated with *number* (if *number* was a subject) or clearly concerned *number* as a precise quantity rather than an indefinite quantity.

Thus far, we've had a clear one-to-one relation between the sense of *number*, the choice of predicate, and the results of verbal agreement, where lexical *number* controls the predicate, requires singular verbal agreement, and definiteness, and Q-noun *number* does not control the predicate, allows for verbal agreement with the N2, and requires indefiniteness. This is what we find in the simple cases.

However, if we insert adjectives into the construction, the correlation between definiteness, agreement, and predicate choice is disrupted. In the examples below, for instance, the N2 determines the predicate and verbal agreement, but the construction is accompanied by a definite article:²⁴

- (139) **The high number of contractors compete** to drive down costs according to Raul Hinojosa-Ojeda, a UCLA professor who has studied the garment industry. (COCA: PBS_Newshour 1997)
- (140) **The overwhelming number of companies** in the U.S., about eighty-four percent, **don't** offer paid maternity leave. (COCA: NBC 2013)

If we remove the adjective, the sentences become infelicitous:

- (141) #The number of contractors compete to drive down costs.
- (142) #The number of companies in the U.S., about eighty-four percent, don't offer paid maternity leave.

The insertion of an adjective seems to license the use of the definite article, which otherwise would be unacceptable. This is again another example where the use of an adjective interacts with the range of possible combinations.

Testing for the availability of a demonstrative turns out to be rather tricky. By the predicate test, the use of a demonstrative is compatible with both the lexical and the Q-noun interpretation. For instance, in the two examples below, the predicate applies to the N2, not the quantity (e.g. employees are being looked after and men are being squished into a cave):

- (143) With **this number of employees** to look after ... (COCA: OccupationalHealth 2015)
- (144) You couldn't fit anywhere **that number of men** in the mouth of that cave. (COCA: Bk:SongSusannah 2005)

In the following two examples, the predicate targets the quantity:

- (145) **That number of rooms is** still 10,000 fewer than normal. (COCA: CNN_LiveSat 2006)
- (146) **This number of advertisements was** typical for all commercial channels. (COCA: WashPost 1991)

Predicates targeting the N2 as opposed to *number* seem to marginally allow plural verbal agreement, in contradiction with the singular demonstrative:

- (147) I can't recall anytime in the annals of military history when **this**

²⁴ It's unclear whether the interpretation here is the Q-noun sense or the lexical sense.

- number of forces have** moved over this distance to put themselves in a position to be able to attack. (COCA: ABC_Jennings 1991)
- (148) **That number of officers were** there to protect other individuals that might have been captured, hostage - taken hostage by Mr. Hayes had he fled, had he run off. (COCA: MSNBC_Abrams 2005)

The data suggests that both the quantity and lexical interpretations are acceptable. However, I would like to point out that the distinction between the Q-noun usage and the lexical usage of *number* in the context of a demonstrative is not clear. In terms of the interpretation, the examples with a predicate targeting the N2 do not indicate some unspecified quantity, as the Q-noun interpretation predicts. In fact, if we examine the context for (144), for instance, we find that there is a contextually specified quantity which the construction refers to:

- (149) "...Of the **sixty-eight men** of Redpath Kra-ten, I believe all but four or five will agree to help - to blend their forces together. It will make powerful khéf. Is that what ye call it? Khéf? The sharing?" "Yes," Roland said. "The sharing of water, we say." "You couldn't fit anywhere **that number of men** in the mouth of that cave,"

This would suggest that despite the fact that the predicate targets the N2, the construction does not involve the Q-noun interpretation, but rather the lexical interpretation. The ability of the predicate to target either the quantity or the N2, as illustrated above, might relate to the fact that the quantity is contextually specified. For instance, if we replace the construction with a numeral, the same types of predicates are permitted:

- (150) With 20 employees to look after...
- (151) You couldn't fit 68 men in the mouth of that cave.
- (152) 28,000 rooms is still 10,000 fewer than normal.
- (153) 11 advertisements was typical for all commercial channels.

The contextually-specified nature of the quantity may give the predicate access to both the quantity and the N2, as if the phrase *this/that number* is itself a numeral.

We have seen that the use of a definite article does not allow predicates to target the N2. This is illustrated below:

- (154) #With the number of employees to look after...
- (155) #You couldn't fit the number of men in the mouth of that cave.

The definite makes *number* lexical, but it does not provide *number* with a quantity. It seems that an exact quantity is necessary to license the treatment of this construction as a numeral. Because the contextual component is missing with the definite article (in contrast to a demonstrative), an N2 predicate is not permitted.

This also holds true with possessives, where the examples which surface in the corpus suggest that the predicate cannot target the N1. Possessives seem to lack the ability to convert *number* into a quantity-referring element, although some ambiguous examples do exist:

- (156) Is it counting **your number of steps, calories?** (COCA: NPR 2013)
- (157) **...his number of calories** burned (COCA: NPR_TalkNation 2009)
- (158) **Their number of years of teaching** were separated into 4 groups
(COCA: InstrPsych 1995)

Despite the various complexities we have seen, the Q-noun interpretation of ‘an unspecified quantity’ seems to be incompatible with definiteness (or at least, difficult to discern in the context of definiteness), and therefore limited to indefinite contexts.

Summarizing, we have seen two senses for *number*: a Q-noun sense, “some indefinite unspecified quantity,” and a lexical sense, “an arithmetic value.” These senses correlate with verbal agreement and predicate choice in simple scenarios. The inclusion of demonstratives and adjectives in the structure make the correlation unclear, but there may be a measure of contextualization that these elements do to give accessibility to the N2. If indeed the Q-noun interpretation only arises in indefinite contexts, and the lexical interpretation in definite contexts, then we have identified a complementary distribution between the Q-noun and lexical uses. As a tentative proposal, I suggest that we are not necessarily dealing with separate lexical items, but rather a single root, for which definite and indefinite contexts trigger a slightly different interpretation. There is a tight relation between the lexical and Q-noun interpretations. We can imagine that adding on a definite determiner has the effect of converting the reference of *number* from an unspecified (indefinite) value to an arithmetic (definite) value. This captures the complementary distribution between the two uses, as well as the fact that the interpretational difference is vague. If true, this leaves open the question of the correlation of sense with Agreement (i.e. lexical *number* shows agreement with *number* and Q-noun *number* agreement with the N2). It is possible that the addition of the D-layer licenses the insertion of # on *number*. We have already seen that the use of an adjective licenses plurality on *number*’s Q-noun use (e.g. **(great) numbers*), and this would constitute another example.

The table summarizes the diagnostics. If the Q-noun and lexical senses of *number* can be related to the presence or absence of definiteness, then *number* is not necessarily multifunctional, and furthermore, does not necessarily block D-material. With this in mind, I have placed a question mark in the multifunctionality cell and both positive and negative values in the D-material cell. Strictly speaking, the Q-noun and lexical interpretations are confined to particular contexts.

(159) Table 6: Properties of Q-nouns *lot*, *ton*, *bunch*, and *number*

	<i>lot</i>	<i>lots</i>	<i>ton(s)</i>	<i>bunch</i>	<i>number(s)</i>
Multifunctional?	NO		YES	YES	?
Morphological Plural?	✓		✓	✗	✓
Adj. Insertion?	✓	✗	✓	✓	✓
Numerals?	✗		✗	✗	✗
D-level material?	✗		✓	✗	✗/✓
An X and a half?	✗		✓	✗	✗

This concludes our discussion of the morphosyntax of Q-nouns. In the next section, I develop the analysis.

6.4 The semi-lexicity of Q-nouns

Studies of pseudopartitives often include container nouns, part nouns, collective nouns, material nouns, measure nouns, kind nouns, and so on, in addition to Q-nouns (e.g. Alexiadou, Haegeman, and Stavrou 2008: 402, Van Riemsdijk 1998: 13, Vos 1999, Jackendoff 1977, Keizer 2007, among others). At a surface level, each of these constructions appears to be related given that there is some N1 which does not function fully lexically and some N2 which does not usually project to a full DP under the N1, despite the presence of the particle *of* (see e.g. Keizer 2007):

- | | | |
|-------|---------------------|------------------------|
| (160) | A bunch of books | <i>Q-noun</i> |
| (161) | A cup of coffee | <i>Container noun</i> |
| (162) | A piece of cake | <i>Part noun</i> |
| (163) | A kilo of sugar | <i>Measure noun</i> |
| (164) | A herd of elephants | <i>Collective noun</i> |

Our study of Q-nouns has shown that within the class of Q-nouns, the morphosyntactic properties of the construction are determined by the Q-noun itself, with different Q-nouns showing subtle differences. The class of Q-nouns presents a problem much the same as we saw with Polish numerals in chapters 4 and 5. While we can call them quantificational pseudopartitives, this does not immediately determine what their morphosyntax will be, and instead, we must assume that the Q-noun contributes idiosyncratic information which interacts with its representation in the quantity domain. This problem presumably extends to the other classes of pseudopartitives (e.g. container nouns, part nouns, measure nouns, collective nouns), suggesting that a uniform treatment within and between classes of pseudopartitive nouns may not be attainable.

We explore the semi-lexicity of Q-noun pseudopartitives in five steps. I start by providing a short overview of previous approaches to pseudopartitives in the literature (section 6.4.1). This section introduces the juxtaposition

construction, which is what we aim for in our account of English pseudopartitives. I then turn to a feature system of Q-nouns (and quantifiers), characterizing in what way they are functional (section 6.4.2). This section develops the validity of the semi-lexicity hypothesis in relation to Q-nouns. I then turn to a basic structure of Q-noun quantification (section 6.4.3), which is manipulated to model the idiosyncrasies of Q-nouns (section 6.4.4). Finally, I illustrate the consequences of the analysis for Agreement (section 6.4.5) and address the status of particle *of* in the pseudopartitive construction, arguing for its treatment as a marker of nominality (section 6.4.5).

6.4.1 *Previous approaches to Q-noun pseudopartitives*

Pseudopartitives have been subject to extensive research, with early beginnings in the work of Jackendoff (1977), Selkirk (1977), and Akmajian and Lehrer (1976), and further attention in Lehrer (1986), Abney (1987), van Riemsdijk (1998), Corver (1998, 2003), Vos (1999), Kinn (2001), Stavrou (2003), Keizer (2007), Rutkowski (2007a), Hankamer and Mikkelsen (2008), Tănase-Dogaru (2008), Alexiadou, Haegeman, and Stavrou (2008), Norris (2014), and (plenty of) others. These accounts can be classified into two main families of approaches: the mono-projectional approach, which takes the pseudopartitive to form a single nominal domain, and the bi-projectional approach, which takes the construction to consist of two nominal domains. In line with the data and analysis of section 6.3.2, I take the pseudopartitive construction to be mono-projectional, and therefore, focus on the mono-projectional family of approaches.

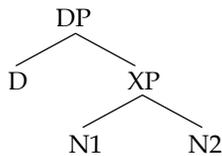
An important difference between English pseudopartitives and pseudopartitives in many other languages, including Dutch (van Riemsdijk 1998, Vos 1999), German (Löbel 1989), Danish (Hankamer and Mikkelsen 2008), Greek (Stavrou 2003), Norwegian (Kinn 2001), Standard Albanian (Giusti and Turano 2004), and Finnish (Norris 2014), etc. (see also Koptjevskaja-Tamm 2001) is that such pseudopartitives surface in what is known as the Direct Partitive Construction or the juxtaposition construction. The pseudopartitives of these languages do not involve a particle like *of* (though some of these languages, e.g. Finnish, make use of case morphology on the N2), but rather juxtaposition of the N1 and N2. This can be shown with Dutch for example:

- (165) Een hoop mensen
 A lot people
 'A lot of people'

For such constructions, it is fairly straightforward to map the N1 onto a head in the extended projection of the N2, and there is a wealth of analyses doing just that. One type of approach takes the N1 to be a functional Q-head (Löbel 1989) or #-head (Grestenberger 2015), but many analyses choose to term the N1 "semi-

lexical,” carrying properties of both lexical and functional categories. Van Riemsdijk (1998), for example, proposes that the N1 carries functional, but not grammatical features, this making it an intermediate category between lexical categories (lacking functional and grammatical features) and functional categories (carrying both functional and grammatical features²⁵), i.e. “semi-lexical.” This type of approach is picked up in Stavrou (2003) who names the projection hosting the semi-lexical head a Classifier Phrase (CIP) or Measure Phrase (MP), and Alexiadou, Haegeman, and Stavrou (2008) essentially follow Stavrou on this within the mono-projectional approach. Hankamer and Mikkelsen (2008) also draw on van Riemsdijk’s (1998) notion of semi-lexicality, but they propose that the N1 is inserted as a little *n* head. Regardless of how we name the projection (QP, #P, CIP, MP, *n*P, NP) or conceptualize its content (functional, semi-lexical), each approach agrees that there is (at least) one projection between the D-layer and the N-layer, and it hosts the N1. We can illustrate this as follows, using XP for the intermediate phrase.

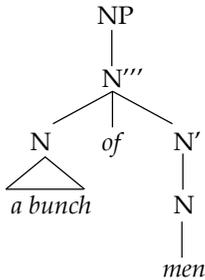
(166) Juxtaposition construction (pseudopartitives)



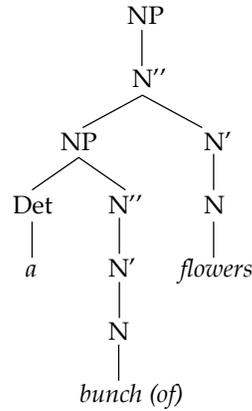
The study of English pseudopartitives has been complexified due to the obligatory particle *of*. The structure above provides no syntactic projection to host the *of*, and this has led to a number of alternative analyses, some very similar to the one above and others widely different. Early approaches were not very concerned with the placement of *of* and Jackendoff (1977) and Selkirk (1977), for example, seem to propose that the N1 is some kind of complex specifier containing the indefinite, and the *of* simply surfaces where needed.

²⁵ In van Riemsdijk’s (1998) paper, functional features seem to make the difference between lexical and functional (e.g. functional feature F), while grammatical features seem to be related to grammatical notions, e.g. #, tense, etc.

(167) Jackendoff (1977):



Selkirk (1977):

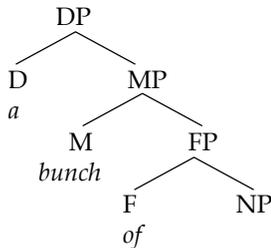


Later approaches, however, have sought to place the *of* within its own phrasal projection. Under some approaches, this entails giving the *of* a function in relation to the pseudopartitive, whereas for other approaches, the *of* is more or less useless, but represented in the structure out of necessity. Abney (1987), for instance, argues that the construction involves a simple PP, which differs from other PPs in not being theta-marked (this deriving differences between partitives and pseudopartitives). Corver (1998, 2003) instead argues to treat the *of* as a copula in a predicational structure, drawing on the work of e.g. den Dikken (2006) and the surface similarity of pseudopartitives to the N-of-an-N construction (*that idiot of a doctor, that jewel of a village*). Schwarzschild (2006) picks up on both of these proposals, and combining them with his study of monotonicity, proposes a Monotonicity Phrase (MonP) which is headed by *of* and takes the N1 in its specifier and the N2 in its complement. Each of these approaches can be considered bi-projectional, given the relational nature of the *of* in Corver (1998, 2003) and Schwarzschild (2006) and its P-status in Abney (1987). Note that under Corver (1998, 2003) and Schwarzschild (2006)'s approaches, the N1 forms a phrasal constituent in the specifier or complement of the projection hosting *of*, similar to Jackendoff's (1977) and Selkirk's (1977) complex specifier analysis.

The alternative is to ignore the *of*, and Stickney (2004, 2009), who complains of the lack of a function for the *of*, can be categorized under such an approach. She places *of* in a Functional Phrase (FP) and situates the N1 in a Measure Phrase (MP) and the N2 as the complement to FP (which is in turn the complement of MP). This approach can be considered the closest to the juxtaposition approach, with the addition of a piece of unidentified structure to host the particle *of*. Grestenberger (2015) also chooses to treat the *of* as the head of an FP in his discussion of English, as does Tănase-Dogaru (2008), in a study of Romanian pseudopartitives, which like English, require a particle *de* (an equivalent of English *of*). We can summarize this class of approaches as in the structure below.

These approaches treat the N1 as a projecting head.

(168) Stickney (2004, 2009)



Given the discussion in section 6.2, which showed pseudopartitives to involve the same type of information as numerals and quantifiers, the contribution of *of* to the construction seems to be null. If *of* is not actually doing anything in the structure, beyond marking the nominality of the N2 in some way, then there is no motivation for giving it a relational position in the structure, as a head mediating between N1 and N2. Under Corver's (1998, 2003) analysis, for instance, the *of* was triggered as a result of predicate inversion, a plausible hypothesis given that the N1s he considered could surface in predicate positions, for example, as a predicate nominal, after the verb *become*, or as an answer to *what...like* questions, which typically ask for a property (Corver 1998; see discussion in Alexiadou, Haegeman, and Stavrou 2008).

(169) His height is 2 meters.

(170) The temperature became 45 degrees in the room within minutes.

(171) A: What is the price like?

B: The price is about 200 dollars.

(Corver 1998)

The same does not hold for Q-nouns:²⁶

(172) *The books are a lot / a ton / a bunch / a number.

(173) *The books became a lot / a ton / a bunch / a number.

(174) What are the books like?

*(The books are) a lot / a ton / a bunch / a number.

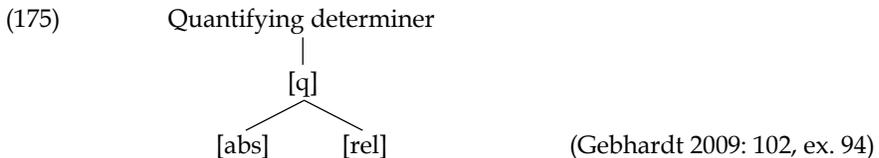
This suggests that Q-nouns require a different sort of treatment. Following

²⁶ However, phrases like *That's a lot* and *It looks like a lot*, which look more predicational in nature, are acceptable. Notice, however, that these are odder with *ton* and *bunch* (*??That's a bunch/ton*, *?It looks like a bunch/ton*), and unacceptable with *number* under its Q-noun reading (**That's a number*, **It looks like a number*). This is potentially related to the allowed use of *lot* as an adverbial (*She drank a lot*, and marginally: *?She drank a bunch/ton*), but deserves more careful attention.

Stickney (2004, 2009), Grestenberger (2015), and Tănase-Dogaru (2008), I assume that the *of* in the pseudopartitive functions as a marker of the nominality of the N2. I return to the issue of *of* in section 6.4.5. My analysis of the construction will try to adhere to the juxtaposition approach as closely as possible.

6.4.2 Quantity features and Q-noun roots

Gebhardt (2009) examines quantificational elements in English and proposes three quantity-related features: Q(uantification), ABS(olute), and REL(ative). We have already made use of a quantification feature in our treatment of Polish numerals (e.g. Chapter 5), and it seems reasonable that quantifiers in English are similarly marked. The features ABS and REL have to do with how the quantificational elements relate to the context. Absolute quantifiers denote fixed quantities, regardless of the context. These include numerals and some quantifiers (e.g. *a dozen*, *a couple*, *a few*, *several*).²⁷ Relative quantifiers, on the other hand, vary the value they can refer to as a function of the context and the N2. *Many*, for example, is a relative quantifier, and determining whether something constitutes ‘many’ requires not only considering the exact quantity it denotes, but that quantity in relation to the N2. For example, if somebody has four children, we might say that they have many children, but if someone has only four friends, we would not necessarily say that they have many friends. What constitutes “many” is relative. Relative quantifiers include *many*, *few*, *little*, and *much*.²⁸ Gebhardt (2009) represents these quantificational features in a feature geometry:



To the three features of Gebhardt (2009), we could add at least four more: MAX(imum), MIN(imum), COUNT, and MASS. Solt (2009) analyzes the relative

²⁷ Judgments on the range of quantities denoted by *a couple*, *a few*, and *several* probably differ between speakers, but they are generally on the lower end and in a particular order: *several* > *a few* > *a couple*. One could argue that these are not fixed, and hence, should not be treated as ABS. However, they are not subject to contextual considerations in contrast to REL quantifiers. This motivates treating them with the set of ABS quantifiers.

²⁸ Morphosyntactically, there is a correlation between relative quantifiers and adjectiveness. Each of the relative quantifiers listed is also capable of acting as a degree-bearing element and inflecting as an adjective would (e.g. *many-more-most*, *few-fewer-fewest*, *much-more-most*, *little-less-least*, *too many*, *too few*, *too much*, *too little*, etc.). The correlation may be significant, but I do not have the space to address it. Notice also that it seems possible to combine a REL quantifier inside an ABS quantifier as in [*a [very few]_{REL}*]_{ABS}, suggesting there could be compositionality between REL and ABS.

quantifiers *many*, *few*, *much*, and *little* as involving a contextually-defined scale, with the quantifiers marking ranges on different ends of the scale. *Many* and *much* represent an upper bound (i.e. the number or amount of N2 exceeds the neutral range for that particular situation), while *few* and *little* represent a lower bound (i.e. the number or amount of N2 falls below the neutral range for that particular situation) (see also Solt 2015). Features MAX and MIN capture the position on the scale as exceeding or falling below a neutral range, and COUNT and MASS capture whether the quantifier combines with count or mass nouns (although COUNT and MASS are probably a shorthand for allomorphy, cf. Smith 2015a). Using this system, we can represent the set of relative quantifiers as below.

- (176) *Many*: [q], [rel], [max], [count]
Much: [q], [rel], [max], [mass]
Few: [q], [rel], [min], [count]
Little: [q], [rel], [min], [mass]

Note that this system cross-cuts the single-point versus range distinction found between numerals (which denote a single point on a cardinality scale) and typical quantifiers (which denote a range on a cardinality scale). To expand our system of features even further, we can add POINT and RANGE.²⁹ Turning to our Q-nouns, the following feature bundles seem appropriate:

- (177) *Lot*: [q], [rel], [max], [range]
Ton: [q], [rel], [max], [range]
Bunch: [q], [rel], [max], [range]
Number: [q], [rel], [count], [point]

The feature system assigns identical feature values to *lot*, *ton*, and *bunch*. However, as discussed in section 6.3.3, their degree of ‘many-ness’ differs, producing the following ordering between the quantities they can denote:

- (178) ton > lot > bunch

This represents nuances of meaning which the feature system does not capture. There are two ways we could deal with this. On the one hand, we could propose that the feature MAX is actually a composite of features, and there are further distinctions in terms of how much above a neutral range the quantity falls. This approach involves further developing our feature system. On the other hand, we could propose that the feature system is indeed limited to the set above, but the

²⁹ There are relations between features I am glossing over here. For example, only elements which denote a range seem to involve MAX and MIN features. The use of functional features to illustrate quantity is mostly illustrative for the moment, and further research should be conducted to explore their validity.

Q-nouns contain roots which add on additional nuances of meaning that have bled over from their lexical interpretations. In the context of *ton*, for example, its lexical meaning of '2000 pounds' could contribute to it denoting a larger quantity than *bunch*, which lexically refers to (smaller) sets of items physically connected or bundled in some way. Under this approach, we expect that the use of nominals in a quantificational way allows speakers to create additional nuances of meaning which the system of functional features is too brusque to generate. This is the semi-lexicity hypothesis and it further predicts that we should be capable of creating Q-nouns on the fly in order to introduce nuances of meaning that would otherwise be unavailable. A wealth of examples surface in the COCA (and in my own writing). Each of the examples below involves a large quantity along the lines of "many," but the meanings of the N1 have not been bleached and instead generate imagery on the nature of that quantity. For example, *a flood of memories* implies many memories which sweep through the mind quickly as a flood would.

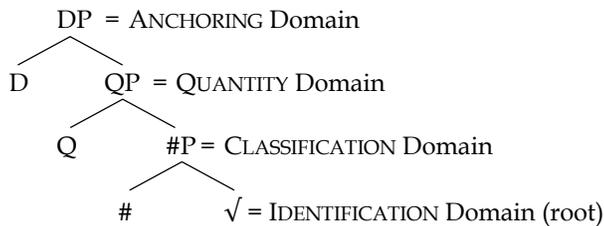
- (179) A flood of memories
- (180) A parade of witnesses
- (181) A torrent of words
- (182) A sea of faces
- (183) A flurry of lawsuits
- (184) A mass of contradictions
- (185) A chorus of boos
- (186) A mob of reporters
- (187) A multiplicity of voices
- (188) A barrage of insults
- (189) A host of possibilities
- (190) A cascade of problems

The ability of numerous nominals to express quantity while also contributing their lexical semantics to the interpretation of the quantity argues in favor of not embellishing the feature system, but rather, deriving the interpretational differences between *lot*, *ton*, and *bunch* from their roots. These Q-nouns differ from the examples above in that they seem to be in the process of grammaticalization, with semantic bleaching affecting their interpretational contribution to the quantity. The fact that they still make minor distinctions, here mostly in terms of the degree of many-ness, argues in favor of them still containing a root core. I adopt the semi-lexicity hypothesis for the Q-nouns considered in this chapter. While they can be marked by functional features, they also contain a root.

6.4.3 *Roots in the quantity domain*

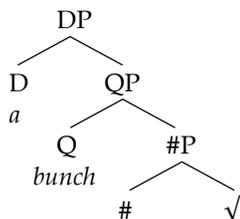
The basic structure of the English nominal domain is reproduced below.

(191) Basic structure of the English nominal domain:



Given this structure, the simplest hypothesis is to say that Q is the insertion site of numerals, quantifiers, and importantly, Q-nouns, and D is the insertion site of the indefinite article (ignoring particle *of*). This hypothesis would be in line with the juxtaposition analyses of pseudopartitives discussed in section 6.4.1.

(192) Potential pseudopartitive structure:



However, the data suggests that the analysis cannot be as simple as this. The main problem concerns the indefinite article, which in the structure above, would be no different from the usual indefinite article found with singular indefinite nouns. This would predict the pseudopartitive to behave singular for processes of Agreement (which it doesn't, e.g. section 6.3.1), and furthermore, would predict both definite and indefinite determiners with pseudopartitives (which is not the case, e.g. section 6.3.3). In this section, we explore how to complexify the structure such that an apparently non-singular indefinite is permitted and definiteness can be excluded where necessary. In this regard, the study of adjective-modified numerals, which show a similar non-singular indefinite, is informative. We start by discussing the relevance of adjective-modified numerals, and drawing on this, propose a base structure of pseudopartitives. This structure will be manipulated in the following section to generate idiosyncratic Q-noun patterns.

Certain English numerals are necessarily accompanied by an indefinite article in indefinite contexts. This includes the base numerals *hundred*, *thousand*, and *higher*.

(193) A hundred people

(194) A thousand people

(195) A million people

The indefinite of the higher numerals does not appear to indicate singularity in any way. Both verbal and demonstrative agreement is plural.

- (196) These/A hundred people **were** stalking the dragon.
 (197) These/A thousand people **were** chasing after a donkey.
 (198) These/A million people **were** cashing in fake lottery tickets.

Thus, despite the apparent singularity of the indefinite, it in no way triggers singularity for processes sensitive to number. A similar problem exists for lower numerals when they are modified by an adjective. Adjective-modified numerals are necessarily marked by an indefinite article.^{30,31}

- (199) She agreed to join him on a publicity trip, ***(a) harmless one day** on the town ending in New York. (COCA: CBS_Sixty 1996)
 (200) With ***(a) whopping 44 colors**, this line has a lip hue for everyone. (COCA: GoodHouseKeeping 2011)
 (201) Hoon told the BBC a contingent of ***(an) additional thousand troops** could be needed as well. (COCA: NPR_ATC 2003)
 (202) Bypassing or tampering with power supplier meters is a growing problem, costing ***(an) estimated hundreds of billions of dollars** worldwide and accounting for 10% to 40% of all energy use in various countries. (COCA: Futurist 2013)

Notice that regardless of the numeral (e.g. *one*, *44*, *thousand*, *hundreds*), the indefinite is obligatory. This is most surprising in example (202) in which the numeral(s) and noun are plural, and hence, there is nothing obviously singular in the nominal containing the indefinite.

Like pseudopartitives and the higher numerals, the indefinite article in this construction does not interact with verbal agreement. The construction necessarily triggers plural, just as a bare numeral would:³²

³⁰ Relative clauses can trigger an indefinite article, but not all do. See also Maekawa (2013).

- i. It is one of **a[n] 11 buildings that were destroyed by the fire** which of course came after the flood. (COCA: CNN_Morning 1997)
- ii. There are **two issues that will make or break the Games-hospitality and security**. (COCA: Ebony 1996)

Notice that the construction also allows adjectives which have been modified, e.g. *a very harmless one day*.

³¹ The discussion in the text is rather brief. For more discussion, I direct readers to the following: Jackendoff (1977), Honda (1984), Gawron (2002), Solt (2007), Ionin and Matushansky (2004), Ellsworth, Lee-Goldman, & Rhodes (2008), Maekawa (2013), Keenan (2013), Bylinina, Dotlačil, & Klockmann (2016), Ionin & Matushansky (under review).

³² There are certain contexts in which a numeral+noun can trigger singular agreement, as

- (203) **A mere eight companies own** nearly all of mainstream media journalism. (COCA: USAToday 2007)
- (204) **A reported 4,000 delegates were** among the 10,000 conventioners gathered in Charlotte, NC, for the six-day confab. (COCA: Jet 1996)
- (205) **A suffocating 92,000 fans were** in the seats for each game at the L.A. Memorial Coliseum. (COCA: Chicago 2005)
- (206) Many others are from Gwinnett County, but **a surprising 12 families are** transplants from New York. (COCA: Atlanta 2003)

The indefinite which surfaces with numerals suffers from the same problem as the indefinite of pseudopartitives: despite the apparent singularity, the D-head cannot be singular, as otherwise, it would predict singular verbal agreement. This shows that the problem of non-singular indefinite articles extends beyond the class of pseudopartitives and includes other quantifier constructions. Notice also, that quantifiers like *a few* and *a dozen* also include an indefinite, despite triggering plurality. Modified *many* behaves similarly.

- (207) A few people **were** fighting in the ballroom.
- (208) A dozen eggs **were** smashed on Paul's head.
- (209) A great/good many donkeys **have** fallen to the butcher's knife.

The comparison suggests that a similar treatment of adjective-modified numerals, higher numerals, and Q-nouns (and potentially quantifiers) is warranted.

Lyons (1999) proposes to analyze the indefinite article as a default marker

opposed to the expected plural. One context is with measures:

- i. 50 degrees (C) / 122 degrees (F) is just too hot.

This example seems to involve a unitizing of the numeral+noun. In other words, it is not each individual degree which is hot, but the culmination of degrees which constitutes 'too hot.' Agreement seems to be sensitive to whether we treat the quantified element as a unit (or culmination) or a plurality made of distinct members. Further examples include:

- ii. Five pounds is a lot of money. (Hudson 1999: 174, ex. 2a)
- iii. Two drops deodorizes anything in your house. (Kim 2004: 1113, ex. 24b)
- iv. Most of us can agree that 8 million people is too many to be receiving disability payments from the government (Maekawa 2013: 430, ex. 52b)

Maekawa (2013: 431), building on the work of Kim (2004), describes examples like (iv) as "refer[ing] to a group of people conceived [of] as a whole rather than discrete entities." It seems that despite the plural on the noun, the numeral+noun is conceived of as a unit or group with consequences for verbal agreement. In the numeral-adjective construction, measure nouns or 'unitized nouns' also allow for a singular verb:

- v. **A cool 68 degrees is** thought to be the most conducive to sound slumber. (COCA: Cosmopolitan 2004)
- vi. So in that span, **a mere nine points separates** the Blues from the best mark in the league. (COCA: STLouis 2014)
- vii. **A heightened five senses comes** standard with being a were, but I firmly believe it gives you heightened instincts, too. (COCA: Bk:NightLife 2008)

Presumably, the two cases of singular agreement are related.

of cardinality, located in a Card(inality)P (what we would consider QP). Under his account, the indefinite does not encode indefiniteness, being specified only for [+sg], but it has come to be associated with indefiniteness through its distribution, which, for independent reasons, is limited to indefinite contexts. He terms it a 'quasi-indefinite article,' and argues that it is a default marker of cardinality, surfacing in precisely those contexts where no other marker of cardinality surfaces, i.e. in the absence of a numeral, quantifier, or plurality.³³ He claims that it does not co-occur with a definite determiner (**the a book*) due to a phonological constraint: being weak forms, the quasi-indefinite article and definite determiner can only occur in an initial position in the phrase (he cites pre-determiners *all (the way)* and *half (an hour)* as the only exceptions), and, as a result, *the* blocks *a(n)* from surfacing.³⁴ It is for this reason that we do not find the quasi-indefinite article in definite contexts, i.e. its restriction to indefinite contexts has nothing to do with indefiniteness *per se*. Ackles (1996) develops a similar account of the indefinite.

In light of the strange distribution of the indefinite article, I assume, following Lyons (1999) that it is a default Q-marker, which surfaces with a QP has been projected, but fails to be lexicalized with overt content (see tree in (210)).³⁵ This assumption implies that wherever the indefinite surfaces as a default cardinality marker, QP is empty. If we return to our lower numerals, which do not show an indefinite when bare, but do when modified by an adjective, then we would have to assume that when bare, QP is filled, but when modified, QP is empty. In a morphologically singular pseudopartitive, QP is necessarily bare.

Suppose English numerals, like Polish numerals, have a root at their core. This would be in line with the fact that numerals can also function in a canonical way, e.g. as referential nouns (*I rolled a six / two sixes*), under the assumption that such structures involve the use of the root without its functional features. We can

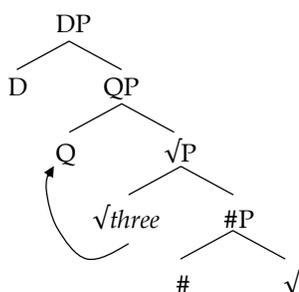
³³ Lyons takes plural morphology to be an instantiation of NumP (equivalent to our #P) and therefore, not CardP. The result is that bare plurals have no overt element in CardP, and by his proposal should also trigger a default indefinite. However, he proposes that bare plurals, carrying plural inflection, are marked enough not to require a CardP. As a result, no default marker is required with bare plurals; singular indefinites, on the other hand, are unmarked and hence, require a CardP. The presence/absence of a CardP that Lyons proposes could potentially be used to model some of the differences between bare plurals and singular indefinites, which have been described by Carlson (1977) and many others.

³⁴ An alternative Lyons doesn't consider (and perhaps rightly so) is to decompose the definite determiner into a definiteness component (*th-*) and a cardinality component (*-e*). The *th-* could be viewed as the definiteness morpheme for the third person, also present in demonstratives (*th-is, th-at, th-ese, th-ose*), and the *-e*, our default cardinality maker *a*, otherwise known as the indefinite article. See Boef and Franco (2013) for a similar decomposition in Dutch. See also Borer (2005: 160-169) or Gebhardt (2009: 367-372) for alternatives to "Lyons' problem," couched within their theories.

³⁵ Lyons (1999) specifically places the article in the specifier of CardP. He has a particular implementation of heads and specifiers, such that inflectional material constitutes a head and non-inflectional material a specifier. The indefinite is not inflectional, hence is treated as a specifier in his system. For us, the choice seems immaterial.

suppose that English numerals are not generated in the QP itself, and instead, must move to that position, as we saw for the Polish numerals 5+.³⁶ If so, we get the following basic syntactic structure with an English lower numeral:

(210) Lower numeral structure³⁷



In the case of bare quantification, the numeral moves from its position as the head of \sqrt{P} to the head of QP. This provides the QP with (overt) content. When an adjective is inserted in the structure, however, it disturbs the relationship between

³⁶ English numerals have same problem with *pluralia tantum* nouns as the Polish numerals 5+ did: *two *(pairs of) pants*. The numeral cannot surface directly with a *pluralia tantum* and the relation must be moderated via some canonical number-bearing head. This may imply that the numeral belongs lower in the structure as it did in Polish. For the present discussion, however, I assume the simplified version above.

³⁷ This structure is ignoring the question of whether English numerals should be analyzed as heads or specifiers. Kayne (2010: ex. 119-120) points out that in complex numerals, the lower numeral and base appear to act as a constituent (=specifier), rather than the base and noun (=head), suggesting the complex numeral is a specifier.

- i. They have three hundred linguistics books, and we have three hundred, too.
- ii. *They have three hundred linguistics books, and we have three, too.

The adjective-modified numeral construction, however, seems to suggest a head account. Under the head analysis, facts like the one below reported by Ionin and Matushansky (2004: 111, ex. 29b) are easily accounted for. The numeral and noun form a constituent which can be coordinated under the scope of an adjective (taking the adjective to be a specifier).

- iii. An amazing [12 performances and 602 rehearsals]

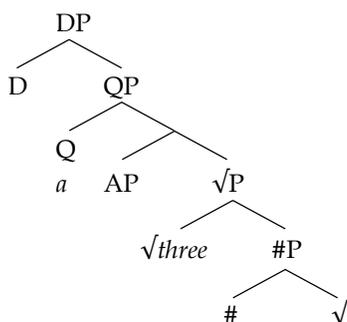
The numeral-specifier account must assume that the adjective is not a specifier of the numeral (as otherwise coordination would include the adjective), and instead, either requires multiple specifiers in English or for the adjective to sit somewhere higher up. Notice that we can combine the two constructions, ellipsis and adjective-modification, which shows that adding an adjective does not affect the constituency:

- iv. They have a good three hundred books, and we have a good three hundred, too.
- v. *They have a good three hundred books, and we have a good three, too.

The data is contradictory, and for illustration, I simply assume a head analysis. The account does not hinge on the numeral being a head in the spine (we could also analyze the indefinite as a type of quantificational determiner), but it maintains parallelism between the Polish cases of chapters 4 and 5, and the pseudopartitives discussed here.

QP and \sqrt{P} , forcing the spell-out of the indefinite (see tree in (211)). The insertion of the adjective seems to block whatever process normally combines the numeral root and Q-head. There are a few ways to account for this. If the process is pure head-movement, it would suggest that the adjective is a head along the spine of the N2, which blocks movement to Q (the AP-over-NP hypothesis, see e.g. Abney 1987, Bošković 2005). Alternatively, this could suggest a spell-out analysis, where the Q-head and numeral root can only become a single word if immediately adjacent, an idea which could be formulated in terms of nanosyntax, or alternatively, as Ionin and Matushansky (under review) propose, through morphological merger of the Q-head with the root (Matushansky 2006) (see also Bylinina, Dotlačil, and Klockmann 2016). I do not choose between these options here, but it is enough to see that the insertion of the adjective prevents the numeral from also lexicalizing the QP. The insertion of the indefinite article, then, seems to be a case of last-resort, along the lines of *do*-support: Q must be realized and if the numeral cannot do it, then the default cardinality marker *a(n)* does:

(211) Adjective-modified numeral structure³⁸



This accounts for the indefinite article which surfaces with an adjective-modified numeral. Numerals which always surface with an indefinite article, for example, 100 and 1000 potentially either (a) are incapable of moving to Q or (b) are blocked from moving to Q by some invisible intervener.³⁹

³⁸ This structure is currently only intended to illustrate the lower numerals. Future research can verify whether it can also be extended to other indefinite requiring quantificational elements, e.g. *a few*, *a hundred*, *a dozen*, *a couple*.

³⁹ With regards to this second possibility, there may be some morpheme functioning to make the numeral into a base, similar to Kayne's (2010) proposal of a morpheme $-\text{NSFX}$. The higher numerals show a complementary distribution between carrying plural morphology and functioning as a base. For example, when a base, they cannot pluralize (**two hundreds*) and when plural, they cannot function as a base (**two hundreds of people*). If there is a silent $-\text{BASE}$ morpheme, we can understand this complementary distribution by proposing that English numerals are limited to a single suffix (a restriction we see in other domains, e.g. the incompatibility of tense and aspect on a single verb: *He will have been playing football*). If

In this system, the article is not necessarily a marker of singularity. It is a default marker of cardinality, but it does not, and in fact, cannot, bear singular features. This becomes most obvious with examples in which the numeral is syntactically plural. I repeat the relevant example below:

- (212) Bypassing or tampering with power supplier meters is a growing problem, costing **an estimated hundreds of billions of dollars** worldwide and accounting for 10% to 40% of all energy use in various countries. (COCA: Futurist 2013)

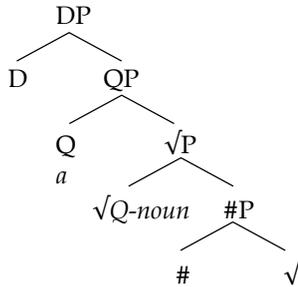
The nominal does not contain a single singular element, either in morphology or meaning. To maintain the assumption that the indefinite article is singular, we would have to assume that there is some silent noun triggering singular on the indefinite, but doing so brings us back to the original problem: how can external agreement be plural if the highest number-bearing head is singular? Instead, such examples force us to treat the default cardinal article, otherwise known as the indefinite article, as not specified for singularity.⁴⁰ A series of lucky coincidences must be taken to account for the fact that it otherwise (aside from these examples) only surfaces in singular contexts, if we assume this is the same article which surfaces elsewhere (as Lyons 1999 does).⁴¹

The structure we find with numerals is the same structure I propose surfaces with pseudopartitives. The difference between pseudopartitives and numerals, however, is that the pseudopartitive does not move to the QP, and hence, cannot stop the indefinite from surfacing. This may be a difference in levels of grammaticalization, where the Q-nouns have not yet grammaticalized to the point where they can surface in a Q-head or move to a Q-head.

so, this may be the intervening piece of structure which blocks 100 in its “unmodified” form from moving to Q, hence the need for a default cardinality article.

⁴⁰ Ellsworth, Lee-Goldman, and Rhodes (2008) and Maekawa (2013) attribute the singularity of the indefinite to singular agreement for AGR(eement) features with the adjective, which is taken to be specified for singular. Under this account, the number present on the numeral is irrelevant for the indefinite article. Verbal agreement is proposed to track INDEX features, which are available on the noun, hence the plurality. This circumvents the issues highlighted in the text, but it requires distinguishing verbal agreement from concord, and assuming number features on English adjectives (which show no morphological evidence of having number).

⁴¹ If the position of the indefinite article generated with lexical nouns, e.g. *a car*, is the same as the default cardinality article proposed above: [QP a [_{#P} car-SG ...]], then it leaves open the question of why the sequence **a cars*: [QP a [_{#P} car-PL ...]] is ungrammatical. One possibility is that bare plurals do not project QP, while singular nouns in English necessarily do (although why this would be is not clear). This could relate to certain systematic interpretational differences between singular indefinites and bare plurals (see Carlson 1977), but the topic requires much further consideration.

(213) Basic pseudopartitive structure⁴²

I now turn to idiosyncrasies of individual Q-nouns

6.4.4 Idiosyncrasies

I repeat the table from the data section below:

(214) Table 7: Properties of Q-nouns *lot*, *ton*, *bunch*, and *number*

	<i>lot</i>	<i>lots</i>	<i>ton(s)</i>	<i>bunch</i>	<i>number(s)</i>
Multifunctional?	NO		YES	YES	?
Morphological Plural?	✓		✓	✗	✓
Adj. Insertion?	✓	✗	✓	✓	✓
Numerals?	✗		✗	✗	✗
D-level material?	✗		✓	✗	✗/✓
An X and a half?	✗		✓	✗	✗

Important differences to touch on include (a) plurality, (b) the (lack of) D-level material, and (c) the distribution of adjectives. I address the data in this order.

6.4.4.1 Plurality

Q-noun *bunch* does not inflect for plural, whereas *lot*, *ton*, and *number*⁴³ do. The availability or lack of plurality can be ascribed to idiosyncratic properties of the Q-noun itself. Speakers lack *bunches* in their paradigm (although not all do, as

⁴² Here I have assumed a head-account for the pseudopartitive. Distinguishing between a head and specifier account is difficult, given the sparsity of evidence. Drawing on the similarity to juxtaposition pseudopartitives, a head account seems more appropriate.

⁴³ *Number* has restrictions on when its plural can surface, namely that it requires an adjective to license plural-marking. This is similar to the phenomenon we saw with Polish numeral 1000 and conditions on the projection of γ P. The insertion of an adjective appears to open up the set of structures available to the Q-noun. This topic, which has popped up in various places in this dissertation, requires a more careful study.

discussed in section 6.3.3.3). The presence or absence of the form *bunches* in a speaker's lexicon is not a property of the pseudopartitive construction itself, but rather, follows from the individual Q-noun, and hence, should be modeled in the lexical entry (with speakers positing different entries). We can accomplish this in a similar way as we did with the Polish numerals: the lexical entry for certain Q-nouns blocks the use of plurality. Thus, we can propose a negative plural #P for Q-noun *bunch*, in addition to the root and quantificational features:

(215) *Bunch*: [$\sqrt{\text{bunch}}$, $\neg\#_{\text{pl,Q}}$, REL, MAX, RANGE]

The more pressing issue in our understanding of number on Q-nouns is its inability to participate in Agreement and its lack of a semantic effect. If Q-nouns like *lot*, *ton*, and *number* can project plurality, they would carry the first #-feature to be encountered upon probing, thus, predicting plural agreement, even in combination with numberless mass nouns. This prediction is false.

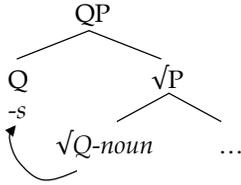
(216) Lots of butter was spilled.

(217) Tons of butter was spilled.

Agreement occurs with the N2. The lack of a plural interpretation, the inability of plural-requiring numerals and quantifiers to combine with the Q-nouns (**two lots*, **two tons* (if quantificational), **two numbers* (if quantificational)),⁴⁴ and the lack of plural Agreement all point towards the plural morphology on these Q-nouns as being inert. Despite the resemblance to a plural nominal form, plural Q-nouns cannot be plural in a canonical way, where we define a canonical plural as involving the free projection of a #P with a syntactically plural head. Instead, the source of the plural marking must differ. In this regard, I propose not to analyze the plural morphology as being indicative of a #P, and instead, adopt the assumption that it is generated in Q. This assumption is motivated by the fact that no default cardinality article surfaces with plural-seeming Q-nouns (e.g. **a lots*, **a tons*, **a great numbers*). If the default cardinality article is triggered by an empty QP, then its absence with *lots*, *tons*, and *numbers* indicates that Q is not empty. This leaves only *-s* as a possible lexicalization of Q in the case of *lots* and *tons* (which may occur bare), suggesting that *a(n)* and *-s* occupy the same position. This gives the following general analysis for plural Q-nouns. Notice that in contrast to "singular" Q-nouns, when Q is filled by *-s*, movement to Q must be permitted. I omit the DP layer for the moment.

⁴⁴ A possible dismissal of this as a test for the plurality of Q-nouns might be to say that the quantity domain only allows a single quantificational element, hence the lack of numerals. However, as we saw in our study of the Polish numerals, in particular, numeral 1000, quantification of a quantificational element is indeed permitted, provided it has the right structure. Presumably the same concept holds in English, and thus, the incompatibility of numerals argues against these being true plurals.

(218) Plurality in the pseudopartitive (*lots, tons, numbers*)⁴⁵



We can assume this to hold for the Q-nouns *lots, tons, and numbers* which permit a form of plural-marking.

6.4.4.2 Definiteness

Turning to definiteness, it was shown that *lot* and *bunch* do not co-occur with definite material like determiners, demonstratives, and possessives, while *ton* does; *number* seems to interact with definiteness such that the addition of D-material creates lexicality. These facts tell us that interactions with definiteness must be a property of individual Q-nouns, as opposed to the construction itself. In this section, we model these differences.

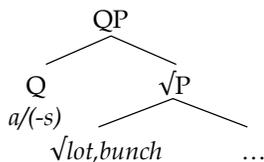
A similar incompatibility between definiteness and pseudopartitives has been observed in Greek (Stavrou 2003; Alexiadou, Haegeman, and Stavrou 2008) and Danish (Hankamer and Mikkelsen 2008). The solution has been to either propose the absence of the D-layer in the structure (Stavrou 2003) or an incompatibility of the pseudopartitive with definiteness (Hankamer and Mikkelsen 2008). This choice seems to hinge (in part) on the conceptualization of the representation of definiteness and indefiniteness. For example, Lyons (1999) proposes that indefiniteness is the absence of definiteness. Under such an approach, it is natural for the D-layer to be absent when indefinite (as in Stavrou 2003), and hence, certain Q-nouns could be assigned an indefiniteness feature and others not. Under analyses where both definiteness and indefiniteness are generated in the D-layer, it would be more natural to assume a D-layer which the Q-noun forces to be indefinite in some way (as in Hankamer and Mikkelsen 2008). Different assumptions on the representation of definiteness and indefiniteness call for slightly different analyses. Despite this, the generalization remains the same: certain Q-nouns are incompatible with definiteness, while others are not. Such information must be specified on the Q-noun itself to derive its interaction

⁴⁵ Lyons (1999) does not assume a CardP when nominal (canonical) plural marking is present, and instead suggests plurality “counts” on its own as a form of cardinality. Thus, while he would predict complementary distribution as I have, he does not explicitly model it in his syntax. It is possible that something similar could be true here (i.e. perhaps *-s* is not actually in Q, but blocks *a* anyways), but, to make the analysis very explicit, I have chosen to represent *-s* in Q, thus, forcing the complementary distribution.

with the structure. This argues in favor of the semi-lexicity hypothesis.

In the following, I illustrate the analysis if we follow Lyons (1999) and take indefiniteness to be the absence of definiteness. All nominals are indefinite until a D-layer is added, which functions to create referentiality to some entity in the discourse (roughly). This is a very simplistic view, but it suffices for our purposes. Differences between Q-nouns can be modeled via the presence or absence of a feature for indefiniteness. *lot* and *bunch* are specified as indefinite (or perhaps “not definite”) and thus, block the projection of DP. They maximally project to a QP. The incompatibility with D-material follows from the absence of a D-layer:

(219) Q-nouns *lot*, *bunch*:



Q-nouns *number* and *ton* require a slightly different treatment. *Ton* shows no restrictions on definiteness, and hence, is presumably unspecified as indefinite. Lacking a functional feature, it does not interact with the projection of the D-layer. A similar conclusion holds for *number*. As discussed in section 6.3.3.4, *number* shows a complementary distribution such that the lexical interpretation surfaces only in definite contexts and the Q-noun interpretation in indefinite contexts:

(220) A number of students were sleeping / #has increased.

(221) The number of students has increased / #were sleeping.

I suggested that we are dealing with the same lexical item in both interpretations, but the addition of definiteness adds a layer of referentiality which creates lexicity. This implies that *number* is in fact similar to *ton* in its interaction with definiteness, although the relation is much more intricate. For example, the addition of a D-layer on *number* allows *number* to control verbal agreement, whereas the same does not hold for *ton* with D-material:

(222) The number of students has/??have increased.

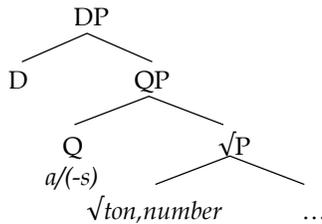
(223) As the ton of graduates with studio art degrees cozy/*cozies up to sleazy gallery owners...

This is presumably related to the phenomenon whereby the insertion of an adjective licenses plural morphology on the Q-noun: *(*great*) numbers. The insertion of a definite determiner seems to license singular number on *number*, which can then control verbal agreement. *Ton* does not show evidence of being

susceptible to this phenomenon.

Thus, we can assume that neither *ton* nor *number* are specified for definiteness. As such, they both freely project a DP above QP. The representation below shows their maximum level of projection; in indefinite contexts, DP is absent.

(224) Q-nouns *ton*, *number*:



This captures the difference in distribution between Q-nouns *lot* and *bunch* and Q-nouns *ton* and *number*. *Lot* and *bunch* are specified as indefinite, while *ton* and *number* are not.

6.4.4.3 Distribution of adjectives

The last puzzle concerns the distribution of adjectives with Q-nouns in their apparent plural forms. Both *tons* and *numbers* permit preceding adjectives, while *lots* does not. Relevant data is repeated below:

(225) ***Whole lots of people**

(226) I could blab about the subsequent meeting with Smith, Jones, and **assorted tons of other officials** (COCA: Analog 2010)

(227) The obvious fear is that **untold numbers of people** will be challenged to prove their legal status in our country. (COCA: America 2010)

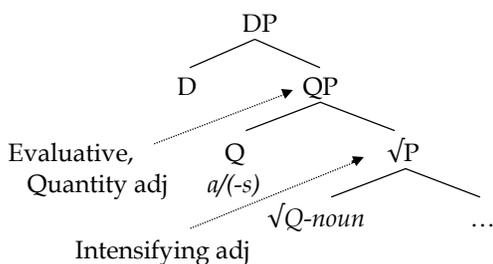
I propose that this difference can be related to the types of adjectives that these elements permit and where those adjectives attach in the structure. As mentioned in 6.3.3, different Q-nouns surface with different types of adjectives. When singular, *lot* permits intensifying adjectives (*whole*, *awful*), but not when plural. Q-noun *bunch* similarly allows only intensifying adjectives (*whole*). Q-noun *number* showed both evaluative (*staggering*, *surprising*) and quantity (*large*, *vast*) adjectives in its singular and plural forms, but no intensifying adjectives. Finally, adjectives with *ton* were rarer, but intensifying adjectives were identified in the singular (*whole*, *big*) and quantity adjectives (*assorted*, *uncounted*) in the plural. This is a rough characterization, as the set of adjectives in these constructions was not systematically investigated; such results, however, are indicative of tendencies.

It has been observed in the literature that adjectives show different

attachment sites in the DP, following an adjective hierarchy, where adjectives higher in the hierarchy attach higher in the nominal domain (Cinque 1994, Scott 2002, Svenonius 2007, Flanagan 2014, and references therein). The upper level of most adjective hierarchies seems to include what are called evaluative adjectives, or in the terminology of Scott (2002), subjective comment adjectives. These are adjectives like *beautiful*, *nasty*, *useless*, and *magnificent* which evaluate or make a subjective comment on some aspect of the noun they modify. We can use adjective height to understand restrictions on adjectives with Q-nouns.

With regards to Q-noun *number*, I identified a class of adjectives which are evaluative in nature, namely *surprising*, *staggering*, *unusual*, etc. Taking these to be evaluative, they should occur high in the DP. I hypothesize that they attach at or around the level of QP, when commenting on the quantity. The second class of adjectives with Q-nouns includes quantity adjectives, e.g. *large*, *growing*, *vast*, *countless*, etc. Presumably such adjectives also attach at or around the QP. The final class of adjectives are the intensifying adjectives. These include *awful*, *whole*, *big*, *fucking*, *powerful*, *mighty*, *bloody*, *goddamn*, etc. Intensifiers tend to occur adjacent to the element they are intensifying (e.g. *rather quick*, *really nice*, *awfully slow*, etc.), and thus, we can suppose that intensifiers attach very near to where the Q-noun is generated, in particular, near the \sqrt{P} of the Q-noun. Thus, we have the following attachment sites for the adjectives which surface with Q-nouns:

(228) Adjective positions:



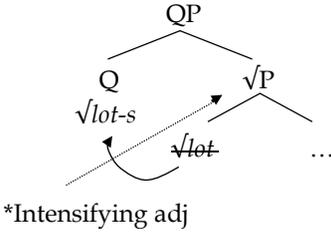
We are now in a position to understand the distribution of adjectives with Q-nouns. I start with Q-nouns *bunch* and *lot*. The singular of *lot* and *bunch* permits only intensifying adjectives, and in the plural, *lots* allows no adjectives at all. This follows from the structure and the position of adjectives and Q-nouns. Intensifying adjectives are expected to surface between QP and \sqrt{P} , i.e. between *a* and *lot* or *bunch*, which is exactly what we see:

(229) A whole bunch, a whole lot

Thus, the distribution of adjectives in the singular of *bunch* and *lot* follows straightforwardly from the structure. The next question is why plural *lots* cannot

surface with an intensifying adjective. If we examine the structure, we see that when morphologically plural, *lots* moves from its position in \sqrt{P} to QP.

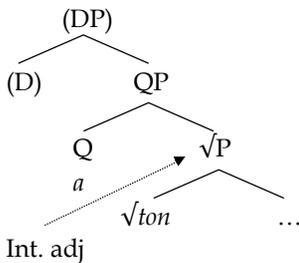
(230) Q-noun *lots*:



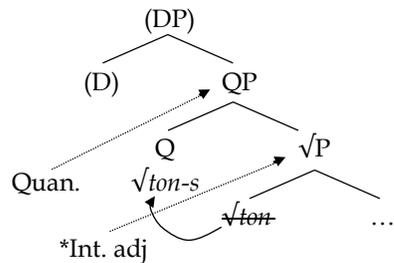
This places *lots* in a position above where an intensifying adjective would be inserted. As a result, no intensifying adjective can precede *lots* (since *lots* sits higher than the insertion site of intensifying adjectives).⁴⁶

The explanation for *ton* is basically the same. *Ton* showed intensifying adjectives in the singular, but not in the plural; instead, the plural was characterized by quantity adjectives. The analysis for the lack of intensifying adjectives in the plural is the same as for *lot*: *tons* moves to Q and hence, cannot be preceded by the intensifier. In contrast, in the singular, the intensifier can attach at the root level, and therefore, surface between *a* and *ton*. Quantifying adjectives are inserted at the level of QP, and hence, we expect them to precede *tons* in the plural. The structure and attachment sites of adjectives is depicted below:

(231) Q-noun *ton*:



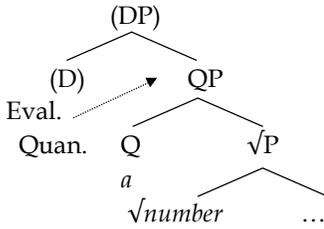
Q-noun *tons*:



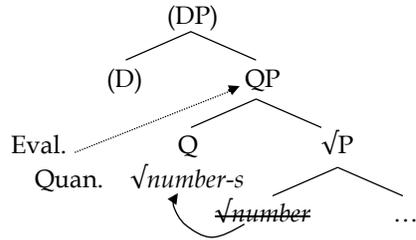
Finally, we turn to *number*. *Number* allowed evaluative and quantifying adjectives in both its singular and plural form. The structure for *number* is identical to *ton*, and thus, we expect the following:

⁴⁶ They do not follow *lots* either, e.g. **lots whole of people*. Possibly, the movement of the Q-noun takes it too far from where the adjective would be inserted, hence why it cannot surface after the Q-noun. This requires further research.

(232) Q-noun *number*:⁴⁷



Q-noun *numbers*:



There is one problematic aspect, namely, that the structure predicts an order of **growing a number* or **staggering a number* as opposed to *a growing number* and *a staggering number*. This suggests that the default cardinality article is capable of moving to the left of the adjective in (232). Lyons (1999), in his discussion of the default cardinality article, states that being a weak element, it must surface in an initial position in the phrase. This could serve as the motivation for such movement, which is presumably morphological rather than syntactic (given the lack of a syntactic position in an indefinite context, under the assumption that indefiniteness involves the absence of the D-layer).

Thus, drawing on adjective hierarchies and their position in the nominal domain, we can model the different behaviors of Q-nouns with respect to adjectives. This does not capture the fact that they occur with different types of adjectives (e.g. what determines which set of adjectives surfaces with which Q-nouns?). That question must be left for future research.

6.4.4.4 Lexical specifications

Q-nouns differ according to their specifications for plurality and definiteness, and this has consequences for how the syntactic structure is built. In the preceding sections, I illustrated how properties of the Q-nouns interact with the structure. In this section, I shortly outline what their lexical entries should look like. As discussed in 6.4.2, we can assume a basic set of quantificational features which these Q-nouns carry, in addition to the root. The feature sets are repeated below:

- (233) *Lot*: [√lot, Q, REL, MAX, RANGE]
- Ton*: [√ton, Q, REL, MAX, RANGE]
- Bunch*: [√bunch, Q, REL, MAX, RANGE]
- Number*: [√number, Q, REL, COUNT, POINT]

⁴⁷ While I have not depicted it here, when the D-layer is present, the Q-noun is capable of projecting #, and thereby triggering singular agreement. The same may hold for plural *numbers*, but given that the noun is also always plural, it is impossible to verify.

In addition, we have seen that *lot* and *bunch* are specified for indefiniteness, and *bunch* is specified as not occurring with plural morphology. Together, this gives us the following feature sets for each of the Q-nouns. Note that these feature sets do not capture restrictions on what adjectives they combine with, nor the special behavior of *number* with regard to adjectives licensing plurality on the Q-noun, or definite determiners licensing the projection of number. Such properties may not be related to the lexical specifications themselves, though this is in need of further research.⁴⁸

- (234) *Lot*: [$\sqrt{\text{lot}}$, Q, REL, MAX, RANGE, INDEF]
Ton: [$\sqrt{\text{ton}}$, Q, REL, MAX, RANGE]
Bunch: [$\sqrt{\text{bunch}}$, Q, REL, MAX, RANGE, INDEF, $\neg\#_{\text{pl}}$]
Number: [$\sqrt{\text{number}}$, Q, REL, COUNT, POINT]

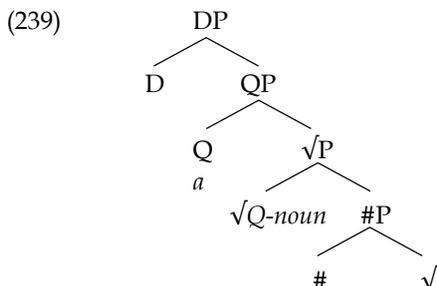
Notice that the system we have created also allows for nouns which lend themselves to a quantity interpretation to be used as quantifiers. In this chapter, we focused entirely on lexicon-based cases of semi-lexicity, which is semi-lexicity specified in the lexicon, via functional features on roots. However, in chapter 2, I also introduced the notion of use-based semi-lexicity, i.e. the idea that by using a particular root in a more functional context, it can acquire a functional flavor without necessarily being specified for functional features. This is presumably the first step in processes of grammaticalization. With regards to the Q-nouns, I introduced in section 6.4.2 a number of quantifying nouns which appear to be lexical. I repeat some examples below:

- (235) A wealth of examples
(236) A flood of memories
(237) A parade of witnesses
(238) A torrent of words

Notice, for instance, that as a noun *wealth* does not permit either an indefinite article (**a wealth*) or an *of*-complement (**wealth of money/houses*). Its morphosyntax is particular to the construction, where, when functioning as a Q-noun, both an indefinite and *of*-particle suddenly become possible. This is related to the *use* of this noun as a Q-noun (and its availability as a Q-noun presumably derives in some way from its lexical semantics, where it has a Q-ish meaning that allows it to be used in a Q-way, as compared to other nouns such as *honesty*, e.g. **an honesty*

⁴⁸ Notice also that Q-nouns do not project #Ps, which could potentially be the result of a deficiency specified in the Q-noun's lexical entry. However, the absence of a #P seems to be a property of the construction rather than the Q-noun, given that none of the Q-nouns project #. The deficiency appears to be systematic which would argue against treating it as a feature in the lexical specification. Why the construction would be characterized by numberlessness remains open, and I leave this for future work.

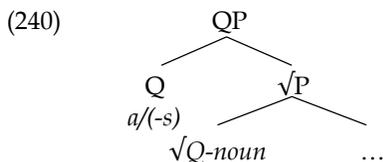
of examples). The structure for pseudopartitives allows for these roots to be inserted underneath the QP in the quantity domain, as illustrated below:



Such Q-nouns cannot lexicality QP, hence the indefinite article which surfaces. This shows that the position is not limited to Q-nouns specified for a Q-feature, but also allows other roots. The position of the root triggers an interpretation of the root as a quantifying element. This gives us use-based semi-lexicality.

6.4.5 Verbal agreement

In this section, I briefly discuss the Agreement patterns introduced in section 6.3.1. It was shown that for processes sensitive to number, such as Agreement, reciprocals, reflexives, and pronouns, the Q-noun is inert, with those processes targeting the N2 instead. This follows from the analysis presented so far. Q-nouns surface as a bare root under the QP projection. I provide the structure again below.



The Q-noun does not project a #P (despite expressing what looks like number, e.g. *a lot* vs. *lots*). Because there is no #P, the Q-noun cannot serve as an intervener for Agreement or number sensitive processes. Instead, the N2, which can carry number, is predicted to be the target of Agreement.

6.4.6 The distribution of the particle *of*

The position of the particle *of* has been a major issue in the study of English pseudopartitives, and an issue which I have so far ignored. As discussed in section 6.4.1, solutions include placing it in an otherwise useless FP (Stickney 2009) or relating it to the realization of a semantic function, like predication (Corver 1998,

2003) or monotonicity (Schwarzschild 2006). I propose an alternative view of *of*, in which the particle is not a piece of structure in the pseudopartitive, but rather, a marker of nominality (see also Corver 2015, Kayne 1997).

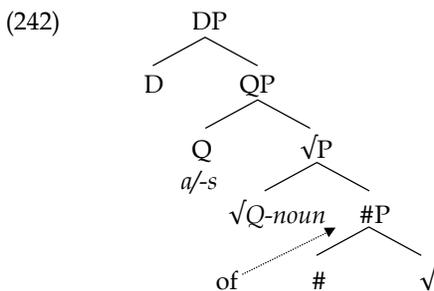
I repeat the table from section 6.2, which illustrated morphosyntactic differences between elements with an identical quantifying function.

(241) Morphological expression of the quantifying function:

A	B	C	D
a	lot / ton / bunch / number	of	books
a	few / hundred / dozen		books
	many / some / three		books

English numerals, quantifiers, and Q-nouns share the function of quantifying; each is situated in the quantity domain and functions to quantify over some N2. They behave together semantically, but differ morphosyntactically. In particular, some quantifying elements need an indefinite whereas others require the particle *of*. I have analyzed the indefinite of pseudopartitives as the result of an empty QP, which requires lexicalization; when empty, a default cardinality marker *a(n)* is inserted. Whether or not this also suffices as a solution for *a few*, *a hundred*, and *a dozen* remains to be seen. The analysis treats the indefinite more or less as a morphological phenomenon (see section 6.4.3), a desired result, given that the indefinite does not contribute to the interpretation. The hypothesis we explore in this section is that the particle *of* similarly represents a morphological phenomenon. If this can be achieved, it allows for a uniform treatment of English quantificational elements, allowing for their idiosyncratic morphosyntax.

Let us start by studying the distribution of *of*. In pseudopartitives, *of* appears to divide the DP at the classification domain. It surfaces between the Q-noun, which constitutes the quantity domain, and the N2, whose structure under *of* extends maximally up to #P of the classification domain. The particle *of* marks the boundary between them. I repeat the basic pseudopartitive structure below.



In pseudopartitives, the N2 can be either count or mass, in which case, the classification domain consists of a #P (count) or nothing at all (mass), under the

assumption that mass nouns lack a #P, e.g. Borer 2005. Thus, based on pseudopartitives, we can say that *of* combines with roots and #Ps. We also know from its behavior as a “preposition” that it combines with full DPs (e.g. *an author of* [_{DP} *two books*]). Together, this shows that the particle *of* combines with things that count as nominal, regardless of the amount of structure, e.g. a root, #P, or full DP. Note that with regards to indefinite mass nouns, our syntax would predict them to be bare roots (e.g. *mass* implies no #P and *indefinite* implies no DP, leaving only the root). However, this seems wrong, especially under the assumption that a root acquires its category as a matter of syntactic context. A bare root without functional structure could be anything, and hence, is not nominal. This suggests that even indefinite mass nouns have some functional structure that makes them nominal, and presumably, this can be modeled by complexifying the nominal domain at the lower levels, e.g. in the classification domain. We return to this shortly.

A second point to note on the distribution of particle *of* is that it never surfaces on the first nominal in a sequence of nominals. For example, when there are two DPs (*an author of a book*), the *of* necessarily surfaces on the second nominal and never the first (**of an author a book*). Together, these observations show that *of* surfaces on nominal things, and in a series of nominals, lower nominals surface with *of*. Notice that this distribution is identical to the distribution of Polish genitive case marking. Genitive case surfaced between DPs, but also within DPs (in numerals constructions); genitive case was conditioned by the presence of at least two phi-bundles within a single domain, similarly to how *of* is conditioned by two nominals. Furthermore, genitive case only targeted the second phi-bundle, much like *of* targets the second nominal. Drawing on this comparison, I propose that the distribution of English *of* is constrained in a very similar way. More specifically, when there are two nominals in a particular locality domain, the lower nominal is marked by *of*.

The next question is what counts as a nominal for *of*? As an initial hypothesis, we might suppose that like Polish, the presence of phi-bundles makes something nominal, and hence, *of* also functions on phi-bundles. In English, the only nominal phi-feature is #, and hence, it predicts *of* to be sensitive to #. This is partially true. As a hypothesis, it works well for numeral 100, which, when pluralized, requires *of*:

- (243) A hundred books
- (244) Hundreds of books

However, it does not work so well for Q-nouns, which were explicitly argued to lack canonical number, and hence a #P. Q-nouns have no #P and assigning them one incorrectly predicts them to be the target of agreement. Instead, I propose that what *of* is sensitive to is the presence of a classification domain. If there are two classification domains in a particular locality domain, the nominal associated with

the lower classification domain is marked by *of*. Notice that this formalization still captures the similarity with Polish – phi-bundles are a product of the classification domain, and hence, an operation which functions on phi-bundles indirectly functions on classification domains.^{49,50}

By this hypothesis, the presence of *of* predicts a classification domain. This immediately implies that Q-nouns have a classification domain, whereas (non-plural) numerals and other quantifiers do not. The implication seems intuitively correct, given that Q-nouns “feel” more nominal than numerals and other quantifiers. This suggests that we are in need of a complexification of the classification domain of English, as already indicated above for mass nouns. That complexification presumably includes pieces of structure which are present on Q-nouns, but not numerals or quantifiers. I do not attempt the complexification here, but note Gebhardt (2009)’s Cl(assifier)P, Cheng and Sybesma (1999)’s Cl(assifier)P, and Hachem (2015)’s Coll(ection)P, Ind(ividuation)P, and MassP as potential candidates.⁵¹

The system provides an interesting insight into grammaticalization processes in English. We have a three-way distinction between quantificational elements such that Q-nouns surface with an indefinite and *of*, some quantifiers and numerals with just an indefinite, and other quantifiers and numerals nothing at all. If this represents a grammaticalization cline, then the particle *of* seems to be most susceptible to grammaticalization, followed by the indefinite. This follows from the analysis presented here. The particle *of* is triggered by the presence of a classification domain; if the classification domain is what creates nominality, then grammaticalization might be expected to target the classification domain early on, leading to the disappearance of *of* (and in this regard the variation between *a couple X* and *a couple of X* is interesting). The indefinite article is triggered by the inability of a quantificational element to lexicalize the QP. The indefinite suggests a level of functionalization that has yet to occur. In the English quantificational system, numerals seem to lack a classification domain and show the ability to

⁴⁹ The source of this general idea is Susi Wurmbrand (p.c.). Wurmbrand points out that the infinitival element *to* in English seems capable of surfacing with verbs of different sizes, depending on the level of restructuring. There is no obvious position to host infinitival *to* across restructuring contexts, and instead, Wurmbrand suggests it is marker of verb-hood. The comparison with the nominal domain suggests a similar analysis for English *of*, treating it as a marker of nominality. The formalization in the text allows this intuition to be related to the structure, in particular, the classification domain, which can be considered the most important set of projections for establishing nominality. Particle *of* is sensitive to this.

⁵⁰ Dutch is a language in which the pseudopartitive does not involve a particle marking the second nominal, and instead, uses juxtaposition. It can be hypothesized that Dutch lacks a similar mechanism of distinguishing classification domains via a particle. This hypothesis predicts that where English *of* applies to non-DPs (e.g. is not a preposition), Dutch should use juxtaposition, a hypothesis which seems to be correct (see Vos 1999).

⁵¹ Such complexification may also give us a better handle on the distribution of apparent plural marking, if –s on Q-nouns is related to the classification domain.

lexicalize QP; Q-nouns on the other hand do not.

6.5 Conclusions

In this chapter, we studied the distribution of four pseudopartitive Q-nouns: *lot*, *ton*, *bunch*, and *number*. The discussion showed that each Q-noun has idiosyncratic properties which require an individual treatment. This argues in favor of the semi-lexicality hypothesis, namely that while these Q-nouns share with numerals and quantifiers the function of quantifying, they differ in their morphosyntactic requirements, such that both the definite cardinal article and the particle *of* surface with Q-nouns. The indefinite was related specifically to the absence of material in the QP layer and the particle *of* to the existence of a classification domain on both the Q-noun and the N2. The syntax of English Q-nouns was not very different from the syntax of Polish numerals, and thus, this shows that quantification can be syntactically very similar, despite showing Q-noun driven differences.

In this chapter, we have seen semi-lexicality in terms of deficiency (the inability of Q-nouns to host true #) and contextual restrictions (the inability of certain Q-nouns to surface in definite environments). Similar types of semi-lexicality were also found with the Polish numerals in chapters 4 and 5. Both Polish and English have the same types of semi-lexicality (deficiency, contextual restrictions), but the surface effects of that semi-lexicality are different. Semi-lexicality effects surfaced in terms of the patterns of Agreement, where Q-nouns were invisible to Agree (deficient for number); this contrasted with Polish, where the numerals still interacted with Agreement, triggering default agreement. Semi-lexicality also surfaced in the form of the particle *of*, which showed a strong similarity in distribution to Polish genitive case. Finally, we saw semi-lexicality in the form of the indefinite article. Nothing similar occurred in Polish, but this may relate to the lack of overt indefinite/definite articles. Despite the surface differences in how semi-lexicality is manifested, the underlying source of semi-lexicality was found to be the same: both Polish and English are characterized by deficient and contextually restricted semi-lexical heads.

There are a number of open issues which have not been addressed in this chapter. An interesting, but unexplored avenue includes the relation between collections and quantities. Both *lot* and *bunch* had homophonous collection readings, which in certain cases, were almost indistinguishable from the Q-noun readings. Traugott (2008) shows that Q-noun *lot* can be traced historically to a collection reading. This suggests a certain role of collections in the development of new quantifiers. Finally, our Q-nouns showed a relation with indefiniteness, such that the more grammaticalized Q-nouns (supposing *lot* is the most grammaticalized) were incompatible with definiteness. How this relates to quantification, and whether the relation is significant, remains open.

Chapter 7

Kinds & the expression of number

7.1 Introduction

The final topic of this dissertation moves away from semi-lexicity in the quantification domain, and instead turns to a very different type of semi-lexicity: the realization of kind-reference as mediated by the items *kind*, *type*, and *sort*. The ontology of nominal reference has been divided into kind-referring and object-referring expressions (e.g. the kind vs. instances of the kind, Carlson 1977, Krifka et al. 1995, Chierchia 1998, Dayal 2004, Mueller-Reichau 2011). The use of a kind-word (*kind*, *type*, *sort*) in combination with some nominal (N2) has the effect of creating kind-reference to a subkind of the N2 (Zamparelli 1998). The existence of expressions with this function argues for the ability of language to create kind-reference using syntactic structure, and this suggests that like the function of quantification we studied in the previous chapters, languages also dedicate (functional) syntactic structure to the relation between kind- and object-reference. Taking this as a starting point, I investigate the morphosyntax of kind-words in English. Morphosyntactically, English kind-words are peculiar in that they seem to show the same number morphology as the N2 (with certain exceptions that we address in this chapter) (Carlson 1977, Lehrer 1986, Zamparelli 1998, 2000), despite otherwise having what looks like a nominal syntax. We explore the use of English kind-words from the perspective of semi-lexicity, testing the hypothesis that they are roots with functional features. This chapter offers a new window into semi-lexicity, exploring how it might be instantiated with a different type of function, namely the creation of kind-reference.

The chapter proceeds in three main steps, which involve discussions on the nature of kind-reference, the morphosyntactic properties of the English kind-construction, and the analysis. The basic problem, which I introduce in section 7.2, is that the English kind-construction shows a number matching effect between a kind-word and its N2. This is the morphosyntactic puzzle this chapter faces: what about the kind-words leads them to mirror the number properties of the N2? In addition to this, kind-words have a particular semantic function, and we begin in

section 7.3 with a discussion of what exactly that function is and what consequences it has for our study of semi-lexicity. This necessitates a (brief) discussion of the semantic literature, in particular, the different constructions which allow reference to the kind-domain. The kind-construction is one such construction, and it does this in a *syntactic* way, via the kind-word. The discussion leads me to hypothesize that there is a series of projections in the structure associated with the kind-word. The kind-word is a root, and has a feature [kind], similar in nature to the [Q] feature identified in chapters 5 and 6 (sections 5.2.1 and 6.4.2). The features [Q] and [kind] say something about the function of the semi-lexical word (quantification or kind-reference), and contribute to their semi-lexicity. The root with its series of functional projections instantiates this function.

Starting from this basic hypothesis on kind-words, I turn to their morphosyntactic behavior in section 7.4. Kind-words follow the kind-generalization: if they and the N2 carry number, that number must match. We test this in the case of mass nouns, singular and plural count nouns, indefinite singular nouns, and *pluralia tantum* nouns. These cases differ in the amount of structure associated with the N2 under the kind-word, with consequences for how number interacts between the kind-word and the N2. If the kind-word is inserted before a count noun projects #P (the locus of number), a #-sharing effect emerges. If the kind-word is inserted above #P, no #-sharing effect emerges. Inserting a kind-word interrupts the projection of structure by the N2, and hence, the size of N2 is limited, not exceeding the classification domain. The set of semi-lexical effects is composite: kind-words have a semantic effect (kind-reference) and they vary in where they project in the DP, with consequences for the morphosyntax of the N2.

7.2 The basic problem

Lehrer (1986: 122) and Carlson (1977: 211) report what looks like a phenomenon of agreement between kind-words (restricting our attention to *kind*, *type*, and *sort*) and the N2 they combine with in English (see also Zamparelli 1998). If the kind-word is singular, the N2 is singular and if the kind-word is plural, the N2 is plural:

- (1) This kind of rabbit, this type of car, this sort of rug
- (2) These kinds of rabbits, these types of cars, these sorts of rugs
- (3) *This kind of rabbits, this type of cars, this sort of rugs
- (4) *These kinds of rabbit, these types of car, these sorts of rug

We can summarize this basic pattern with the following generalization:

- (5) **Kind-word generalization:** The number marking present on the kind-word (*kind*, *type*, or *sort*) and the N2 must be identical.

We discuss the source of the issue with mismatches of this type in section 7.4.4.2 for the words *kind*, *type*, and *sort*.

The ungrammaticality of the examples in (3), repeated below, makes for a puzzle in English. A canonical noun (and here we can assume *family*, *class*, and *genre* to be comparable, more canonical nominals) does not need to have number features which are identical to the N2 for grammaticality.

- (10) *This kind of rabbits, this type of cars, this sort of rugs
 (11) This family of otters, this class of drugs, this genre of films

This is the first clue that the kind-words *kind*, *type*, and *sort* may involve a form of semi-lexicity. As discussed in chapter 2, section 2.3, the semi-lexicity hypothesis proposes semi-lexicity to be the result of a root being lexically specified for some syntactic feature(s). The effect of this can be idiosyncratic syntactic patterns (if we are dealing with non-canonical structures, cf. section 2.4). English kind-words show their own idiosyncrasies, as expressed in the kind-word generalization, and thus, we start from the semi-lexicity hypothesis for *kind*, *type*, and *sort*. We explore to what extent semi-lexicity can help us understand the nature of this phenomenon.

Before beginning the discussion, a number of comments are in order. From this point forward, I use the term ‘kind-words’ to refer specifically to the words *kind*, *type*, and *sort*. Other elements like *family*, *class*, or *genre* are excluded. Secondly, in exploring the extent of the kind-generalization, in particular what exceptions exist and how those exceptions should be dealt with, I make use of the Corpus of Contemporary American English (COCA) (Davies 2008-) in addition to relying on judgments, examples from the literature, and examples from the Internet. The use of the COCA will be more extensive in section 7.4, where I conduct a systematic investigation of the number morphology of kind-words in relation to the N2. As in chapter 6, COCA examples are marked in the following way: (COCA: Source Year_of_source). Note that while this section has introduced the basic domain of inquiry (kind-words), it has not addressed other uses of the kind-words which are not considered here, namely its use as a qualifier and an adverbial. In the next section, I briefly introduce these uses of kind-words.

7.2.1 *Types of kind-words*

Keizer (2007) conducted a corpus study in the British National Corpus on the syntactic manifestations of kind-words. She refers to it as the SKT-construction (*sort/kind/type*-construction), and identifies three subclasses of SKT-constructions: the referential construction, the qualifying construction, and “constructions of the third kind” (Keizer 2007: 154). The referential construction involves reference to the kind specified by the N2. Examples include:

- (12) The sort of information needed may seem obvious at first sight.
 (13) It's a made with a similar sort of apparatus to uh the apparatus that firemen use to find uh bodies trapped in rubble.
 (Keizer 2007: 153, ex. 2a&b)

This is the construction we are interested in in this chapter, i.e. the use of kind-words to refer to kinds.

The second construction Keizer identifies is the qualifying construction. The interpretation of the qualifying construction is one in which the nominal refers to something which is similar to the N2, but cannot quite be classified as an example of N2. She refers to such uses as downtoners; Simone and Masini (2014) term it an "approximator" use. Examples include:

- (14) I suppose it's **a sort of holiday**. (Keizer 2007: 169, ex. 44a)
 (15) But the idea is that uhm, it's a magazine that's going to be **a kind of forum** for a lot of the things that are happening.
 (Keizer 2007: 165, ex. 29c)
 (16) Our date seems to have reached **a kind of conclusion**.
 [= 'not properly a conclusion but something similar']
 Simone and Masini (2014: 57, ex. 11a)

Only *kind* and *sort* can function in this way – constructions with the kind-word *type* are necessarily related to kind-reference. Keizer also relates this use of *kind* and *sort* to their function as hedges, as in the example below. She reports these as often involving hesitation or repetition of the hedge.

- (17) Oh **it's sort of a kind of a a sort of a** a negative kind of a word in a way like... (Keizer 2007: 164, ex. 26a)

Kind and *sort* both have an adverbial use, which Keizer suggests may be related to their use as a downtoner in the preceding contexts:

- (18) She's **sort of** broad in the chest and she's **sort of** stocky
 (19) ...and then they **kind of** snap back shut again
 (Keizer 2007: 163, ex. 25a&c)

Notice that despite the absence of an N2 in the adverbial use, the particle *of* still co-occurs with the kind-word. I have not studied the qualifying construction nor adverbial uses of kind-words in any detail, and hence, do not consider them in the remainder of this chapter.

The final construction Keizer (2007: 154) identifies are "constructions of the third kind." These fall under the class of referential constructions identified above, but they show a very different morphosyntax, hence Keizer's decision to treat them separately. One characteristic property is that they do not trigger singular

morphology on demonstratives despite appearing to be singular.

- (20) I mean I don't associate you with uh you know one of **these sort of skills like like driving**.
- (21) And then we can also use the same feedback to help them to produce **those kind of pitch changes** in their speech.
- (22) Sometimes in **these type of races** he's got a withering kick, but I don't know whether he's going to get up and move up with these boys.
(Keizer 2007: 170, ex. 45a&b&c)

I treat this use of kind-words with the referential use of kind-words (i.e. like the referential kind-words, these reference the kind specified by the N2), but I assign them a different morphosyntax, given their different morphosyntactic status. We address this use of kind-words in section 7.4.5.

7.3 Locating kinds and kind-words

This chapter is a study of the semi-lexicality of the kind-words *kind*, *type*, and *sort*. In order to gauge in what way these are semi-lexical, it is important to understand what their contribution to the interpretation is, where in the structure they are located, and what their morphosyntactic properties are. In this section, I provide the base for accomplishing this. We start by focusing on the notion of kinds as defined in the literature, in particular the meaning of a kind (section 7.3.1), and where in the structure kind-reference can be generated (section 7.3.2). The semantic literature on kinds is rich, but the syntax of kind representation is a relatively undeveloped domain, and hence, the discussion of kind-syntax is rather speculative. I also propose an initial hypothesis on the lexical specifications of kind-words, and where in the structure in relation to the N2 they are generated (section 7.3.3). This gives us an initial hypothesis on their semi-lexicality, which is further developed in the following sections.

7.3.1 *The meaning of a kind*

The notion of a kind goes back to Carlson (1977) and his work on bare plurals. He argues that bare plurals (e.g. determiner-less and quantifier-less plural nouns such as *dogs*, *cars*, *books*, etc.) denote kinds, where a kind is roughly “the name of a kind of thing” (Carlson 1977: 61). More recent descriptions include:

- (23) “Kinds can be defined as abstract objects which are representative of a group of individuals with similar characteristics.” (Aguilar-Guevera 2014: 37)

- (24) "...roughly, they correspond to 'regularities occurring in the world.' They can be 'natural' (e.g. rocks, plants, animals, etc.), 'artificial' (e.g. bottles, houses, lipsticks, etc.), or expressed by modified nominals (thus corresponding to some sort of complex object like *three-headed dogs*)." (Castella 2014: 25)

Intuitively, kinds are a way of referring to the class of elements a noun represents, without referencing any particular instances of that noun. A kind-word is not necessary to create a kind-interpretation, as shown in the following examples. The bolded part refers to potatoes as a kind, i.e. the species *Solanum tuberosum*.

- (25) a. **The potato** was first cultivated in South America.
 b. **Potatoes** were introduced into Ireland by the end of the 17th century.
 c. The Irish economy became dependent upon **the potato**.
 (Krifka et al. 1995: 2, ex. 1a-c)

Kind-denoting uses of nouns contrast with object-denoting uses of nouns. The examples below refer to instances of potatoes:

- (26) a. **Potatoes** rolled out of the bag.
 b. **The potato** I bought yesterday is sitting on the table.
 c. Can you please put **the potatoes** in the fridge?

Nouns can be either kind-denoting or object-denoting, as has been illustrated above with the noun *potatoes*. Kind-referring nouns refer to the kind, and object-referring nouns refer to an instance of a kind.

Any common noun can in principle function as a kind. Morpho-syntactically, kind reference shows up in a number of contexts, making it difficult to pinpoint a particular syntactic configuration which could be responsible for kind-reference. Definite singulars, bare plurals, mass nouns, indefinite singular nouns, and definite plurals can all denote kinds in English (see Gerstner-Link and Krifka 1993, Krifka et al. 1995, also Carlson 1977, Dayal 2004). Gerstner-Link and Krifka (1993) provide the following paradigm of English kind-denoting noun phrases, but remark that definite plurals are marginal and decline to comment further on them.

- (27) a. **The lion** is a ferocious beast. *Definite singular*
 b. **A lion** is a ferocious beast. *Indefinite singular*
 c. **The lions** are ferocious beasts. *Definite plural*
 d. **Lions** are ferocious beasts. *Indefinite plural (bare plural)*
 e. **Gold** is precious. *Mass*

(Gerstner-Link and Krifka 1993: 966, ex. 1)

Kind-reference is divided into two main types: kind-reference at the level of the noun phrase (kind-referring NPs) and kind-reference at the level of the sentence (characterizing sentences) (Krifka et al. 1995). Examples of kind-referring NPs include bare plurals (27)d, mass nouns (27)e, and singular definites (27)a. As the name 'kind-referring NP' implies, kind-reference is generated by the nominal itself. This type of kind-reference will be relevant in the next section, where we explore which functional projections could contribute to a nominal being kind-referring or object-referring. The second type of kind-reference is found in characterizing sentences, which trigger kind-reference at the sentence level. Singular indefinites (27)b are taken to be only object-referring, unless embedded in a characterizing sentence (Krifka et al. 1995); the characterizing sentence gives a kind-flavor to a nominal which can otherwise only be object-referring:³

- (28) **A potato** rolled out of the bag. *Object-referring*
 (29) **A lion** has a bushy tail. *Kind-referring, characterizing sentence*
 (Krifka et al. 1995: 9, ex. 20a)

The standard analysis of characterizing sentences (taking Krifka et al. 1995 as representative of the standard analysis) assumes a semantic genericity operator GEN, which creates kind-reference at the sentence level.⁴

The kind-construction, involving the kind-words *kind*, *type*, and *sort*, seems to involve creating reference to a kind syntactically, through the overt expression of a kind-word.

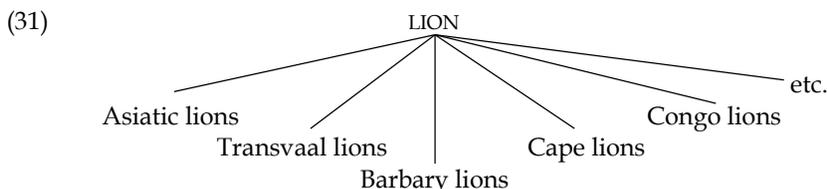
- (30) **That kind / type / sort of lion** is a ferocious beast.

The use of a kind-word furthermore creates reference to a subkind with respect to a taxonomy of kinds (Zamparelli 1998). This makes the kind-construction different from other types of kind-denoting nouns. The examples in (27), for instance, make reference to the kind denoted by the noun *lion*, and therefore, refer to any and all instances of creatures we would consider to be lions (*Panthera leo*); they do not generate reference to the larger hierarchy lions belong to (e.g. lions as mammals or cats, creatures with four legs, etc.). By contrast, the kind-construction specifically deals with a subkind of the kind lion. Thus, the expression could refer to any type of creature which we might subsume under the class of lions, e.g.

³ To quote Krifka et al. (1995: 14) here: "We have seen that indefinite singular NPs cannot simply be considered as kind-referring or 'generic' in and of themselves (in contrast to some earlier analyses). The reason is that they get an apparent 'generic' interpretation only when occurring in a characterizing sentence (if we exclude the taxonomic interpretation). The locus of genericity is not in the indefinite singular NP, but rather in the sentence itself; and therefore this type of genericity is outside the nominal system." As far as I can tell, this remains the dominant view, which I follow.

⁴ I have not encountered syntactic accounts of the genericity operator, and thus, it is difficult to say what this would look like from a syntactic perspective, if syntax is even involved.

Asiatic lions, Transvaal lions, Barbary lions, etc. The kind-space can involve the kind lion divided according to species, as below, but it is also possible to divide the kind-space according to any characteristic of the N2 (e.g. by tooth-length, personality, speed, etc. – some divisions are easier to conceptualize than others).



Kind-words trigger a hierarchy of kinds and pick out a sub-kind of the kind denoted by N2 (Carlson 1977: 211-212; Zamparelli 1998). The three kind-words share this function.

7.3.2 *The position of a kind*

In the previous section, we identified three types of kind-referring NPs, definite singulars (32), bare plurals (33), and mass nouns (34); kind-reference is taken to be generated by the NP itself (Krifka et al. 1995).

- (32) The lion is ferocious. *Kind-referring NPs*
 (33) Lions are ferocious.
 (34) Gold is precious.

What we explore in this section is whether there is a syntactic correlate to kind-reference, such that there is some piece(s) of structure responsible for attributing kind and/or object reference to a DP. The syntax of kind-reference has not received very much attention in the syntactic literature, and as such, this section can be considered both preliminary and speculative. However, it builds a basis from which to investigate the structural contribution of kind-words.⁵

De Belder (2008, 2011) observes a difference between plural-marked mass nouns with and without a diminutive suffix in Dutch. The use of an indefinite article or plural morphology with a mass noun requires kind-reference:

- (35) Ik proefde chocolade.
 I tasted chocolate
 'I tasted chocolate'

⁵ The literature on the semantic contribution of kinds and how it interacts with the status of a noun as mass, count, definite, etc. is vast and beyond the scope of this chapter. For discussion see e.g. Gerstner-Link and Krifka 1993, Krifka et al. 1995, Chierchia 1998, Krifka 2004, Dayal 2004, Longobardi 2005, Borik and Espinal 2012, among many others.

- (36) Ik proefde een chocolade.
 I tasted a chocolate
 'I tasted a certain kind of chocolate.'
 # 'I tasted a piece of chocolate.'
- (37) Ik proefde chocolade-s.
 I tasted chocolate-PL
 'I tasted different kinds of chocolate.'
 # 'I tasted pieces of chocolate' (de Belder 2008: 117-8, ex. 15-17)

In contrast, if a diminutive marker is included, the nominal has an object-reading. De Belder (2008, 2011) terms this the unit reading.

- (38) Ik proefde een chocola-tje.
 I tasted a chocolate-DIM
 'I tasted a piece of chocolate.'
 # 'I tasted a certain kind of chocolate.'
- (39) Ik proefde chocola-tje-s.
 I tasted chocolate-DIM-PL
 'I tasted pieces of chocolate.'
 # 'I tasted different kinds of chocolate.'
- (De Belder 2008: 118, ex. 18-19)

In other words, the addition of a diminutive suffix has the effect of converting the nominal from a kind-reading to a unit-reading.⁶ In English, similar nominals are ambiguous, allowing both a kind and a unit reading:

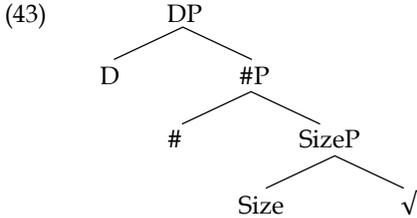
- (40) I tasted chocolate.
- (41) I tasted a chocolate.
 KIND: 'I tasted a certain kind of chocolate.'
 UNIT: 'I tasted a piece of chocolate.'
- (42) I tasted the chocolates.
 KIND: 'I tasted the different kinds of chocolates.'
 UNIT: 'I tasted the pieces of chocolate.' (De Belder 2008: 117, ex. 12-14)⁷

De Belder (2008, 2011) builds on the work of Borer (2005) and argues for the role of syntactic structure in determining the interpretation of a root. She follows Borer (2005) in the assumption that the inclusion of a #P (the locus of number) converts a root from a mass denotation to a count denotation. De Belder proposes that the diminutive also has an interpretational and structural contribution to a

⁶ Note, de Belder (2011) reports that Dutch count nouns behave ambiguously like the English examples in (41)-(42), rather than the Dutch mass noun examples in (36)-(39).

⁷ David Pesetsky (p.c.) points out that some of the ambiguity in English may arise from an ambiguity in the verb *taste*, e.g. tasting as in "eat a little bit" or "try a diverse sampling." The ambiguity is less clear with other verbs, e.g. *I bought the chocolates, I ate a chocolate*.

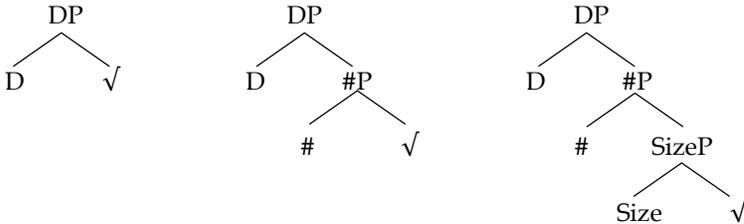
Dutch nominal. In particular, it converts a nominal from a kind-reading to a unit-reading. She operationalizes this with a feature [size] which is instantiated in a SizeP under #P.



(de Belder 2011: 94, ex. 47)⁸

De Belder (2011) hypothesizes that Size has the effect of adding boundedness to a nominal, such that it has a particular size and shape in space. In other words, it converts the nominal into a unit. She notes the similarities between mass-readings and kind-readings with regards to boundedness (both lack boundaries in time and space) and proposes that they share the property of being unbound, and hence, lack a SizeP. In effect, the SizeP of de Belder (2011) categorizes a noun as a countable unit, and can be seen as attributing count semantics to the noun. This is the same function Gebhardt (2009) attributes to his Cl(assifier)P and Hachem (2015) to her Ind(ividuation)P – there is some projection which converts a root into a count noun for further computation. In de Belder’s system, a mass noun is a bare root (unbound, uncountable), a noun with a kind-reading carries #, but not Size (unbound, but countable), and a noun with a unit-reading carries both Size and # (bound and countable). The root must move to Size and # to combine with the Size and # suffixes. A structure with only Size is proposed to be impossible, given a requirement that count denotations be divided (#P).⁹

(44) Mass noun (= (35)) Kind-count (= (37)) Unit-count (= (39))



⁸ I have adapted the labels in the tree to the projections used in this dissertation. De Belder names #P NumP and assumes an empty set where the root is placed.

⁹ “Divider” is a specific term borrowed from Borer (2005). Borer assumes that the role of plurality is to divide the reference of the nominal. In de Belder’s system, being bound (= SizeP) further requires division (= #P).

Presumably, the ambiguity of (41)-(42) in English relates to the fact that SizeP lacks a morphological correlate, and hence, the form of the nominal is compatible with both structures.

De Belder's analysis identifies a particular syntactic projection which is responsible for converting the nominal from a kind-reading to a unit-reading. In this system, the kind-reading is taken to be the basic interpretation, with the unit-reading being derived. The approach suggests that the denotation of a root falls within the kind-domain. Note that the approach does not necessarily imply that SizeP functions to create object-reference. Rather, it adds boundedness to the interpretation of the nominal, and it seems that this boundedness makes it possible for the nominal to be object-referring. Actual object-reference is presumably accomplished compositionally, through multiple functional projections. The approach does imply, however, that object-reference for mass nouns is dependent on the nominal having a bounded interpretation.

De Belder's approach can be related to a class of approaches in the semantic literature which seem to take nominals to be inherently kind-referring and only come to denote objects via the mediation of some particular piece of syntactic structure. Déprez (2005), for example, identifies #P as the locus of Carlson's (1977) Realization Relation. The Realization Relation relates a kind to an instance (or 'realization') of that kind, and thus, the function of #P seems to be to take a kind and map it to an instance of the kind (an object). Le Bruyn (2010) similarly places the Realization Relation in #P, but in addition, he assumes the indefinite article, which is generated in #P, to be an instantiation of the Realization Relation. This captures the fact that referring indefinite singulars are object-referring (see section 7.3.1). Borik and Espinal (2012) also attribute #P the function of converting a noun from kind-referring to object-referring. Note that while these authors take #P to be the relevant projection, it's not fully clear why this should be, and furthermore, it would not be capable of modeling de Belder's data, as both the unit reading and the kind reading involve a plural #P. Attributing kind-reference to the nominal domain below #P is also compatible with the observations that adjectives closest to the root tend to be kind-level, as is illustrated below, *Victorian* being kind-level (Hetzron 1978, Sproat and Shih 1991, Cinque 2010, Beauseroy and Knittel 2012, Schulpen 2016).

- (45) A red-hot Victorian marble fireplace
 (46) *A Victorian red-hot marble fireplace (Scott 2002: 102, ex. 18b)

What these various approaches seem to imply is that the lower part of the nominal, closest to the root is kind-referring, and it is with the introduction of additional functional structure that the nominal comes to be object-referring.¹⁰

The discussion suggests that nominals begin as kind-referring and come to

¹⁰ The approach of Longobardi (2005) also argues in this direction, but he takes object-reference to be (in part) a derivational notion, achieved by N-to-D movement.

refer to objects via the addition of certain functional projections, e.g. SizeP or #P. Object-reference is then compositional and kind-reference is a default. However, we also know that kind-words can be inserted in a structure to create reference to the subkind denoted by the N2. Furthermore, this is also possible with nominals overtly marked for plurality, which project a #P in their structure (see discussion in chapter 2, section 2.3):

- (47) One kind of lion
 (48) Two kinds of lions

If #P is responsible for facilitating object-reference on a nominal, as proposed by Déprez (2005), Le Bruyn (2010), and Borik and Espinal (2012), then the expression of plurality on the noun in (48) would predict *lions* to be object-referring. However, the expression *two kinds of lions* is, in fact, kind-referring. This implies that the object-reference of *lions* has been converted into kind-reference via the kind-word. In other words, the nominal goes from kind-referring (root) to object-referring (SizeP/#P), and back to kind-referring again (kind-word). Thus, there is some projection hosting the kind-word which is capable of facilitating kind-reference on a presumably object-referring nominal. Together, this implies that kind-reference can surface at multiple levels in the DP, both under the #P/SizeP and above it. While this may seem redundant, it is not. It simply means that there is more than one way for the denotation of a nominal to access the kind-domain (a claim I expect is not very controversial given that characterizing sentences also allow access to the kind-domain, but external to the DP, cf. (29) in 7.3.1).¹¹

Zamparelli (1998, 2000) proposes a projection KIP (Kind Phrase), which mediates between kind- and object-reference. Such a projection seems to be what is needed for kind-words (and Zamparelli makes use of his KIP in analyzing English and Italian kind-words). The introduction of a KindP produces a layered approach to kind-reference where a root enters the derivation with its denotation in the kind-domain (which may relate directly or indirectly to the concept instantiated by the root, see Acquaviva 2009, Mueller-Reichau 2011) and is converted to object-reference via the mediation of syntactic structure; it can be related again to the kind-domain when a KindP is introduced.

We can find evidence for this layered approach by embedding Dutch nominals with a unit-reading or kind-reading under a kind-word. In Dutch, the kind-word *soort* also creates reference to a subkind of the N2. It co-occurs most naturally with a mass noun as mass, but the speakers I consulted also accept the

¹¹ This further relates to the observation that the nature of the kind-reference differs between kind-referring expressions. For example, definite singulars (*the lion*) are taken to name the kind, whereas bare plurals (*lions*) are taken to aggregate over the members of the kind. Borik and Espinal (2012) hypothesize that the definite singular (*the lion*) lacks a #P, which is in contrast to bare plurals (*lions*) which necessitate one given their plurality. The structural difference may relate to the differences in how these phrases refer to kinds.

unit-reading of the mass noun under a kind-word (n=6).

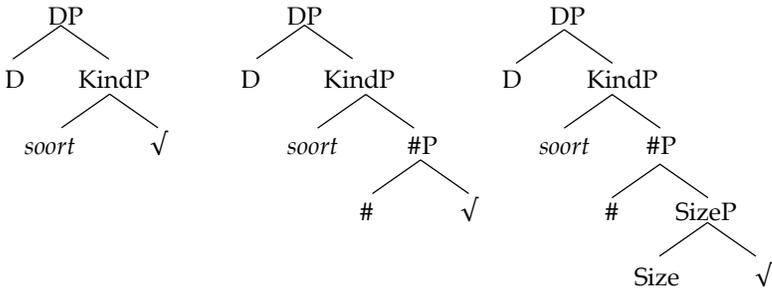
- (49) Twee soort-en bier
 Two kind-PL beer
 'Two kinds of beer'
- (50) Twee soort-en bier-tje-s
 Two kind-PL beer-DIM-PL
 'Two kinds of beers (e.g. bottled Heineken and Grolsch, or small (vaasje) and smaller (fluitje) beers)'

More difficult is the use of a kind-word *soort* with the kind-reading of a mass noun (rejected by 2, accepted by 4), but where possible it indicates kinds of kinds.¹²

- (51) %Twee soort-en bier-en / wijn-en
 Two kind-PL beer-PL / wine-PL
 'Two kinds of beer kinds / wine kinds'

If we follow the analysis of de Belder, and additionally, following Zamparelli (1998), include a KindP to host *soort*, we get rough structures as below:

- (52) Mass (= (49)) Kind-count (= (51)) Unit-count (= (50))



The interpretations are compositional: adding *soort* to a kind-reading mass noun (e.g. a mass noun with plural morphology, (51)) creates a kind of a kind

¹² For instance, in the context of the noun 'wine', Marjo van Koppen (p.c.) reports that the use of a plural on the mass noun creates an interpretation of subtypes of wine types, e.g. there are two main classes of wine, for example, red wine and white wine, and within those classes of wine, we also have subtypes of wine (e.g. Moscato, Riesling, etc. as white wines and Merlot, Syrah, etc. as red wines). This contrasts with the use of a bare mass noun (e.g. *twee soorten wijn* 'two kinds of wine') which says something only about the macrotypes, e.g. red wine and white wine and has no implications for subtypes. This distinction can also be reproduced in English, where *two kinds of wine* could correspond to red wine and white wine, while *two kinds of wines* corresponds to two different sets of wine types each which can be subsumed under the label of either 'red wine' or 'white wine.'

interpretation, whereas adding *soort* to a unit-reading mass noun (e.g. a mass noun with both plural morphology and a diminutive, (50)) creates a kind out of the unit. Thus, *soort* combines with both kind-readings and unit-readings, and furthermore, functions to make reference to a subkind of the N2. This argues in favor of there being two levels at which kind-reference can occur.

In this section, we explored the representation of object- and kind-reference in the nominal domain, starting from the hypothesis that it is possible to identify syntactic projections involved in moving between the two types of reference. The approach outlined here is that roots start out kind-referring and come to refer to objects via additional syntactic structure, e.g. SizeP or #P. However, both English and Dutch have kind-words whose function it is to create reference to a subkind of the N2, and they seem capable of doing this at a stage in which the nominal has been converted to object-reference. Our discussion of the Dutch data suggests that this is a compositional process, which takes as its input either a kind-referring or object-referring expression and returns an expression which refers to a sub-kind of its input. This forms the motivation for something like a KindP, which will be the locus of kind-words (in their function to create reference to a kind). Note that this section has not included a discussion of the rich semantic literature, which does not necessarily model the relation between kind- and object-reference via syntactic structure (e.g. Chierchia 1998 employs type shifting). The relation between such approaches and the one suggested here (and additionally how pieces of syntactic structure relate to the interpretation as a kind or object) is a domain which deserves further attention, but falls beyond the scope of this chapter, and our interest in the morphosyntax of kind-words.

7.3.3 *The position of a kind-word*

In this section, I introduce the semi-lexicity of a kind-word, its functional structure, and where it should appear in the structure, drawing on the results of the preceding sections. This is an initial approximation of the syntactic configuration and does not introduce the morphosyntactic idiosyncrasies of kind-words, which will be introduced in later (section 7.4). The analysis at this point can be considered a general hypothesis on the positioning of kind-words, morphosyntactic differences aside.

7.3.3.1 Kind-words and semi-lexicity

In line with the preceding discussion, we can assume that the locus of kind-words is something like a KindP, a notion which will be made more precise shortly. The KindP functions to return a subkind of what is denoted by the N2. It takes the denotation of the N2 as a macrokind and divides the N2 kind-space into a hierarchy of subkinds. For instance, in the example below, the kind-word treats the N2 *people* as a macrokind and divides the kind-space into two particular

subkinds, according to whether they are people who eat their fries with ketchup or with mayonnaise.

- (53) There are two kinds of people: those who eat their fries with ketchup and those who eat them with mayonnaise.

In this sense, a kind-word does two things: it forces the reference of the construction into the kind-domain and it furthermore introduces a kind-hierarchy, along with (some of) the subkinds instantiating that kind-hierarchy. We can suppose that this is encoded in the functional system rather in the lexical system, and therefore involves at least some functional feature(s). For simplicity, I assume a feature [kind], but this can be considered a shorthand for a more complex semantics, which is not treated here.¹³ Each of the kind-words *kind*, *type*, and *sort* functions the same in this regard. I hypothesize that the kind-words, in addition to carrying a kind-feature, also have a root at their core. Each kind-word is capable of projecting its own functional structure (as will be illustrated in the following section), and furthermore, they each seem to introduce some nuance of meaning (though precisely what the interpretational differences are is difficult to identify). Together, these would suggest that we are dealing with nominal roots. This gives us an initial characterization of the lexical entries of kind-words as in the following.

- (54) Kind: [$\sqrt{\text{kind}}$, [kind]]
 Type: [$\sqrt{\text{type}}$, [kind]]
 Sort: [$\sqrt{\text{sort}}$, [kind]]

This is the semi-lexicity hypothesis (section 2.3): kind-words are in fact roots which carry functional feature(s), in this case, a [kind] feature.

7.3.3.2 The functional structure of kind-words

In this section, I briefly introduce the functional structure of a kind-word, comparing it to the functional structure of a canonical DP in English. In some cases, kind-words do not project functional structure, and this is dealt with separately in section 7.4.5.

In chapter 2, section 2.4.3, I presented the following structure of an English DP, divided according to domains:

¹³ Zamparelli (1998: 281), for instance, hypothesizes that “‘kind’ and similar words denote functions from noun denotations [...] to singletons containing individual kinds,” where the denotation of a noun is a set of objects or kinds. I direct the reader to Zamparelli for further discussion. The [kind] feature could be shorthand for a semantic kind-function.

- (59) Those kinds/types/sorts of friends
 (60) Two types of apples
 (61) The sorts of mistakes that I often make

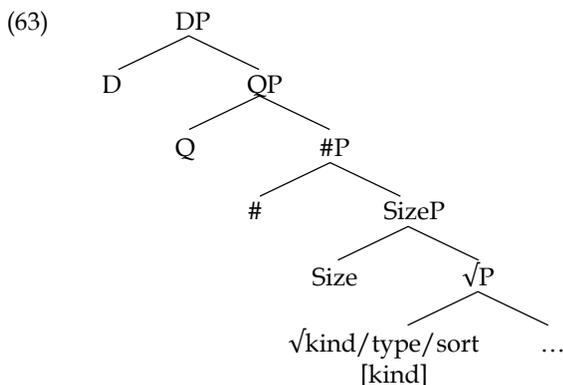
These can also be combined:

- (62) And there's a difference between **those two kinds of doubt**. (COCA: CBS_48Hours 2007)

This suggests that in addition to a classification domain (#P), a quantity domain (QP) and anchoring domain (DP) is projected above the kind-noun. I hypothesize that the material in the quantity and anchoring domains “belongs” to the kind-word (in combination with the N2) and not the N2 alone. This suggests that the kind-word projects the full range of projections permitted in an English DP. In *two types of apples*, for instance, there are two apple subkinds and not two apples. Similarly, in *those types of friends*, it is the subkind which the demonstrative refers to and not necessarily the friend. When combined, as in *those two kinds of doubt*, again the quantifier and demonstrative say something about the subkind and not the N2 *doubt*: there are two specific doubt-subkinds and not two specific doubts. The classification domain, quantity domain, and anchoring domain above the kind-word are projected by the kind-word. This is expected under the semi-lexicality hypothesis, given that the kind-word is indeed a root, and roots project functional structure. From what we have seen so far, a kind-word is not very different from a canonical noun. Like a canonical noun, it projects SizeP, #P, QP, and DP. At this point, the main difference concerns the [kind] feature which a canonical noun lacks. This gives the following structure for a kind-word:

-
- | | | |
|------|--|--|
| ii. | The Paris that I love | I earned it the old-fashioned way. |
| iii. | The old Paris
(Larson 1991: 18, ex. 43) | I earned it the way that one should
(Larson 1991: 18, ex. 41) |

Zamparelli (1998) terms this “(Kind) Anti-Anaphora.” Following Barker (1998) for a similar “anti-uniqueness” phenomenon with partitives, he claims that the problem lies in the definite determiner when it is tasked with picking out a subkind from the kind-construction. Due to a specific semantics of the kind-construction, the definite article is not able to isolate a single subkind on its own, and instead needs further contextualization, via a modifier or relative clause, to isolate the subkind. With the “totality of subkinds” cases, there is no need to pick out a subkind, as all subkinds are being referenced, and hence the problem does not exist. For Zamparelli, this phenomenon is not a syntactic issue but a semantic one, and I am inclined to agree with this conclusion.



Recall the notion of a KindP which was introduced previously in sections 7.3.2 and 7.3.3.1. Notice that the structure of a kind-word does not involve a projection labeled KindP. This is similar to what we saw with Polish numeral 1000 in section 5.3, which could surface in the quantity domain of a Polish noun without projecting a QP. There, the numeral with its Q-feature was sufficient to indicate that it constituted the quantity domain. Here, the use of a [kind] feature seems to be sufficient to signal the move to the kind-domain. I do not assume an explicit KindP for kind-words projecting functional structure, but I do refer to the series of projections connected to the kind-word together as the kind-phrase.

We have now seen that a kind-word can project its own functional structure. In the following section, we probe what the relation between the kind-word and the N2 is syntactically.

7.3.3.3 Kind-words and the extended projection of the N2

In the following discussion, I draw on the diagnostics utilized in chapter 6, section 6.3.2 to test the position of Q-nouns in relation to the N2. The diagnostics included distributional evidence for an anchoring domain and quantity domain between the N2 and Q-noun and patterns of extraposition and *wh*-movement. In this section, I apply the same diagnostics to kind-words, and propose that kind-words form a single DP with the N2. This ties in to the hypothesis developed later in this chapter (section 7.4) that kind-words “take over” the projection of functional structure within the DP.

I start with the functional structure of the N2 under the kind-word. Material from the anchoring domain is not permitted under singular or plural kind-words, as can be seen by the inability of definite determiners or demonstratives to surface:

- (64) *This { kind/type/sort } of { the/this/that } dog
 (65) *These { kinds/types/sorts } of { the/these/those } dogs

The N2 cannot be a pronoun or proper name either:

- (66) *This { kind/type/sort } of { me/them/her/you/Paris/Maartje }¹⁵
 (67) *These { kinds/types/sorts } of { me/him/them/us/Paris/Maartje }

The one exception to the lack of D-level material is found with the indefinite article. In chapter 6, section 6.4.3, I proposed the English default cardinality marker *a(n)* which surfaced to lexicalize an empty QP. The indefinite which occurs in the kind-constructions may also similarly not be D-material. We examine the use of the indefinite in more detail in section 7.4.4.

- (68) This { kind/type/sort } of a dog

This data suggests that the N2 cannot project a D-layer. Material from the QP, e.g. quantifiers, numerals, and Q-nouns also appear to be ungrammatical under the kind-word. This suggests that a Q-layer may similarly be absent:

- (69) *This { kind/type/sort } of { each / every / some } dog
 (70) *These { kinds/types/sorts } of { some / many / a few } dogs
 (71) *This { kind/type/sort } of one dog
 (72) *These { kinds/types/sorts } of { two / three / a hundred } dogs
 (73) *This { kind/type/sort } of { a lot / a ton / a bunch } of coffee
 (74) *These { kinds/types/sorts } of { a lot / a ton / a bunch } of dogs

The use of a kind-word prevents the N2 from projecting to a full DP. We see this in the fact that neither D-level nor Q-level material is permitted under the kind-word (the indefinite aside). This suggests that the kind-word and N2 form a single extended projection, where only the kind-word can project the upper layers of the DP (QP and DP). It further suggests that the *of* which surfaces is not a preposition mediating between DPs, but may also be a nominal marker (see section 6.4.6).

As with the pseudopartitive Q-nouns in chapter 6, section 6.4.6, we can draw on evidence from extraposition and *wh*-movement to show that the kind-word and N2 are a unit. This supports the hypothesis that they form a single DP together, despite the intermediate particle *of*. I repeat the examples from Selkirk (1977: 309, ex. 86) below. This illustrates that while the complement of a lexical noun (N2) can be extraposed, the complement of its complement (N3) cannot.

¹⁵ It may be marginally available with proper names (*?this is the kind of Paris that I like*), if for instance, the uniqueness of the proper name is dropped (similar in flavor to *Paris* vs. *the Paris that I love*). This is not problematic for the conclusions here, under an analysis in which proper names undergo N-to-D movement (Longobardi 1994).

- (75) A review_{N1} of answers_{N2} to your argument_{N3} was given.
 (76) A review_{N1} was given of answers_{N2} to your argument_{N3}.
 (77) *A review_{N1} of answers_{N2} was given to your argument_{N3}.

Kind-words behave differently, and in fact, they replicate the data we saw with pseudopartitive Q-nouns (section 6.3.2). While the N2 of a kind-word cannot be extraposed (the (b) examples), the complement of the N2, i.e. the N3, can (the (c) examples):

- (78) Extraposition with *kind*:
 a. Two kinds_{N1} of answers_{N2} to your argument_{N3} were given.
 b. *Two kinds_{N1} were given of answers_{N2} to your argument_{N3}.
 c. Two kinds_{N1} of answers_{N2} were given to your argument_{N3}.
 (79) Extraposition with *type*:
 a. Two types_{N1} of answers_{N2} to your argument_{N3} were given.
 b. *Two types_{N1} were given of answers_{N2} to your argument_{N3}.
 c. Two types_{N1} of answers_{N2} were given to your argument_{N3}.
 (80) Extraposition with *sort*:
 a. Two sorts_{N1} of answers_{N2} to your argument_{N3} were given.
 b. *Two sorts_{N1} were given of answers_{N2} to your argument_{N3}.
 c. Two sorts_{N1} of answers_{N2} were given to your argument_{N3}.

A similar pattern is replicated with *wh*-movement. A lexical noun allows its complement (N2) to be extracted, but not the complement of its complement (N3):

- (81) What did you give a review_{N1} [of ___]?
 (82) *What did you give a review_{N1} of answers_{N2} [to ___]?

This differs with kind-words, where the N2 cannot be extracted (the (a) examples), but an N3 can (the (b) examples).

- (83) *Wh*-movement with *kind*:
 a. *What did you give two kinds_{N1} [of ___]?
 b. What did you give two kinds_{N1} of answers_{N2} [to ___]?
 (84) *Wh*-movement with *type*:
 a. *What did you give two types_{N1} [of ___]?
 b. What did you give two types_{N1} of answers_{N2} [to ___]?
 (85) *Wh*-movement with *sort*:
 a. *What did you give two sorts_{N1} [of ___]?
 b. What did you give two sorts_{N1} of answers_{N2} [to ___]?

In both cases, to replicate the pattern of a lexical noun, an additional nominal is required, namely the complement of the complement of the N2 (e.g. N4). N4 appears to function like the N3 of a lexical noun does, suggesting that the kind-word and N2 form a unit with regards to extraposition and *wh*-movement:

- (86) Two kinds/types/sorts_{N1} of answers_{N2} to your argument_{N3} against abortion_{N4} were given.
- (87) Two kinds/types/sorts_{N1} of answers_{N2} were given to your argument_{N3} against abortion_{N4}.
- (88) *Two kinds/types/sorts_{N1} of answers_{N2} to your argument_{N3} were given against abortion_{N4}.
- (89) What did you give two kinds/types/sorts_{N1} of answers_{N2} [to ___]?
- (90) *What did you give two kinds/types/sorts_{N1} of answers_{N2} to your argument_{N3} [against ___]?

The data suggests that the kind-word and N2 behave as an (inseparable) unit for *wh*-movement and extraposition. As in chapter 6, section 6.3.2, we can take this to imply that they form a single extended projection.¹⁶

Before concluding this section, I would like to give a final word on the particle *of*. The particle *of* does not appear to be a preposition in the kind-construction. In chapter 6, section 6.4.6, I argued the English particle *of* of the pseudopartitive to be a marker of nominality, similar in distribution to genitive case in Polish (see chapter 4, section 4.2.2). The particle *of* was argued to be inserted when two classification domains were present in a particular domain. This accounted for the fact that despite appearing in the extended projection of the N2, a Q-noun still required the mediation of particle *of*:

- (91) A lot / ton / bunch / number *(of) people

A similar *of* seems to be involved in the kind-construction. We know the kind-word projects a classification domain (#P) and if the N2 does as well, then we predict the particle *of* to surface. If we compare the construction to Dutch, we find further evidence for this hypothesis. Dutch differs from English in that both the pseudopartitive and the *soort*-construction ('kind'-construction) require the juxtaposition of the N1 and the N2, without a mediating particle:

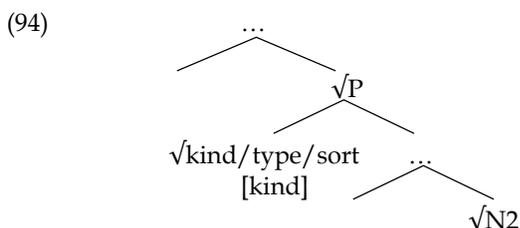
- (92) Twee soorten mensen
Two kinds people
'Two kinds of people'

¹⁶ I do not provide an analysis for the extraposition and *wh*-movement data. Instead, as in chapter 6, fn. 12, I direct readers to Stickney (2009). Her analysis treats pseudopartitives, but the configuration is similar enough that the analysis could be attempted here.

- (93) Een hoop mensen
 A lot people
 ‘A lot of people’

The use of juxtaposition in both constructions suggests that they have a similar syntax, and more specifically, “small” N2s. English differs in that both the pseudopartitive (chapter 6) and the kind-construction (this chapter) require the mediating particle *of*. Analyses of these constructions can be made more consistent if we assume a general difference in how the languages mark small nominals. We can hypothesize that English has a mechanism of marking nominals DP-internally, while Dutch has no such mechanism (see also fn. 48 in chapter 6).¹⁷ Under this hypothesis, the presence of *of* in English is an artifact of the use of two noun-like elements in a single DP, whereas its absence in Dutch is related to the absence of a similar mechanism. This provides indirect evidence for the non-P status of the particle *of*.

We have considered distributional evidence, movement evidence, and the status of particle *of* in the kind-construction. Together, this suggests that we should analyze the kind-word and N2 as forming a single extended projection. We can visualize the rough structure as below, but note that this will be adjusted in the following sections, as we study the morphosyntactic details of kind-words. Given that the kind-word projects its own functional structure above the N2, preventing the N2 from further projecting QP or DP, I analyze the kind-word as a head in the spine of the N2; see section 5.3.1 in chapter 5 for discussion of the use of a \sqrt{P} in the structure dominating the kind-word.



I now turn to specific examples of the use of kind-words, focusing on their morphosyntax and how they should be analyzed structurally.

¹⁷ Norbert Corver (p.c.) also reports that some dialects of Dutch permit *van* ‘of’ in the construction, suggesting this may be subject to variation.

7.4 The morphosyntax of kind-words

The syntax for kind-words given in the previous section allows us to model their function in relation to the N2, namely the fact that they combine with some N2 and return a subkind, regardless of whether the N2 is kind-referring or object-referring. So far, this discussion has ignored the fact that there is a particular morphosyntax associated with kind-words. English kind-words seem to show the same number inflection as the N2, described as the kind-word generalization in section 7.2. I repeat the kind-word generalization below:

- (95) **Kind-word generalization:** The number marking present on the kind-word (*kind*, *type*, or *sort*) and the N2 must be identical.

In this section, we test the kind-word generalization, and in so doing, develop an understanding of the morphosyntactic properties of kind-words. The data is drawn for the most part from the Corpus of Contemporary American English (COCA) (Davies 2008-), but judgments, examples from the literature, and examples from the Internet are also used. We explore the morphosyntax of the kind-construction in a systematic way, testing the expression of plurality, singularity, and numberlessness on kind-words and N2s in the kind-construction. Each section consists of (a) a description of the data for a particular combination of number features and (b) a structural analysis, drawing on the results of section 7.3.3 and the morphosyntactic data. I start with numberless N2s (section 7.4.1), then turn to singular and plural N2s (section 7.4.2), including N2s marked by an indefinite article (section 7.4.4) and *pluralia tantum* N2s (section 7.4.3). Finally, I address numberless kind-words (section 7.4.5).

7.4.1 Numberless N2s in the kind-construction

In this section, we consider numberless N2s, taking mass nouns and some abstract nouns as examples of N2s which would lack a #P (see e.g. Borer 2005). The kind-generalization enforces number matching between the kind-word and the N2, and thus, we predict that if the N2 has no #P, number matching is not enforced. Kind-words should freely surface as singular or plural with mass and abstract nouns. We test this hypothesis against the corpus and judgments (7.4.1.1), and furthermore, explore whether bare singular N2s (*this kind of dog*) can also be considered numberless (7.4.1.2). An analysis of the construction with numberless N2s is provided in section 7.4.1.3.

7.4.1.1 Numberless N2s

Examples from the corpus confirm that kind-words can freely surface with both

singular and plural kind-words, as predicted. Relevant examples are given below:

- (96) Mass nouns with a singular kind-word:
- a. The next morning we motor out on a very different lake, the water surface devoid even of ripples. It's **the kind of water** that causes havoc for low-flying pilots. (COCA: NaturalHist 2013)
 - b. And what I like about **this particular type of coffee**, it's – it's an arabica blend. (COCA: CBS_Morning 1999)
 - c. You know, they had **the same sort of blood and DNA** running through their vocal chords, you know, even though their voices were totally different. (COCA: NPR 2013)
- (97) Abstract nouns with a singular kind-word:
- a. That's **the kind of love and support** that helps you get over something like this. (COCA: Fox_Election 2008)
 - b. It's great to see **the type of support** the Comets have generated and to see where women's sports have come from and where they are going. (COCA: Houston 1999)
 - c. Sergeant Todd, I would think, deserves **the same sort of respect and recognition** that Sergeant Munley has already enjoyed. (COCA: PBS_Newshour 2009)
- (98) Mass nouns with a plural kind-word:
- a. At Suez, **some silty kinds of sand** adhered to the buckets and were extracted with difficulty. (COCA: October 2003)
 - b. "They must be trying to make this hospital something else," Mrs. Rodgers thought, "like the modern world with all those **different types of coffee**." (COCA: AntiochRev 2002)
 - c. **What sorts of food** do you eat at home? (COCA: FantasySciFi 2006)
- (99) Abstract nouns with a plural kind-word:
- a. That year there was **all kinds of talk** about Judy Garland. (COCA: Ebony 2000)
 - b. Its aim is to make explicit **the types of thinking and reasoning** behind particular skills. (COCA: StudiesInEducation 2014)
 - c. One generation instructs the next in **the sorts of contempt and violence** that are acceptable and expected (COCA: WashPost 1992)

These examples indeed show that number matching is not enforced when the N2 is numberless; such N2s are compatible with both singular and plural kind-words. In addition to mass and abstract nouns, corpus searches also returned a small set of examples involving nouns which are usually count. Such examples are dependent on the context for their acceptability, and without the preceding contexts provided below, would be judged ungrammatical by a naïve speaker.

- (100) The use of window and whole-house fans can minimize very effectively the heat gain from the sun, lights used in the home, appliances, etc. **Both types of fan** are very inexpensive. (COCA: MotherEarth 1993)
- (101) The facts are that when you look at the 6,000-odd black elected officials in this country – and there are too few of them – there’s a disproportionate number of them under **all kinds of investigation**. (COCA: ABC_20/20 1990)
- (102) She weaves two- and three-rod baskets. They are made of willow, both the coil and the wrap. Two-rod baskets use two rods of willow in the coil that are then wrapped in strips of willow. Three-rod baskets use three rods in the coil. If the rods are warped in weaving, the wrapping is the weft that holds it together and provides the pattern. The difference between **the two types of basket** is the tightness of the stitch. Two-rod baskets use a gap stitch, wrapping completely over the previous coil. A three-rod basket doesn’t skip over the previous row, instead weaving between the third rod of the previous row, so it has a tighter weave. (COCA: NewsNativeCA 2010)

If these are singular N2s, the kind-generalization would predict the kind-word to be similarly singular. These examples seem to provide a counterexample to the kind-word generalization, but I propose that they should, in fact, be analyzed as numberless, along with mass nouns and abstract nouns. Intuitively, these examples have been “massified” in some way. We know that the Universal Grinder (Pelletier 1975, see also section 1.2) is not the only type of interpretation available to numberless count nouns (see Gillon 1999). For instance, the example below expresses something like “this house is too big of a house (or too much house) for a barber to afford.” Intuitively, *house* has ceased to be an identifiable unit, and has been “massified,” such that it lacks boundedness.

- (103) That’s **a lot of house** for a barber.
(quote in *Homeland*, season 5, episode 7, “Oriole”)

As discussed in chapter 6, section 6.3.3.1, the Q-noun *lot* combines only with plural nouns and mass nouns. For *house* to be used with *lot*, it must be mass in a syntactic sense (i.e. no #P), which is what seems to contribute to the interpretation. A similar process could occur in the examples above ((100)-(102)): the kind-word combines with a numberless N2, and one which usually projects a count syntax, hence the intuition of “massification”.¹⁸ If these N2s are numberless, we expect

¹⁸ There is a further intuition that these N2s could be kind-referring. We can vaguely see this in the following set of examples where, in an out-of-the-blue context, it is much more natural if the N2 is a noun which is more frequently used to denote kinds than objects.

i. **These kinds of {feline /?domestic cat / ??cat}** require more attention than...
We also see that kind-level adjectives are more acceptable:

them to behave similarly to mass and abstract N2s, and therefore, to show no interaction with the number marking of the kind-word. This explains why a plural kind-word is permitted in these constructions.

7.4.1.2 A word on bare N2s

Given that an N2 can be numberless, and when numberless, occurs in a bare form ((100)-(102)), an obvious question is what the status of the bare N2 is when co-occurring with a singular kind-word. Relevant examples are given below.

- (104) a. This kind of rabbit
 b. This type of car
 c. This sort of rug

There are two possible answers here, both compatible with the data. On the one hand, we might claim that the bare form is always numberless, and hence, the N2 in the examples above must be numberless. This hypothesis makes clear predictions about the status of number on the N2: bare N2s have no #P. Alternatively, we might say that the bare form is ambiguous between a numberless N2 (no #P) and a singular N2 (singular #P). Under this hypothesis, there is no clear way to distinguish the singular from the numberless form, given that they are morphologically identical.

While it is impossible to say for sure which hypothesis is correct, we can draw on distributional evidence to point us towards the most plausible solution. If the N2 is necessarily numberless when bare, we expect it to show a similar distribution to mass and abstract nouns, given that these are numberless nouns, not constrained by the kind-generalization. Thus, bare N2s should occur with singular and plural kind-words at a similar rate as mass and abstract nouns. If, alternatively, the N2 is ambiguous between being numberless and singular when bare, we don't necessarily expect a distribution similar to mass and abstract nouns. In fact, if the numberless form is a more marked pattern, plausible given that it requires contextualization to be acceptable (cf. 7.4.1.1), then we might even expect numberless bare N2s to be rarer, which would be visible through a low frequency when combining with a plural kind-word.

I test this in the following table. Because it is not possible to isolate the mass nouns from the singular nouns in an automatic way in the corpus, I have chosen to look at selected nouns.¹⁹ Below, I provide the frequencies of these combinations.

-
- ii. **These kinds of {electric/??cheaply-made fan} are the best on the market.**

¹⁹ I chose nouns based on frequency, using the frame "kinds/types/sorts of N_{PL}" to identify count nouns (since count nouns pluralize) and the frame "kinds/types/sorts of N_{SG}" to identify mass nouns (since mass nouns easily appear in this context), and chose the two most frequent examples. For *sort*, however, the two most frequent count nouns were *thing* and *way*, both nouns which Emonds (1985) takes to be semi-lexical; instead, I replaced *way*

(105) Table 1: Frequency of a SG/PL kind-word with mass and count nouns

Pre-modifier		Counts (COCA)					
		<i>kind</i>	<i>type</i>	<i>sort</i>	<i>kinds</i>	<i>types</i>	<i>sorts</i>
Mass	<i>stuff</i>	1305		260	220		67
	<i>cancer</i>		134			185	
	<i>information</i>	601	217	99	205	179	38
Count	<i>thing</i>	4827	626	3905	7	1	10
	<i>question</i>	224		56	0		1
	<i>activity</i>		157			21	

Bare (count) N2s clearly have a different distribution from mass N2s. Mass nouns seem equally capable of surfacing with singular and plural kind-words, although they are more frequent with singular kind-words (adding up the mass examples, 75% of them have a singular kind-word and 25% of them a plural kind-word). Bare N2s, on the other hand, occur frequently with singular kind-words, but rarely, if at all, with plural kind-words (adding up the count examples, 99.5% of them have a singular kind-word and 0.5% a plural kind-word²⁰). This result is most compatible with the hypothesis in which the bare N2 form is morphologically ambiguous between being numberless and singular. Thus, we expect that a bare N2 corresponds to both a root (a mass version of something which is typically count) and a root under a singular #P.

- (109) *dog*: (a) [$\sqrt{\text{dog}}$] *numberless N2*
 (b) [_{#P} SG [_{SizeP} Size [$\sqrt{\text{dog}}$]] *singular N2*

Summarizing, the two main hypotheses concerning the bare N2 take it to be either numberless or ambiguous between a numberless and singular form (assuming these to be phonologically identical). While impossible to differentiate based on the morphological patterns we find, the two hypotheses make different predictions about the distributions of bare N2s, and results from the corpus seem to point towards the second hypothesis, namely that a bare N2 is ambiguous between being a #P and a bare root. For this reason, I treat the bare N2 both in this section, with the numberless N2s, and in section 7.4.2, with the numbered N2s.

7.4.1.3 The syntax of kind-words with numberless nouns

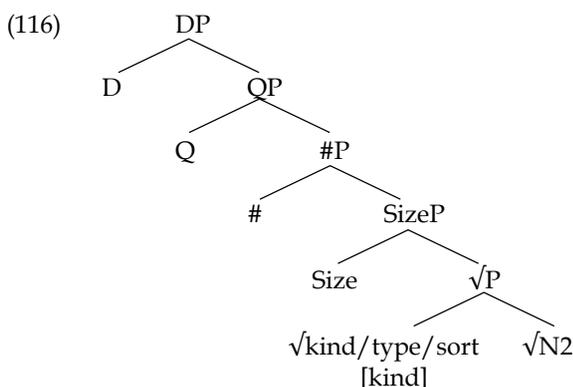
We have come to the conclusion that kind-words with numberless N2s (mass nouns, abstract nouns, certain instances of numberless count nouns) freely surface as singular or plural. Some examples are provided below:

with its third most frequent count noun *question*.

²⁰ If we remove *thing* from the count, the percentage changes only slightly: 95.2% with singular *kind*-words and 4.8% with plural *kind*-words.

- | | | |
|-------|------------------------------------|-------------------------------|
| (110) | This kind/type/sort of tea | <i>Mass nouns</i> |
| (111) | These kinds/types/sorts of tea | |
| (112) | This kind/type/sort of honesty | <i>Abstract nouns</i> |
| (113) | These kinds/types/sorts of honesty | |
| (114) | This kind/type/sort of fan | <i>Numberless count nouns</i> |
| (115) | These kinds/types/sorts of fan | |

I propose that the kind-phrase developed in section 7.3.3.2 combines directly with the numberless noun. We can represent this as below. The structure does not predict the # of the kind-word to interact with the N2 in any way.



While I have not represented it here, I do expect that the numberless N2 contains more in its structure than a bare root (see also the brief discussion in chapter 6, section 6.4.6). Presumably, the root projects a classification domain, but it does not contain #P. This follows from the obligatory particle *of*, which, as argued in section 6.4.6 of chapter 6, is inserted if there are multiple classification domains within a single domain. This motivates a complexification of the structure, which could be achieved via a Mass Phrase (as in Hachem 2015), or some other projection.

This concludes the discussion of numberless N2s in the kind-construction. I now turn to a discussion of the representation of the kind-construction when number is involved.

7.4.2 *Count nouns in the kind-construction*

In the previous section we considered the kind-construction in relation to numberless N2s. Lacking any number on the N2, the kind-generalization could not apply, and this was confirmed by the ability of the kind-word to freely surface with singular and plural morphology. In this section, we focus particularly on count nouns which have number on the N2. The kind-generalization predicts number matching to occur in these contexts. We start by considering N2s which are plural, briefly touching on singular N2s, before turning to an analysis.

7.4.2.1 Plural count noun N2s

The kind-word generalization predicts the use of a plural kind-word with a plural N2 to be grammatical, given that they match in number. This holds true in the corpus, and numerous examples surface (rough corpus numbers are: *kinds*: 16721, *types*: 10036, *sorts*: 4283). Examples are provided below with different types of pre-modifiers on the kind word to illustrate the range of possibilities (adjectives, quantifiers, demonstratives, definite determiners, *wh*-words).

- (117) They work with **different kinds of sharks and feeding systems**. (COCA: NBC_Dateline 2001)
- (118) Now, I've learned to trust my wife more on **those kinds of calls**. (COCA: ABC_GMA 1997)
- (119) But there are lots of good reasons to eat **both kinds of vegetables**. (COCA: ChildDigest 1998)
- (120) **What types of authors** do you assign in your courses? (COCA: WestHumRev 2015)
- (121) Experts explain that sunburns commonly cause **two types of burns**. (COCA: ChildLife 2004)
- (122) Fortunately for **both types of riders**, bike companies are cranking out some of the best values ever seen on two wheels. (COCA: Bicycling 2003)
- (123) **What sorts of problems** does that create? (COCA: Inc. 1990)
- (124) No, we made only **the most erudite and sophisticated sorts of mistakes**. (COCA: Atlantic 2012)
- (125) But remember, real estate investors got **those sorts of returns** a few years ago too. (COCA: WashPost 1993)

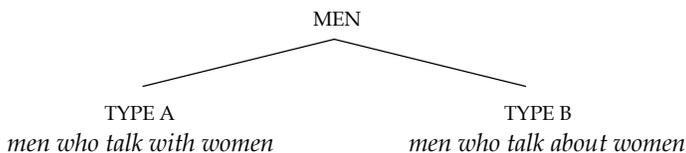
Examples of plural kind-words in combination with plural N2s can be divided into two main subclasses, according to the interpretation of number features on the kind-word. In one class of examples, the plural marking on the kind-word is meaningful (or rather "interpretable" in the sense of Chomsky 2001), and triggers an interpretation in which we are dealing with multiple subkinds. This is illustrated in the examples below.

- (126) Earlier in this broadcast you heard Gianni Agnelli say there are **two kinds of men, those who talk with women and those who talk about them**. (COCA: ABC_PrimeTime 1991)
- (127) There are **two types of roofs: flat, and pitched; and three main types of roofing: built-up, shingle and tile**. (COCA: MotherEarth 1990)

- (128) Harry recognized Valium, Seconol, and some type of amphetamine. He suspected the other contained **various sorts of painkillers**. (COCA: BKSilentTreatment 1995)

These examples involve multiple subkinds (and where multiple subkinds are available, they have been indicated with underlining). We can draw a kind-hierarchy for the example in (126) as given below. In this scenario, all men are classified as either type A or type B.

- (129) Kind hierarchy for example (126):



This type of plurality is what we would expect to find on a canonical noun. In the canonical case, if a noun is marked plural, the interpretation of that noun involves a set with multiple members. Here, the kind-word is marked plural, and similarly, the interpretation involves a set of multiple subkinds.

The second class of examples involves a meaningless plural on the kind-word (“uninterpretable” in the sense of Chomsky 2001). For such examples, despite their plural marking, they do not denote multiple subkinds, but rather, a single subkind. The examples are rather subtle, so we address a few cases individually. In the example below, despite the morphological plurality of the kind-word *types*, there seems to be only one type of bond in contention, namely, as indicated by the apposition, bonds which are Kennedy bonds.²¹

- (130) **These types of bonds, Kennedy bonds**, supposedly would be issued in the ‘50s or ‘60s (COCA: Fox_Beck 2009)

The use of an appositive which lists only a single subkind attests to the lack of semantic plurality on the kind-word. In addition, the example above does not seem to allow a numeral or quantifier. This is in line with the claim that its plural morphology is not a true indication of plurality.

- (131) #Two types of bonds, (namely) Kennedy bonds, ...

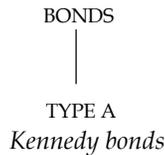
²¹ As indirect evidence for the analysis here, the equivalent in Dutch, a language which does not have a number matching effect, is to combine a singular kind-word with a plural N2:

i. Dit soort bonden
 This kind.SG bond.PL
 ‘These kinds of bonds (lit. this kind of bonds)’

- (132) #Both types of bonds, (namely) Kennedy bonds, ...
 (133) #Many types of bonds, (namely) Kennedy bonds, ...

Thus, in this example, we are dealing with a single subkind despite the apparent plurality. We can model the kind hierarchy as follows.

- (134) Kind hierarchy for example (130):



The following examples involves a similar use of a plural kind-word.

- (135) For 20 years now, Mangano has been racking up mega-sales with **why-didn't-I-think-of-that kinds of inventions**.
 (<http://abcnews.go.com/2020/story?id=1782048>)

The kind-hierarchy for inventions involves only a single invention subkind, namely inventions of the “why-didn't-I-think-of-that” type. Again, despite the plurality of the kind-word, the phrase denotes one subkind.

The following example contains the expression *these types of parties*, which seems to refer to the subkind indicated by the underlined DP.

- (136) I'm thinking of planning a launch party, and um, I usually don't ever plan **these types of parties**.²²
 (<https://www.youtube.com/watch?v=VPf-gfFgz5M>, at 5:22)

The speaker clarifies in the first clause that she is planning one specific type of party, namely a launch party. In the follow-up clause, we find a plural on both *parties* and *types*. Presumably, the plural on *parties* is a way of generalizing away from any specific parties. With regards to the plurality on *types*, we know from the context that there is only one type of party in contention; thus, there is no semantic reason for *types* to be plural. This use of plurality seems to be a case of an uninterpretable plural, in some kind of agreement with generic *parties*. Notice also that in this case, inserting a numeral creates a contradictory example:

²² This seems to mean something like “launch parties and other parties like launch parties,” where “launch parties” acts as an umbrella term for a whole set of party types which are unified under the classification “launch party”. This may suggest that the plural on the N2 indicates the existence of a kind-hierarchy under the N2. This requires further research.

- (137) #I'm thinking of planning a launch party, and um, I usually don't ever plan **these two types of parties**.

More examples for which the context sets up a single subkind, but the kind-word appears in the plural are given below. Some involve a generic plural on the N2.

- (138) Our, our, our parents were so intent on vaccinating us when the Salk vaccine came out because we knew and we came out of the generation that knew that the horrors of **these kinds of diseases**. (COCA: NBC 2015)
- (139) Back in the late '70s, early '80s, people forget, but there were a lot of "R"-rated comedies. "Caddyshack," "Animal House," you know, **those types of movies**, and the '80s got, I don't know why, but they got the, you know, they went to the PG-13 variety. (COCA: NBC_Today(1) 1998)
- (140) The offshore wind turbines that have been built so far all have foundations that extend to the seabed, and this necessitates shallow water sites generally close to shore. **These sorts of sites**, such as those found in the North Sea basin, are limited to geographical areas that do not always have the best wind resources. (COCA: MechanicalEng 2010)

Such cases seem to be related to the kind-word generalization, such that the kind-word and the N2 match in number features. Here, it seems to specifically be the number of the N2 which determines the number of the kind-word.

There is a related kind-construction which provides further evidence for the proposed classification. If we invert the kind-word and the N2, the two classes of examples behave differently. Starting with the meaningful plural cases, the reverse order is often as good as the initial order, and no obvious changes occur (aside from word order). Examples which contrast the two orders are given below.

- (141) Earlier in this broadcast you heard Gianni Agnelli say there are **men of two kinds / two kinds of men**, those who talk with women and those who talk about them.
- (142) Recently, Gail has been trying **ads of different types / different types of ads**.
- (143) Harry recognized Valium, Seconol, and some type of amphetamine. He suspected the other contained **painkillers of various sorts / various sorts of painkillers**.

In the case of a meaningless plural, however, the reverse order triggers a loss of plurality on the kind-word.

- (144) For 20 years now, Mangano has been racking up mega-sales with

inventions of the why-didn't-I-think-of-that kind / *kinds.

- (145) **Bonds of this type / *these types**, Kennedy bonds, supposedly would be issued in the '50s or '60s.
- (146) I'm thinking of planning a launch party, and um, I usually don't ever plan **parties of this type / ???these types**.
- (147) The offshore wind turbines that have been built so far all have foundations that extend to the seabed, and this necessitates shallow water sites generally close to shore. **Sites of this sort / *these sorts**, such as those found in the North Sea basin, are limited to geographical areas that do not always have the best wind resources.

Turning to the corpus, there is something interesting to be said about the types of pre-modifiers in the reverse order. The following table provides rough counts (examples have not been verified) for certain classes of pre-modifiers.²³

(148) Table 2: Pre-modifiers of kind-words in reverse order

Pre-modifier	Counts (COCA)						
	<i>kind</i>	<i>type</i>	<i>sort</i>	<i>kinds</i>	<i>types</i>	<i>sorts</i>	
Dem. <i>this/these</i>	689	608	603	4	18	3	
	<i>that/those</i>	170	73	228	1	2	0
Poss.	202	22	18	0	3	0	
Det. <i>the</i>	523	367	547	5	35	2	
	<i>a</i>	193	104	237			
	<i>every</i>	151	30	88			
Num. <i>1, 2+</i>	188	30	154	6	10	2	
Quant. <i>some</i>	1029	53	1024	0	3	2	
	<i>all</i>			895	283	333	
	<i>many</i>			57	20	10	
	<i>several</i>			9	12	1	
	<i>both</i>			5	19	0	
	<i>most</i>			1	2	1	
Adj. <i>various</i>				204	77	79	
	<i>(a) different</i>	96	9	126	37	59	7
	<i>(an)other</i>	80	9	57	22	9	11
	Other	128	87	63	18	148	8

In the singular, the kind-word allows for seemingly any type of pre-modifier: demonstratives, determiners, possessives, quantifiers, numerals, adjectives, etc., provided that they are compatible with singularity. In the plural, we find only a very restricted set of pre-modifiers, those mostly being plural-requiring

²³ The search was "[nn*] of __ kind -of", where [nn*] asks for either a singular or plural noun, the __ is where the pre-modifier belongs, *kind* the kind-word, and *-of* means "exclude of from this position" to avoid non-examples of the type: *the outcomes of those kinds of trials*.

quantifiers and certain adjectives.²⁴ These pre-modifiers seem to be precisely those we expect if we are dealing with a meaningful plural on the kind-word. Adjectives like *various*, *different*, and *other*, as well as quantifiers like *many* and *several*, trigger a multiple kinds reading (e.g. *various kinds of X*, *different kinds of X*, *other kinds of X*, *many kinds of X*, *several kinds of X*). This is further illustrated below.

- (149) In the marine reserve, **illegal fishing of several kinds** persists within a boom-and-bust cycle (COCA: Bioscience 2009)
- (150) That would mostly be doctors, lawyers, **professional people of various kinds**, who now pay about 50 percent of their income taxes (COCA: ABC_Brinkley 1992)
- (151) If the walking is easy, you're hunting the wrong habitat for ruffed grouse. Find dense, snaggy young woods or edges where **forests of different types** meet. (COCA: OutdoorLife 2007)
- (152) Given the proper incentives, **industries of many types** have shown they can cut their water needs 40-90% with available technologies and practices. (COCA: USAToday 1993)
- (153) There is **resistance of various sorts** across the country. (COCA: Analog 2012)
- (154) **Addicts of all sorts** eventually become imprisoned by their addictive behavior. (COCA: InstrPsych 1993)

The majority of examples in the reverse order with a plural kind-word involve a pre-modifier which requires multiple kinds. In other words, we mostly find examples in which the plural on the kind-word is necessarily meaningful. If we combine this observation with our previous observation from (144)-(147) that a reversal of the kind-construction with a meaningless plural removes the plurality, then it seems logical to conclude that the reverse construction requires meaningful, or interpretable number.²⁵ Thus, we can view the reverse

²⁴ There are certain quirks in the table. For one, there are many more "Other adj" for *types* than for *sorts* or *kinds*. The reason for this seems to be that *types* can occur independently of the N2, thus inflating the count with false hits. For example, a number of the "Other adj" hits include: *Jung's theory of psychological types* (InstrPsych 1994), *a virtual diaspora of creative types* (SanFranChron 2005), and *an army of corporate types* (Mov:IRobot 2004). *Types* also seems to show inflated hits for demonstratives, the definite determiner, and numerals, as compared to *kinds* and *sorts* (and significantly fewer hits in the singular with *some* and *one* as compared to *kind* and *sort*). Again, this may be due to false positives. For example, with the definite determiner, we find that in 18 of the 35 examples, *types* is immediately followed by *and* and not actually an example of the reverse construction, e.g.: *Analysis of the types and locations of these injuries* (Archeology 2011) and *reports of the types and amount of food consumed* (Adolescence 2008). Further inspection might identify reasons for the other irregularities.

²⁵ There are presumably further restrictions on the reverse construction besides this. For example, numerals occur very infrequently with plural kind-words, despite the fact that

construction as a test for the interpretability of the number feature on the kind-word. If the kind-word changes in number, then we are dealing with an uninterpretable plural; if it does not change in number, the plural is interpretable. Ungrammatical results are uninformative, as there are a number of reasons as to why the result might be ungrammatical (cf. fn. 25).

Summarizing, the kind-word is capable of carrying a meaningless (uninterpretable) number feature, in addition to the more canonical meaningful (interpretable) number. The availability of uninterpretable number on the kind-word is a surprising result, as number is generally interpretable on nominals. This pattern seems to confirm one of the predictions of the kind-generalization, namely that the kind-word and N2 must have identical features. Furthermore, it suggests a one-way relation such that the number on the N2 conditions the number on the kind-word. This configuration looks like a pattern of Agreement.

As a short aside, we also expect singular N2s to pattern the same. As discussed in section 7.4.1.2, it is impossible to distinguish between a numberless N2 and a morphologically singular N2, given that the two options are morphologically identical. However, if an N2 is syntactically singular, it predicts that the kind-word will also be singular. The singular-singular pattern is very common (e.g., with a preceding singular demonstrative, we get the following COCA counts: *kind*: 20301, *type*: 6364, *sort*: 5959), and we can take this as indirect evidence that the same pattern also holds in the case of singularity.

7.4.2.2 The syntax of kind-words with count nouns

Both bare singular and plural (count noun) N2s have been found to follow the kind-generalization, such that the kind-word and N2 show identical number:

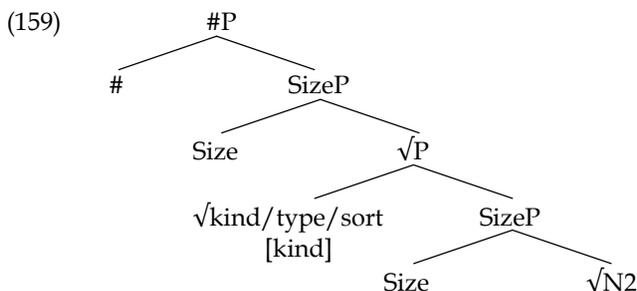
- (155) This kind of rabbit, this type of car, this sort of rug
- (156) These kinds of rabbits, these types of cars, these sorts of rugs
- (157) *This kind of rabbits, this type of cars, this sort of rugs
- (158) *These kinds of rabbit, these types of car, these sorts of rug

The kind-generalization is particularly relevant for count nouns, given that

they enforce multiple kinds; likewise, plural demonstratives are surprisingly scarce, given that they do not necessarily require an uninterpretable plural on the kind-word. The lack of relevant examples is not because such elements are ungrammatical in the reverse construction (see below), but is probably the result of there being a very specific set of conditions under which a numeral or plural demonstrative is permitted. It is not my goal to fully characterize the reverse construction, and thus, I leave it at this.

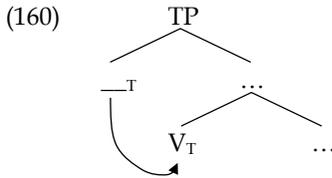
- i. **Gestures of these kinds** do not always produce an effect in legislation (COCA: NatReview 1991)
- ii. The populations of the shelters jumped three days after the quake, with **new arrivals of three types**: residents fleeing safe homes out of fear of aftershocks, [...] (COCA: SanFranChron 2006)

numberless nouns did not show any number restrictions (see preceding section 7.4.1). This suggests that #P plays a crucial role in the kind-generalization. If both the kind-word and the N2 express #, then by the kind-generalization, feature matching is required. I propose that this pattern stems from a “sharing” of the #P between the kind-word and the N2. This is very similar to what was proposed for Polish numerals 2-4 and 5+ in chapters 4 and 5 (sections 4.3.2.3 and 5.4.1). The numerals showed a dependence on the #P of the quantified noun, such that they could only surface if #P could be projected over them. This created a type of #P sharing configuration between the numeral and the quantified noun. With regards to kind-nouns, I propose an identical configuration: kind-nouns surface before the N2 has projected a #P, and therefore there is a single #P dominating both the kind-word and the N2. This basic relation is represented below, and is what we expect for both interpretable and uninterpretable number features on the kind-word. Being count, the N2 projects at least a SizeP.

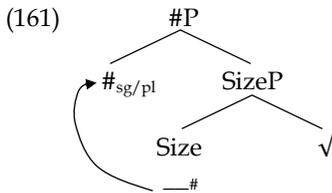


Notice that superficially, this configuration is identical to what we saw with numberless nouns, and therefore, does not predict the kind-generalization. I propose that there is an important difference between the two configurations which has not been captured yet. More specifically, I propose that count syntax involves a relation between the #P and the root, which is missing in numberless contexts. I illustrate first how this works and then return to the kind-word puzzle.

Suppose that number morphology is not necessarily achieved via head movement to #P, but rather via an Agreement relation, with the root and the #-feature Agreeing (see chapter 3 for details on the theory of Agreement adopted in this thesis). In the verbal domain, Pesetsky and Torrego (2007) make use of an Agreement relation between T and the verb. In a configuration like below, the verb enters the derivation with an uninterpretable, but valued tense feature, and T enters the derivation with an interpretable, but unvalued tense feature. In the structure below, I only depict the valued/unvalued distinction. T, carrying an unvalued T feature, probes down and agrees with V, carrying a valued T feature:



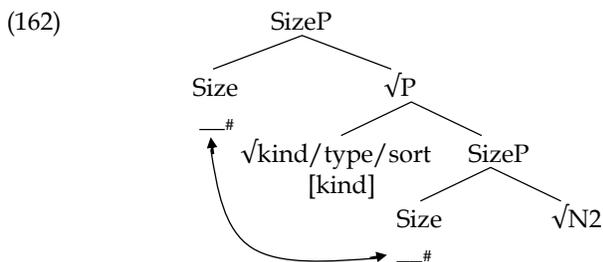
This system serves to connect tense on the verb to tense on T in English. I propose a similar mechanism in the nominal domain, between the Size head and #.²⁶ However, I take the relation to be reversed: # carries a valued # feature, and Size carries an unvalued # feature. This creates a configuration in which Agreement is *upwards* rather than downwards, along the lines of Cyclic Agree (see chapter 3, section 3.4.2.1). By Cyclic Agree, a probe first searches in its c-command domain, and then searches upwards. In this example, there is nothing in the c-command domain of the probing Size-head (upon first Merge), and therefore, Agreement must search upwards:



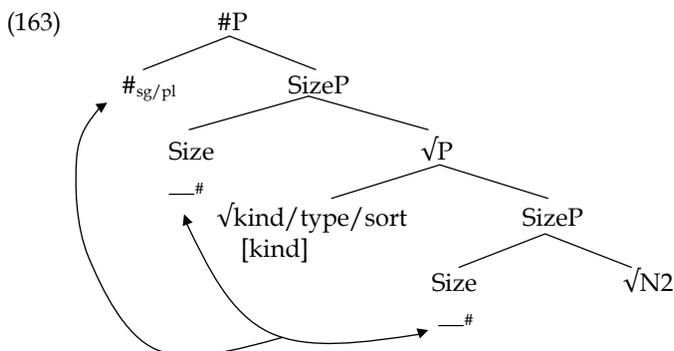
The probing results in a shared # feature between the #-head and the Size-head (via feature sharing, see section 3.4.1.1 for discussion).

If we apply this to the kind-construction, the Size-heads of both roots are assigned a number probe, which, given their configuration, are predicted to Agree with each other. Agreement is cyclic, and thus, the probe of N2's Size-head will be forced to search upwards, given that its c-command domain contains only a root. The probe of the kind-word's Size-head is predicted to first probe downwards. The two probes are predicted to find each other and enter into an Agreement relation. The Agreement relation is depicted below.

²⁶ De Belder (2011) notes that a SizeP cannot occur in the structure without a #P, implying a dependence. In the structure, this dependence may be related to the probing number feature, which connects the bounding Size-head to the #-head. If boundedness is equivalent to making something count, then the relation between # and Size is reasonable.



Given feature sharing, which takes two Agreeing feature instances and combines them into a single feature, the two probes are predicted to coalesce into a single probe. This probe, by Cyclic Agree, continues probing, and at this point, in an upwards direction. A new Agreement relation is established between the #-head and the probe of the Size-heads. This Agreement relation values the # probe as either singular or plural, with the effect that both the kind-word and the N2 must be either singular or plural.



The syntax depicted above forces strict matching of number features between the kind-word and the N2. Given that both are count nouns, expected to express number, they both carry an agreeing number feature via Size. However, because the kind-word Merges *before* the N2 projects its #P, we get a system in which the kind-word and N2 must first Agree with each other, before they Agree with #P. As a result, they necessarily share number. This derives the kind-generalization.

There is one open question: what accounts for the fact that number on the kind-word is or is not interpretable? I repeat the relevant examples below. The first involves an interpretable plural and the second an uninterpretable plural.

- (164) Earlier in this broadcast you heard Gianni Agnelli say there are **two kinds of men**, those who talk with women and those who talk about them. (COCA: ABC_PrimeTime 1991)
- (165) For 20 years now, Mangano has been racking up mega-sales with **why-didn't-I-think-of-that kinds of inventions**.

As a first note, we can conclude that the two examples must both involve the syntax of (163). The kind-generalization applies to interpretable and uninterpretable number on the kind-word alike. This is clear because the configuration of a singular kind-word with a plural N2 is still ungrammatical when the kind-word carries an interpretable singular:

(166) *One kind of tortoises

Thus, the configuration must be the same, regardless of the interpretability of the # feature on the kind-word. The question then is: how is interpretability determined? Rather speculatively, I propose that there may be a restriction on where the # provided by the #P can be interpreted. With a canonical plural or singular, there is a single #P per root. In that case, it is clear that # should be interpreted in relation to that root. However, in the scenario of the kind-word, there are two roots and only one #P. I propose that this creates optionality in the system, where the # feature can be interpreted either with the kind-word or the N2, but not both. This gives the two following scenarios, with interpretability marked by the letters *i* 'interpreted there' and *u* 'not interpreted there.'

(167) [_{#P} # [_{SizeP} Size [_{RootP} √kind/type/sort [_{SizeP} Size √N2]]]
i# u#

(168) [_{#P} # [_{SizeP} Size [_{RootP} √kind/type/sort [_{SizeP} Size √N2]]]
u# i#

In principle, the # feature can be freely interpreted with either root. However, context must also play a role, given that the use of a numeral seems to fix interpretability on the N2 (see discussion in 7.4.2.1). I leave this open.

7.4.3 *Pluralia tantum* nouns

In this section, I address *pluralia tantum* nouns. *Pluralia tantum* nouns are obligatorily plural. From a surface view, we might then expect that they also adhere to the kind-generalization, enforcing plurality on the kind-word. As per the analysis above, this would imply that the kind-word would surface before the *pluralia tantum* noun projects its #. We test this hypothesis against the *pluralia tantum* nouns in this section.

7.4.3.1 *Pluralia tantum* N2s

We see that *pluralia tantum* nouns co-occur with plural kind-words:²⁷

²⁷ Acquaviva (2008: 15-21) discusses the problems of treating *pluralia tantum* nouns together, noting that they show much variation with regards to whether a singular form is entirely ungrammatical, allowed with a slightly different interpretation, etc. Because the corpus is

- (169) So, I spent an hour trying on **all the different kinds of jeans** - button fly, zipper fly - that were available - stone-washed, distressed. (COCA: NPR_ATC 2011)
- (170) Ten years ago we were focused on **what types of jeans** people wanted. (COCA: USAToday 2004)
- (171) When thinking quiets down and sensory input is at a minimum, **very different sorts of feelings** can arise, some of which are extraordinarily unlike normal waking consciousness. (COCA: Humanist 2002)

They also co-occur with singular kind-words. That the kind-word is singular is supported by the singular demonstrative preceding it.

- (172) It's something to be said for that kind of -- that kind of courage, that kind of strength and **that kind of guts**. (COCA: Fox_Susteren 2010)
- (173) Is part of this you kind of blame that kind of activity, **that kind of feelings...** (COCA: ABC_Nightline 2008)
- (174) People are always surprised to find out that -- that that kind of quality and **that type of goods** are made in southern Louisiana. (COCA: CBS_SunMorn 1995)

Empirically, the *pluralia tantum* nouns do not pattern with canonical plural count nouns in the kind-construction. We see this in the fact that despite the morphological plurality of the N2, the kind-word is free to be singular or plural. This suggests that such examples are exempt from the matching condition identified in the form of the kind-generalization.

7.4.3.2 The syntax of kind-words with *pluralia tantum* nouns

With *pluralia tantum* nouns, number matching does not occur. The kind-word and N2 can differ in #:

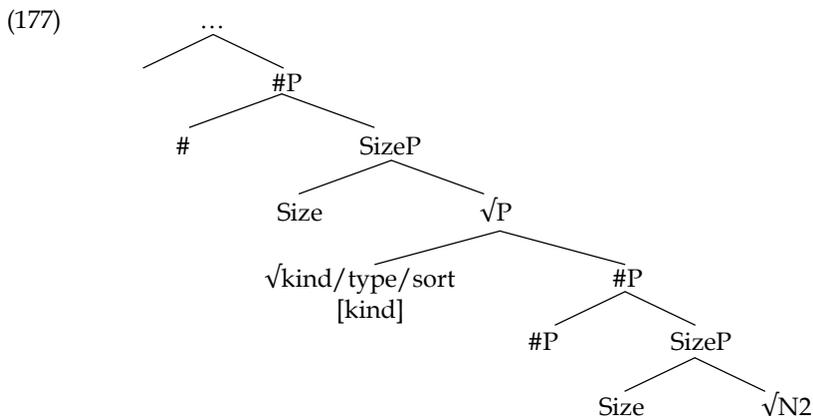
- (175) This kind / type / sort of jeans
 (176) These kinds / types / sorts of jeans

In the analysis of canonical count nouns (section 7.4.2.2), the #P was taken to be

incapable of distinguishing *pluralia tantum* nouns from canonical plurals, the set of nouns had to be chosen, choices which I made by drawing on the expertise and discussion of Acquaviva (2008). *Guts*, for example, has a singular counterpart, but the singular does not carry the same interpretation as in (172): *gut* = 'intestines, inner belly', *guts* = 'gumption, bravery.' *Goods* ceases to be a noun if the plural is removed (*goods* vs. *good*) and *feelings*, while it does have a singular (*a good feeling*), seems to have a slightly different interpretation in the plural (*She hurt his feelings* / **feeling*), suggesting that the two are disconnected to some extent. Searching the set of more canonical *pluralia tantum* nouns (*jeans, pants, scissors*) did not result in enough relevant examples, hence the move towards more unusual examples.

shared between the kind-word and N2. This was modeled via an Agreement relation which linked the SizePs of the kind-word and N2, and those to the #P. *Pluralia tantum* nouns do not show a number restriction, and thus, it cannot be the case that the kind-word merges under the #P of the N2.

I propose that the difference is related to the semi-lexicality of the *pluralia tantum* noun. As mentioned at various points in this dissertation (sections 2.3 and 4.3.2.3), *pluralia tantum* nouns carry a plural number feature in their lexical specification. The effect is that a *pluralia tantum* noun necessarily projects plural # in a nominal context. I hypothesize that this is the source of the difference between the canonical plurals illustrated above in section 7.4.2.2 and *pluralia tantum* plurals. The kind-word necessarily Merges *after* # has projected. This places the kind-word above the #P. It creates a structure with two independent #Ps, one projected by the kind-word, the other by the *pluralia tantum* noun. This is illustrated below.



Because each root is accompanied by its own SizeP and #P (and hence, presumably has its # determined by that #P), the structure does not predict any interaction between the number features of the kind-word and the N2. This correctly predicts the kind-word to be free to surface as singular or plural.

7.4.4 An indefinite N2

In this section, we turn to the configuration in which an indefinite article surfaces in the kind-construction (*this kind of a dog*). The construction differs in a subtle way from examples with a bare singular (*this kind of dog*), and we begin by probing the differences between the two (section 7.4.4.1). In section 7.4.4.2, we consider whether the kind-generalization, which shows sensitivity to #, might also apply in this construction and in section 7.4.4.3, I present an analysis.

7.4.4.1 Indefinite and bare N2s in the kind-construction

Examples with a singular kind-word and singular indefinite or bare N2 are common in the corpus. Quite often, they seem to be interchangeable with little interpretational difference. Each of the examples cited below originally surfaced in the corpus with an indefinite, but removing the indefinite does not change the grammaticality (as indicated by parentheses):

- (178) It's not research, like Dr. Lantos was talking about, but it's a moral experiment for the parents in **this kind of (a) situation**. (COCA: CNN_King 1990)
- (179) But come in quickly if you hear **any kind of (a) ruckus**. (COCA: Analog 2001)
- (180) We wish there was no need for **this type of (a) camp** but the reality is there is a need. (COCA: OrangeCR 2013)
- (181) You're talking about **what type of (a) tax system** we have (COCA: CNN_Crossfire(1) 1997)
- (182) I don't think there's any evidence that there's **any sort of (a) bandwagon effect** based on who's ahead (COCA: NPR_Science 2004)
- (183) I would not be eligible for something – for **that sort of (a) program**. (COCA: NPR_Morning 1998)

The two constructions differ in terms of overall frequency, where the use of an indefinite N2 is much less frequent than the use of a bare N2. We can illustrate this by comparing frequencies of the sequence “demonstrative_{SG} + kind-word + of + (a) + N2.”²⁸ As the table below shows, a bare N2 occurs nearly 20 times more than an indefinite N2 with *kind*, and around 60 times more with *type* and *sort*:

(184) Table 3: Frequency of bare N2/indefinite N2

	<i>kind</i>	<i>type</i>	<i>sort</i>
<i>this/that</i> __ of N2	20301	6364	5959
<i>this/that</i> __ of a(n) N2	1060	109	102

The lower overall frequency of the indefinite construction suggests that the use of an indefinite in the kind-construction is a restricted option, which may require a

²⁸ While it might seem more intuitive to conduct a general count without the demonstrative, it invites many more false hits than including a demonstrative does. Recall from section 7.2.1 that kind-words also have an adverbial use (*it's kind of a doozy*) and can function as hedges (*it's sort of a kind of a ...*). Such uses are less likely with a demonstrative, and hence, the inclusion of a demonstrative reduces the number of false positives. False positives or not, the numbers are different enough to support the conclusion of the text.

more specific context or set of features to be licensed. I now examine the interpretational differences between a bare N2 and indefinite N2.

Consider the following minimal pair:

- (185) a. That kind of dog
b. That kind of a dog

The difference between the bare N2 and the indefinite N2 is very subtle, but I propose that it relates to obligatory object-reference by the indefinite N2, in contrast to the bare N2. In particular, an indefinite N2 must be referential with some entity relevant to the present context or discourse. A bare N2, on the other hand, may or may not be object-referring. Object-reference is not required. We can bring this distinction out more clearly by contextualizing it. In the example below, the use of an indefinite is less acceptable.

- (186) A: Oh look! They have Terriers and German Shepherds at the pet shop!
B: Cute! I love Terriers! I want **that kind of (??a) dog** one day!

The kind-construction above references dog subkinds in terms of breed, e.g. Terriers and German Shepherds, with the speaker expressing a desire to own a dog of one of those breeds. Crucially, there is no particular dog-instance which is being referred to in the context or discourse, only dog breeds, as evidenced by the dog types the speaker sees in the shop window. To make the indefinite acceptable, it is necessary for there to be some discourse or context relevant exemplar dog which the N2 can refer to. For example, the sentence in (187) below is compatible with a scenario in which the speaker sees a dog with some characteristic property (e.g. cuteness, extreme happiness, etc.), and is expressing a desire to own a dog with a similar quality.

- (187) I want that kind of a dog!

In this case, it is no longer about the breed of dog, but rather, some quality which is possessed by that dog and that dog alone (in the given context). The kind-construction seems to extrapolate from the dog instance and build a kind. Notice the similarity of this discussion to what we saw with regards to the ability of Dutch *soort* to embed both unit-reading and kind-readings of mass nouns (section 7.3.2). As I argued there, it is possible for the Dutch kind-word *soort* to build kinds out of both types of N2s. With regards to these examples in English, the kind-word takes as its input an object-referring N2 and converts the reference to the kind-domain. The result of this process is a very context/discourse-specific

subkind, which is defined on a context or discourse relevant exemplar.^{29,30}

We can examine more examples in the corpus to illustrate this further.

- (188) As he moves away, I see **the kind of dog** he is, a nasty, overbearing one, with close-cropped fur and ears laid back along his narrow, mean head. (COCA: AntiochRev 1993)
- (189) Jake's ears are so long they touch the ground when he is checking a scent, which is most of the time, as he is **that kind of a dog**, part basset. (COCA: NewEnglandRev 2015)

Here the bare N2 refers to a dog kind in terms of a personality trait, while the indefinite N2 refers to a dog kind in terms of breed. I have chosen examples which switch the type of kind-reference in order to also show that the way the kind-space is divided (i.e. in terms of breed or personality) is not dependent on the construction type. The crucial case is example (189). There is an apposition *part basset*, which ascribes a name to the subkind denoted by the construction, showing the kind-space to be divided in terms of breed. At the same time, *a dog* refers to Jake or dogs like Jake, whose ears are so long they touch the ground when checking a scent (which is often), and share these properties with dogs which are (part) basset. If we remove the indefinite, the connection to Jake and dogs like Jake is reduced, and instead, we seem to be just specifying breed, without including properties of Jake. In other words, the dog-subkind in (189) with an indefinite refers to breed, but importantly, breed as defined by characteristics of Jake.

The following set of examples are even more subtle:

- (190) At one point, he discovered that a treasurer had misspent about \$10 of the group's money, so he hauled the girl before a meeting, recalled Mr.

²⁹ Bennis, Corver, and den Dikken (1998) notice a similar contrast in the Dutch *wat-voor* construction (Corver, p.c.), characterized by the presence or absence of an indefinite.

i. Wat voor (een) jongens zijn dat?
 What for a boys are that
 'What kind of boys are those? / which boys are they?'

(Bennis, Corver and den Dikken 1998: 113, ex 51 a&b)

They report that without the indefinite, the construction can be interpreted as asking for a type or a set (e.g. *what kind of boys are those?* or *which boys are they?*), but with the indefinite only the set interpretation (*which boys are they?*) is permitted.

³⁰ The distinction I make here may be related to the 'representative object interpretation' (Dayal 1992, Krifka et al. 1995), as exemplified below:

i. In Alaska, we filmed the grizzly. (Krifka et al. 1995: 78, ex 124f)

As Krifka et al. (1995: 83) describe it, "if the object in the situation described is only relevant as a representative of the whole kind, then a property can be projected from the object to the kind." In this example, there is one grizzly bear being filmed (=object), but it is representative of the kind *grizzly*. See Dayal (1992) for a potentially related phenomenon with indefinites in Hindi; she also discusses the role of context in licensing kind-reference.

Falcon, a member at the time, and reduced her to tears. # “He was like a prosecutor,” Mr. Falcon said. “He could have talked to her privately, but instead he made a big deal of it. He was just **that kind of a guy**.” (COCA: NYTimes 2005)

- (191) He likes to get things done. A lot of people like to hear themselves talk. I don’t think he’s **that kind of guy** at all. (COCA: Denver 2014)

There is a specificity difference between the two examples. In (190), the context describes the behavior of one man and *that kind of a guy* refers to guys with behaviors and personality traits like the man in the context. In other words, we extrapolate from a context-specific referent to a subkind. In (191), *that kind of guy* is more general, and does not refer to a single specific person, but rather a general class of people, namely “people who like to hear themselves talk.” From this, we extrapolate to a kind. The indefinite N2 makes use of a specific exemplar, while the bare N2 does not. The analysis proffered here predicts that when an indefinite is present, there must be some kind of exemplar, whether existing in the external world (i.e. a salient dog entity, which the speaker can see, hear, and touch) or created contextually (i.e. the description of the behavior of a man). No such requirement seems to hold with a bare N2.

Supposing the distinction given above is on the right track, we expect to find fewer instances of the kind-construction with an indefinite N2 than with a bare N2. To use the indefinite, the context must set up an exemplar, and this will necessitate more contextualization than if no exemplar is necessary. Furthermore, we only expect the indefinite to be used if speakers want to make a direct connection to some discourse/context-salient referent, and this state of affairs may simply be less common. At any rate, based on the extra contextualization needed to license the indefinite, we can expect it to occur less frequently.

Given the need for an exemplar for the indefinite N2 to refer to, the next question is what sort of indefinite we are dealing with. I propose that this is a typical indefinite article, which introduces some referent to the discourse. This connects to the need for an exemplar in the kind-construction – the exemplar is the instantiation of the object which is referred to by the indefinite article and noun. Recall from the discussion in section 7.3.1 that indefinite singulars in English are necessarily object-referring (Krifka et al. 1995). Kind-reference only arises at the sentence-level in characterizing sentences.

- (192) **A potato** rolled out of the bag. *Object-referring*
 (193) **A lion** has a bushy tail. *Kind-referring, characterizing sentence*
 (Krifka et al. 1995: 9, ex. 20a)

Indefinite singulars can only denote kinds with the assistance of further structure or some operator. Otherwise, a referring indefinite singular is object-referring. With regards to the kind-construction with an indefinite N2 (*this kind of a dog*), we might expect object-reference on the N2, this necessitating some contextually

salient “object” which the N2 refers to. This is the source of the requirement that there be some exemplar: the exemplar *is* the object referred to by the N2. The addition of a kind-word on top of an indefinite has the effect of creating reference to a subkind which has been extrapolated from the referent of the N2. Thus, like we saw for Dutch, the kind-word builds a kind out of the N2, regardless of what it denotes. Here, given that it refers to an object, the subkind which is created is defined on that object, and thus, we find a very context specific-type of subkind.³¹

7.4.4.2 Mutual exclusivity

Following the previous discussion, I hypothesize that the indefinite article in the kind-construction is similar to the indefinite found with indefinite nouns. This suggests that the structure under the kind-word is larger than a bare root, and presumably includes a #P. As per the analyses in the preceding sections, we expect the kind-word to freely occur as singular or plural. Despite this, there does seem to be a matching effect, and in this section, we identify a potential explanation: mutual exclusivity.

At a broad level, the combination of a plural kind-word with a singular indefinite N2 is generally ungrammatical:

- (194) a. *These kinds of a rabbit
 b. *These types of a car
 c. *These sorts of a rug

Likewise, the combination of a plural kind-word with an indefinite N2 is

³¹ Zamparelli (1998) proposes that the use of an indefinite in the kind-construction should be considered an example of the N-of-an-N construction (e.g. *a scumbag of a father*, den Dikken 2006), rather than the kind-construction. His gives three reasons: the construction is rare, it is restricted mostly to contexts with *what* or *some* as premodifiers, and it triggers a negative connotation. I disagree. As discussed above, the construction is rare as it requires an exemplar. Furthermore, it is not restricted to *what* and *some*. Demonstratives, *any*, *the*, and adjectives also occur commonly. Across the three kind-words, we find the following frequencies: *what*: 1106, *some*: 1417, *this/that*: 1271, *any*: 403, *the*: 127, adjectives: 503. Finally, while some examples can have a negative connotation (i), this is not necessary (ii, iii):

- i. You woke me up and now you won't feed me? **What kind of a nurse** are you? (COCA: Bk:DeadBroke 2008)
- ii. As a family, they spend so much time doing community service. All of them, his sister, his mom and his father. He was raised in **that kind of an environment**. (COCA: OrangeCR 2014)
- iii. “Could you write a patent for us, Wally?” “**What sort of a patent?**” (COCA: Analog 2010)

Negative connotations also surface without the indefinite (*what* being the unifying factor):

- iv. **What sort of person** announces to her boyfriend that she's pregnant as part of a stand-up monologue in a comedy club? (COCA: KenyonRev 2014)

Instead, I propose to treat the indefinite construction with the kind-construction.

extremely rare in the corpus. It occurs once with *sorts*, not at all with *types*,³² and only twelve times with *kinds*.³³ The low frequency argues for the general unacceptability of a plural kind-word with a singular indefinite N2, a surprising result if the N2 projects its own #P. The #-features of the kind-word and N2 are not predicted to interact if the #P is not shared.

There are reasons to believe that there may be a semantic condition interacting with the data. Carlson (1977: 212-214) observes that a single entity cannot normally instantiate multiple kinds or subkinds, a property I term “mutual exclusivity.” He starts with the following example:

(195) Two kinds of dogs are in the next room.

The question is whether an example like the one in (195) could ever be used to describe a single dog, which happens to instantiate at least two dog kinds. For example, both Collies and watchdogs are kinds of dogs. Suppose that in the next room, there is a dog, Fido, and he happens to be both a Collie and a watchdog. In this scenario, Fido instantiates two subkinds of the kind dog. However, if any person walked into that room and saw only one dog, they would contest the sentence. For (195) to be true, there must necessarily be at least two dogs in the room, if not more. Carlson terms this the “disjunction condition.” One dog cannot be taken to instantiate multiple kinds; each dog maximally represents one kind in the kind-hierarchy, hence the fact that Fido, a Collie and a watchdog, cannot validate the sentence above. This is also illustrated by the following example.

(196) There are two kinds of cars in the world: cars that run right, and Fords (Carlson 1977: 213)

Sentence (196) implies that Fords are cars which do not run right. Because the

³² There are two hits, but they are not relevant; for example, *some types of a mother's psychological problems...* (COCA: Education 2009) is clearly not our construction.

³³ The hits can be categorized as (i) idiomatic, (ii) a variant involving pre-modifier *all*, which may be a very reduced or dialectal option, (iii) obviously ungrammatical cases, and (iv) acceptable examples, which seem to require the indefinite to refer to a plurality of sorts.

- i. I felt like **ten kinds of a fool** when I knew the truth (COCA: Bk:TrueColors 1991)
- ii. Well, I may be **all kinds of a son of a bitch**, and the prince of whatever, but that doesn't mean I wouldn't, [...], stand up and take the bullet for you. (COCA: Mov:ManTrouble 1992)
- iii. And doing **this kinds of a deal** gives them the global dial tone and the muscle to start positioning themselves for the next wave of Internet. (COCA: PBS_Newshour 2000)
- iv. I was interested in portraying that a sexual life for a woman isn't necessarily compartmentalized; it flows in and out of **the other kinds of a woman** that she is -- a worker, a lover, a mother, a daughter, a friend -- all those dimensions are woven into one another. (COCA: America 1994)

We briefly return to the counterexample in (iv) in section 7.4.4.3.

whole of the set of cars in the world has been divided into cars which run right and Fords, mutual exclusivity blocks any car which has been classified as a “Ford” from also being classified as a “car that runs right.” By implication, Fords are cars that do not run right. This is the mutual exclusivity of kinds at work – no single object can instantiate more than one kind in the kind-hierarchy.

Mutual exclusivity seems to play a role in the general unacceptability of a plural-singular combination in the kind-construction. I have argued that in the indefinite construction, the N2 is object-referring, and references some exemplar from which the kind is built. This implies that the exemplar itself is an instantiation of the subkind. If we combine a plural kind-word with a singular indefinite N2, it is the equivalent of trying to build multiple subkinds out of a single exemplar or entity. This is outlawed by mutual exclusivity. The same entity cannot instantiate multiple subkinds, and hence we predict the absence of a plural kind-word with an indefinite marked N2.

7.4.4.3 The syntax of kind-words with indefinite singular nouns

In the preceding sections, we have studied kind-words which combine directly with a root, either a numberless root or a count root with a #-feature, and kind-words which combine with a #P, required in the case of a *pluralia tantum* noun. Where the kind-word combines has predictable effects on how number in the kind-construction is expressed: if the kind-word combines before a count root has projected a #P, number matching occurs (modeled via Agreement); if the kind-word combines after a count root has projected #P, no matching effect occurs. We have now introduced a new construction, which involves the projection of the indefinite article under the kind-word. Number in this construction is constrained not by the kind-generalization, but rather mutual exclusivity, which prevents a single entity from instantiating multiple subkinds. In this section, we discuss the structure involved with an indefinite N2, paying careful attention to where in the structure the indefinite should be located.

In chapter 6, section 6.4.3, I proposed the default cardinality marker *a(n)*, drawing on the work of Lyons (1999). This default cardinality marker was numberless, and surfaced in QP when QP was not lexicalized. This occurred in various cases, for example, with a numeral modified by an adjective, or with a Q-noun which lacked morphological plurality:

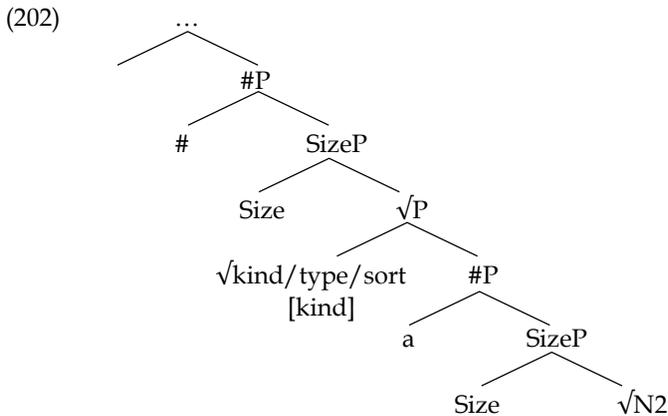
- (197) A good twenty students
- (198) A bunch of students

In both cases, *a* was proposed to surface in QP, given that the numeral or Q-noun was unable to. In the kind-construction, this solution seems insufficient. If *a* lexicalized the QP, this would predict that a QP could be generated under the kind-word, and therefore, quantificational material should surface:

- (199) *This kind of a good one dog
 (200) *These kinds/this kind of a bunch of dogs
 (201) *This kind of one dog

The unavailability of such material would suggest that no QP layer is present under the kind-word. Where, then, might the indefinite article be located? In certain works, it has been hypothesized that the indefinite article is merged in the #P projection. This is, for example, the approach of Borer (2005), who models the indefinite article as originating in #P and moving up to DP. By placing the indefinite article first in #P, Borer captures the fact that it is linked to a specific #-value, namely singular. Similarly, Le Bruyn (2010) argues on a semantic basis for the merge-site of the indefinite article as #P. If, like Borer and Le Bruyn, we take the indefinite article to merge in a position which is *lower* than QP or DP, for example #P, we can capture the fact that the indefinite can surface in the kind-construction, while other material, such as definite determiners or quantifiers cannot. The maximum amount of structure under the kind-word does not extend past a #P, or rather, the classification domain of the N2.

Let us suppose that the initial merge-site of the indefinite article is #P. This is a preliminary hypothesis and requires more consideration, but for the moment it suffices.³⁴ Assuming a #P to host the indefinite, the kind-word and its functional structure is generated above the #P.



The structure itself does not predict any interaction between the number features

³⁴ As discussed in chapter 6, section 6.4.3, we cannot link the default cardinality marker to singularity, as that would make incorrect predictions about its distribution. This may suggest that either the indefinite article and default cardinality marker are different lexical items, despite a similarity in surface form, or they are one and the same, but our understanding of the morphosyntax and position(s) of the indefinite needs to be refined.

of the kind-word and the N2, given that they each have independent #Ps. As mentioned previously, there does seem to be a number matching effect in the construction, such that a plural kind-word does not occur with a singular N2. As discussed in section 7.4.4.2, this can be related to mutual exclusivity, which bars a single entity (our object-referring N2) from instantiating multiple kinds. Thus, the syntax does not predict ungrammaticality, but the semantics does. One puzzling counterexample which arose in the corpus was the following (see fn. 33):

- (203) I was interested in portraying that a sexual life for a woman isn't necessarily compartmentalized; it flows in and out of **the other kinds of a woman** that she is -- a worker, a lover, a mother, a daughter, a friend -- all those dimensions are woven into one another. (COCA: America 1994)

The indefinite seems to be interpreted as a type of plurality, where *a woman* is also conceived of as *a worker, a lover, a mother, a daughter* and *a friend*. The example is acceptable, despite mutual exclusivity, and this seems to relate to the plurality inherent in the interpretation of the N2. The context divvies up *a woman*, allowing mutual exclusivity to be satisfied. Thus, while the structure does not predict a matching effect in the number features, mutual exclusivity will enforce it, unless circumvented in some way (as in the example above).

This construction shows that what the kind-word combines with is not fixed. It can combine with various sizes of N2s, so long as they have not projected farther than the classification domain (QP, DP). Because the indefinite is generated relatively low in the structure, it can surface while other elements cannot. By inserting the kind-word above the N2, we do not expect number matching to occur in this construction; the fact that it does is related to an independent condition, namely mutual exclusivity. Together, this accounts for the patterns with the indefinite article.³⁵

7.4.5 *Kind-words with minimal functional structure*

Till now we have considered kind-words which are capable of morphologically expressing singular and plural. However, some kind-words seem to lack number altogether. In this section, we discuss such "numberless" kind-words. Note that the morphosyntactic pattern we discuss in this section has been termed "kind-

³⁵ An open issue is why a root cannot project a plural #P under the kind-word (predicting **this kind of dogs*), while a singular #P with *a* can. Potentially, projection of #P with canonical nouns (not *pluralia tantum* nouns) is only possible if object-reference is intended, and object reference with plurals requires more than a plural #P to achieve. Carlson (1977) points out a number of significant differences between bare plurals and indefinite singulars, and a study of those in relation to the kind-construction could help uncover a motivation as to why #P-projecting bare plurals do not seem to occur. This is a matter for future research.

constructions of the third kind" by Keizer (2007: 154) and categorized as a postdeterminer or complex determiner in Denison (2002).

7.4.5.1 Numberless kind-words

Given our study of kind-words so far, we expect phrases like those in (204) to be ungrammatical. This is true:

- (204) a. *This kind of rabbits
 b. *This type of cars
 c. *This sort of rugs

However, there are a number of very specific contexts where a mismatch of precisely this combination of number features is fully acceptable. While a singular demonstrative like *this* or *that* produces ungrammaticality, plural demonstratives like *these* or *those* do not.

- (205) ...they're accessible to people in a way that **these kind of images** never were. (COCA: PBS_NewsHour 2012)
 (206) Studies have shown that **these type of stressors** are directly associated with illicit drug use. (COCA: DrugIssues 2007)
 (207) And I think there's a real mean-spiritedness in him, in which **these sort of remarks** come out. (COCA: NPR_Weekend 1995)
 (208) And you said, you know, you're a little bit uncomfortable with **those kind of games** but you do find them to be fun. (COCA: NPR 2015)
 (209) Judge Brennan generally avoided **those type of events** whenever he could. (COCA: Bk:Airtight 2013)
 (210) So **those sort of stories** are quite, probably, relevant to our past. (COCA: NPR_Science 2012)

Similarly, the definite article *the* is perfectly acceptable, as is the wh-word *what*:

- (211) Well, **the kind of fires** that I'm photographing are quite different than what you're seeing in California. (COCA: NPR_Sunday 2003)
 (212) They were **the sort of women** who remained little girls around their mothers. (COCA: VirginiaQRev 2013)
 (213) And I had never paddled in **the type of conditions** I would soon be facing. (COCA: PopMech 2015)
 (214) And who knows **what kind of things** are going to blow up. (COCA: CBS 2015)
 (215) So, **what sort of monsters** lurk down here? (COCA: FantasySciFi 2014)
 (216) There also seems to be a misunderstanding of **what type of operations**

are counted for air traffic purposes. (COCA: Chicago 1997)

Zamparelli (1998) finds similar data in the British National Corpus for *kind*, where the majority of examples involving singular *kind* with a plural N2 used *what*, *the*, *these*, or *those*. I repeat Zamparelli's (1998: 292 Table 1) BNC counts for the word *kind* below, and also include counts from the COCA, which shows the same general trend. Given the sheer number of hits, I have not verified these to be true hits, and thus, the actual COCA counts are bound to be less.³⁶

(217) Table 4: Counts of phrases *pre-modifier kind/type/sort of N_{PL}*

Pre-modifier	Counts <i>kind</i> (BNC, Zamparelli 1998)	Counts (COCA)		
		<i>kind</i>	<i>type</i>	<i>sort</i>
<i>what</i>	116	2137	156	305
<i>the</i>	526	2737	651	566
<i>these / those</i>	45	1248	270	195
<i>this / that</i>	6	266	55	62
Others	106	—	—	—
Total	799	6388	1132	1128

This shows us that in both British and American English, a mismatch is permitted, so long as it is preceded by a plural demonstrative, or an element which does not overtly mark number (*the*, *what*). The ungrammaticality of (204) (e.g. **this kind of dogs*, **this type of cars*, **this sort of rugs*) appears to stem from the specification of singular number on the demonstrative, and not from anything in the form of the kind-word itself. A simple explanation for these facts would be that the kind-word, despite appearances, is not actually singular; rather, it is numberless.³⁷

If numberless, then we predict that (a) elements which explicitly require or express singularity (*each*, *every*, *one*, etc.) should be ungrammatical and (b) number ambiguous elements (*the*, *what*, *any*, *some*, etc.) should be possible. Both predictions seem true. In the table below, I provide counts for the occurrence of the premodifiers *one*, *every*, *single*, *another*, and *each* in combination with a "numberless" kind-word and a plural N2. These examples have been verified to be true hits.³⁸

³⁶ Some examples of false positives which I found in the search but have not excluded are:

- i. So **this kind of levels** the playing field. (COCA: NPR 2013)
- ii. **This kind of grass-roots** organizing could alienate some of the very lawmakers it aims to persuade (COCA: CSMonitor 2009)

I have left such examples in the counts, given my inability to systematically exclude them.

³⁷ The adverbial use of kind-words (see section 7.2.1) may similarly be numberless. If and how these uses are connected remains a topic for future research.

³⁸ An obvious choice for a singular-requiring element is the indefinite article *a*. However, the indefinite also often occurs in the approximator or qualifying construction (see section 7.2.1), and I lack an automatic way of excluding such uses from the counts. As there are too

(218) Table 5: Corpus counts for *premodifier kind/type/sort of N_{PL}*

Pre-modifier	Counts (COCA)		
	<i>kind</i>	<i>type</i>	<i>sort</i>
<i>one</i>	6	2	1
<i>every</i>	3	1	0
<i>single</i>	0	0	0
<i>another</i>	2	0	2
<i>each</i>	1	3	0
Total	12	6	3

Examples with a singular-requiring pre-modifier are extremely rare in the corpus. Adapting some of the sentences we've seen already, the use of these singular elements is also ungrammatical:³⁹

- (219) Singular-requiring pre-modifiers
- a. *{A (single) / one / every / each / another} kind of things are/is going to blow up.
 - b. *{A (single) / one / every / each / another} type of operations are/is counted for air traffic purposes.
 - c. *{A (single) / one / every / each / another} sort of monsters lurk(s) down there.

As for the second prediction, we expect number ambiguous pre-modifiers to be relatively common and generally acceptable. We have already seen this to be true for *what* and *the*. It also holds true of *some*, *any*, and possessives (albeit with a lower frequency, especially possessives). Because there are so many hits, I have not verified that all are true hits and the actual numbers are bound to be lower.

many examples, I have chosen to exclude the indefinite here.

³⁹ However, there are a few exceptions, and the following seem to be acceptable:

- i. **One kind of parents** sent their kids to Dr. Lassiter. (COCA: BkSF:DownRabbit Hole 2006)
- ii. Participants' scores of modeling advantage in **each kind of teachers** ranged from 8 to 56. (COCA: Adolescence 2008)
- iii. Don't stop at baking just **one kind of cookies**. (www.holidayinsights.com/other/bakecookiesday.htm)
- iv. Birds are **a kind of dinosaurs**. (COCA: CNN_SunMorn 2005)

The N2 may in some sense be functioning as a collective unit, this permitting the singularity on the kind-word. Again, more research is necessary.

(220) Table 6: Corpus counts for *premodifier kind/type/sort of N_{PL}*

Pre-modifier	Counts (COCA)			Total
	<i>kind</i>	<i>type</i>	<i>sort</i>	
<i>what</i>	2137	156	305	2598
<i>the</i>	2737	651	566	3954
<i>some</i>	243	30	162	435
<i>any</i>	278	47	72	397
possessives	48	10	11	69
Total	5443	894	1116	7442

Some examples from the corpus with pre-modifiers of *some*, *any*, and possessives are given below.

- (221) Most communities have **some kind of fairs or activities** where a club can educate and promote. (COCA: PSAJournal 2006)
- (222) Why isn't somebody doing something to put **some type of programs** in here for us? (COCA: CBS_Sixty 1993)
- (223) **Some sort of irregularities** must have been present in the universe at the outset. (COCA: Mercury 1992)
- (224) I have never tried **any kind of drugs** other than beer and cigarettes. (COCA: Houston 2009)
- (225) We try to limit **any type of pathogens** in the product to begin with. (COCA: Denver 2011)
- (226) Anybody have **any sort of opinions** about juxtaposition? (COCA: NBC_Dateline 2009)
- (227) Senator Chafee concedes that **his kind of Republicans** are a distinct minority among... (COCA: NPR_ATC 2004)
- (228) They had never seen anyone with **her type of injuries** recover. (COCA: CBS_48Hours 2001)
- (229) I mean this goes to Ana's point that you're not going to get **your sort of policies** through if you can't actually sit down and work with people in Congress. (COCA: CNN 2012)

Morphologically, singular kind-words cannot co-occur with a singular requiring element (*a*, *one*, *each*, *every*, etc.), but they can co-occur with a number ambiguous element. This supports the hypothesis that the kind-words we see in these examples are morphologically numberless.

Agreeing demonstratives and verbs provide further evidence for this hypothesis. Demonstratives are necessarily plural (as seen earlier), and so are verbs (demonstrated below).

- (230) ...they're accessible to people in a way that **these kind of images** never

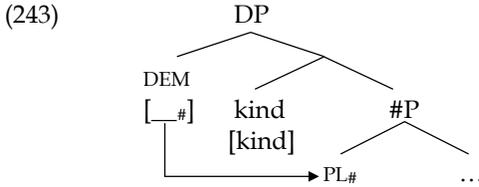
- were/*was.** (COCA: PBS_NewsHour 2012)
- (231) Well, **the kind of fires** that I'm photographing **are/*is** quite different than what you're seeing in California. (COCA: NPR_Sunday 2003)
- (232) And who knows **what kind of things are/*is** going to blow up. (COCA: CBS 2015)
- (233) There's no respect and **any kind of boundaries are/*is** thought of as being just sort of silly. (COCA: PBS_Tavis 2006)
- (234) **Some kind of demons are/*is** chasing him through his sleep. (COCA: Etcetera 1994)
- (235) But the truth is **those type of novelties are/*is** far overrated. (COCA: LiteraryRev 2006)
- (236) I was convinced because **the type of agents** that Dr. DeGusta mentioned **are/*is** not represented in these fossils. (COCA: NPR_Science 2010)
- (237) There also seems to be a misunderstanding of **what type of operations are/*is** counted for air traffic purposes. (COCA: Chicago 1997)
- (238) They are there to sell, not particularly Madonna, but **those sort of superstars are/*is** there to sell a product. (COCA: CNN_King 2004)
- (239) **The sort of issues** discussed **include(*s)**: "I'm not the lead professional but the parent keeps coming to me"; ... (COCA: CommunCare 2010)
- (240) So, **what sort of monsters lurk(*s)** down here? (COCA: FantasySciFi 2014)
- (241) And even where **any sort of elections were/*was** held. (COCA: SocialStudies 1990)
- (242) And **some sort of congratulations are/*is** in order. (COCA: Analog 2002)

Presumably, agreeing verbs and demonstratives probe past the kind-word and agree with the N2. If the kind-word were singular, we would expect it to function as an intervener, predicting singular demonstratives and verbs. Instead, the kind-word seems to be invisible to agreement. A way of accommodating this is to say that the kind-word is indeed numberless.⁴⁰ Being numberless, it is invisible to Agreement processes and cannot license singularity on singular-requiring elements. This is visualized below.⁴¹

⁴⁰ Another way to go might be to say that it is an adjunct or specifier. However, it's not clear why a specifier or adjunct would be invisible to Agree with kind-words, but not for, for example, the subject of a sentence, which also presumably begins as a specifier.

⁴¹ Certain exceptions exist, though they are most common with *type* and occur in the set of academic texts. Examples are given below.

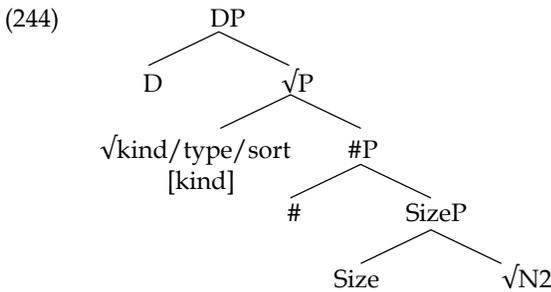
- i. The latter type of laws requires... (COCA: Church&State 1991)
- ii. A common and important type of rules has... (COCA: Communications 2011)
- iii. Each type of biosolids was mixed with... (COCA: BioCycle 1997)
- iv. The first type of benefits involves... (COCA: Education 2009)



We observed that the combination of a singular kind-word with a plural N2 is grammatical, provided the pre-modifier is a plural demonstrative or a non-singular-requiring element. Given that the kind-word acts invisible for both demonstrative and verbal agreement, I hypothesized that the kind-word is not actually singular, but numberless.

7.4.5.2 The syntax of numberless kind-words

Numberless kind-words are not very different from kind-words with functional structure. Like the other cases we have studied, this use of kind-words functions to create reference to a subkind of the N2. The main difference seems to lie in their functional structure, where numberless kind-words are deficient. Structurally, I assume just the root with its [kind] feature is inserted in the structure.



The kind-feature on the kind-word seems to be sufficient to generate kind-reference to a subkind of the N2. The functional structure of a kind-word then is not necessary for kind-reference. Notice, however, that without that functional structure, the construction cannot express multiple subkinds. Instead, it is restricted to a single subkind:

- (245) These kind/type/sort of people = 1 subkind of people
 ≠ 2+ subkinds of people

This follows from the fact that the kind-word lacks a #P.⁴² Since the kind-word

⁴² If no #P is present, then we lack evidence for a classification domain on the kind-word. Without a classification domain, no *of* is predicted to surface. The particle *of* does surface,

cannot express a singular-plural distinction, it cannot introduce multiple subkinds. In relation to this, it cannot host numerals or quantifiers:⁴³

(246) *These many/three kind/type/sort of people

Thus, numberless kind-words lack their own functional structure, the result being that they are deficient both in structure and the range of interpretations they can express. Furthermore, because they lack a #P, they cannot trigger Agreement, hence their invisibility to demonstratives and verbs. Together, this makes for a different sort of kind-word than we have been looking at in the previous sections, but it makes for a similar type of semi-lexical deficiency as we have seen in previous chapters, for example, Polish numerals 2-4 and 5+ (section 5.4) and English Q-nouns (section 6.4).

7.4.6 Summary

This section began with an observation from the literature that kind-words show identical number to the N2. This was captured in the kind-word generalization:

(247) **Kind-word generalization:** The number marking present on the kind-word (*kind*, *type*, or *sort*) and the N2 must be identical.

In this section, we have systematically considered the use of kind-words with different types of N2s. We started with mass nouns, which do not adhere to the kind-generalization: if the N2 is numberless, kind-words freely surface as singular or plural. This contrasted with the use of count nouns in the construction, which strictly followed the kind-generalization, with the effect that some instances of plurality on the kind-word were uninterpretable. We also considered *pluralia tantum* nouns, which behave like the set of mass nouns rather than the set of count nouns: number on the kind-word is free to be singular or plural.

These differences were modeled in terms of where in the structure the kind-word was merged. If the kind-word merged above the #P of the N2 (*pluralia tantum* nouns) or if the N2 was numberless (mass nouns), the # of the kind-word would be expressed independently of whatever the N2 was doing with number. This allowed the kind-word to freely surface as singular or plural. If, however, the kind-word merged before an N2 with count syntax projected a #P, then the configuration necessarily led to a matching effect. I proposed that count nouns

but it may differ in quality with such kind-words. Both *kind* and *sort* allow for a reduced form of the particle: *these kinda people*, *these sorta people*, although *type* resists it, *#these typea people*. The reduction of *of* could be related to a reduction in functional structure on the kind-word, but further research, in particular, the phonetic quality of the particle, is necessary.

⁴³ It remains an open question whether the D-level material (determiners, demonstratives) is projected by the N2 or the kind-word. This is not clear from the interpretation.

project a SizeP, and the Size-head carries a # probe. Their position in the structure leads to agreement between the two probes and the #P dominating them, with the result being that the kind-word and N2 have an identical number value via Size. This derived matching # features on the kind-word and N2, and I further speculated that whether # is interpreted on the kind-word or the N2 is optional, but potentially subject to contextual factors (e.g. the presence of a numeral).

Two other subcases were considered: indefinite singulars under the kind-word and numberless kind-words. I proposed that the indefinite singular was object-referring, with the indefinite article generated in a #P. This made the indefinite singular structurally comparable to *pluralia tantum* nouns, predicting the kind-word to freely surface as singular or plural. Despite this, a matching effect was still found. As a source for the matching effect, I discussed the semantic condition of mutual exclusivity, which prevents a single object from instantiating multiple kinds. The configuration with a plural kind-word and a singular indefinite N2 creates precisely this state of affairs, hence its general ungrammaticality. Finally, I also considered numberless kind-words. These showed that the kind-words could also surface with deficient functional structure, a result being that they could not participate in Agreement, nor could they be used to refer to multiple subkinds.

The morphosyntax of the kind-construction seems rather complex, but once we probe a bit, it turns out to be simple and systematic. Kind-words either project functional structure or not, and they combine with N2s which consist of a #P or smaller. These lead to a range of possibilities, both in interpretation and structure, allowing for a construction which can express various nuances of meaning.

7.5 Discussion and Conclusions

In this chapter, we studied the semi-lexicity of the English kind-words. English kind-words are very similar to lexical nouns, given that they are capable of projecting the full range of nominal projections: SizeP, #P, QP, and DP. However, they differ from lexical nouns in that they create reference to the kind-domain. Kind-words have a *function* in relation to the N2, which is expressed by the [kind] feature. This makes them both functional ([kind] feature) and lexical (a root), in line with the semi-lexicity hypothesis (chapter 2, section 2.3). In this section, I briefly discuss the semi-lexicity of kind-words and the implications for the study of semi-lexicity. Aside from the [kind] feature, there were two main semi-lexicity effects: the structure of the N2 and deficiency on the kind-word.

A semi-lexical kind-word interacts with the structure of the N2. A kind-word effectively takes over the projection of functional structure from the N2, blocking the N2 from projecting any further functional structure. For instance, in the case of a count noun, the semi-lexical head is inserted before the count noun projects #P, hence the number matching effect expressed in the kind-word

generalization. Once the kind-word is inserted, all higher structure belongs to it, and not the N2. In the case of a count noun, this implies that the count noun does not have a chance to project its #P, given the early insertion of the kind-word. The kind-word is, in fact, very similar to a restructuring head (Wurmbrand 2001): it takes a “small” complement and projects functional structure from there on up. We briefly explore this possibility in Chapter 8, section 8.3.

Of further interest in the configuration is the amount of structure an N2 can project. The highest projection we had evidence for was #P; neither QP nor DP surfaced under the kind-word. This implies that an N2 in the kind-construction can maximally project up to the classification domain. A similar restriction was found in the other semi-lexicality cases we considered. Both Polish numerals (chapters 4 and 5) and English Q-nouns (chapter 6) combined with a nominal which maximally projected a classification domain. In the context of quantification, there was a very simple solution: what followed the classification domain in the functional sequence was the quantity domain, and thus, if a quantifier is to appear, it would be expected to surface in the quantity domain. The N2 with only a classification domain is a natural consequence of the structure of the nominal domain. In the kind-construction, the issue is more complex. We have not identified a “genericity domain” in the functional structure of the N2 (though something like that may very well exist) and our syntax does not include a dedicated domain or structure for material associated with kind-interpretations. That such a restriction should exist is surprising.

As a suggestion, this may be an indication that our conceptualization of the “quantity” domain as indicating quantity is not fully accurate. In chapter 2, section 2.4.3, I developed the view that the nominal domain consists of four sub-domains: the identification domain, the classification domain, the quantity domain, and the anchoring domain. The inclusion of a quantity domain followed Hachem (2015) and was a departure from Wiltschko’s (2014) original formulation, which made use of “point-of-view” (a notion which is harder to translate into the nominal domain). With regards to the kind-construction, we have evidence that it occurs above the classification domain, and this places it in the region of the quantity domain. One way to interpret this would be to say that the kind-phrase is in some sense instantiating the quantity domain. Potentially then, what I have been calling the quantity domain is something even more general than quantity, and is the locus of both quantification and genericity. I do not have an answer to what this more general function might be, but it presents an interesting line for future research.

A final point to make about this form of semi-lexicality concerns the interaction of a kind-word with a count noun. Kind-words can combine with roots (mass and numberless N2s), SizePs (count nouns), plural #Ps (*pluralia tantum* nouns), and singular #Ps (indefinite singulars). However, what they cannot combine with is a plural #P of a canonical noun. This represents a gap in the paradigm and shows that there must be further constraints on the shape of the

N2. There are two ways to approach this, which involve either relating the problem to the bare plural (e.g. there is some problem for a plural #P under a kind-word) or to the kind-word (e.g. the kind-word is incompatible with a plural #P, unless it is necessarily plural, as in the case of a *pluralia tantum* noun). I lack evidence for either approach, and therefore, leave this issue open.

The second semi-lexicity effect we encountered was *deficiency* on the kind-word itself. This involved a sub-construction of the kind-construction which has received individual treatment in previous discussions of kind-constructions (e.g. Keizer 2007, Denison 2002). The kind-word behaves as if invisible to any agreement probes. As an analysis, I proposed the kind-word to be numberless, and moreover, to lack canonical nominal functional structure, including #P and QP (whether it or the N2 projects the DP remains vague). This type of semi-lexicity is very similar to what we have seen in the other cases of semi-lexicity we studied. In chapters 4 and 5, we identified Polish numeral 1000, which could surface without gender (γ P) with consequences for verbal agreement. Similarly, in chapter 6, the class of Q-nouns seemed to lack a canonical #P, showing an inability to interact with verbal agreement. In both cases, deficiency of the semi-lexical noun is involved: because the kind-word, Q-noun, or numeral is deficient in projecting canonical nominal structure, it does not interact with agreement in a canonical way, leading to (by now) familiar canonical effects.

This chapter has found further evidence for semi-lexicity in terms of deficiency, and new evidence for a third type of semi-lexicity, namely semi-lexicity which blocks the embedded noun from projecting any further structure. This chapter provides further evidence for the semi-lexicity hypothesis and moreover, illustrates how semi-lexicity might be instantiated with a different type of function in the nominal domain: genericity.

Chapter 8

Conclusion

8.1 Semi-lexicity

This thesis is a study of semi-lexicity. The literature sporadically reports elements which do not behave as expected, and are therefore “semi-lexical.” What exactly it meant to be semi-lexical, and how the different examples of semi-lexicity in the nominal domain, adjectival domain, and verbal domain related, however, had remained unexplained. This dissertation takes a step in that direction, by studying examples of semi-lexicity in the nominal domain. It developed what I have termed “the semi-lexicity hypothesis,” repeated below:

- (1) **Semi-lexicity Hypothesis:** Semi-lexicity is what arises when a root is also specified in the lexicon for a syntactic feature.

This dissertation took the radical approach that semi-lexicity isn’t really anything special. Language makes use of roots (lexical) and syntactic features (functional), and these can occur both in isolation and together. One type of lexical entry, however, does not have any different status from another type of lexical entry, and syntax simply computes “dumbly” on its input. When just a root is involved, the syntax is free to build any type of functional structure around that root (so long as it adheres to principles on how functional structure is constructed). In this situation, we consider the product of syntax to be “lexical.” Roots can project into nouns, verbs, and adjectives, and thus, these constitute the core lexical categories. On the other hand, when a root with features is involved, the syntax is no longer free, and is instead constrained by the requirements of that functional feature. Some features require the root to project a particular piece of functional structure, other features prevent the root from projecting some piece of structure, and others yet constrain the contexts in which the root can surface, for instance, requiring a piece of structure, or being incompatible with some piece of structure. When any of this occurs, we consider the product of syntax to be “semi-lexical,” given that the root in question does not behave how we expect a lexical

root to behave. However, the syntactic mechanisms are the same between lexical and semi-lexical roots, and thus, there is no semi-lexicality in syntax, only semi-lexical effects. Those semi-lexical effects derive from the semi-lexicality of the root, or rather, from the fact that the root is specified for a functional feature. It is in this sense in which semi-lexicality isn't really anything special: it is simply what arises when the lexicon combines features and roots, a state of affairs which is presumably more common than we are aware (e.g. gender on a root is by definition an example of semi-lexicality, but its semi-lexical effect is limited to specifying the value of γP in a nominal context).

The semi-lexicality hypothesis is what this thesis proposes can unify the other cases of semi-lexicality identified in the literature, including semi-lexicality in the verbal and adjectival domains. Once we have an understanding of what the canonical functional structure of an adjective or verb would be in a particular language, we can then explore how the specification of a functional feature on a root would interact with the projection of functional structure above and around that root. The prediction is that similar types of patterns should be found: features which prevent the projection of structure, require the projection of structure, are incompatible with certain pieces of structure, or are dependent on certain pieces of structure.

In the remainder of this chapter, I review the main findings of this thesis in relation to the research questions, and further, discuss implications of this work for the study of language variation and change and the well-studied phenomenon of restructuring, which may be related to semi-lexicality.

8.1.1 *Chapter summary*

In chapter 1, I introduced the driving research question of this thesis:

- (2) What does semi-lexicality in the nominal domain tell us about the nature of categories, in particular, the division between lexical and functional and the implementation of lexical categories?

This question was accompanied by the following sub-questions, designed to probe into the nature of semi-lexicality through a study of the nominal domain.

- (3) How can semi-lexicality be defined?
- (4) What types of semi-lexicality exist? How is it manifested?
- (5) How do languages differ in their expression of semi-lexicality?
- (6) Where does semi-lexicality originate?

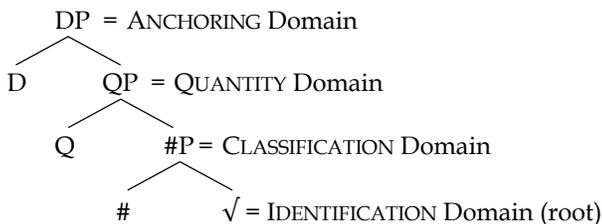
Chapter 2 developed a definition of semi-lexicality, thereby providing an answer to the research question in (3). This is the semi-lexicality hypothesis, which combines notions of lexicality and functionality to form semi-lexicality.

- (7) **Semi-lexicality Hypothesis:** Semi-lexicality is what arises when a root is also specified in the lexicon for a syntactic feature.

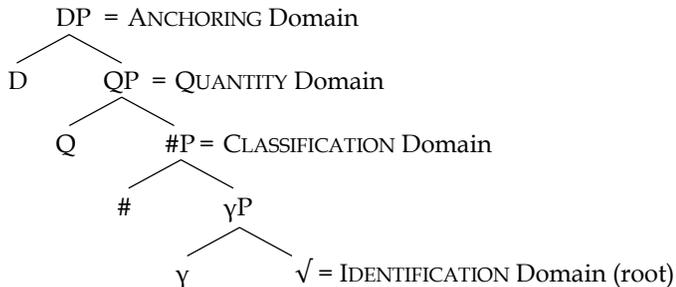
The semi-lexicality hypothesis implies that the specification of gender or plurality on a root is an instance of semi-lexicality. However, the effect of such feature specifications is rather different between the two cases. In languages which project gender (γP), the specification of gender on a root only has the effect of providing a value for that gender projection. In other words, whether or not γ is specified, the syntactic structure in a nominal context will be the same. This contrasts with *pluralia tantum* nouns, which are specified for plurality. The syntactic structure of a nominal root does not always include a projection for number ($\#P$), and thus, by specifying plurality on the root, *pluralia tantum* nouns place restrictions on the functional structure. The requirement of a plural $\#P$ has “semi-lexical” effects. The *pluralia tantum* noun cannot combine with a singular indefinite article (**a pants*) or appear in mass contexts (**much pants*), unlike roots without such a specification. This toy example illustrates the distinction made in chapter 2 between canonical and non-canonical categorial structures. Gendered roots project a canonical set of nominal structures (e.g. exactly the same range of structures a bare root would be capable of projecting), while numbered roots project a non-canonical set of nominal structures (e.g. not the same range of structures a bare root would be capable of projecting). While both are semi-lexical, the semi-lexicality of the *pluralia tantum* noun interacts with syntactic structure building in a way that the semi-lexicality of a gendered noun does not. This dissertation focused specifically on those cases of semi-lexicality which had consequences for structure building, and hence, non-canonical effects.

Chapter 2 further developed our understanding of a canonical nominal structure, adopting the idea of universal distinction domains (cf. Wiltschko 2014, Hachem 2015). In this dissertation, there were four relevant domains in a nominal structure: the identification domain, the classification domain, the quantity domain, and the anchoring domain. These correspond roughly to the root, γP and $\#P$, QP , and DP . I adopted the following basic structures for Polish and English:

- (8) Basic structure of the English nominal domain:



- (9) Basic structure in the Polish nominal domain:



Chapter 3 developed a theory of case and agreement, necessary to allow us to explore case and Agreement semi-lexicity effects. The standard approach to case and agreement is found in Chomsky (2000, 2001). This approach links case to agreement, such that an agreement relation is required for case assignment. The approach capitalizes on the correlation between case, agreement, and grammatical function in languages like English. However, in this chapter, I argued in favor of abandoning this link, instead taking case and agreement to be independent mechanisms. From this perspective, I developed the case and agreement mechanisms to be adopted in this thesis, drawing extensively on the literature. I assumed an agreement mechanism very similar to Chomsky, but with certain adjustments to allow for a wider empirical coverage, particularly with regard to the phenomena considered here. Like Chomsky, I proposed that agreement functions on pairs of valued and unvalued features. I took unvalued features to be probes, which begin probing immediately upon insertion. I assumed the search domain of a probe to be derivational, such that a probe searches first in its c-command domain (downwards) and then in structure dominating it (upwards); this is the cyclic agree mechanism of Řezáč (2003). If a matching feature (= feature identity) is identified, agreement occurs, and by feature sharing, those feature instances coalesce into a single feature (Frampton and Gutmann 2000). If no matching feature is identified, no agreement occurs, but the derivation does not crash (Preminger 2011).

The case mechanism I adopted is derived from the dependent case mechanism (e.g. Marantz 1991). I distinguished between structural and oblique case, such that structural case is assigned by the dependent case mechanism, and oblique case is triggered by an oblique-case-requiring head immediately upon its Merge into the structure. These two assumptions are responsible for timing effects in case assignment. Oblique case must be assigned immediately upon Merge of the relevant head, while structural (dependent) case waits until a case assignment domain has been built. This allows oblique case assignment to bleed the process of dependent case assignment. As a further assumption, I took case to be assigned to bundles of phi-features, rather than DPs. This resulted in a relation between the output of Agreement and case assignment, with Agreement feeding case

assignment. This reanalysis of case as functioning on phi-bundles rather than DPs was necessary to capture the DP-internal case assignment which would be dealt with in the following chapters. The theories of case and agreement developed in this thesis gave us the power to model case and agreement relations with semi-lexical heads.

Chapters 2 and 3 were theoretical and focused on developing the necessary background to explore semi-lexical phenomena. Chapters 4, 5, 6, and 7 turned to case studies of semi-lexicality, applying what we knew about the origins of semi-lexicality and the mechanisms of case and agreement to the data.

Chapters 4 and 5 together dealt with the semi-lexicality of Polish numerals. In chapter 4, I studied the Polish numerals 2-4, 5+, and 1000+, focusing on their patterns of case and agreement, but also considering their distribution in relation to *pluralia tantum* nouns and the distributive marker *po*. The study led me to propose the following three lexical specifications for Polish numerals:

- (10) *tysiąc* '1000': [$\sqrt{1000}$, (\neg)m[i] $_{\gamma}$, Q]
 (11) *pięć* '5': [[$\#_P$ [$\sqrt{5}$]], $\neg\gamma$, $\neg\#$, Q]
 (12) *trzy* '3': [[$\#_P$ [$\sqrt{3}$]], $\neg\gamma$, ($_ \gamma$), $\neg\#$, Q]

This illustrates a few ways features can trigger semi-lexical effects, and I briefly review them. Polish numeral 1000 optionally projects gender (γ), the gender value being masculine inanimate. The numeral is always semi-lexical, in the sense that it carries a Q-feature ("quantification"), but it can vary in the semi-lexical effects it triggers. When it projects gender, it is no different in its functional structure from a canonical lexical noun, and therefore, interacts with case and agreement as a canonical noun would. When it does not project gender, however, it is *deficient*. It can only partially project a nominal functional structure, with the γP crucially missing. This has important effects on case and agreement, which were illustrated in chapter 5. Because it has #, but not γ , the numeral still functions as a target for Agreement, and similarly, case, but it is a deficient target, necessarily triggering default agreement. The default agreement is a semi-lexical effect, deriving from the deficient functional structure of the numeral.

Numerals 2-4 and 5+ share with numeral 1000 deficiency in their functional structure. However, the level of deficiency is more severe. Numeral 1000 always projects # and optionally projects γ ; it is only optionally deficient in its functional structure. The numerals 2-4 and 5+, however, are simply incapable of projecting either γ or #, and thus, they have no functional structure of their own. This shows that the level of deficiency in the functional structure of a semi-lexical head can vary, with certain semi-lexical heads being more deficient than others. In either case, the effect on agreement is the same: the numeral can only trigger default agreement. The numerals 2-4 and 5+ further interact with the context they are embedded in, this being a difference from numeral 1000. Both 2-4 and 5+ require a #P in their immediate environment, and those structures which do not allow for

this configuration cannot host the numerals. It is for this reason that these numerals are incapable of combining with *pluralia tantum* nouns. This is a second type of semi-lexicity, where the feature specification places restrictions on the contexts in which the numeral can surface. Numerals 2-4 and 5+ show this requirement, whereas numeral 1000 does not.

Finally, the last type of feature specification we see on these numerals is the optional gender probe on numerals 2-4. As illustrated in chapter 5, the presence of this probe affects case and agreement, and in fact, makes the numerals seem more lexical than semi-lexical. Because these numerals carry a gender probe, they pattern with adjectives for case and agreement, rather than the other semi-lexical numerals. Thus, while agreeing numerals 2-4 have *more* feature specifications than non-agreeing 2-4 and numerals 5+, they behave more lexically with regards to case and agreement. This shows that certain semi-lexical feature specifications do not always produce a semi-lexical effect in the syntax, where a semi-lexical effect is understood as being aberrations from the lexical categories they resemble.

In chapter 6, we continued to study quantificational semi-lexical heads, but we focused particularly on quantificational nouns (Q-nouns) in English: *lot*, *ton*, *bunch*, and *number*. The intriguing puzzle with these elements was their resemblance to nouns despite their inability to control Agreement. Each of these Q-nouns could surface with an indefinite article and the particle *of*, e.g. *a lot of books*, *a ton of books*, *a bunch of books*, *a number of books*, and some could surface with a morphological plural *lots*, *tons*, *great numbers*. However, none of them could control Agreement, and instead, verbal agreement consistently targeted the N2. This constituted the starting point for the study of Q-nouns.

In this chapter, I considered each Q-noun individually, exploring its distribution with regards to adjectives and definiteness, and the status of its plurality and singularity. None of the Q-nouns appeared to project a true #P with semantic singularity or plurality. This explained their inability to control Agreement: lacking a #P, they could not function as an intervener for Agreement. Instead, I proposed that both the indefinite and the morphological plurality were lexicalizations of a projection QP, with the indefinite functioning as a default. It surfaced whenever QP could not be lexicalized, which was the case for morphologically singular Q-nouns. The study of Q-nouns further identified idiosyncrasies between the Q-nouns, with differences in their ability to express morphological plurality, to combine with definite material, and to combine with different classes of adjectives. The lack of morphological plurality represented a semi-lexical deficiency in the paradigm of the Q-noun, much like the deficiencies we saw with Polish numerals. In addition, certain Q-nouns were incompatible with definite contexts, as modeled by assigning them a feature INDEF (which could also have been written: \neg DEF). These Q-nouns showed the same type of semi-lexicity as was found with the Polish numerals, namely they placed a restriction on the set of contexts they could surface in. While Polish numerals 2-4 and 5+ were limited to contexts where a #P was projected above them, Q-nouns were limited

to contexts where a (definite) DP was *not* projected above them. Thus, the semi-lexical Q-nouns, in addition to showing semi-lexicity as a deficiency, also showed semi-lexicity as restrictions on the context.

In the final case study in chapter 7, I considered kind-words in English. Based on the study of numerals in Polish and Q-nouns in English, we had seen ways in which semi-lexicity surfaced when quantification was involved. Chapter 7 gave us the chance to consider semi-lexicity in relation to a different type of function, namely genericity or kind-reference. The function of a kind-word is to create reference to a subkind of the N2. Thus, in the phrase *this kind of dog*, we are referring to a subkind of dog, for example, the class of small dogs or big dogs. This function was captured through a [kind] feature, which kind-words were proposed to carry. The use of a kind-word had an effect on the interpretation, but additionally, it affected the morphosyntax of the N2, where the insertion of a kind-word prevented the N2 from projecting further structure. This led to semi-lexicity effects in the syntax, as seen by, for example, the apparent agreement between the kind-word and a (canonical) count N2. The use of a kind-word required small nominals under it, no larger than #P. A similar phenomenon was also identified with Polish numerals and Q-nouns, but it was explained via the functional sequence, where, given the position of the quantity domain above the classification domain, the N2 could not project any further structure under the numeral or Q-noun. With regard to kind-words, a similar restraint holds, and for the moment, it has been analyzed as triggered by the kind-word, but further research may identify a “genericity domain” in the functional structure of a noun. Finally, like the other semi-lexical case studies, deficiency was also identified in kind-words. The kind-words could surface as numberless (no #P), with predictable effects for how they interacted with Agreement.

8.1.2 *Types of semi-lexicity and semi-lexical effects*

The study of semi-lexicity in the nominal domain has identified three main ways of being semi-lexical. In this section, we discuss these forms of semi-lexicity and in addition, address the semi-lexical effects that surface in the syntax as a result of the semi-lexicity of a root.

The first way of being semi-lexical is through deficiency in the functional structure of the semi-lexical head. Some semi-lexical heads are prevented from projecting certain pieces of structure, as we saw with Polish numerals (no γ P or no ν P and no #P), English Q-nouns (no #P), and English kind-words (no #P). Lexical specifications can prevent some piece of structure from being projected, with consequences for the surface effects of that semi-lexicity. As an inverse of this, certain semi-lexical heads can *require* a piece of functional structure, as we saw with *pluralia tantum* nouns. This is not deficiency per se, but it can be taken to represent the exact opposite of deficiency and in that sense is comparable. Thus, semi-lexicity can be expressed as a restriction on the functional structure of the

root, either requiring or blocking a piece of functional structure.

The surface effects of (phi-)deficiency are related to the (phi-)feature system of the language in question. Polish has two DP-internal phi-features, γ and #, while English has only one, # (ignoring person). This makes it possible to create degrees of nominality (or alternatively degrees of phi-deficiency) in Polish, according to whether #, γ , or both are deficient. Numeral 1000, for instance, may be considered more nominal than numerals 2-4 and 5+ given that it always projects #, while 2-4 and 5+ project neither γ nor #. English cannot create degrees of nominality in terms of phi-features, given that the phi-feature # either is or is not present. Differences in the phi-systems further predict differences in how the semi-lexical heads interact with case and agreement. English kind-words, for instance, were deficient for #P and as a result, did not function as Agreement targets; they behaved invisibly for Agreement. Polish numeral 1000, on the other hand, could be deficient for γ , but not #. This partial deficiency created the situation in which the numeral still functioned as an Agreement target, but could not value the agreement probe. This led to default agreement. Thus, phi-deficiency in English produced inertness, while partial phi-deficiency in Polish triggered default agreement. Together, this shows that the possible surface effects of semi-lexicity are dependent on the types of phi-features present in the language and how case and agreement operate on those features. This predicts that semi-lexical effects in the syntax will be language dependent, and can manifest in various ways. However, the underlying source of the semi-lexicity is the same: the functional structure of a root is deficient, with predictable consequences for the syntax (recognizable once we understand how the language system functions on those features).

The second type of semi-lexicity we identified concerns restrictions on the context the semi-lexical head appears in. This form of semi-lexicity differs from the previous in that it does not put restrictions on the functional structure of the semi-lexical root, but on the functional structure of what it combines with. It constrains the distribution of the semi-lexical head. We saw two instances of this, arguably inverses of each other. Polish numerals 2-4 and 5+ were dependent on a #P for their realization. Thus, they were restricted to contexts where the quantified noun could project canonical number. In contrast, English Q-nouns *bunch* and *lot* were restricted to indefinite contexts. Thus, they could only surface if the N2 did not project a (definite) DP. The first type requires a piece of structure to be projected, whereas the second type prevents a piece of structure from being projected. In this sense, they are inverses, either requiring or blocking a piece of structure from their immediate environment.

Again, examples of this type of semi-lexicity will be constrained by the feature system of the language in question. Polish, for instance, lacks a morphological definite-indefinite contrast, and thus, semi-lexicity in the form of "not in a definite context" will be less clearly defined (if it even is definable). Much like how patterns of phi-deficiency are dependent on the phi-features available in

a language, the patterns of context-sensitive semi-lexicity will be dependent on the types of features and structures that occur in a language. The same conclusion holds, however. While the surface effects of semi-lexicity may differ between languages, the underlying source of semi-lexicity is arguably the same: roots can be specified for the contexts in which they are permitted.

The final type of semi-lexicity we considered was semi-lexicity which cut-off the functional structure of the N2. This occurred, for instance, with English kind-words. Once the kind-word was inserted, whether within the classification domain of the N2 or at its periphery, the N2 failed to project further syntactic structure. The kind-word took over the projection of functional structure, resulting in small nominals under the kind-word. Thus, the semi-lexical effect concerns the structure of the N2, which is necessarily small. A similar phenomenon was identified with Polish numerals and English Q-nouns, but this was related to the fact that these are quantificational elements, and surface in the quantity domain. If genericity is a form of quantification, or if genericity and quantification fulfill a similar abstract function, then this type of semi-lexicity could also be related to the structure of the functional sequence.

The patterns of semi-lexicity are summarized below:

- (13) **Ways of being semi-lexical:**
- a. **Restrictions on the semi-lexical noun:** The semi-lexical noun must or must not project a particular piece of structure.
 - b. **Restrictions on the contexts a semi-lexical noun surfaces in:** The semi-lexical noun either requires or prohibits some piece of structure in the larger structure it has been inserted in.
 - c. **Minimal structures:** Insertion of the semi-lexical noun overrides the ability of the embedded noun to project any further functional structure.

A final comment is in order concerning the semi-lexicity considered in this book. Each semi-lexical element we studied had a particular function in relation to the N2. Polish numerals and English Q-nouns quantified and English kind-words created genericity or kind-reference. These functions were captured via the features [Q] and [kind], respectively. The mere presence of one of these features on a root is enough to call that root semi-lexical, under the hypothesis that semi-lexical heads are roots with features. This suggests a fourth type of semi-lexicity, instantiated purely by the function the semi-lexical head is fulfilling.

- (14) **Ways of being semi-lexical:**
- d. **Grammatical function:** Fulfill a grammatical function via some functional/grammatical feature, e.g. [Q] or [kind]

This predicts that we may find further cases of semi-lexicity by testing how the heads instantiating other grammatical functions behave.

I repeat the sub-questions here, many of which we have answered already:

- (15) How can semi-lexicality be defined?
- (16) What types of semi-lexicality exist? How is it manifested?
- (17) How do languages differ in their expression of semi-lexicality?
- (18) Where does semi-lexicality originate?

The definition of semi-lexicality is captured by the semi-lexicality hypothesis. Semi-lexical heads are roots with features. Similarly, we have identified four main types of semi-lexicality: restrictions on the semi-lexical noun, restrictions on the context of the semi-lexical noun, minimal structures, and fulfilling a grammatical function. Finally, we have also seen that languages differ in their expression of semi-lexicality as a product of their feature system. Given that semi-lexicality combines a feature with a root, the form semi-lexicality will take will be dependent on the types of features available in that language. We return to the final question briefly in section 8.2.

8.1.3 *Implications for a theory of categories*

In this section, I address the larger research question, repeated below:

- (19) What does semi-lexicality in the nominal domain tell us about the nature of categories, in particular, the division between lexical and functional and the implementation of lexical categories?

The semi-lexicality hypothesis makes clear claims on the division between lexical and functional categories, and furthermore, the implementation of lexical categories. The set of commonly identified lexical categories includes adjectives, nouns, and verbs (e.g. Baker 2003), each categories which share at their core a root (e.g. Halle and Marantz 1993, Marantz 1997, Borer 2005). A lexical category such as noun or adjective is a root plus the functional structure typically associated with that lexical category. What makes a noun a noun is that there is some root which projects a canonical nominal structure and what makes a verb a verb is that there is some root which projects a canonical verbal structure. What semi-lexicality shows is that it is possible to be noun-like, but not be a canonical noun. Semi-lexicality introduces shades of nominality into the system (see also Ross 1972), and this can be understood by examining the functional structure of and around the root. Deviations in the functional structure create shades of nominality, and if the functional structure for a root differs from canonical nominal functional structure, the result is a semi-lexical noun. We can think of functional categories as the grammatical notions and features which drive syntax (Merge, Agree), including γ , #, π (person), Q, D, probes ($__\#$, $__\gamma$, $__\pi$), and other features, such as the EPP. These functional categories are the set of features or

pieces of structure used to build a noun, verb, or adjective and to connect that noun, verb, or adjective to other structures in the sentence. In this system, what is truly “lexical” is the root, and the functional structure makes that root into a lexical or semi-lexical category. Semi-lexicality shows that concepts such as noun, adjective, and verb can and should be decomposed.

8.2 On language variation and change

The conclusions concerning semi-lexicality in this book can also be related to the study of language variation and change. There are three points to be made in this section and they concern the source of variation, the nature of categories in relation to quantification, and the relation between language change and semi-lexicality.

The semi-lexicality hypothesis supports the idea that variation originates in the lexicon. We have attributed the special morphosyntactic behaviors of numerals, Q-nouns, and kind-words to their lexical specifications. This is in line with the Borer-Chomsky Conjecture (attributed to Borer 1984 by Baker 2008), which takes variation to originate in the set of functional features of a language. These are termed microparameters (micro in the sense that variation is attributed to properties of a single head), and our semi-lexical heads induce a form of microparametric variation. The semi-lexical effects in the syntax are derived from lexically specified properties of the semi-lexical root (functional features), and these can be construed as a form of microparametric variation. The semi-lexicality hypothesis places variation in the lexicon.

The approach to categories here further implies that the set of lexical categories are language-specific and constructed (potentially out of a set of universal features), a conclusion in line with Wiltschko (2014). If a noun, verb, or adjective is defined on the basis of the functional structure which instantiates it, and if functional structure is subject to variation cross-linguistically (constrained by the functional sequence), then the implementation of a noun, verb, or adjective will vary cross-linguistically. In other words, the approach predicts variation between lexical categories, according to how a language implements its functional structure (and the functional features it uses). In the approach to categories here, it is the functional features or functional heads which define the lexical categories (e.g. Polish nouns have a γP , while English nouns do not), and those functional features are specified in the lexicon. Again, this places variation in the lexicon. The conclusions of this book support both the notion that variation can be related to the lexicon and the notion that categories are constructed and language-specific.

In this book, we have studied the expression of quantificational material in the quantity domain of a nominal, focusing on Polish numerals and English Q-nouns. The analyses in this book support the conclusion that the quantificational elements we have studied are constructed categories, and hence, subject to cross-

linguistic variation. Neither Polish numerals nor English Q-nouns provided evidence for something like a category “numeral” or “Q-noun.” Instead, the numerals and Q-nouns showed (minor) idiosyncratic differences, which required individual treatments. This conclusion may extend beyond English Q-nouns and Polish numerals. English quantifiers and numerals, for instance, show minor differences, where some require an indefinite article (*a hundred, a dozen, a few*) and others do not (*few, three, many*); Polish quantifiers are also subject to idiosyncrasies (see Przepiórkowski 1999, Swan 2002). The set of quantificational elements in both languages show a variety of morphosyntactic possibilities. However, they are united by Q-features and their position in the quantity domain of the noun. Q-features and the quantity domain may very well be universal, but it is possible that there is no universal category for implementing these, and instead, the quantifiers and numerals we find cross-linguistically are constructed categories.

We can illustrate this with numerals. Donohue (2005), who conducted a typological survey of numerals, concludes:

- (20) “Numerals can appear with genitive constructions in some languages, a morphosyntactic strategy that is prototypically associated with nominals, [...], while in other languages numerals appear modificationally with the same morphosyntactic treatment as verbs, [...]. If numerals can be satisfactorily mapped into an idealised ‘semantic space,’ then they are clearly not linked, cross-linguistically, to any particular region in this map, but are subject to influence from a variety of different constructions.” (Donohue 2005: 21)

Donohue reports a wide range of syntactic manifestations of numerals. For example, in Koasati, a Muskogean language of the south-eastern United States, numerals are verbal, appearing as the main predicate in a clause where the quantified noun functions as the subject. In Samoan (Polynesian), numerals often appear as verbal predicates, but can occur DP-internally through relative clauses. In Pengo (Dravidian), numerals pattern with demonstratives (not adjectives which are syntactically verbal), showing gender and number agreement, and in Wangkajunga (Australian), numerals are marked with the same case affix as the quantified noun, suggesting a kind of case agreement. As a final example, in Supyire (Gur), the numeral is inflected in what might be treated as a genitive, taking the possessed tone used in possessive constructions. The results of Donohue (2005) suggests that the conclusions for Polish numerals hold at a wider level: numerals are constructed categories.

Why should numerals not exist as a universal category? While the ability to express various quantities, either vaguely (through quantifiers) or in exact terms (through numerals) is a universal, I expect that the actual linguistic expression of quantity is a product of the needs of the linguistic community. Thus, it is only if a need arises that numerals will come into existence in a language; as they are essentially being “created,” they will have to be constructed, presumably

by drawing on existing categories. On the other hand, if there is no pressure in the linguistic community to express exact, there will be no need to develop a set of numerals. A case in point is Pirahã (family Mura), which is notorious for lacking numerals, although it does have a small set of quantifiers (see discussion in Nevins, Pesetsky, and Rodrigues 2009, Gordon 2004). Frank, Everett, Fedorenk, and Gibson (2008) argue that speakers of Pirahã are capable of understanding exact quantities (=numerals), but they lack the linguistic tools to represent them in language, and this has consequences for their ability to manipulate high numerosities.¹ Thus, there is no inherent reason for Pirahã not to have numerals; it simply doesn't. This is expected: quantity is universally available, but the expression of quantity is a language-specific invention, and languages need not invent such expressions if they don't need to. More cross-linguistic evidence on numerals and quantifiers might provide further support for this hypothesis.

This brings us to language change and grammaticalization. I propose that a common source of semi-lexicity is grammaticalization. In section 5.7 of chapter 5, I briefly discussed the grammaticalization of Polish numerals. Numeral 5 of Old Polish had the morphosyntax of a noun, despite being a numeral. In Modern Polish, however, it only partially resembles a noun, and otherwise has a very idiosyncratic morphosyntax, as illustrated in chapters 4 and 5. The process of grammaticalization converted the numeral from something lexical into something less lexical, and the result of this process is a semi-lexical head. I hypothesize that this conclusion holds more generally. The stages between lexicity and functionality are where we most expect to find semi-lexicity. As an element grammaticalizes, it sheds its lexical properties, and the expectation for the morphosyntax is that it will no longer pattern with the elements of the canonical category it resembles. A further study of grammaticalization in relation to semi-lexicity can verify to what extent these can be related.

8.3 DP - CP parallelism: Restructuring

There has been a general quest for identifying parallelism between the nominal and verbal domains (e.g. Chomsky 1970, Abney 1987, Szabolcsi 1994, Hiraiwa 2005, den Dikken 2010, among many others). If such a parallelism exists, then we

¹ Frank et al (2008) suggest that numerals provide a cognitive advantage in representing higher quantities, as the numeral acts as a placeholder for some quantity which can be manipulated. For example, if a language has only very low numerals, high numerosities will require some mental gymnastics to compute, much like the question of how to express 1000 in a system which has only numerals up to 10 is quite complex. While the quantity seems easy to understand for those who have the numeral, it requires complex arithmetic for those who do not, using the numerals they do have; for users of a language without any linguistic way of expressing exact quantities, we can imagine that the task is even more difficult.

expect to find similar types of phenomenon in both domains. In this section, I briefly explore one possible parallelism, based on the semi-lexical phenomenon we have studied: restructuring (Wurmbrand 2001). The comparison suggests that there may be restructuring in the nominal domain, and furthermore, that some cases of verbal restructuring could involve semi-lexicality.

Wurmbrand (1998, 2001, 2007, 2014, 2015) takes restructuring to involve a configuration in which the functional structure of the lower verb in a bi-verbal construction (which we could name V2) does not project to a full CP. Differences in the amount of structure projected by the V2 (e.g. VP, *v*P, TP, or CP) are proposed to account for the availability of a number of processes, including clitic climbing, scrambling, and long object movement. In Polish, for example, a clitic or scrambled object thematically introduced by the V2 can surface in a position preceding the matrix verb (which we could name V1):

- (21) Jan **ja** postanowił_{V1} (*żeby) przeczytać_{V2}.
 Jan it decided so.that read.INF
 ‘Jan decided to read it.’
- (22) Jan **książkę** postanowił_{V1} (*żeby) przeczytać_{V2}.
 Jan book decided so.that read.INF
 ‘Jan decided to read a/the book.’ (Wurmbrand 2015: ex. 6d)

Wurmbrand (2015) correlates this to a lack of a CP-layer, as evidenced by the inability of the infinitival complementizer *żeby* to surface in the examples above. If the complementizer *żeby* is present, both clitic climbing and scrambling become impossible. The CP-layer blocks these processes.

- (23) *Jan **je** nalegał_{V1} żeby zostawić_{V2}.
 Jan them insisted so.that leave.INF
 ‘Jan insisted on leaving them.’
- (24) *Jan **pieniądze** nalegał_{V1} żeby zostawić_{V2}.
 Jan money insisted so.that leave.INF
 ‘Jan insisted on leaving the money.’ (Wurmbrand 2015: ex. 6a)

Wurmbrand manipulates the amount of structure projected above the V2 to account for such processes, as well as interpretational differences (e.g. whether the tense of the V2 must be identical to the V1, or refer to the future, etc.). Restructuring then is a question of whether V1 projects to a VP, *v*P, TP, or CP.² Wurmbrand (2015) refines this hypothesis by dividing the clausal domain into three sub-domains, much like we have done for the nominal domain. These include a thematic domain (roughly *v*P), an inflectional domain (roughly TP), and

² This is a simplification of her approach. Wurmbrand (2015), for example, further manipulates what the position of clitics and scrambled objects in a language might be, and she also makes a distinction between size restructuring and voice restructuring.

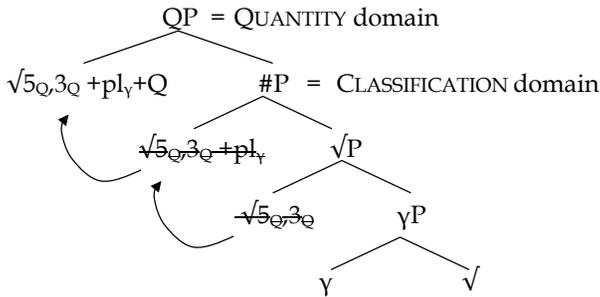
There are two conditions which make such Agreement possible. Firstly, the N1 is deficient in some way, such that Agreement can bypass it, and secondly, the N2 is not “too big” to fall outside the domain of Agreement. In chapter 3, section 3.6.1, I introduced the search domain of a probe as being the phase. If DP is a phase, then in each of these, it is the fact that the N2 is smaller than a DP which allows Agreement to target it. This phenomenon can be taken as a correlate of the scrambling and clitic climbing which characterizes restructuring predicates in the verbal domain. Because the N2 in each of these examples involves a smaller structure (maximally #P), that element can still be targeted by Agreement.

There are some issues with the comparison in some cases, which I highlight now. Certain types of restructuring allow tense to be shared between V1 and V2, as illustrated below. Here, the timing of the event in V2 necessarily coincides with the timing of the event in V1, hence the impossibility of *tomorrow*.

- (29) Leo tried to tame an elephant (*tomorrow). (Wurmbrand 2015: ex. 4b)

Two of our potential nominal restructuring configurations involved a shared #P, which could be considered the equivalent of shared tense. The first involved Polish numerals 2-4 and 5+. I provide the configuration below:

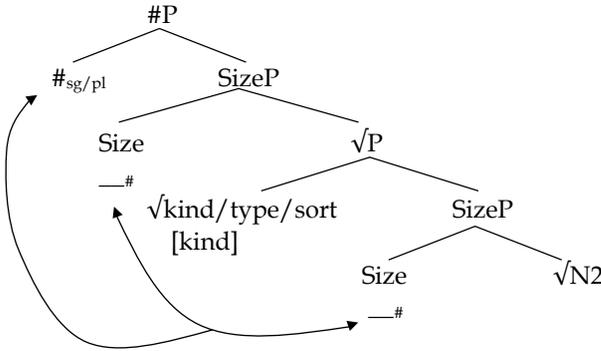
- (30) Polish numerals 2-4 & 5+:



In Polish, the inability of these numerals to combine with *pluralia tantum* nouns was taken as evidence that they necessarily Merge under the #P of the N2, before moving to the Q-head. The comparison to restructuring seems plausible given the shared nature of number, but is otherwise convoluted. In example (29), V1 carries tense morphology and not V2. In the construction above, however, the noun is overtly marked for number, not the numeral. Similarly, the numeral is dependent on the noun for #P, behaving more like the dependent V2 of restructuring, rather than the independent V1. In other words, despite the word order, it is the noun which contributes the #P and which overtly carries #-morphology, not the numeral, and hence, the noun which is comparable to the V1 in a restructuring context.

The second shared #P is found with English kind-words:

(31) English kind-words



The fact that number was necessarily identical between the kind-word and the N2 was taken as evidence that they must share number. This was modeled by inserting the kind-word before the N2 could project its number, where the Size-heads were forced to Agree with each other. The comparison to restructuring seems more valid than the previous one, but is still not perfect. The kind-word is not dependent on the N2 for number, given that it can surface with mass nouns. Instead, the N2 is dependent on the kind-word for the expression of number. This is similar to how the V2 is dependent on the V1 for tense. Where they differ, however, is in the expression of morphology. Restructuring does not create tense morphology on both the V1 and the V2, whereas the example with kind-words requires number morphology on both the N1 and the N2. If the comparison is a valid one, this could indicate that restructuring has different effects in the nominal and verbal domains.

Summarizing, the constructions we have considered create a configuration which resembles restructuring. This suggests that we may be dealing with an example of restructuring in the nominal domain. If so, it is interesting to consider to what extent nominal restructuring parallels verbal restructuring. Furthermore, it is curious whether semi-lexicality might be involved in some cases of restructuring in the verbal domain, as it is in the nominal domain.

8.4 Outlook

This dissertation explored semi-lexicality in the nominal domain. We have considered the morphosyntax of numerals, quantificational nouns, and kind-words in Polish and English. The phenomena considered in this book argued in favor of the semi-lexicality hypothesis: certain roots can also be lexically specified

for functional features. The effects of the lexical specifications are manifested in a variety of ways, including deficiencies in the functional structure of the semi-lexical root, or restrictions on where that root can surface. The feature specifications of the semi-lexical root, for instance, have consequences for structure building, which in turn has consequences for how case and Agreement operate on those structures. The study of Polish numerals, English Q-nouns, and English kind-words has illustrated the variety of ways in which semi-lexicality can surface, but it has also shown that those patterns can be derived from a few definable “ways” of being semi-lexical.

This study has been restricted to the nominal domain, but the hypotheses developed here can also be applied to other domains. The approach predicts that we should find a similar range of semi-lexicality in the verbal and adjectival domains, and moreover, that those patterns can be reduced to a few ways of being semi-lexical: restrictions on the functional structure of the semi-lexical head, restrictions on the contexts the semi-lexical head can surface in, and minimal structures induced by the semi-lexical head. While the ways of being semi-lexical is predicted to be similar across various domains, the manifestation of that semi-lexicality should show a wide range of variation, constrained by the set of functional features available in that language. This study represents an initial step towards categorizing semi-lexicality and semi-lexical effects in the nominal domain, but it opens the door for furthering our understanding of semi-lexicality in other areas of the grammar.

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Samenvatting in het Nederlands

Binnen de taalwetenschap verdeelt men normaal gesproken woorden in categorieën gebaseerd op hun vorm en betekenis. Bekende categorieën zijn bijvoorbeeld zelfstandige naamwoorden, werkwoorden, en adjectieven, die elk een eigen set karakteristieke eigenschappen hebben. In sommige gevallen is een simpele classificatie tot zelfstandig naamwoord, werkwoord, of adjectief niet mogelijk. In plaats daarvan *lijkt* het woord wel op een zelfstandig naamwoord, werkwoord, of adjectief maar gedraagt het zich niet zo. De vraag is dan: wat is de categorie van zo een element en hoe kunnen we het morfosyntactisch analyseren?

Dit proefschrift gaat over die gevallen waarin de traditionele verdeling in categorieën niet werkt. Het is een studie over categorieën, en specifiek, semi-lexicale categorieën. De term semi-lexicaliteit beschrijft de situatie waarin een element een mix van lexicale en functionele eigenschappen vertoont. Het 'lexicale' aspect betekent dat het op een lexicale categorie lijkt, terwijl het 'functionele' aspect betekent dat het functionele eigenschappen heeft, en dus, niet volledig als lexicale categorie kan worden geanalyseerd. In dit proefschrift pleit ik voor een meer genuanceerde benadering van categorieën. Als categorieën worden verdeeld in kleinere componenten, wordt het mogelijk om in kaart te brengen hoe iets *bijna* een zelfstandig naamwoord kan zijn.

Het empirische domein van dit proefschrift is semi-lexicaliteit in het nominale domein, en in het bijzonder binominale constructies. Ik focus op voorbeelden van semi-lexicaliteit die afwijkingen veroorzaken in naamval- en congruentiepatronen. Dit proefschrift omvat drie casestudies, namelijk studies van Poolse telwoorden (hoofdstuk 4 en 5), Engelse kwantificatiele zelfstandige naamwoorden (*a lot of books*, 'een hoop boeken') (hoofdstuk 6), en Engelse soortwoorden (*this kind of book*, 'dit soort boeken') (hoofdstuk 7).

De traditionele lexicale categorieën zijn zelfstandige naamwoorden, werkwoorden, en adjectieven. Huidige theorieën stellen dat deze categorieën in hun kern een *root* bevatten, waarbij een root verwijst naar een concept (zo ongeveer). Dit betekent dat wat traditionele lexicale categorieën met elkaar delen de aanwezigheid van een root is. De structuur van een lexicale categorie moet dus bestaan uit een root en een set functionele projecties die geassocieerd worden met die categorie (zelfstandige naamwoorden, werkwoorden, of adjectieven). Dit leidt tot een hypothese over lexicaliteit:

- (1) **Hypothese, deel I:**
Lexicaliteit impliceert de aanwezigheid van een root.

Tegelijkertijd verschillen lexicale categorieën in de set van functionele kenmerken waarmee zij kunnen combineren (zoals werkwoordtijd, getal, animacy). Bovendien worden functionele kenmerken vaak gezien als de drijvende kracht in syntactische processen (bijv. naamval, congruentie, verplaatsing). Dit leidt tot een hypothese over functionaliteit:

- (2) **Hypothese, deel II:**
Functionaliteit impliceert de aanwezigheid van een syntactisch kenmerk.

De semi-lexicaliteitshypothese volgt uit de observatie dat semi-lexicale elementen zowel lexicale als functionele eigenschappen combineren:

- (3) **Semi-lexicaliteitshypothese:**
Semi-lexicaliteit ontstaat als een root ook gespecificeerd is in het lexicon voor een syntactisch kenmerk.

De semi-lexicaliteitshypothese vormt het vertrekpunt voor de casestudies en wordt verder uitgewerkt in hoofdstuk 2.

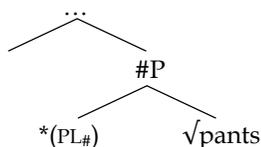
In dit boek worden drie manieren om semi-lexicaal te zijn geïdentificeerd.

- (4) **Manieren om semi-lexicaal te zijn:**
- a. **Restricties op het semi-lexicale zelfstandige naamwoord:** Het semi-lexicale zelfstandig naamwoord moet per se een bepaald deel van de structuur projecteren of een deel van de structuur juist niet projecteren.
 - b. **Restricties op de contexten waarin een semi-lexicale zelfstandig naamwoord voorkomt:** Het semi-lexicale zelfstandig naamwoord vereist of verbiedt een bepaalde structuur als context.
 - c. **Minimale structuren:** Invoegen van het semi-lexicale zelfstandig naamwoord blokkeert de mogelijkheid van het ingebedde zelfstandig naamwoord om verdere functionele structuur te projecteren.

Het eerste type semi-lexicaliteit zien we bij Poolse telwoorden, Engelse kwantificatiele zelfstandige naamwoorden, en Engelse soort-woorden. Twee soorten beperkingen komen voor. In het eerste geval is het semi-lexicale woord verplicht om een bepaald gedeelte van de syntactische structuur te projecteren. *Pluralia tantum* nomina zijn hier een voorbeeld van. Zij zijn morfologisch gemarkeerd voor meervoud, wat kan worden gezien als een verplichting voor de syntaxis om meervoud te projecteren (hier gerepresenteerd als een plural #P).

- (5) *Pluralia tantum* nomina in het Engels: *pants* ('broek'), *scissors* ('schaar'), *glasses* ('bril')

- (6) Verplichte meervoudstructuur:

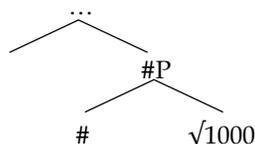


De tweede soort restrictie is dat een bepaald gedeelte van de syntactische structuur verplicht afwezig is. Dit kan worden gezien als een hiaat in de syntactische structuur geprojecteerd door het semi-lexicale hoofd. Het telwoord 1000 in het Pools is hier een voorbeeld van. Het ongemodificeerde telwoord 1000 zorgt voor *default agreement* op het werkwoord.

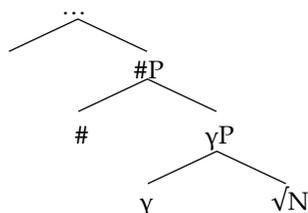
- (7) Żołnierze zginęli.
Soldaten.NOM sneuvelen.V.PL
'Soldaten sneuvelen.'
- (8) Tysiąc żołnierzy zginęło.
Duizend soldaten.GEN sneuvelen.N.SG(DEF)
'Duizend soldaten sneuvelen.'

In hoofdstuk 4 en 5 wordt het telwoord 1000 geanalyseerd als een item dat geen geslacht heeft. Ontbreken van het geslacht op dit telwoord (dat structureel wordt gerepresenteerd als het ontbreken van een geslachtsfrase γP die normaal gesproken het telwoord domineert) is verantwoordelijk voor de *default agreement*. Dit is het cruciale verschil met lexicale zelfstandige naamwoorden, zoals hieronder geïllustreerd:

- (9) Semi-lexicale structuur:



- Lexicale nominale structuur:



Vergelijkbare hiaten worden in dit proefschrift ook besproken voor andere Poolse telwoorden (hoofdstuk 4 en 5), Engelse kwantificatorische zelfstandige naamwoorden (hoofdstuk 6) en Engelse soort-woorden (hoofdstuk 7). Dit type semi-lexicaliteit heeft vaak directe gevolgen voor de morfosyntaxis van het semi-lexicale hoofd zelf, zoals te zien aan de verplichte aan- of afwezigheid van functionele structuur boven het semi-lexicale hoofd.

Het tweede type semi-lexicaliteit gaat over restricties op de context waarin een semi-lexicaal hoofd kan voorkomen. Een semi-lexicaal zelfstandig

naamwoord kan wel of niet verenigbaar zijn met een bepaalde context, wat consequenties heeft voor zijn distributie. Bepaalde Engelse kwanitificationale zelfstandige naamwoorden zijn bijvoorbeeld alleen maar verenigbaar met indefiniete contexten (zie hoofdstuk 6). Het gebruik van definiet materiaal zorgt voor ongrammaticaliteit.

- (10) A lot/bunch of people
Een hoop/boel van mensen
'Een hoop/boel mensen'
- (11) *The bunch/lot of people
De hoop/boel van mensen
'De hoop/boel mensen'

Het resultaat is dat het kwanitificationale zelfstandig naamwoord niet in een definiete context voor kan komen. Als we definietheid zien als de aanwezigheid van een DP-laag, en indefinietheid als de afwezigheid van een DP-laag (zie Lyons 1999), dan is het de aanwezigheid van een DP waar het kwanitificationale zelfstandige naamwoord niet mee te verenigen is:

- (12)
-
- ```

graph TD
 DP["(*DP)"] --- D["D"]
 DP --- QP["QP"]
 QP --- root["√root"]
 QP --- dots["..."]

```

De DP wordt niet geprojecteerd door het semi-lexicale zelfstandige naamwoord, maar het is onderdeel van de context waarin deze wordt ingevoegd. Dit tweede type semi-lexicaliteit heeft een direct effect op de distributie van het semi-lexicale hoofd, en voorspelt dus dat het semi-lexicale hoofd niet dezelfde distributie heeft als een lexicaal hoofd.

Het derde type semi-lexicaliteit zien we bij Engelse soort-woorden (hoofdstuk 7). In het Engels volgen soort-woorden die gecombineerd worden met een telbaar zelfstandig naamwoord de soort-woordgeneralisatie (waarbij N2 refereert aan het ingebedde zelfstandig naamwoord):

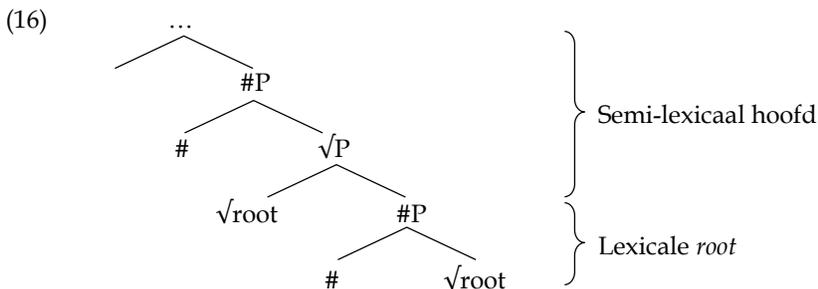
- (13) **Soort-woordgeneralisatie:** De getalsmarkering op het soort-woord (kind 'soort', type 'type', sort 'soort') en op de N2 moeten identiek zijn.

Het soort-woord en de N2 moeten identieke getalskenmerken laten zien:

- (14) This kind of rabbit, These kinds of rabbits  
Dit soort van konijn, Deze soorten van konijnen  
'Dit soort konijn, Deze soorten konijnen'

- (15) \*This kind of rabbits, #These kinds of rabbit  
 Dit soort van konijnen, Deze soorten van konijn  
 ‘Dit soort konijnen, Deze soorten konijn’

Ik noem dit derde type semi-lexicaliteit “minimale structuren”. Het invoegen van semi-lexicale soort-woorden zorgt dat de onderliggende *root* geen verdere structuur kan projecteren. Dit creëert een situatie waarin een gevarieerde hoeveelheid structuur geprojecteerd mag worden *onder* het semi-lexicale hoofd, maar waarbij de structuur die wordt geprojecteerd boven het semi-lexicale hoofd van het semi-lexicale hoofd zelf afkomstig is.



In het geval van telbare zelfstandige naamwoorden wordt het soort-woord ingevoegd vóórdat de N2 getal (#P) kan projecteren. Het gevolg is dat het soort-woord en de N2 getal moeten delen, wat zorgt voor een verplicht matching effect. Dit type semi-lexicaliteit lijkt erg op *restructuring* (Wurmbrand 2001).

Elk van deze drie typen semi-lexicaliteit is gerelateerd aan specifieke lexicale items. Dit betekent dat zulke semi-lexicaliteit veroorzaakt wordt door het semi-lexicale hoofd zelf, en, wat cruciaal is, niet het resultaat is van een speciaal morfosyntactisch proces. Het semi-lexicale hoofd moet op een bepaalde manier gespecificeerd zijn om deze effecten te veroorzaken, en in hoofdstuk 4 - 7 onderzoek ik precies wat de lexicale specificities van Poolse telwoorden (hoofdstuk 4 en 5), Engelse kwantificatiele zelfstandig naamwoorden (hoofdstuk 6) en Engelse soort-woorden (hoofdstuk 7) zijn. Deze casestudies ondersteunen de semi-lexicaliteitshypothese en laten zien waar afwijkingen in de syntaxis vandaan komen. Op deze manier laat deze dissertatie zien dat het mogelijk is om op een zelfstandig naamwoord te lijken, zonder echt een zelfstandig naamwoord te zijn.



# Curriculum vitae

Heidi Klockmann was born in 1987 in Brawley, California, USA. In 2005, she started her bachelor studies at the University of California in Los Angeles (UCLA), and graduated *cum laude* with a BA in linguistics, a specialization in computing, and a mathematics minor in 2009. In 2010, she moved to the UiL-OTS at Utrecht University and began a research master's in linguistics. After obtaining her MA degree with a *cum laude* distinction in 2012, she began working as a PhD at the UiL-OTS in Utrecht University, in the Netherlands Organization for Scientific Research (NWO) project "The uniformity of linguistic variation: Subject-predicate relations." In 2014, she spent three and a half months as a visiting student at the Massachusetts Institute of Technology (MIT). This dissertation, completed in 2017, is the result of her PhD research.

