Missing Person

Structure and change in Romance demonstratives

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Missing Person

Structure and change in Romance demonstratives

Vermist Persoon

Structuur en verandering in Romaanse aanwijzende voornaamwoorden

(met een samenvatting in het Nederlands)

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Per Mau, :)

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Abbreviations and glosses

#	number
1	1st person
1EXCL	1st person exclusive
1F1H	1 Feature–1 Head
1INCL	1st person inclusive
1/2	participants
2	2nd person
3	3rd person
2/3	non-speaker
±A	[±author]
ACC	accusative
A:DEM	adverbial demonstrative (*here*, *there*)
±at	[±atomic]
±au	[±author]
AUX	auxiliary
B	binary
CL1, CL2, …	class (Bantu languages)
CVC	Cape Verdean Creole
DAT	dative
DEF	definite
DEM	demonstrative (*this*, *here*)
DET	determiner
DIST	distal
DM	Distributed Morphology
Dx	Deixis
ES	*émigré* speakers
EXCL	exclusive
F	feminine

[F]	feature
fseq	functional sequence
GEN	genitive
HS	heritage speakers
i	speaker
INCL	inclusive
IRR	irrealis
iu	speaker & hearer
LIFO	Last in, First out
M	masculine
MED	medial
±min	[±minimal]
MMM	Maximise Minimal Means
MOD	adnominal prefix
N	neuter
N:DEM	nominal demonstrative (*this*, *that*)
NA	not available
NOM	nominative
NPI	negative polarity item
NTL	non-target-like
o	other
±P	[±participant]
PERF	perfect
PF	perfect
PL	plural
PLD	Primary Linguistic Data
PROX	proximal
PRS	present
PST	past
±pt	[±participant]
PTCP	(past) participle
Q	quaternary system
REINF	reinforcer
SG	singular
STL	semi-target-like
T	ternary system
TL	target-like
TRI	trial
u	hearer
U-A	unit-augmented
UG	Universal Grammar
$\vec{v}$	vector

CHAPTER 1

Introduction

1.1 Demonstratives, deixis, language change

Demonstrative forms, such as *this* and *that*, are ubiquitous elements in natural languages, to the extent that they are generally regarded as a genuinely universal feature of language (see among many others Levinson 2018; Dixon 2003; Diessel 1999). Perhaps unsurprisingly, demonstrative forms are also known for displaying cross-linguistic variation under a wide array of respects: a rich summary of such morphological, syntactic, semantic, and pragmatic differences is provided in Diessel 1999. This dissertation investigates the meaning-related cross-linguistic variation attested by demonstrative systems, with a specific focus on the diachronic development of Romance demonstrative systems, which it aims at formalising and explaining.

The meaning of demonstrative forms poses, in fact, numerous challenges. The most obvious one is linked to how the referent of demonstratives is established: unlike most other nominal expressions, which carry an inherent denotation (e.g. "dog" or "Fido"), the meaning of demonstratives is only partly determined by the lexical semantics of the single demonstrative form itself. Its full interpretation is instead extrinsic to the given form, and rather bears on the context in which that form is used, and changes alongside it. As such, demonstrative forms are construed as having a two-fold meaning. On the one hand, each demonstrative form has an unambiguous and fixed semantics, as determined by the linguistic convention: for instance, *this* may only introduce a referent that is in the (relative) proximity of the speaker, but not one that is further away (*that*); likewise, the spatial adverb *there* denotes a location that

cannot be identified with the location occupied by the speaker (**I am there*), unlike *here* (*I am here*). On the other hand, the fixed semantics of demonstratives is not sufficient to uniquely identify their referents; rather, the denotation of a demonstrative form varies according to the spatial and temporal coordinates of the utterance (*hic et nunc*). For instance, *here* does not refer to the same place for me while writing and for my reader. In the same way, *this* denotes two different t-shirts in the following exchange:

(1) [*In a shop, A standing opposite to B and at some distance*]

A: Do you like this t-shirt? [*holding up a t-shirt from a shelf*]

B: Not bad, but I prefer this one. [*holding up a different t-shirt*]

Despite the fact that both t-shirts are introduced by *this*, they are different t-shirts (otherwise, B's response would not be felicitous); the use of *this*, in fact, only informs us of the proximity of a given t-shirt to one utterer or the other, without committing to the identity of those t-shirts (i.e. without consistently denoting one and the same t-shirt).

The role played by the context in the interpretation of demonstrative forms is acknowledged defining them as context-sensitive, or context-dependent, expressions: that is, expressions that can only be understood upon the consideration of additional contextual information. These are more formally labelled as indexical, or deictic, expressions (Lyons 1977: chapter 15, 1995: chapter 10; Levinson 1983: chapter 2, 2004; Perry 1997, 2017; Diessel 2012; Braun 2017; among many others).[1] The terms "indexicality" and "deixis", respectively from Latin *index* 'pointing finger' and Greek *δείκνυμι* [deíknumi] 'to show, to point out', are conventionally associated to different study traditions (see Lyons 1995: 303 for discussion), but are used interchangeably in this work.

Demonstrative elements belong to the set of indexical expressions alongside, for instance, personal pronouns, tense morphology, temporal adverbs, and some motion verbs. These, too, have a fixed conventional meaning, but their actual content varies from one context to another, as shown by the following example:

(2) You came to our party yesterday.

The sentence in (2) invariably means that the addressee of the utterance (*you*) went to a party held at the location of the speaker (*came*) and organised by/in honour of the speaker and someone else (*our*), and that this event took place before the utterance time (i.e. in the past: *came*, rather than *come*) and, more

[1] The concept of indexicality originates from Peirce's semiotic theory (see e.g. Peirce 1955: 98–119), where an "index" is a sign that is directly related in space and/or time to the object that it denotes (*Id.*, 107). The term was subsequently introduced in linguistics by Silverstein (1976). The concept of deixis, instead, goes back at least to Bühler 1934 (Lyons 1995; see also Frei 1944 and Fillmore [1971] 1997). In earlier days of linguistic theorising, indexical expressions were referred to as "shifters", by virtue of their ever changing referent (Jespersen 1922: 123–124; Jakobson [1957] 1971: 131–133 in particular; see also Silverstein 1976, again; and, for a review of the concept of shifters, Fludernik 1991).

specifically, the day before the utterance time (*yesterday*). However, the identification of the speaker, addressee, location of the party, and day of the party changes from one context to the other, according to who utters the sentence when and to whom.

On the basis of which coordinates of the utterance context are relevant for their interpretation, indexical elements are divided into at least three categories (starting from Bühler 1934; see also Lyons 1977; Levinson 1983: chapter 2, 2004; Fillmore [1971] 1997; Diessel 2012; and discussion in Section 3.3 below): person indexicals (*I*, *you*, *our*, ...); time indexicals (present, past, *now*, *then*, ...); and place or space indexicals (*this*, *here*, *bring*, *come*, ...). Two additional categories were introduced by Fillmore ([1971] 1997: see in particular lecture 6), on whose work many others built (e.g., again, Lyons 1977; Levinson 1983: chapter 2; Diessel 2012): discourse indexicals (*in this section*, *the latter*, *in the foregoing*, ...); and social indexicals (honorifics and other address systems).

Many scholars have engaged with the challenge posed by the formalisation of the meaning of indexical elements in the last century or so, and in particular linguists and philosophers. In fact, the sensitivity to the context that indexical elements display is not straightforwardly amenable to the truth conditional Fregean semantics, as one and the same proposition may be true in one context and false in another (for the first remarks on the issue, see Perry 1977, 1979; Kaplan 1989a, with references to a "sloppy thinker"). The most prominent semantic account devoted to these issues was formulated by Kaplan (most famously published as Kaplan 1989a,b, but dating back to the early 1970s). Many other accounts followed, among which those proposed by Nunberg 1993; Perry 1997; and, with a specific focus on demonstratives, King 2001; Roberts 2002; Elbourne 2008; and, most recently, Ahn 2022, to which I address the reader for an overview of the field and for more extensive references. This line of research, in fact, is not immediately relevant for the purpose of this study and cannot therefore be explored in greater detail.

Indeed, this work is not concerned with how demonstratives, among other indexicals, refer in the context, by far the most thoroughly investigated meaning-related aspect of variation.[2] Rather, it explores the attested cross-linguistic variation in the fixed semantic meaning of demonstrative forms. That is, in Kaplanian terms, this study investigates the "character" of demonstrative forms, rather than their "content". As will be discussed in greater detail in Chapter 3 (but see, for much more complete overviews, WALS' Feature 41, by Diessel 2013b; Diessel 1999; Imai 2003; Dixon 2003; among others), languages are known to differ widely in terms of how their demonstrative forms relate to the extra-linguistic context. The main sources of variation can be reduced to i)

[2]Note that variation in this respect is not exclusively context-bound; cross-linguistic variation is available, too: for instance, some languages allow for their indexicals to be evaluated either against the context of the clause in which they occur or against that of that clause's root clause. The latter case, labelled shifty indexicals or indexical shift, is very restricted cross-linguistically and was systematically considered for the first time by Schlenker 2003 and, most recently, by Deal 2020 and Sundaresan 2021.

what the reference point is with respect to which a given referent is identified (while all languages express spatial coordinates by computing proximity to or distance from the speaker, some languages also rely on proximity to and distance from the hearer, and/or both speaker and hearer at once; see Levinson 2018: 23 for an overview of the different systems available cross-linguistically); and to ii) whether any additional semantic contrasts accompany the former distinctions (e.g. whether, in the realm of the referents far from the speaker, different degrees of distance can be described; whether a difference is made between visible and invisible referents; whether elevational information is present; *etc.*). That is, all languages encode deictic information in their demonstrative systems, but exactly which information is encoded is a matter of cross-linguistic variation.

Despite being largely acknowledged in typological studies, this aspect of variation has been considerably less well investigated from a formal standpoint, as semantic accounts for the conventional meaning of demonstratives and, more generally, of indexical forms, are typically focused on English (see most of the references above). Some syntactic accounts, instead, do take issues with this variation; the most important ones have been put forth by Harbour (2016) and Lander & Haegeman (2018a). The present work feeds into this latter line of investigation, in that it explores how indexical information is encoded in demonstrative forms primarily from a syntactic perspective (for a very preliminary semantic approach, see discussion in Chapter 4, especially Section 4.2.3). However, rather than focusing exclusively on synchronic cross-linguistic variation, as done in the studies available so far, this dissertation explores the diachronic change that affects the invariable meaning of demonstrative forms and seeks to provide a formalisation and an explanation thereof.

It has been observed, in fact, that demonstrative systems may undergo change (for the first systematic remarks in this sense, see Frei 1944; see also references provided in Section 2.1). Change, in this respect, consists in an expansion or a reduction in the set of forms available to a given demonstrative system: for instance, demonstrative systems with three contrastive terms may evolve into demonstrative systems with two contrastive terms, or *vice versa* (here, only patterns of reduction will be thoroughly considered; for some notes on the expansion of demonstrative systems, see in particular Section 2.2). Any such change, in turn, leads to a general reorganisation of the "paradigmatic" relations within the set of available demonstrative forms in a given system: intuitively, bigger or smaller demonstrative systems will respectively afford more or less rich partitions of the space in which the utterance takes place.

Importantly, however, no such change is recorded for other indexical categories, or at least not to a similar extent: that is to say that, while demonstrative systems (possibly: cyclically) expand and then reduce, gaining and subsequently losing contrastive forms, other indexical systems tend not to. For instance, personal pronouns have been shown to be remarkably stable: see e.g. Nichols 1992 (more on this can be found in Appendix D.1). It should be immediately specified that personal pronouns are regarded here as stable insofar as their semantics is

concerned (how many deictic oppositions they encode, and which ones); this is not however the case for their morphology, which instead undergoes significant changes in diachrony and contact alike (for instance, a comprehensive overview of the diachronic changes that affect personal pronouns in Romance languages is given by Cappellaro 2016).

While these facts have been individually (albeit perhaps scantily) observed in the literature, they have never been considered jointly; moreover, no account is available, at present, neither as to how to model the process of reduction that affects demonstrative systems, nor as to how to capture the diachronic asymmetry between pronominal paradigms (diachronically stable) and demonstrative systems (diachronically unstable). The former is the main question that this study aims at answering, the latter its corollary; a preliminary question to be addressed concerns how indexicality is encoded in indexical forms, and particularly in demonstratives. On the basis of the Romance data presented in Chapter 2 and of the assumptions related to the encoding of deixis in demonstrative forms (demonstrative systems are construed as person-oriented and as derived by a pronominal base embedded in a PP-like structure; Chapters 3 and 4) this work proposes that the reduction of demonstrative systems is driven by the interaction of featural and structural factors, and that the same structural considerations account for the overwhelming stability of personal pronouns, too (Chapters 5 and 6).

Before turning to an outlook of the present work (Section 1.4), the next two sections are devoted to some basic terminological clarifications (Section 1.2) and to the definition of the theoretical framework against which this work is set (Section 1.3).

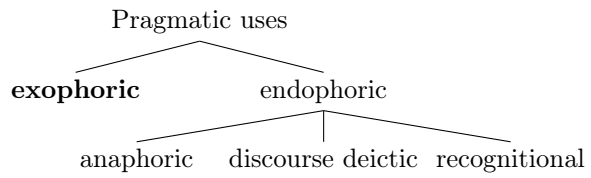
1.2 Terminological notes

This section provides some terminological clarifications to set the stage for the remainder of this work.

1.2.1 Exophoric demonstratives

Demonstrative forms are associated with an articulated array of pragmatic functions. Diessel (1999: chapter 5) gives a systematic overview of these different uses and I refer the reader to it for details and additional references:[3]

(3) *Pragmatic uses of demonstratives* (from Diessel 1999: 6; bold mine)



[3]For a different (and more extensive) taxonomy, see Levinson (2004: 108).

The focus of this dissertation is on exophoric demonstratives, i.e. demonstrative forms that are used to define the position of their referent in the external world, be it an entity or an area, with respect to a deictic centre, or *origo*. I will instead not be dealing with endophoric demonstratives, i.e. demonstrative forms that establish a relation with other discourse-internal elements, such as already mentioned DPs (anaphoric demonstratives), or already uttered (or written) propositions (discourse deictic demonstratives); or demonstratives that directly refer to the common ground by specifying a referent as internal or external to it (recognitional demonstratives).

This choice is guided by the fact that the exophoric function of demonstratives is generally regarded as the basic one, upon which all other uses are built by metaphor or grammaticalisation (see Diessel 1999: chapter 5.5). Crucially, only some of the forms available in the exophoric function undergo this refunctionalisation and acquire a novel pragmatic function. This is clearly illustrated by recognitional demonstratives (Colasanti & Wiltschko 2019): given the intrinsically binary nature of the distinction that underlies the recognitional use (either the referent is in the common ground, or not), only (at most) two exophoric forms may be "recycled" to take up the additional recognitional function, even if the set of forms employed exophorically extends beyond those two forms. Thus, in this work, I restrict the focus to exophoric demonstratives to ensure that the demonstrative systems considered are as rich as they can be in each variety under investigation.

1.2.2 Syntax

The second issue worth mentioning is that demonstrative forms occur in various syntactic contexts (Diessel 1999: chapter 4). In traditional grammatical terms, the label "demonstratives" is restricted to adnominal and pronominal contexts:

(4) a. This explanation is boring.
    b. This is boring.

Adnominal demonstratives (4a) modify a noun within a DP and are also referred to as demonstrative adjectives or demonstrative determiners; pronominal demonstratives (4b) independently occur as arguments of verbs and prepositions and are also referred to as demonstrative pronouns.[4] However, Diessel (1999: chapter 4) discusses two more contexts in which demonstrative forms occur cross-linguistically: they can modify a verb (adverbial demonstratives: *I'm getting there*), or they be the complement of copular constructions (identificational demonstratives: *Here it is*). Adverbial demonstratives can be further classified as spatial adverbs (possibly forming a locative, allative, and ablative series: e.g. German *da* 'there', *dahin* 'to there/thither', and *daher* 'from there/thence', respectively), and manner adverbs (e.g. Italian *così* 'this way').

[4]For the status of the lexical content of these DPs, see Section 4.3.2.

This work only focuses on demonstrative adjectives and pronouns and on spatial adverbs, because these are the most readily available across Romance languages, and the most well-documented ones. In what follows, I will refer to adnominal and pronominal demonstratives jointly as **"nominal demonstratives"** (N:DEM), and restrictively use the label **"adverbial demonstratives"** (A:DEM) for spatial/locative adverbs only; when this syntactic distinction is not relevant, I simply refer to "demonstratives" (DEM).

1.2.3 Deictic centre(s): The view from Romance

The third clarification point involves the definition of the deictic centre: as already mentioned, exophoric demonstrative forms make reference to the position of a referent in the external world with respect to a deictic centre. However, languages show a significant degree of variation in the ways in which the deictic centre is encoded and in the grammaticalisation of additional contrasts, resulting in semantically non-uniform demonstrative systems (see Diessel 1999: chapter 3 for an overview of the major deictic features associated with demonstrative systems: location with respect to the deictic centre, visibility, elevation, geographical position, path). I will come back to semantic variation across demonstrative systems in Chapter 3, where I propose a unification of most surface semantic differences by means of an underlying person opposition, possibly modified by distance contrasts (for its syntactic implementation, see instead Chapter 4). For the time being, let us simply examine the different ways in which the deictic centre is encoded across Romance languages, at least at face value: an extensive overview of the variation in this respect is provided by Ledgeway & Smith (2016).

Speaker-based binary systems The most common semantic organisation for demonstrative systems is the one centred on the speaker as the deictic centre, i.e. the reference point for the location of an entity or area in the external world:

(5) *Italian pronominal demonstratives*

questo	quello
'this near me'	'that far from me'

Under this system, a two-way deictic opposition between a referent near the speaker (*questo*) and a referent not near the speaker (*quello*) is defined. Systems like the one in (5) are referred to as "speaker-based binary systems", that is: systems that encode a speaker *vs* non-speaker deictic opposition.

Participant-based binary systems A different way in which a two-way opposition can be encoded in demonstrative systems is attested in systems that are centred on the participant(s), i.e. the speaker and/or the hearer. Concretely, in these varieties the first term refers to the logic disjunction of the domain(s)

related to the discourse participants (i.e. to the location of the speaker, or the hearer, or both), rather than pointing to the speaker-related domain only:

(6) *Catalan pronominal demonstratives (innovative varieties)*

aquest	aquell
'this near me and/or you'	'that far from us'

Hence, the participant *vs* non-participant opposition yields again a binary system: in (6), a two-way deictic contrast is defined between an entity or area near either or both participants (*aquest*) and one not near either participant (*aquell*). Systems of the Catalan type are referred to as "participant-based binary systems".

Ternary systems Another possibility is for the hearer to also be encoded in its own right as a deictic centre, and for spatial relations to be contrastively defined with respect to this additional anchor as well, as in European Portuguese:

(7) *European Portuguese pronominal demonstratives*

este	esse	aquele
'this near me'	'that near you'	'that far from us'

The addition of one anchor for the computation of spatial relations yields a three-way opposition, with the possibility to contrastively point to a referent that is near the speaker (*este*); near the hearer (*esse*); or far from both (*aquele*). Systems that show the same organisation as the Portuguese one in (7) are referred to as "ternary systems".[5]

Unary systems Finally, to complete the traditional typology for Romance languages, it can also be the case that no deictic centre is specifically encoded in demonstrative forms at all. This option is restricted to some Gallo-Romance varieties and to their nominal domain only:

(8) *French pronominal demonstrative*

celui
'this/that'

The one and only form in (8) does not enter into any deictic oppositions with other forms, unless in combination with a locative adverb (*celui-ci* 'this'; *celui-là* 'that'): as such, it can be regarded as not anchored onto any specific deictic

[5]Some Romance ternary systems are not to be modelled (exclusively) in these terms. In Section 3.2.2, I discuss the case of Spanish, where distance contrasts may be encoded, too (under the distance-oriented interpretation, the middle term of the system does not refer to the hearer, but to an intermediate degree of distance from the speaker). Moreover, in Section 5.2.1, I analyse some seeming ternary systems as encoding, in fact, four different deictic centres, rather than just three as in (7).

centre on its own. Demonstrative systems of this type are referred to as "unary systems". Nonetheless, it can be argued that the deictic content of *celui* is not completely empty: despite the unavailability of additional information about the exact identity of the deictic centre, a demonstrative form which does not encode indexical oppositions still "signals that the identity of the referent is immediately accessible to the hearer, without the inferencing often involved in interpreting simple definites" (Lyons 1999: 21). In what follows, I will mostly leave unary demonstrative systems out of the picture for their limited availability in the Romance domain and their typical combination with more richly specified adverbial systems to encode indexical oppositions.

Conflation One last observation in this respect concerns the very semantic organisation of binary demonstrative systems. Importantly for the purposes of this study, there is good evidence that binary systems do not showcase simple syncretism across two of the three categories available in ternary systems (see (7)): in other words, it is not the case that the hearer-related domain of ternary systems is systematically syncretic with one of the other domains when encoded in binary systems. Rather, as most clearly illustrated by speaker-based binary systems, the hearer-domain is *not* encoded in binary systems to begin with: here, the grammar is simply not sensitive to the hearer as a possible deictic centre. As a consequence, the hearer-related deictic domain can be referred to either by means of the speaker-oriented term or by means of the non-speaker-oriented term, strictly on the basis of the position of the hearer with respect to the speaker (is the speaker "inside" or "outside" the speaker-related domain?). This optionality indicates that speaker-based binary systems cannot be plainly analysed as instantiating a hearer- and non-participant-related syncretism.

Given this, here I take binary demonstrative systems to "conflate" two categories: conflation (as opposed to syncretism) can be defined as the absence of an opposition in a given language's syntax, rather than in that language's morphology (McGinnis 2005). This means that binary systems are syntactically poorer than ternary ones, as the featural inventory involved in their derivation is not sufficient to yield more than two oppositions in the syntax itself.

1.2.4 Glosses

The fourth and final remark concerns the glossing systems adopted in this work, which does not follow the conventional Leipzig Glossing Rules (PROXimal, DISTal). Instead, I gloss demonstrative forms by combining N:DEM or A:DEM, according to the nominal *vs* adverbial demonstratives distinction respectively (see Section 1.2.2), with one number among 1, 2, and 3, or a combination thereof, as illustrated in Table 1.1.[6]

[6] Unary demonstratives (see again French in (8)), excluded from Table 1.1, can simply be glossed as 'N:DEM', by virtue of their minimal deictic contribution.

Table 1.1: Glosses used for nominal and adverbial demonstratives

Binary systems, speaker-based (e.g. Italian)	Near the speaker ('proximal')	N:DEM.1 A:DEM.1	*questo* *qui*
	Far from the speaker ('distal')	N:DEM.2/3 A:DEM.2/3	*quello* *lì*
Binary systems, participant-based (e.g. Catalan)	Near the participants ('proximal')	N:DEM.1/2 A:DEM.1/2	*aquest* *aquí*
	Far from the participants ('distal')	N:DEM.3 A:DEM.3	*aquell* *allí*
Ternary systems (e.g. Portuguese)	Near the speaker ('proximal')	N:DEM.1 A:DEM.1	*este* *aqui*
	Near the hearer ('medial')	N:DEM.2 A:DEM.2	*esse* *aí*
	Far from the participants ('distal')	N:DEM.3 A:DEM.3	*aquele* *ali*, *lá*

Note that the shorthand notation "DEM.3" does not by default refer to something that is near a third party: a referent that is not in the vicinity of either the speaker or the hearer is in fact not necessarily in the vicinity of a non-participant in the discourse, a fact to which I come back further in Chapter 3 while discussing the person feature system assumed in study.

The choice of a non-conventional set of glosses depends on two main reasons: the first one is the ambiguity of a PROX–DIST opposition with respect to the speaker-based *vs* participant-based nature of the bipartition (cf. (5) and (6)). As shown in Table 1.1, in fact, 'PROX' would be employed for both 'near the speaker' and 'near the participant(s)': to disambiguate, I gloss the two different interpretations as DEM.1 and DEM.1/2, respectively. Similar considerations apply to 'DIST', which is disambiguated here by DEM.2/3 as opposed to DEM.3. The second reason is related to ternary systems: for the middle term (e.g. Portuguese *esse*), no "official" gloss is available. The commonly adopted solution is to use MEDial, but this does not straightforwardly map to systems that make clear reference to the position of the hearer, as some of the Romance ones. 'Near the hearer', in fact, defines proximity to the hearer anchor (a sort of 'PROX.2'), rather than a supposed medial/intermediate distance from the speaker, as suggested by the use of 'MED'. I will discuss these issues in more detail, along with the traditional distinction between person-oriented and distance-oriented demonstrative systems, in Section 3.2.

1.3 Theoretical background

This work is couched in a non-lexicalist implementation of syntactic minimalism. In this section, I give a brief overview of the theoretical background and introduce the main assumptions on which I will be building in what follows.

1.3.1 Minimalism

Minimalism is a research programme in generative grammar (Chomsky 1995, Chomsky 2000) which aims at explaining the design of natural language in a principled way and with as few idiosyncratic tools as possible, so as to reconcile evolvability and learnability conditions. The former require a poor Universal Grammar ('UG'), compatibly with the fact that UG must have evolved under the constraints of human biological evolution; the latter, instead, require UG to be rich enough to allow language learners to surmount the poverty of the stimulus. The reconciliation of this tension for any linguistic phenomenon is regarded as its "genuine explanation" (see, most recently, Chomsky (forthcoming)).

In its bid to explain language design, minimalist theorising assumes that this is shaped by the interactions of three different factors (Chomsky 2005): Universal Grammar, with which all human beings are genetically endowed (first factor); the Primary Linguistic Data ('PLD'), which constitute the linguistic experience, the input that language acquirers receive (second factor); additional design principles that are not language-specific, but apply to other cognitive domains as well, and that can be qualified as "(a) data processing, and (b) architectural/computational-developmental constraints" (Chomsky 2005: 9; third factor). UG and PLD were already relevant in previous generative frameworks, whereas third factor principles are specific to the minimalist agenda. Their identification is still very much matter of debate; the present work partly feeds into this line of research, as it proposes an explanation for the patterns of change in demonstrative systems by referring to third factor principles. More specifically, a novel such principle (the monotonicity bias) is put forth in Chapter 5.

Despite the ongoing effort to inventorise third factor principles, the very assumption that language shares some principles of design with other cognitive modules progressively led to a reduction in the content attributed to UG. Under proposals compatible with this paradigmatic shift, UG is thought to only include Merge, the basic operation that builds hierarchical structures in a binary fashion, and, possibly, features and the Agree operation (Chomsky 1995, Chomsky 2000; and, for Merge and features alone, Chomsky 2007). As the present dissertation focuses on features, let us review minimalist features in some more detail.

1.3.2 Features and non-lexicalism

Features can be regarded as the primitives of syntactic derivation and their role is often compared to that played by atoms in the physical world, in that they constitute the building blocks of syntax (see for instance Adger 2003: chapter 2 and, for an overview, Adger 2010). Features come in three different guises (Chomsky 1995: 230): phonological features, semantic features, and formal (or syntactic) features. It is generally understood (see e.g. Zeijlstra 2008, section 2 in particular, for a full discussion) that phonological features are completely separated from semantic and formal features, which instead partly overlap with each other. Crucially, this allows for a distinction to be made within the set of formal features: a subset of formal features are, at the same time, semantic features, i.e. they carry some semantic content as well; the remaining formal features are instead purely formal and semantically void. The former subset of formal features is referred to as being "interpretable", [*i*F], as those features can be interpreted at the Conceptual-Intentional ('C-I') interface; the latter subset of formal features is instead referred to as being "uninterpretable", [*u*F], as those features cannot be interpreted (they carry no semantic value). For the syntactic derivation to proceed, [*u*F]s need to be deleted: this is achieved when a [*i*F] "checks" that [*u*F] by means of a syntactic operation (Agree and, possibly, Move). The present work focuses on interpretable formal features, and more precisely on some interpretable formal ('ϕ') features (person and, to a lesser extent, number).

With this in place, and returning to the discussion of features in relation to UG, Chomsky posits that the

> F[aculty of] L[anguage] specifies the features F that are available to fix each particular language L. [...] We adopt the conventional assumption that L makes a one-time selection [F_L] from F. These are the features that enter into L; others can be disregarded in use of L. (Chomsky 2001: 10)

A more conservative option is that UG only specifies the basic [*i*F] *vs* [*u*F] templates and a subset of features, and namely the truly formal features in a given grammar (i.e. those features that do not intersect with the set of semantic features), as all other features can be plainly deduced from the input (see e.g. Zeijlstra 2008; Biberauer & Roberts 2013: 15; see also Biberauer 2019b for further elaborations).

Regardless of exactly which and how many features are provided by UG, differences across languages ultimately reduce to differences in the specific sets of features that each and every language grammaticalises. This claim is in line with the "Borer–Chomsky conjecture", as Baker (2008b) dubbed Borer's (1984) conclusions with respect to cross-linguistic variation, which were later subsumed into minimalist research by Chomsky (1995). The Borer–Chomsky conjecture can be summarised as follows: "[a]ll parameters of variation are attributable to differences in the features of particular items (e.g. the functional

heads) in the lexicon" (Baker 2008b: 157). Standard implementations of syntactic Minimalism assume, in this spirit, that features are to be construed as properties inherent to the given lexical items. Concurrently, they assume that the derivation is (at least partially) determined by the formal features carried by the lexical items; these are expressly selected from the lexicon to initiate the derivation (selection is taken to be performed by a Select operation, which yields the Numeration; see Chomsky 1995: 226–228). Ultimately, these models posit a separate lexicon which "precedes" (and feeds) the syntax, determining the syntactic and semantic properties of the derivation's output: such approaches are therefore commonly referred to as "lexicalist".

However, the idea that cross-linguistic variation is regulated by divergences across feature inventories does not necessarily (nor univocally) endorse lexicalist approaches, but is likewise compatible with a series of originally non-standard minimalist implementations, generally referred to as "non-lexicalist". According to these latter models, features are not inherent to lexical items and the generation of the structure is therefore independent of the lexicon. Instead, the derivation proceeds by manipulating abstract features (i.e. devoid of phonetic content) associated to a series of functional heads. Further, under this view, the structure itself determines the syntactic and semantic properties of the resulting linguistic expressions, and not the specific lexical items involved in those expressions.[7]

The hallmark characteristic of non-lexicalist approaches is "Late Insertion", or the hypothesis that the abstract features manipulated by the syntax will eventually be matched (spelled out) by compatible lexical items, which carry phonological information. Said otherwise, lexical items are inserted at later stages of the derivation to realise the abstract object of syntactic computations: as such, these models are also referred to as "realisational". A Spell-Out operation regulates the insertion of vocabulary items post-syntactically; thus, in these models, variation at Spell-Out, along with cross-linguistically different feature sets (see again Chomsky 2001: 10), captures cross-linguistic variation.

Different theoretical frameworks adopt a non-lexicalist view of syntax, and most importantly, in the current theoretical landscape, Distributed Morphology ('DM'; Halle & Marantz 1993, 1994; see also Embick 2015 for a fully fledged introduction) and Nanosyntax (Starke 2009; see also Caha 2009; Baunaz *et al.* 2018). In the present work, I adopt a non-lexicalist position which is by and large compatible with some non-standard strands of research in DM. The main differences with respect to regular DM approaches concern additional assumptions about the architecture of syntax (1 Feature–1 Head; Section 1.3.3) and, consequently, about Spell-Out (Spanning; Section 1.3.4).

[7]Other labels for lexicalist *vs* non-lexicalist approaches are endo-skeletal *vs* exo-skeletal approaches (Borer 2003) and projectionist *vs* constructivist approaches (Levin & Rappaport Hovav 2005), respectively. Both series of terms refer to the fact that lexicalist theories assume that the syntactic and semantic properties of linguistic expressions derive from the lexical items, while non-lexicalist theories assume that those same properties are built in the constructions themselves, and are as such extrinsic to the specific lexical items.

Note that, strictly speaking, the account to be developed in this work does not exclusively hinge on either of the non-standard assumptions laid out in what follows and that different implementations are instead conceivable. The non-standard assumptions reviewed below are a simple matter of theoretical preferences. Under standard assumptions, the major difference with respect to the analyses presented in this work would concern the structural formalisation of the reduction of demonstrative systems (see Chapter 6, where feature stability is related to structural factors); this issue is discussed further there (see in particular Section 6.2).

1.3.3 Syntactic architecture: 1 Feature–1 Head

As regards the former difference, in this study I adopt a "1 Feature–1 Head" ('1F1H') architecture for syntax, largely following the argumentation lines presented by Putnam (2020). Under this approach, each feature is assumed to head its own functional phrase; in other words, I take each terminal node to amount to one single feature. This is in clear opposition to standard DM assumptions, where features may (and typically: do) come into complex bundles; however, the atomic features option has been likewise explored in non-standard DM, and in particular under Spanning approaches (see Section 1.3.4 for more).

The hypothesis that each feature corresponds to a syntactic head stems from two main crucial facts. Firstly, in line with Starke (2014), it should be pointed out that, if features are seriously regarded as syntactic objects, feature bundles (i.e. collections of syntactic objects) cannot possibly be construed as atoms in the derivation (as under DM's implicit assumptions), but must themselves be derived by (binary) Merge.[8] As such, the hypothesis that features are syntactic heads themselves, rather than primitive bundles hosted by dedicated syntactic heads, is fully compatible with minimalist assumptions. Secondly, as noted by many (see for instance Adger & Svenonius 2011 for extensive discussion), the syntactic nature of features is ill-defined and unclear at best. The assumption that features are syntactic heads mitigates this issue altogether.

Unlike in DM, a 1F1H architecture is outrightly assumed in syntactic theories such as cartography (Rizzi 1997; Cinque 1999; Cinque & Rizzi 2010; see also Shlonsky 2010) and Nanosyntax (where it is referred to as the "No Bundling" property; see e.g. Caha 2020).[9] Cartography is a research programme that takes the Uniformity Principle (Chomsky 2001: 2: "In the absence of compelling evi-

[8] Starke (2014: 246): "Trivially, a 'feature bundle' is equivalent to a constituent. Enclosing elements inside square brackets is a notational variant of linking those elements under a single mother node. Feature bundles are thus trees, typically flat n-ary trees with $n > 2$."

[9] In one of its first instantiations, a 1F1H model has been proposed by Kayne under the label "Principle of Decompositionality": "UG imposes a maximum of one interpretable syntactic feature per lexical item" (Kayne 2005b: 212) and, conversely, "UG requires that [...] two notions correspond to two separate elements (two separate nodes)" (Kayne 2005c: 289). This principle is also adopted in the new Morphology as Syntax research programme (Collins & Kayne 2021); however, its implementation is fully lexicalist in nature, contrary to what is assumed in this work.

dence to the contrary, assume languages to be uniform, with variety restricted to easily detectable properties of utterances") to its extreme consequences by hypothesising

> that the distinct hierarchies of functional projections dominating VP, NP, AP, PP, IP, *etc.*, may be universal in the type of heads and specifiers that they involve, in their number, and in their relative order, even if languages differ in the type of movements that they admit or in the extent to which they overtly realize each head and specifier. (Cinque & Rizzi 2010: 55)

As a probe into universal hierarchies, the cartographic programme assumes the following axiom: "one (morphosyntactic) property—one feature—one head" (Cinque & Rizzi 2010: 61); complex heads which encode more than one feature are ruled in, but only as the result of previous derivations. Crucially, given their generalised availability and their language-specific nature, these hierarchies are regarded as part of UG (thus as innate and not derivable by third factor principles). Likewise, Nanosyntax assumes fixed hierarchies of functional projections which are universal, in spite of surface cross-linguistic variation. The main nanosyntactic focus is however on hierarchies at sub-morphemic level, such that each terminal node encodes one feature and sequences of terminal nodes are eventually matched by a single morpheme. The sequence of terminal nodes is commonly referred to as universal functional sequence ('fseq').

Although the 1F1H architecture assumed in this dissertation is fully compatible with these accounts, and in particular (given the scope of the present work) with Nanosyntax, I do not assume a universal functional sequence, nor its rigid ordering. I do so because of widely recognised concerns with respect to the tenability of such fine-grained functional sequences as part of UG, in clear breach of the minimalist reduction of the content of UG (see Section 1.3.1). Rather, to solve the tension between the vast empirical coverage of universal functional sequences and the striving for genuine explanations, here I follow Ramchand & Svenonius' (2014) proposal that "hierarchies emerge in some highly constrained way" (2014: 153), as their universality and rigidity are not to be systematically regarded as primitives.[10] This proposal specifically addresses issues relative to cartography, and, more precisely, to the (clausal) functional hierarchy, where only the order CP $\prec$ TP $\prec$ VP is taken to be universal and to be constrained by the semantic relation among the three conceptual primitives provided by UG (e[vents] in VP, s[ituations] in TP, and p[ropositions] in CP). However, I take it that the general rationale can be legitimately extended to Nanosyntax as well. In particular, in relation to the content of this work, I take the person and number domains encoded within indexical elements to be universally and rigidly ordered (number $\prec$ person; see Section 6.5.1 and Appendix D.2), but the features that operate in these domains to be (a) emergent and (b)

[10]Following a similar rationale, see again emergent features as proposed by Zeijlstra (2008) and Biberauer & Roberts (2013) *et seqq.*, which likewise limit the number of features available to each language and reconcile cross-linguistic variation with acquisition concerns.

flexibly ordered with respect to each other. Both emergentism and flexibility will be shown to derive different person and number systems (while warranting an overall more parsimonious system) and, in turn, can be conceived as dependant on the evidence provided by the PLD as to which semantic oppositions are available in a given language. This assumption heavily builds on Harbour (2016) and can be conceived as a way to recast those conclusions in a 1F1H model (more on this in Section 3.3).

Crucially, this is in stark contrast with the nanosyntactic hypothesis of a universal functional sequence, which is one of the core components of nanosyntactic theorising. On a par with cartography, Nanosyntax aims at uncovering the (by hypothesis) universal and rigidly ordered functional sequence on the basis of morphological linear relations, as well as of containment relations, among the exponents of the different terminal nodes in the syntax; assuming uniformity strengthens the predictive powers of the theory.

Thus, the specific implementation given to the 1F1H architecture in this work is substantially irreconcilable with Nanosyntactic assumptions. Instead, as already remarked, the assumption that every feature coincides with a syntactic head is underlyingly compatible with the DM framework. Ultimately, considering features as bundled on a functional head whose whole purpose is to host those features (as in standard DM) as opposed to considering them as scattered along the functional spine (under 1F1H) are two substantially compatible options, provided that, in the latter case, the standard Zermelo-Fraenkel axiom of extension is applied to the set of features in the Numeration (i.e. the Numeration may only contain each feature once, as any further occurrence of the same feature would not change the extension of the numeration; see Harbour 2014a: 205). However, only the latter option seems fully compatible with the DM maxim "syntax all the way down" (see also Blix 2021: 48–49 for similar remarks): in fact, once features are rigorously regarded as syntactic objects manipulated by the syntax in the derivation (as in non-lexicalist models) and once the binary nature of the Merge operation is fully appreciated, a decomposition of the standard feature bundles into atomic features becomes inevitable.

1.3.4 Spell-Out: Spanning

The 1F1H architecture assumed here for syntax has obvious ramifications for the operation of Spell-Out. In fact, under standard DM assumptions, morphemes overtly realise individual terminal nodes in the syntactic derivation. As these nodes might contain more than one feature, DM ultimately assumes a one-to-many relation between morphemes and features (but a one-to-one relation between morphemes and terminal nodes). This is clearly shown by the assumption that, during Vocabulary Insertion, the item that will win the competition and be inserted at later stages of the derivation is the one that matches the greatest number of the features that are encoded by the relevant terminal node (Halle & Marantz 1993: section 2.2). Importantly, a vocabulary item may *not* be inserted if it contains features that are absent from the relevant terminal

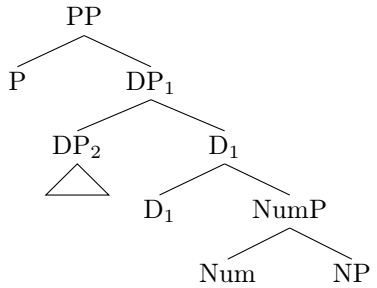
node: rather, the set of features included in a given vocabulary item must be in a subset relation with respect to the set of features included in the terminal node to be spelled out (and, as such, may be underspecified for some of the features encoded by the terminal). This is referred to as the Subset Principle (first explicitly defined in Halle 1997: 128, but implicit to previous formulations of the theory).

Importantly here, the Subset Principle prevents a lexical item from lexicalising more than one node. However, the hypothesis that features are not bundled together, but scattered along the functional spine (1F1H), makes the standard model for Spell-Out unsuitable: it is not always the case that one morpheme spells out just a single feature. As a matter of fact, DM does allow for similar mismatches between a single morpheme and a single terminal node: post-syntactic operations such as fusion, fission, and impoverishment (among others) substantially "fix" the syntactic output to make it suitable for Vocabulary Insertion (for these post-syntactic operations, see e.g. Embick 2015). Specifically, under standard DM assumptions, vocabulary items may spell out features that are encoded on two separate nodes only subject to the application of a fusion operation: fusion "fuses" two separate terminal nodes into one prior to Vocabulary Insertion, ensuring that the new, fused terminal node is exposed by a single vocabulary item.

Here, rather than taking fusion to apply as a permanent fix to model Vocabulary Insertion under a 1F1H architecture, I adopt a more systemic approach for the exponence of a series of nodes by assuming a Spanning operation, in line with other non-standard DM approaches, some of which likewise assume an architecture closer to 1F1H than to the traditional feature bundles (Bye & Svenonius 2012; Svenonius 2012, 2016, 2020; Merchant 2015; Julien 2015; Haugen & Siddiqi 2016; Blix 2021; Davis 2022; *i.a.*).[11] Spanning is conceived as an operation whereby any series of terminal nodes may be spelled out by one and the same morpheme. More precisely, a span is defined as "a complement sequence of heads, normally in a single extended projection" (Svenonius 2012: 1): hence a sequence of heads constitutes a "non-trivial" span (while a single head is a "trivial" span). Svenonius illustrates the concept by means of the following tree:

[11]See Svenonius (2012) for a discussion of the history of the notion of "spanning", and its relation to Abels & Muriungi's (2008) "stretches" of syntactic heads. Also note that the convenience of a Spanning operation at Spell-Out has been invoked independently of 1F1H implementations to limit the weight of the post-syntactic component. Assuming spanning, in fact, Spell-Out can be restricted to Vocabulary Insertion (which is constrained exclusively by the structural relations among the relevant nodes), doing away with all the additional post-syntactic operations and resulting in a more economical model. See Haugen & Siddiqi 2016 for discussion.

(9) (Svenonius 2012: 1)



All heads in (9) constitute trivial spans; the following six spans are instead non-trivial: P–D_1; P–D_1–Num; P–D_1–Num–N; D_1–Num; D_1–Num–N; Num–N (Svenonius 2012: 1). Additional spans may be included within DP_2.

The "Spanning insertion hypothesis" can then be formulated as follows:[12]

> [M]orphological exponents are always associated with spans, trivial or non-trivial. [...] A single morphological exponent (morpheme, for short) cannot spell out two heads (cannot 'span' two heads) unless those heads are in a complement relation with each other.
>
> (Svenonius 2012: 2)

In other words, spanning allows one and the same morpheme to "span" over (and, thus, to spell out) multiple contiguous terminals. The assumption of spanning necessitates a revised regulation for competition at Spell-Out: I follow Julien (2015) in assuming a "Principle of Maximal Expression", whereby "a vocabulary item will win the competition for insertion if [it] leaves fewer *nodes* and features unexpressed than its competitors" (Julien 2015: 2; emphasis mine).

More precisely, in this work I adopt the spanning operation as recently implemented by Davis (2022). Contrary to other spanning models which take one morpheme to span across a series of terminal nodes (see again (9)), Davis proposes that spanning can involve terminal and non-terminal nodes alike. While a "standard" spanning approach is sufficient to handle Vocabulary Insertion in most of the data discussed in the present work, there is one exception that (under present structural assumptions) may only be captured by additionally assuming that spanning can target non-terminal nodes. This is the case of the MeasP which I argue to be included within the internal structure of DemP and further spelled out together with the Dem head that it modifies (see Section 4.4.2).

Before concluding, it should be mentioned that spanning is reminiscent of the nanosyntactic phrasal Spell-Out model. However, in this respect as well, a crucial difference makes the present work substantially incompatible with nanosyntactic tenets. Concretely, the spanning operation does not put specific constraints on which nodes must be spelled out together within a functional

[12] I remain agnostic as to the timing of spanning: according to Svenonius, spanning precedes linearisation, while according to Haugen & Siddiqi it follows linearisation. The consequences of these two approaches are discussed by Haugen & Siddiqi (2016: 375–377 in particular).

sequence, except the adjacency requirement: any of the spans given a sequence of nodes may be targeted by Vocabulary Insertion. To the contrary, Nanosyntax assumes the "Anchor Condition", whereby "[i]n a lexical entry, the feature which is lowest in the functional sequence must be matched against the syntactic structure" (Caha 2009: 89). In other words, given the tree in (9), only the spans that include the lowest head may be lexicalised under the nanosyntactic phrasal Spell-Out model: P–D_1–Num–N; D_1–Num–N; Num–N. Crucially, the data discussed in Section 4.4 can only be accommodated by a spanning model, and not under an approach which assumes the Anchor Condition.

In sum, this dissertation assumes a non-lexicalist minimalist model for syntactic derivations combined with a general 1F1H architecture for syntax and a spanning model for Vocabulary Insertion at Spell-Out. The main focus of this work is on formal interpretable features, and particularly on person (and, more marginally, number) features. These are explored in synchrony, with a focus on their encoding in the internal syntax of demonstrative forms (Chapters 3 and 4); and in diachrony, with a focus on their (in)stability in demonstrative systems, a fact ultimately reduced to third factor principles and independent structural considerations (Chapters 5 and 6).

1.4 Dissertation outline

In the foregoing, I introduced the main topic of this dissertation, provided a terminology primer, and sketched the general framework against which the research presented here is set. To conclude this introduction, I briefly discuss how the following chapters contribute in addressing the main puzzle under investigation.

Chapter 2 provides the empirical backbone of this study and consists of a detailed overview of the evolution of Romance (apparent) ternary demonstrative systems in diachrony and in contact, on the basis of data collected from the literature (diachrony and Portuguese-based creoles) and on fieldwork (attrited and heritage Italo-Romance varieties in micro- and macrocontact). Given the typological interest of this varied set of data, Chapter 2 only provides their description in a fashion as much as possible theory-neutral. The following generalisations emerge from this chapter:

(10) a. ternary demonstrative systems may be unstable and tend to reduce to binary systems in diachrony and contact alike;

b. whenever this reduction takes place, the indexical domain that is invariably affected by change is the hearer-oriented one (in spite of the semantic and formal variation in the actual patterns of reorganisation).

The analysis of the data presented in Chapter 2 and an account for the generalisations in (10) are provided in the remainder of the dissertation. Specifically,

Chapters 3 and 4 present my featural and syntactic analyses for demonstrative forms, which, together, account for how indexicality is encoded in demonstrative systems. Building on this, Chapters 5 and 6 put forth a principled account for the reduction of demonstrative systems, discussing what determines their instability, how this can be constrained to derive the attested reduction patterns, and why other indexical systems are instead stable.

More specifically, Chapter 3 argues that Romance demonstrative systems are person-oriented: that is, they define the location of a referent in the external world with respect to one of the discourse participants (the speaker, the hearer, neither of them). In turn, it is contended that demonstrative forms must be derived by means of person features, i.e. by the same tools that also derive pronominal forms (and other person indexicals). Finally, the person features adopted in the remainder of this work is introduced and it is shown how the attested (synchronic) variation within the Romance domain (and beyond) is derived under this system.

Chapter 4 presents a novel proposal for the internal structure of demonstratives, which, it is argued, includes a pronominal-like component (derived by the machinery described in Chapter 3) merged under a prepositional-like component. The former defines the deictic centre with respect to which each demonstrative is interpreted; the latter establishes a spatial relation of proximity between that deictic centre and the demonstrative's referent, much in line with current approaches to prepositions. Ultimately, this amounts to analysing *this book* as '(the) book near me'. Supporting evidence for this proposal is provided by the morphological decomposition of Romance demonstrative systems.

Assuming the main conclusions drawn from Chapters 3 and 4, Chapters 5 and 6 return to the data presented in Chapter 2 to finally formalise and account for the changes attested in the encoding of indexicality in demonstratives. In Chapter 5, it is observed that all patterns of reduction, regardless of their variation, can be descriptively modelled as resulting from the loss of the last person feature to enter into the derivation of a given (seeming) ternary demonstrative system. Further, a principled account for this intuition is proposed and shown to capture the generalisations in (10): concretely, it is argued that feature loss hinges on the properties of the feature system assumed here and is driven by a third factor principle (the monotonicity bias) that leads to less computationally complex derivations.

In Chapter 6, instead, a structural constraint on feature loss is introduced: feature loss is shown to be restricted to the second and last person feature to enter into the derivation ("Last in–First out" principle, which hinges on the importance of the ordering of compositions for action-on-lattice features), making feature (in)stability a function of merge position. Additionally, it is argued that the "Last in–First out" principle prevents the loss of person features in pronominal systems, deriving the exceptionality of demonstrative systems with respect to all other person-based indexical categories.

Chapter 7 concludes with a summary of the core findings and presents prospects for further research.

CHAPTER 2

Demonstrative systems: Patterns of change

2.1 Introduction

This chapter provides a detailed overview of the development of Romance ternary demonstrative systems, in diachrony and in contact situations. While it is generally acknowledged that demonstrative systems that encode a three-way deictic opposition can, and indeed do, often reduce to systems that are less rich in their deictic organisation, no systematic work is currently available that provides a typology of the patterns of change. Mentions of such reduction process can be found in: Frei (1944) for some general remarks, Abondolo (1998: 24) for Uralic languages, Lyons (1999: 110) for European languages (especially English, German, Catalan, and French), Manolessou (2001) for Greek (see also Lendari & Manolessou 2012 for a discussion of the variation attested in modern Greek dialects), Bhat (2004: 181–182) for Indo-Aryan and Dravidian languages, Marchello-Nizia (2004) for French, Vulchanova & Vulchanov (2011) for Bulgarian, and Pérez Saldanya (2015) for Catalan and Spanish. The most systematic overview is provided by Ledgeway & Smith (2016) who, in documenting demonstrative systems attested across current and historical Romance languages, gather an enormous quantity of data that can inform a typology of semantic change in that domain.

This chapter sets out to provide such a typology for the reduction of ternary demonstrative systems displayed by Romance languages as attested both in diachrony and in different contact scenarios. In fact, thanks to the sizeable amount of data in both contexts and relative accurate descriptions, Romance languages offer a valuable window onto the development of demonstrative sys-

tems. On these bases, I will show that ternary demonstrative systems present a fairly strong tendency towards the reduction to binary systems. This process further attests a considerable amount of semantic and formal variation, rather than being fully uniform; yet, regardless of the points of variation, I will emphasise how the reduction process always results in the loss of the dedicated 2nd person ('that/there near you') semantics. Using the conventions to be adopted in what follows, the results that this chapter presents can be summarised as in (1):

(1) *Patterns of reduction: Overview*

Ternary semantics:	DEM.1	DEM.2	DEM.3
Three forms:	⇒1	⇒2	⇒3
Binary: speaker-based	⇒1	⇒3	
	⇒1	⇒2	
Binary: participant-based	⇒1		⇒3
	⇒2		⇒3

The first two rows of the table in (1) represent the original ternary systems: these systems encode a three-way deictic contrast between DEM.1 (the speaker-related deictic domain: 'this/here near the speaker'), DEM.2 (the hearer-related deictic domain: 'that/there near the hearer'), and DEM.3 (the non-participant-related deictic domain: 'that/there far'); see also Section 1.2.3. Each deictic domain has a dedicated form, signalled by an arrow (⇒) followed by a number which refers to the relevant domain: ⇒1 (the speaker-oriented form, for DEM.1), ⇒2 (the hearer-oriented form, for DEM.2), and ⇒3 (the non-participant-oriented form, for DEM.3).[1]

While ternary systems show a one-to-one mapping between deictic domains and their exponents, reduced binary systems (binary: speaker-based and participant-based, in (1)) display a more complex situation. This chapter shows that: semantically, binary systems cluster together two originally independent deictic domains, as indicated by the boxes which enclose them (semantic reduction and variation with respect to the domain with which the hearer-related one merges); formally, binary systems may express this new underspecified deictic domain by means of either of its two original exponents, as shown by the two different rows available for each binary system (formal variation). That is, in line with the discussion in Section 1.2.3, speaker-based binary systems encode a two-way contrast between the speaker-related deictic domain (DEM.1) and the non-speaker-related one (DEM.2/3, boxed); while DEM.1 is consistently expressed by ⇒1, this chapter will show that there is variation as to the expression of DEM.2/3, where either the original non-participant-oriented form, ⇒3, or the original hearer-oriented form, ⇒2, may be employed in the new non-

[1] For Latin, Roman numbers are used instead (e.g. ⇒III for *ille*); cf. discussion around (4).

speaker-oriented function. Likewise, participant-based binary systems display a two-way deictic opposition between the participant-related deictic domain (DEM.1/2, boxed) and the non-participant-related one (DEM.3); in this case, it will be shown that DEM.3 is consistently expressed by ⇒3, whereas DEM.1/2 may be realised either by the original speaker-oriented exponent, ⇒1, or by the original hearer-oriented one, ⇒2.

Given the typological interest of these data, this chapter provides a theory-neutral systematic description thereof. Their analysis is provided in the remainder of this study, and specifically: Chapter 3 gives a featural description of the deictic contrasts encoded by demonstratives; Chapter 4 presents a fully fledged syntactic analysis of the data; finally, Chapters 5 and 6 propose a principled featural and structural account for the attested reduction patterns.

This chapter is organised as follows: Section 2.2 discusses in detail the diachronic Romance data. Section 2.3, instead, presents different strands of investigations into Romance demonstratives in contact, including initial data from Italo-Romance attrited and heritage varieties spoken in contact with other closely related, minimally different languages ("microcontact", Section 2.3.1), from the same varieties spoken in contact with (US) English ("macrocontact", Section 2.3.2), and from Portuguese-based creoles (Section 2.3.3). The aim of these empirically different domains is to show that, despite extra-linguistic differences, the same patterns of reduction and the same variety of formal outcomes are attested, which require a holistic approach: Section 2.4 concludes by collecting and restating the generalisations uncovered in the rest of the chapter and by setting the *explananda* for the remainder of this work.

2.2 Demonstrative systems in diachrony

This section introduces the patterns of reduction of ternary demonstrative systems attested by Romance languages and illustrates the semantic and formal variation that such reduction brings about (see (1)).

The most comprehensive survey of demonstrative systems in Romance languages has been given by Ledgeway & Smith (2016) (see also Ledgeway 2015 for an overview of Italo-Romance only and Ledgeway 2020 for a parametric analysis of the variation). Their sample collects 239 demonstrative systems, including both nominal and adverbial systems, and is summarised in (2):

(2) *Romance demonstrative systems* (Ledgeway & Smith 2016)

System	N:DEM	A:DEM	Total
Ternary	68	43	111
Binary, speaker-based	45	8	53
Binary, participant-based	40	35	75
Total	153	86	239

The figures reported in (2) capture both synchronic and diachronic stages attested across Romance languages and provide information about the semantics of their demonstrative systems. Of course, the numbers are only indicative and by no means inclusive of the entire variation attested. Still, the level of micro-variation for Romance demonstratives is clearly wide-ranging. Note that, while ternary demonstrative systems are well attested across the Romance family, the two binary systems combined are overall more frequent.[2]

2.2.1 The origins of variation in Romance demonstratives

The variation attested by Romance demonstrative systems can be brought back both to the early stages of formation of the Romance languages (whether a given Romance variety innovated the Late Latin system, or not; Section 2.2.1.1) and to further developments at later stages of those same varieties (whether a given Romance variety that innovated the Late Latin system underwent a semantic reduction over time, or not; Section 2.2.1.2).

2.2.1.1 Early variation: Non-innovative *vs* innovative varieties

The first type of variation goes back to the origin of Romance languages and is deeply related to the transmission of the original Latin demonstrative systems. In this respect, it must be pointed out here that the encoding of deixis in demonstrative systems proved to be diachronically unsteady in Latin already. The general consensus is that Classical Latin showed ternary, person-oriented demonstrative systems as the ones discussed here.[3]

However, the Classical Latin ternary systems already showed an incipient reorganisation, as attested by the contemporary Vulgar Latin (colloquial variety; Ernout & Thomas 1953: 190). In the nominal system, this reorganisation is generally understood to have been triggered by the loss of the speaker-related term (*hic*), with the subsequent expansion of the deictic meaning of the hearer-

[2]Note that the systems in (2) are classified according to the maximum amount of deictic contrasts that can be encoded in each domain; in the nominal domain, however, some of these contrasts are realised by combining a (poorer) nominal demonstrative systems with a (richer) adverbial one, thus yielding demonstrative-reinforcer constructions (e.g. most famously French *ce* N-*ci*/-*là*). Thus, some nominal demonstrative systems labelled here as ternary and binary are in fact unary, whenever considered in isolation. Unary systems, in line with wider cross-linguistic tendencies (see WALS, feature 41A: Diessel 2013a) are quite rare, and amount to 9 in this sample. These systems will be mainly left out of the discussion, also due to their extremely reduced availability. However, see Sections 2.3.3.2–2.3.3.4 below for some examples, and Chapter 4 for their importance for the decompositional analysis proposed for the internal structure of demonstratives.

[3]Among others: Meillet 1933: 161–162; Ernout 1953: 79; Ernout & Thomas 1953: 187–191; Lyons 1999: 109; Lüdtke 2015: 541–542; Pinkster 2015: throughout chapter 11 and especially: 970, 1094, 1097, 1137 for adnominal and pronominal demonstratives in their exophoric and anaphoric uses; *pace* Frei 1944; Benedetti & Ricca 2002, *i.a.*

related one (*iste*) to cover that domain as well.[4] Although the chronology of these changes is not entirely clear, a binary system with this organisation can be taken to be the Late Latin input to Romance languages. The evolution of the adverbial system has instead received less attention and is not mentioned in the works reported above. Nonetheless, considering the Romance outcomes as discussed below, it is possible to say that the hearer-oriented adverbial series (e.g. *istic*) gradually fell out of use (with the exception of Tuscan varieties, where it is still preserved: *costì* 'there near you' < ECCU-ISTIC, Rohlfs 1968: 248):

(3) *Latin demonstratives*[5]

	N:DEM.1	N:DEM.2	N:DEM.3	A:DEM.1	A:DEM.2	A:DEM.3
Latin	hic	iste	ille	hic	istic	illic
Late Latin	iste		ille	hic	(istic)	illic

Some Romance languages retained the binary organisation of the Late Latin system in its original shape (i.e. with an extended referent for the first term, involving both the speaker and the hearer), or, more commonly, in a slightly modified one (with the first term making reference to the speaker only). These varieties will be referred to as "non-innovative" Romance varieties, as they substantially retained the original Late Latin system without innovating it further; these are discussed in Section 2.2.2.

Instead, some other Romance languages rebuilt a ternary system out of the binary Late Latin one by incorporating a new hearer-oriented term in demonstrative systems; therefore, these varieties will be referred to as "innovative" Romance varieties, discussed in Section 2.2.3. In nominal systems, the new hearer-oriented demonstrative typically stemmed from either a 2nd person marker or from the outcomes of the anaphoric/emphatic pronoun IPSE (see Stavinschi 2012 for an account of the typologically unusual evolution anaphoric > exophoric; and Lüdtke 2015: 547–549 and Ledgeway & Smith 2016 for references). Likewise, in the adverbial domain, new hearer-oriented forms were introduced on the basis of an erstwhile anaphoric form (typically IBI; Lüdtke

[4]See Grandgent 1907: 35, 163; Meillet 1933: 161; Väänänen 1981: 120–121; Vincent 1999; Alkire & Rosen 2010: 301–302; Lüdtke 2015: 546–547; Pinkster 2015: 11.141; Ledgeway & Smith 2016.

[5]Only NOM.SG.M forms reported for N:DEM; only locative forms for A:DEM. It is also worth mentioning here that Latin adverbial demonstratives displayed, for each semantic domain (near the speaker, near the hearer, far), four different series with contrastive motion values, each characterised by a vowel: -*i*- for the locative series, -*u*- for the allative series, -*in*- for the ablative series, and -*a*- for the perlative series (see e.g. Lüdtke 2015: 544). This opposition was only fragmentarily preserved in early Romance and eventually lost in later developments, with original locative and perlative forms (*i*- and *a*-series) most commonly retained to the disadvantage of the others. These two series are now typically used with a punctual (or specific) *vs* areal (generic) semantics, respectively (Ledgeway & Smith 2016: 894 and references therein). For brevity, in what follows I only refer to originally locative forms.

2015: 554) or of the specialisation of one form from either the speaker-oriented *hic* series or the non-participant-oriented *illic* series.

Thus, the development of demonstrative systems from Late Latin to innovative Romance varieties can be outlined as follows:

(4) *Demonstrative systems: from Late Latin to innovative Romance*

a. *Nominal demonstratives*

	N:DEM.1	N:DEM.2	N:DEM.3
Late Latin	iste, ⇒II		ille, ⇒III
Romance	ISTE, ⇒1	IPSE, ⇒2	ILLE, ⇒3

b. *Adverbial demonstratives*

	A:DEM.1	A:DEM.2	A:DEM.3
Late Latin	hic, ⇒I	hic/illic, ⇒I/III	illic, ⇒III
Romance	HIC, ⇒1	*various*, ⇒2	ILLIC, ⇒3

In (4), each cell contains, besides the Latin attested form (first row) or the Latin source forms from which Romance demonstratives developed (second row; reported in small capitals, following the Romance linguistic tradition), the shorthands already introduced in (1). Latin forms are marked as ⇒I, ⇒II, or ⇒III, to signal their original speaker-oriented, hearer-oriented, or non-participant-oriented functions, respectively, in the Classical/Vulgar Latin system (see (3)). Romance forms are instead marked as ⇒1, ⇒2, or ⇒3, to signal their speaker-oriented, hearer-oriented, or non-participant-oriented functions in the innovative Romance varieties. While the association of semantics and relative forms in innovative Romance varieties is straightforward, the reduction of this ternary system into binary systems makes the picture more complicated: hence, this notation will be used in what follows to highlight possible mismatches between the old and new semantics of each demonstrative form throughout the reduction process, as already explained with respect to (1) above. An exemplary case, in this respect, is provided by the Late Latin nominal system, which is itself the result of a reduction process: its participant-oriented term *iste* 'N:DEM.1/2' was the original hearer-oriented form of Classical Latin (N:DEM.2; see (3)) and is hence marked as ⇒II, to indicate the semantic change from an erstwhile hearer-oriented form to a general participant-oriented one.[6]

[6] *Iste* subsequently gave rise to the Romance speaker-oriented form, marked as ISTE, ⇒1; this etymological link is obscured by the different number types (Roman *vs* Arabic), which are used to refer to two different ternary systems (the Classical Latin one, (3); the innovative Romance one, (4)). The advantage of such notation, however, is that it immediately sets aside non-innovative Romance varieties (which never developed a new ternary system: marked by a Roman number) and innovative ones (which instead did: marked by an Arabic number).

Finally, it should be noted that the original Latin forms have been almost systematically reinforced, in early Romance varieties, by reflexes of Latin presentative demonstrative ECCE 'behold', which could precede both nominal and adverbial demonstratives (as attested by their etymologies) to strengthen their deictic content.[7] For an overview of patterns of variation in this type of reinforcement across pronominal and adnominal demonstratives, see Ledgeway & Smith 2016; for a proposal about the role of this type of reinforcement in shaping the Romance demonstrative systems, see Vincent 1999. This type of reinforcement will not be dealt with in this work.

2.2.1.2 Late variation: Ternary *vs* reduced systems

As for the second type of variation, this only applies to varieties in which a ternary system was rebuilt (innovative Romance type, in (4)). Such innovative ternary systems underwent subsequent reductions in a subset of those varieties, resulting in new binary systems.[8] This type of variation can be summarised as follows:

(5) *Demonstrative systems: Reductions in innovative Romance varieties*

	DEM.1	DEM.2	DEM.3
Ternary (innovative) Romance systems	⇒1	⇒2	⇒3
Speaker-based binary systems	⇒1 ⇒1	⇒3 ⇒2	
Participant-based binary systems	⇒1 ⇒2		⇒3 ⇒3

As (5) shows, innovative ternary systems, in which each deictic domain (DEM.1, DEM.2, and DEM.3) has a dedicated exponent (⇒1, ⇒2, and ⇒3, respectively), possibly evolved into binary ones. The semantic reductions attested by these systems are represented by boxing together the relevant deictic domains (DEM.2/3 for speaker-based binary systems; DEM.1/2 for participant-based binary systems). These reductions brought about the loss of one of the two

[7] A similar process is attested for the proximal series of northern and western Germanic by means of a sigmatic reinforcer (suffix *-si*/*-se*, most likely a particle resulting from the Proto-Germanic imperative for 'see, look'), as shown by Lander 2015.

[8] For the cyclical nature of the reduction–expansion process in demonstrative systems, see Stavinschi (2012: 88–89 particularly). Note that this cycle, besides the presentative form ECCE mentioned above, also includes another type of reinforcement that will not be dealt with specifically here: nominal demonstrative forms can be reinforced by means of adverbial(-like) forms, yielding the so-called demonstrative-reinforcer constructions, eventually grammaticalised into new demonstratives (for a description of this process as a cycle, especially in relation to Germanic languages, see Vindenes 2018; for a recent grammaticalisation analysis for Romance, see Andriani *et al.* 2020). These constructions will be mostly left aside in this dissertation, but see fn. 18 for references, and Section 4.3.3 for a preliminary syntactic proposal.

originally contrastive forms (e.g., for DEM.2/3, either ⇒2 or ⇒3 is retained in the new non-speaker-oriented function); variation in this respect is represented by the two different forms available within each box.

In what follows, I review in detail the patterns of development attested for both non-innovative and innovative Romance varieties. I will start by describing the non-innovative varieties, i.e. those that did not recreate a ternary system but that preserved the binary opposition in the Late Latin simplified system (Section 2.2.2), and then move on to examine the innovative varieties and the patterns that led to novel binary systems (Section 2.2.3). Both sections discuss the different attested semantic developments (speaker- *vs* participant-oriented systems); the latter section also introduces the formal variation instantiated by those systems.

2.2.2 Non-innovative varieties

In the vast majority of northern Romance languages (Gallo-Romance, Rhaeto-Romance, northern Italo-Romance), binary demonstrative systems are attested. Such systems have been recorded already in the initial stages of documentation of those varieties (Ledgeway & Smith 2016: 879) and are therefore understood to be the direct continuation of the reduced demonstrative systems of Late Latin, following the discussion above (see in particular (4)).

Romance varieties belonging to the groups listed above most typically continue these demonstrative systems, but showing a limited amount of semantic variation: Section 2.2.2.1 introduces the most common development, that into speaker-based binary systems; Section 2.2.2.2, instead, presents a rarer case, namely the retention of the old participant-based binary semantics.

2.2.2.1 Speaker-based binary systems

The most common binary system attested across Romance languages (and beyond) is the speaker-based one, in which a binary opposition is defined between the speaker-related area and the non-speaker-related area (DEM.1 *vs* DEM.2/3).

The Late Latin demonstrative systems resulted in such a system across most northern Romance languages, as in Ladin's nominal series (6a). Besides, the adverbial -*a*-series (from the original Latin perlative, see fn. 5) attested in Ibero-Romance languages, such as Galician (6b), systematically lacks the hearer-oriented term (cf. the *i*-series, which is instead organised as a fully fledged ternary system): there is good evidence that, rather than developing a new form dedicated to the hearer-related domain exclusively, and then losing it, the hearer-related domain across Ibero-Romance never had a dedicated exponent in the -*a*-series and instead stemmed directly from the Latin binary system (see for instance Teyssier 1981 for Portuguese).

(6) a. *Ladin nominal demonstratives* (Ledgeway & Smith 2016: 879)

	N:DEM.1	N:DEM.2	N:DEM.3
Late Latin	iste, ⇒II		ille, ⇒III
Ladin	chësc, ⇒II	chël, ⇒III	

b. *Galician adverbial demonstratives* (Ledgeway & Smith 2016: 891)

	A:DEM.1	A:DEM.2	A:DEM.3
Late Latin	hac, ⇒I	(istac, ⇒II)	illac, ⇒III
Galician	acá, ⇒I	alá, ⇒III	

As the examples show, the evolution of the Late Latin binary demonstrative system into the speaker-based binary one of Romance was absolutely straightforward in the adverbial domain, where both its forms and semantics were preserved (6b). In the nominal domain, instead, the binary organisation of the demonstrative system was retained (two contrastive forms only), but the semantics of the two terms shifted slightly (6a). Specifically, the first term restricted its deictic interpretation to the denotation of the speaker-related domain, while the second term expanded its deictic value to include the hearer-related domain, besides the non-participant-oriented one to which it was originally bound. This change has been explained in pragmatic/cognitive terms by Stavinschi (2012), who proposed that a pragmatic process ("subjectification"; see Traugott 1989) is at work in the participant-oriented (and erstwhile hearer-oriented; cf. (3)) ⇒II term, such that it tends, over time, to univocally designate the speaker-related domain in opposition to all other deictic domains, "including the space of the Hearer (2nd), previously designated by the same proximal term" (Stavinschi 2012: 88).

As said, these systems are very well attested across all northern Romance varieties, in which both nominal and adverbial demonstratives have been systematically documented as binary since their origins (Ledgeway & Smith 2016: 879–881, 891). As regards Ibero-Romance varieties, despite they typically developed dedicated hearer-oriented terms (see Section 2.2.3 below), they show speaker-based binary systems in the *-a*-series of adverbial demonstratives (as well as in the *-o*-series, for those varieties that still retain one): this is the case for varieties of Spanish, Portuguese, Galician, Asturian (see Ledgeway & Smith 2016: 891).

2.2.2.2 Participant-based binary systems

In considerably fewer instances, the Late Latin binary system did not show the semantic shifts attested in (6a) above and was instead preserved as a

participant-based binary system. Participant-based binary systems encode the opposition between the participant-related domain and the non-participant-related one (DEM.1/2 *vs* DEM.3).

The preservation of the original Late Latin binary system is extremely restricted and found exclusively in the nominal domain, for instance in Old French:

(7) *Old French nominal demonstratives* (Ledgeway & Smith 2016: 880)

	N:DEM.1	N:DEM.2	N:DEM.3
Late Latin	iste, ⇒II		ille, ⇒III
Old French	cist, ⇒II		cil, ⇒III

As (7) shows, the two systems perfectly parallel each other (barring the reinforcing element found in Old French: *c-*, as mentioned above): in Old French, the first term of the binary system can refer either to the speaker-related domain, or to the hearer-related domain, or to both. The second term, instead, is restricted to the non-participant-related domain, in continuity with its original Latin semantics.[9]

Participant-based binary systems derived directly from Latin are extremely rare in Romance, possibly because of the "subjectification" process mentioned above (Stavinschi 2012), but more well attested as further development from innovative Romance ternary systems, as will be shown in Section 2.2.3.2 below, in line with the hypothesis of a cyclic development of demonstrative systems exposed by Stavinschi (2009, 2012). As for the type discussed here, besides Old French, a comparable system is attested in Romansh (and specifically in Sursilvan and Vallader varieties: Ledgeway & Smith 2016: 880; Sornicola 2011: 236; Lausberg 1962: 139; and in some Ladin varieties: Lausberg 1962: 139) and in Old Romanian (Maiden *et al.* 2021: 236–237).

2.2.3 Innovative varieties

Late Latin binary demonstrative systems were not preserved as such in the remaining Romance varieties: southern Romance varieties (i.e. Ibero-Romance, central/southern Italo-Romance, and Balkan Romance varieties) display innovative systems in which the hearer-related domain was provided with a new

[9]Note that Marchello-Nizia (2004, 2005; see also Guillot 2015) concluded instead that the Old French demonstrative system should be best characterised as substantially speaker-based (see in particular Marchello-Nizia 2005: section 9: "The 'deictic center' is the speaker's sphere. [...] There will probably be cases where, in direct speech, uses of CIST seem to refer to the situation of the utterance, encompassing both the speaker and the hearer. These are cases where the speaker's sphere is not distinguished from that of his hearer", pp. 61–62). Whether these two characterisation stand in a diachronic relation with each other or whether one is inaccurate is left aside here; it is important to remark, however, that participant-based systems such as those discussed here are very rare.

dedicated exponent, as outlined in (4); for an overview of their documentation, see Stavinschi 2009.[10] This clearly sets these varieties apart from those that, instead, only attested binary demonstrative systems throughout their history (i.e. the non-innovative varieties presented in Section 2.2.2).

The innovation took different shapes, as mentioned above. In the nominal domain, the most commonly attested one is the incorporation of the Latin anaphoric/emphatic pronoun IPSE. This has been reconstructed by Stavinschi as the result of the "frequent anaphoric reference to some element in the Hearer's discourse" (Stavinschi 2012: 85) that led to the grammaticalisation of IPSE to refer to the hearer's discourse and, eventually, to the hearer-related deictic domain.[11] This resulted across Romance varieties in forms of the *isso/quisso* type (the latter reinforced by a reflex of Latin ECCE 'behold') and is the type mostly found across Ibero-Romance and central/southern Italo-Romance. Otherwise, reference to the hearer-related domain was contrastively reintegrated into the Late Latin/Early Romance binary system by combining participant-oriented ISTE with a dative 2nd person pronoun (from Latin TIBI 'you.DAT'), possibly preceded by a presentative demonstrative (from Latin ECCE 'behold'), to yield a *tisto/codesto* type, meaning literally: '(behold), for you this' and typically found in Tuscan and Umbrian varieties of central Italy (Ledgeway & Smith 2016: 882).

As regards the adverbial domain, here, too, we find two major etymological types for the dedicated hearer-oriented form. Ibero-Romance varieties display the *ahí/aí* type, derived from a Latin speaker-oriented adverbial demonstrative (IBI, or HIC) originally used in anaphoric function, following a pragmatic development similar to the one already observed for the *isso/quisso* nominal demonstratives. In central and southern Italo-Romance varieties, instead, the new hearer-oriented adverbial demonstrative ultimately proceeded from the Latin non-participant-oriented form in the allative case, ILLŌC 'thither' (Rohlfs 1969: 256–257), possibly blended with Latin LŎCO 'place' (Loporcaro 1988: 51 and fn. 81) and through a reconstructable proto-Romance form of the type **illɔko*, to give rise to the type *loco/(d)doco/ddó*. Other dedicated hearer-oriented forms, such as the series constituted by the presentative demonstrative ECCU and by analogical forms based on IPSU and ILLU (type: *ecco*, *esso*, *ello* of many central and upper-southern Italo-Romance varieties; Ledgeway & Smith 2016: 892), are overall more infrequently attested.

Regardless of this variation, in what follows I uniformly refer to the innovative hearer-oriented terms as ⇒2, as per the notation laid out above.

As shown in (2), many Romance varieties retain their innovative ternary demonstrative systems (mostly: Ibero-Romance varieties and some central and southern Italo-Romance ones). Instead, other Romance varieties that developed

[10] But see isolated examples of (synthetic) ternary systems in Northern Italo-Romance (Piedmont, Liguria): Stavinschi 2009: 41–42.

[11] For a different analysis of the same development, see Vincent (1999), who argues that the hearer-related semantics was the result of the reinforcement of IPSE by means of ECCU 'behold', the latter implicitly carrying reference to the hearer.

a ternary demonstrative system in previous stages of their history currently show a reduction analogous to the one described for Latin, resulting in new binary systems. This reduction (and reorganisation) process results in two types of variation: under the semantic respect and under the formal one. The description of the new binary systems given below is organised around the semantic variation that they attest: Section 2.2.3.1 is dedicated to the new speaker-based binary systems, while Section 2.2.3.2 to the new participant-based binary systems. Inside each of these sections, I additionally discuss the formal variation displayed cross-linguistically and made possible by the presence of three deictic forms in the input systems: the resulting systems, accordingly, can establish a two-way opposition by means of the original Latin forms (if ⇒1 and ⇒3 are retained), or by preserving instead the new form (i.e. ⇒2) to the expense of either ⇒1 or ⇒3. I will refer to the first option as Pattern A and to the second as Patterns B or C (according to whether ⇒3 or ⇒1 is lost).

2.2.3.1 Speaker-based binary systems

The speaker-based binary systems derived from the new Romance ternary systems show the unification of the hearer-oriented and the non-participant-oriented semantics: DEM.1 *vs* DEM.2/3. Two such unification patterns are attested:

(8)

	DEM.1	DEM.2	DEM.3
Pattern A	⇒1	⇒3	
Pattern B	⇒1	⇒2	

The first option is formally "conservative": the original speaker-oriented (⇒1) and non-participant-oriented (⇒3) forms are retained, with the latter expanding its deictic sphere to subsume the hearer-related domain, too (if the hearer does not fall into the speaker-related domain). The second option, instead, is partially "innovative": the original non-participant-oriented term (⇒3) falls out of use and is substituted by the newly introduced hearer-oriented form (⇒2), which broadens its semantics to also denote the non-participant-related domain.

Pattern A is presented in the following examples from Sardinian and Aromanian:

(9) a. *Sardinian nominal demonstratives* (Blasco Ferrer 1984: 248)

	N:DEM.1	N:DEM.2	N:DEM.3
Conservative varieties	kústu, ⇒1	kússu, ⇒2	kúḍḍu, ⇒3
Innovative varieties	kústu, ⇒1	kúḍḍu, ⇒3	

b. *Aromanian adverbial demonstratives* (Nevaci 2007: 73, 75)

	A:DEM.1	A:DEM.2	A:DEM.3
Aromanian (Grămostean)	aoa, ⇒1	aţia, ⇒2	aclo, ⇒3
Aromanian (most varieties)	aoa, ⇒1	aclo, ⇒3	

Sardinian varieties developed a new ternary system by reintroducing a dedicated hearer-oriented term, derived from the (reinforced) anaphoric/emphatic Latin pronoun IPSE. While this system is still attested across conservative Sardinian varieties, some more innovative ones lost the contrastive reference to the hearer-related domain. One of the attested new binary systems across Sardinian shows a fully conservative form, as shown above: the erstwhile speaker-oriented term (*kústu* < **akku*-ISTU) retains its function, the new hearer-oriented term (*kússu* < **akku*-IPSU) falls out of use and the original non-participant-oriented term (*kúḍḍu* < **akku*-ILLU) develops to cover its deictic domain as well, yielding a two-way opposition between the speaker-related domain and the non-speaker-related one.

As regards Aromanian adverbs, a disclaimer is in order: the two systems presented in (9b) are synchronically attested, rather than two different stages of one and the same variety. However, it is conceivable that Aromanian varieties did develop a ternary system ("as it happened within the Ibero-Romance languages", Nevaci 2007: 75; although the lack of earlier documentation prevents us from verifying this), reduced then to a binary one in most of the contemporary varieties, but retained in some more conservative ones. Granting this scenario, the evolution attested by more innovative varieties is comparable to the one described for Sardinian: the original speaker-oriented adverb (*aoa* < AD-HAC) is retained in its semantics and exponent, the new hearer-oriented term (*aţia* < ECCE-HIC) is lost, and the erstwhile non-participant-oriented term (*aclo* < ECCE-ILLOC) expands its deictic sphere and includes the hearer-related one, too, defining the binary opposition between the speaker's area and the rest (for the etymological sources, see Nevaci 2007: 72).

This pattern of development in either or both domains is very well represented across the other Romance languages that simplified their innovative ternary systems: this is the case, most famously, for Standard Italian (both systems, own knowledge), for many Latin American Spanish varieties (in both systems; Ledgeway & Smith 2016: 888 fn. 13, 891 mention the varieties spoken in Cuba, Venezuela, Ecuador, and Chile), and for some Gallo-Romance varieties (e.g. nominal system in some Occitan varieties: Ledgeway & Smith 2016: 879, 883).

Pattern B systems, with the new two-way opposition realised by the original speaker-oriented term (⇒1) and the new hearer-oriented one (⇒2), are illustrated in the following examples from Latin American Spanish and Occitan:

(10) a. *Latin American Spanish* (Kany 1945: 135)

	N:DEM.1	N:DEM.2	N:DEM.3
European Spanish	este, ⇒1	ese, ⇒2	aquel, ⇒3
Latin American Sp.	este, ⇒1	ese, ⇒2	

b. *Occitan adverbial demonstratives* (Ledgeway & Smith 2016: 895)

	A:DEM.1	A:DEM.2	A:DEM.3
Conservative varieties	aicí, ⇒1	aquí, ⇒2	alai, ⇒3
Innovative varieties	aicí, ⇒1	aquí, ⇒2	

While some Latin American Spanish varieties developed following the pattern presented in (9a), some others show a formally different speaker-based binary system, as in (10a), where the innovative hearer-oriented form (*ese* < IPSE) is retained and the original non-participant-oriented form (*aquel* < **akku*-ILLE) is lost instead. The latter deictic domain is covered by the hearer-oriented form, which enters into a binary opposition with the original speaker-oriented term (*este* < ISTE); the latter is fully preserved both in its semantic function and in its formal realisation. Also, interestingly enough, some varieties such as Rioplatense Spanish (Andrés Saab, *p.c.*) display both developments across domains: the nominal series is of the type illustrated in (10a), with the opposition *este*—*ese*, whereas the adverbial series patterns with the example in (9b), with the opposition *acá*—*allá*.

A similar mismatch across domains is displayed by some Occitan varieties whose nominal series presents the conservative exponents *aquest(e)*—*aquel*/*aquéu* (along the lines of (9a) above), but whose adverbial series is as in (10b). In Occitan, as was the case for Aromanian above, the new hearer-oriented dedicated form *aquí* developed from a speaker-oriented form (<**akku*-HIC); in some Occitan varieties, this new form was preserved at the expense of the original non-participant-oriented form (*alai* <**akke*-ILLAC). The speaker-oriented term (*aicí* <**akke*-HIC) was instead retained in both shape and meaning.

Pattern B is rarer than Pattern A, but still well attested, especially in the nominal domain. Comparable varieties include Sardinian varieties that display a speaker-based binary system (but formally different than the one shown in (9a): see again Blasco Ferrer 1984: 248) and Occitan varieties in which the nominal system patterns with the adverbial one just reviewed.

2.2.3.2 Participant-based binary systems

Ternary systems that were recreated in the early Romance period evolved, otherwise, into participant-based binary systems, which define a two-way opposition between the domain of the participants and that of the non-participants.

Thus, the speaker-oriented semantics and the hearer-oriented one are collapsed into a more general participant-related domain. Again, two such patterns of reduction are found across Romance varieties, according to whether the innovative form (⇒2) is lost (Pattern A) or preserved instead of ⇒1 (Pattern C):

(11)

	DEM.1	DEM.2	DEM.3
Pattern A	⇒1		⇒3
Pattern C	⇒2		⇒3

Pattern A systems retain the original exponents throughout: this is the formally "conservative" option, where the original speaker-oriented form (⇒1) and the original non-participant-oriented one (⇒3) are preserved, while the innovative hearer-oriented form (⇒2) falls out of use; the hearer-related deictic domain is merged with the speaker-related one to yield the general participant-related domain. In Pattern C systems, the innovative hearer-oriented form (⇒2) is instead retained, while the original speaker-oriented term (⇒1) is lost, resulting again in the general participant-related domain.

The formally conservative patterns are exemplified by Neapolitan and Tarantino, two southern Italo-Romance varieties:

(12) a. *Neapolitan nominal demonstratives* (Ledgeway 2009: 195–212)

	N:DEM.1	N:DEM.2	N:DEM.3
Old Neapolitan	chisto, ⇒1	chisso, ⇒2	chillo, ⇒3
Modern Neapolitan	chisto, ⇒1		chillo, ⇒3

b. *Tarantino adverbial demonstratives* (Ledgeway & Smith 2016: 892)

	A:DEM.1	A:DEM.2	A:DEM.3
Reconstructed Tar.	qua, ⇒1	*addó*, ⇒2	addà, ⇒3
Tarantino	qua, ⇒1		addà, ⇒3

The diachronic evolution of the Neapolitan demonstrative systems has been carefully traced by Ledgeway (2004, 2009) and will be addressed in greater detail in Section 5.2.1. Here it suffices to say that the hearer-related term (*chisso* < ECCU-IPSU) was, already in Old Neapolitan, partly substituted by the speaker-oriented term (*chisto* < ECCU-ISTU), used to refer to the whole participant-related domain. Eventually, the former fell out of use, yielding a new binary opposition between *chisto* and the non-participant-related domain (*chillo* < ECCU-ILLU).

As regards the system presented for Tarantino, a disclaimer is in order. Tarantino, like the vast majority of the other non-standardised Italo-Romance varieties, is predominantly spoken in nature and has only been documented in the last couple of centuries (the very brief first description dates back to de Vincentiis' 1872 dictionary). The dedicated hearer-oriented form has not been documented for Tarantino, but it can be reconstructed for its system on the basis of the outcomes of present-day adverbial demonstrative systems attested in close-by dialects, such as Altamurano (*ddo* 'A:DEM.1/2', Loporcaro 1988: 330), and generally widely attested within the Southern Italo-Romance domain. As just discussed for Neapolitan, it can be then understood that the hearer-oriented term, reconstructed in the example above following the ILLOC-type of other Apulian varieties to *(a)ddò*,[12] was eventually abandoned and its deictic sphere covered by the original speaker-oriented term *qua* (< ECCU-HAC), which thus became the participant-oriented term attested today in a binary opposition with the (conservative) non-participant-oriented term *addà* (< ECCU-ILLAC).

Similar systems are very well attested across southern Italo-Romance varieties, both in the nominal and in the adverbial domains. Otherwise, a comparable development is shown by innovative Catalan varieties (e.g. the Barcelona one), but restrictedly to the nominal system (for the adverbial system, see (13b) *infra*), in some other Sardinian varieties than the ones already discussed in 2.2.3.1 above, and in Judaeo-Spanish (Ledgeway & Smith 2016: 886).

Pattern C participant-based binary systems, which instead retained and expanded the innovative form (⇒2), are represented here by Brazilian Portuguese and Catalan.

(13) a. *Brazilian Portuguese nominal demonstratives* (Meira 2003)

	N:DEM.1	N:DEM.2	N:DEM.3
European Portuguese	este, ⇒1	esse, ⇒2	aquele, ⇒3
Spoken Brazilian Pg.	esse, ⇒2		aquele, ⇒3

b. *Catalan adverbial demonstratives* (Ledgeway & Smith 2016: 892)

	A:DEM.1	A:DEM.2	A:DEM.3
Old/conservative Catalan	aicí, ⇒1	aquí, ⇒2	allí, ⇒2
Modern/innovative Cat.	aquí, ⇒2		allí, ⇒3

Brazilian Portuguese shows a pattern of development that is comparable to the Late Latin one (as retained in Old French and Old Romanian, Section 2.2.2.2). Here, it is the (new) hearer-oriented term *esse* (< IPSE), rather than the (old)

[12]See for example the dialect of Bari: *ddó* 'A:DEM.1/2' (Andriani 2017).

speaker-oriented *este* (< ISTE) to be retained in the general participant-oriented function and to enter into a new binary opposition with the old non-participant-oriented term *aquele* (< **akku*-ILLE). Note that this system is widely attested in the informal/spoken register of Brazilian Portuguese (and typically accompanied by ternary reinforcers, i.e. adverbial-like demonstratives; see fn. 18 for references), but the standard/prescriptive variety is described as ternary, as the European Portuguese system given in the top row of (13a).

The Catalan adverbial system shows a perfectly comparable development, at least in its innovative varieties (a ternary system is preserved in more conservative varieties, e.g. Valencian Catalan in the south and Ribagorçà Catalan in the east: Ledgeway & Smith 2016: 884): the speaker-oriented form *aicí* (< **akke*-HIC) falls out of use and the deictic sphere to which it was linked falls under the exponent for the hearer-related domain, the innovative form *aquí* (< **akku*-HIC), that thus expands its semantics. The non-participant-oriented form (*allí* < **akke*-ILLAC) is instead preserved. Note that, just as in the case of speaker-based binary Latin American and Occitan varietes (2.2.3.1), Catalan shows a formal mismatch across the nominal and the adverbial domain, with the innovative form retained in the adverbial one (13b) but lost, in favour of the speaker-oriented one, in nominal demonstratives (*aquest*—*aquell*, along the lines of Neapolitan in (12a) above).

Besides the Ibero-Romance examples above, this pattern of development is very well attested among southern Italo-Romance varieties, too, and particularly widely found in Apulian dialects, in both domains (see e.g. Bari dialect, tonic series: Andriani 2017).

2.2.4 Interim conclusions

This section provided a first typology for the diachronic reduction of ternary demonstrative systems into binary ones across Romance languages. A summary of the patterns of reduction, and of the semantic (speaker-based binary systems *vs* participant-based ones) and formal (the Romance new ⇒2 form is lost or retained to the expense of one of the conservative forms) variation is provided in Table 2.1.

Semantic variation is equally attested in both the nominal and the adverbial domain, represented together in Table 2.1, with the partial exception of participant-based binary systems in the adverbial domain of varieties that did not introduce a new exponent for the A:DEM.2 semantics in the old Late Latin system.

Formal variation is organised into three different patterns. Pattern A, both for nominal and for adverbial demonstratives, refers to the retention of conservative forms, that is systems in which only ⇒1 and ⇒3 were preserved. Patterns B and C, instead, stand for two different patterns of innovative morphology: in systems of type B, ⇒1 and ⇒2 are preserved; in systems of type C, instead, ⇒2 and ⇒3 are preserved. This variation is supported by both nominal and adverbial demonstratives; crucially, there seems to be a systematic difference

Table 2.1: Patterns of change: Demonstratives in diachrony

① **Latin > non-innovative Romance**

ⓐ Nominal demonstratives

Binary (Late Latin, (4))

N:DEM.1	N:DEM.2	N:DEM.3
⇒II		⇒III

Binary, sp.-based (§2.2.2.1)

N:DEM.1	N:DEM.2	N:DEM.3	
⇒II	⇒III		(6a)

Binary, pt.-based (§2.2.2.2)

N:DEM.1	N:DEM.2	N:DEM.3	
⇒II		⇒III	(7)

ⓑ Adverbial demonstratives

Ternary (Latin, (3))

A:DEM.1	A:DEM.2	A:DEM.3
⇒I	(⇒II)	⇒III

⟶

Binary, sp.-based (§2.2.2.1)

A:DEM.1	A:DEM.2	A:DEM.3	
⇒I	⇒III		(6b)

② **Innovative Romance > reduced Romance**

Ternary (Romance, §2.2.3)

DEM.1	DEM.2	DEM.3
⇒1	⇒2	⇒3

Binary, sp.-based (§2.2.3.1)

	DEM.1	DEM.2	DEM.3	
A	⇒1	⇒3		(9)
B	⇒1	⇒2		(10)
C	⇒2	⇒3		(—)

Binary, pt.-based (§2.2.3.2)

	DEM.1	DEM.2	DEM.3	
A	⇒1		⇒3	(12)
B	⇒1		⇒2	(—)
C	⇒2		⇒3	(13)

between the patterns found in the speaker-based binary systems and those found in the participant-based ones. As regards the innovative speaker-based binary systems recorded across Romance languages, these do not seem to allow Pattern C, i.e. they do not employ the innovative hearer-oriented form (⇒2) to mark the speaker-related domain, instead of the original speaker-oriented form (⇒1). With respect to the innovative participant-based binary systems, instead, those do not instantiate Pattern B, i.e. they do not use the new hearer-oriented form (⇒2) for the non-participant-related domain to the expenses of the original non-participant-oriented form (⇒3).

The attested variation notwithstanding, the different reduction patterns of ternary systems to binary ones can be compared under one important respect: across all of them, one of the two deictic domains that lost their contrastive encoding is consistently the hearer-related one. In participant-based binary systems, the hearer-related domain is entirely merged with the speaker-related one; in speaker-based binary systems, it is merged instead with the non-participant-related one (unless the hearer is close to the speaker and no contrastivity is needed; see again Section 1.2.3). Thus, it can be preliminarily suggested that the hearer-related domain is an invariant point of instability across semantic variation patterns. Note that, despite the general instability of the hearer-related semantics, its exponent can be retained in the new binary systems, as seen in Patterns B and C (see the examples for Latin American Spanish, (10a); Occitan, (10b); Brazilian Portuguese, (13a); and Catalan (13b)), although this option is less common cross-linguistically. Furthermore, the patterns of formal variation have been shown to be non-consistent even within one and the same variety, as attested for instance by some Latin American Spanish varieties (Pattern B for the nominal domain, Pattern A for the adverbial one) and by the innovative Catalan ones (Pattern A for the nominal domain, Pattern C for the adverbial one).

In the rest of this dissertation, I will provide a principled account for the attested (and unattested) patterns of reduction and take the formal variation (especially within one variety) to support a purely featural account for the reorganisations patterns, rather than, for instance, a frequency-based approach: similar types of variation are hard to make sense of, considering that one and the same indexical domain is expressed by two forms, one that falls out of use and one that is preserved. In featural terms, instead, I will take the attested variation to mirror the fact that features are equivalent, i.e. not organised in geometries or characterised by precedence relations (as will be discussed in Section 3.3).

But before moving to an account for the reduction patterns just outlined, I will provide more empirical evidence for them, by showing that similar patterns are found in the reduction of ternary demonstrative systems in various contact contexts, too.

2.3 Ternary demonstrative systems in contact

The evolution of demonstrative systems in contact has been largely investigated insofar as their DP-internal syntax in concerned. Available studies have mostly focused on contact-induced grammaticalisation of demonstrative forms (as determiners: Kupisch & Polinsky 2022; Aalberse *et al.* 2017; Heine & Kuteva 2008; as pronouns: Kinn & Larsson 2022; among many others) and on the effects of contact on their linearisation within the DP and their co-occurrence with determiners (Guardiano & Stavrou 2021; Guardiano & Michelioudakis 2019; Zúñiga 2019; Moro 2016: 3.2.1; Gómez Rendón 2008: I, 5.3; among many others).

Whether the encoding of deictic features in the demonstrative forms of a given language undergoes change when that language is spoken in contact with varieties that display structurally different demonstrative systems (i.e. whether demonstrative systems expand or reduce because of cross-linguistic influence, and specifically of transfer), instead, is a largely unexplored research question. Nonetheless, the general understanding is that the encoding of indexicality in various contact settings is remarkably stable for all indexical elements, including demonstratives (see, a.o., Heine & Kuteva 2005; Friedman 2006; barring the occasional borrowings: see e.g. Matras 2009: 8.1.6; Aikhenvald 2006: 3.2 and 4.1 in particular; and references therein).[13]

In this section, I provide some initial findings concerning ternary demonstrative systems in contact situations; concretely, I present data from the *Microcontact* project that were used to explore whether ternary demonstrative systems undergo contact-induced change in the grammars of attrited *émigré* speakers and of heritage speakers of Italo-Romance varieties (Sections 2.3.1 and 2.3.2), and data from Portuguese-based creole varieties (Section 2.3.3).

This section, on a par with the preceding one, shows that ternary demonstrative systems can be stable, but can also undergo a reduction to (speaker-based or participant-based) binary systems. Again, this results in the systematic loss of contrastive encoding for the hearer-related deictic domain (DEM.2). Hence, overall, the contact data discussed in what follows are compatible with the semantic and formal variation attested in diachrony (Section 2.2). This parallelism between the development of demonstrative systems in diachrony and contact suggests that contact does not affect the encoding of deixis in demonstrative systems in an exclusive way. More discussion on this specific point can

[13]Note that a recent investigation by Vulchanova *et al.* (2020) seems to suggest a more nuanced picture, with demonstrative forms possibly undergoing attrition in adult bilinguals. The authors suggest that attrited Spanish speakers in Norway undergo transfer from Norwegian, which results in a contact-induced reorganisation of Spanish ternary demonstrative system into a binary one (*este–ese*; for a parallel reduction, see (10a)). However, this is shown not to correlate with the length of exposure to Norwegian (Vulchanova *et al.* 2020: 9); furthermore the role of cross-linguistic influence in the reduction of the Spanish demonstrative system is significantly downsized in Vulchanova *et al.* 2022, who acknowledge instead the similarity of this development with the general diachronic drift towards systems less rich in deictic contrasts. The latter view is compatible with the discussion presented in this section.

be found in Section 2.3.1.3, which shows how the patterns of retention and reduction of ternary systems in (micro-)contact cannot be simply construed as the effects of transfer.

2.3.1 Microcontact

The *Microcontact* project aimed at investigating a selection of syntactic phenomena as attested in attrited and heritage Italo-Romance languages spoken in the Americas.[14] More precisely, each of the Italo-Romance languages under examination was considered in "microcontact", i.e. in extensive contact with closely related languages, such that differences with respect to one another are at a micro-variational level. The Romance contact varieties considered are: Argentinian Spanish, Brazilian Portuguese, Quebecois and Belgian French.[15] Data for the phenomena under investigation were collected through fieldwork interviews. For each Italo-Romance variety, the results for the different language pairs (e.g. Sicilian/Argentinian Spanish, Sicilian/Brazilian Portuguese, Sicilian/French; control: Sicilian/English) were compared; by further examining the results of these pairwise comparisons in contrast to the diachronic data available for Italo-Romance, the purpose of the project was to assess whether the target phenomena underwent (language-specific) contact-induced change (for a general overview, see particularly Andriani *et al.* 2022b: section 2.1).[16]

This section reports on demonstrative systems as documented in attrited and heritage Italo-Romance varieties spoken in microcontact, to determine whether contact affects the encoding of deixis (see also Terenghi 2022a for a more extensive discussion of the heritage results). More concretely, it considers southern Italo-Romance varieties whose respective homeland varieties are described as ternary by the available grammars, and specifically Sicilian, Abruzzese, and Calabrian varieties. Molisano was additionally included because of its proximity to Abruzzese (Hastings 1997; in what follows, Molisano and Abruzzese data will be considered jointly). For the present purposes, their demonstrative systems are considered as substantially alike with respect to their structure, although microvariation is systematic at this level as well. One

[14]Heritage speakers are speakers of an immigrant variety (their heritage language) who were born in the immigration country and who naturally learnt their heritage variety at home in their early childhood, but who were subsequently exposed to, and became dominant in, the contact language spoken by the wider society. For a recent and comprehensive overview, see Polinsky 2018. It is important to mention that the baseline for comparison for heritage grammars should be identified with the input grammar for the language acquirers. This was not available in most cases in our investigation. However, heritage languages possess a fully fledged independent grammar of their own and can be investigated as such in their own right (D'Alessandro *et al.* 2021).

[15]Belgium was added to this study in a second stage; see Andriani *et al.* 2022a for an explanation. The same Italo-Romance varieties were also considered in contact with English, for control; the results of the control group are discussed in Section 2.3.2.

[16]For further information about the *Microcontact* project, see D'Alessandro (2021), Andriani *et al.* (2022b) and the project website (in particular the full project description); for a reflection on the fieldwork data collection and its issues, see Andriani *et al.* (2022a).

sample demonstrative system for each of these varieties follows:

(14) *Demonstratives: Target varieties*[17]

	N:DEM.1	N:DEM.2	N:DEM.3	A:DEM.1	A:DEM.2	A:DEM.3
Sicilian	chistu	chissu	chiddru	ccà	ddrùəcu	ddrà
E. Abruzzese	queštə	questə	quellə	èccə	èssə	èllə
Calabrian	chistu	chissu	chiju	ccá(ni)	jócu	já(ni)
Shorthand	⇒1	⇒2	⇒3	⇒1	⇒2	⇒3

The demonstrative systems of the contact languages instantiate instead the full range of semantic variation, as seen in Section 1.2.3:

- **speaker-based binary** systems in Argentinian Spanish (nominal demonstratives: *este–ese*, Kany 1945: 135, A. Saab, *p.c.*; or *este–aquel*, Ledgeway & Smith 2016: 888; adverbial demonstratives: *acá–allá*), and French in Quebec and Belgium (nominal demonstratives: *ce... ci–ce... là*; adverbial demonstratives: *ci–là*);[18]

- **participant-based binary** nominal demonstratives in Brazilian Portuguese (*esse–aquele*, Meira 2003);

- **ternary** systems in Argentinian Spanish (nominal demonstratives: *este–ese–aquel*; adverbial demonstratives: *acá–ahí–allá*)[19] and in Brazilian Portuguese adverbs (*aqui–aí–ali/lá*, Meira 2003).[20]

Different outcomes can be conceived as the result of the extended and intense contact between ternary Italo-Romance varieties and their respective contact varieties:

1. nothing, in Italo-Romance ternary demonstrative systems, changes in microcontact: that is, varieties that display(ed) ternary demonstrative sys-

[17]Sources: Sicilian, Mussomeli (Ledgeway & Smith 2016: 885); Eastern Abruzzese, Arielli (R. D'Alessandro, *p.c.*); Calabrese, Roccella Jonica (Guarnieri 2010: 49, 60).

[18]French demonstrative systems are binary only if demonstrative-reinforcer constructions are considered, i.e. whenever the unary nominal demonstrative *ce*(*lui*) is followed by a binary adverbial(-like) demonstrative, the reinforcer (*-ci*, *-là*); see Bernstein 1997, 2001; Brugè 1996, 2002; Leu 2008, 2015; Roehrs 2010; Terenghi 2019, 2021a. Demonstrative-reinforcer constructions will be mostly left aside in this work. Additionally, note that French has a wider usage for *là* 'there' (A:DEM.2/3), which can be employed to refer to the position of the speaker, as well (Ledgeway & Smith 2016: 894 and references therein).

[19]This richer system is understood to be in place in the prescriptive variety; however, it was also elicited in our fieldwork interviews with native speakers of Argentinian Spanish.

[20]In spoken Brazilian Portuguese, this system may be combined with the nominal one (demonstrative-reinforcer construction), yielding a fully fledged ternary system for the nominal domain, too; see also Section 3.2.

tems in Italy display similar ternary demonstrative systems in the different contact settings;[21]

2. for a given Italo-Romance variety, the encoding of deixis changes in one language pair (e.g. Sicilian/Brazilian Portuguese), but not in the others, highlighting the role of language-specific contact-induced change in microcontact. Concretely, we would expect that: ternary systems might be preserved in Argentina (barring variation) and in Brazil (at least in the adverbial domain); ternary systems might reduce to speaker-based binary systems in contact with French and, possibly, with Spanish; and ternary systems might reduce to participant-based binary systems in contact with Brazilian Portuguese (at least in the nominal domain);

3. for a given Italo-Romance variety, the encoding of deixis changes across all microcontact pairs and in a way that systematically diverges from the changes observed in diachrony (Section 2.2), highlighting the role of contact *per se*;

4. for a given Italo-Romance variety, the encoding of deixis changes across all microcontact pairs and in a way that is comparable to that attested in diachrony (Section 2.2): the explanation for the attested change has to transcend contact and should be sought in more general principles of language change.

This section provides initial evidence in favour of the last option. To do so, after quickly reviewing the methodology of this study (Section 2.3.1.1), I discuss the patterns of change attested in the collected data (Sections 2.3.1.2 and 2.3.1.3).

Before proceeding, a disclaimer is in order: the data discussed here were collected in a preliminary set of fieldwork sessions which took place between 2019 and early 2020.[22] These sessions were meant to gain some insights into the specific phenomena under examination (in this case: the encoding of deixis in demonstrative forms), which are otherwise not documented in the target varieties; to fine-tune the experimental design; and to establish a contact network with the local communities in preparation for a second round of data collection. The main data collection would have thus been carried out throughout 2020, with more precise research questions, more participants and improved questionnaires. This could not happen because of the COVID-19 outbreak.

The exploratory design of the first fieldwork sessions had various consequences. The most relevant here is that the sample of speakers considered could

[21]Note, however, that in Italy these varieties are spoken in contact with Italian. Moreover, the varieties spoken by *émigré* speakers (i.e. the first generation of immigrants to the Americas, who roughly left Italy between the 1940s and the 1960s) should be compared to the same varieties spoken in Italy at that point in time, as these latter varieties might have changed in time, too (independently, or because of contact with Italian; see Frasson *et al.* 2021: 3 for a discussion of this issue with respect to Friulian). Unfortunately, such fine-grained comparisons were not possible.

[22]For the locations in which our interviews took place, see the Microcontact Atlas (https://microcontact.hum.uu.nl/#contributions).

not be systematically controlled for homogeneity: hence, statistical analyses were not possible. Besides, the high degree of intra- and inter-speaker variation recorded for the demonstrative data might point to a change-in-progress situation (for its full extent, see Appendix A.3), which needs further research to be fully assessed. Nonetheless, the results discussed in what follows are particularly robust, despite the shortcomings of the data collection process.

2.3.1.1 Methodology

To assess whether the encoding of deixis undergoes any (language-specific) contact-induced changes, we tested both the comprehension and the production of deictic contrasts in the target varieties. We did so through stimuli that targeted one of the three deictic domains contrastively encoded in ternary demonstrative systems: the speaker-related space (DEM.1, i.e. 'this/here near me'), the hearer-related space (DEM.2, i.e. 'that/there near you'), and the non-participant-related space (DEM.3, i.e. 'that/there far'). Here, in keeping with the foregoing, I refer to their corresponding contrastive forms as ⇒1, ⇒2, and ⇒3, respectively.

2.3.1.1.1 Participants 38 speakers of southern Italo-Romance varieties whose homeland counterparts are described as displaying a three-way demonstrative system by the available grammars were included in this study.[23] Their dialectal group and their generation (*émigré* speakers 'ESs' *vs* heritage speakers 'HSs') are indicated in Table 2.2; additional (socio-)linguistic information relative to the participants, including the specific variety spoken and the demonstrative system of the relative homeland variety, is given in Appendix A.2.

Table 2.2: Participants

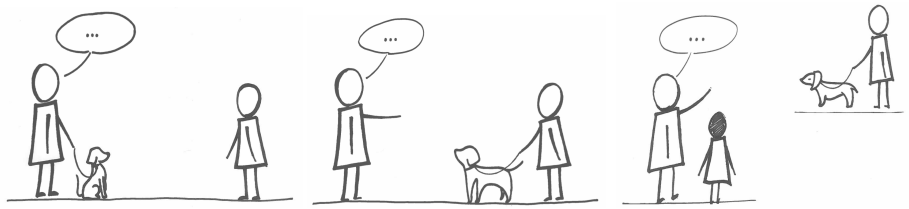
	Argentina		Brazil		Quebec		Belgium		Total
	ES	HS	ES	HS	ES	HS	ES	HS	
Sicilian	6	3	2		4	1	3	1	20
Abruzzese	5	2			1		1		9
Calabrian	5	1			2				8
Molisano					1				1
Total	16	6	2	—	8	1	4	1	38

2.3.1.1.2 Tasks Demonstrative data were collected by means of two tasks: a picture-sentence matching task ('Task A') and a semi-guided production task

[23]Speakers of varieties with binary systems were interviewed, too. As the focus of this study is on ternary demonstrative systems, those data are left aside here.

('Task B').[24] For both tasks, instructions and stimuli were presented in an audio format and were recorded by Italian-born native speakers of the target varieties. The stimuli were presented in random order, but no fillers were used. A comprehensive discussion of the design of the specific tasks, along with that of the whole questionnaire, is presented in Andriani *et al.* 2022a; the full questionnaire in the target languages can be found in Appendix A.1 here.

In the picture-sentence matching task, the task was for our informants to select the audio stimulus that best described the given picture. Our informants saw one picture at a time while listening to three audio stimuli in the target varieties. In each picture, a dog owner and their dog were represented together with at least another character, as shown in Figure 2.1; the character on the left was invariably marked as the speaker by a balloon and the dog was in a different deictic domain in each picture (respectively, the one related to the speaker, DEM.1, in Figure 2.1a; the one related to the hearer, DEM.2, in Figure 2.1b; and the one far from both, DEM.3, in Figure 2.1c).



(a) Speaker-related domain (DEM.1) (b) Hearer-related domain (DEM.2) (c) Non-participant-related domain (DEM.3)

Figure 2.1: Picture-sentence matching task

The audio stimuli reproduced alongside each picture always contained one demonstrative that described the position of the dog with respect to the speaker by using the ⇒1 form, one that did so by using the ⇒2 one, and one that did so by using the ⇒3 one. For instance, for the picture representing the hearer-related domain (DEM.2, Figure 2.1b), the participants listened to three stimuli: "this (⇒1) is your dog", "that (⇒2) is your dog", and "that (⇒3) is your dog". The target response, in this case, would have been "that (⇒2) is your dog".

This setting had some flaws that made the questionnaire results not completely reliable: for an overview, see Andriani *et al.* 2022a. In particular, our informants had difficulties identifying with the speaker in the picture, and instead provided answers based on the actual context in which the interviews took place; besides, the speaker-related and the hearer-related domain were

[24] Deixis has become the focus of much research only recently: therefore, a well-established model for data collection is still mostly unavailable, with the exception of Wilkins 1999, 2018. As that questionnaire would have proved excessively long (and rather difficult to perform), we opted for original tests for our first trial.

only suboptimally distinguished, due to the small size of the pictures. These two facts converged in yielding higher ⇒1 rates than expected: this is particularly clear when comparing the results of this task with those of the production task, where many instances of "wrong" ⇒1 forms (which should be associated to DEM.1) are restored to ⇒3 (for DEM.3) and, but less so, ⇒2 (for DEM.2).

To test production, we ran a semi-guided production task. We resorted to three pictures that were placed in the three deictic domains under examination, i.e. near the speaker (the informant: DEM.1), near the hearer (the interviewer: DEM.2), and far from both (DEM.3). The pictures represented one cat each: an orange one, a black one, and a white one. Our informants were asked to indicate the location of each cat in the context, both in the form "which one is the [*colour*] cat?" and "where is the [*colour*] cat?". This way, we elicited respectively nominal and adverbial demonstratives. As this task proved to be more reliable overall, in the following discussion I will single out its results in a dedicated column ('Task B') in the graphs.

These two tasks allowed us to test each deictic domain (DEM.1, DEM.2, DEM.3) overall five times: the picture-sentence matching task (A) contained three sets of stimuli for each domain (by manipulating the syntactic environment in which the demonstrative forms occurred: adnominal context, pronominal context, demonstrative-reinforcer construction; see Appendix A.1); the semi-guided production task (B), instead, tested them twice: once in the nominal condition (without further specification) and once in the adverbial one. Thus, by design, 15 items should have been elicited for each participant.

As Tasks A and B tested the three deictic domains in five different syntactic conditions and we interviewed 38 speakers, 190 (38 informants × 5 conditions) items should have been elicited by domain, for a total of 570 elicited items (38 × 5 × 3 deictic domains). However, due to missing answers (61, among which some irrelevant answers elicited in the semi-guided production task, i.e. non-demonstrative forms), the final sample includes 509 items. Details on how the elicited data were coded and the full results can be found in Appendix A.3; here, it suffices to say that the answers can be divided into three main categories:

- **target-like answers** (TL): ⇒1 forms used for DEM.1, ⇒2 forms used for DEM.2, and ⇒3 forms used for DEM.3;

- **semi-target-like answers** (STL): cases in which two or three competing options were given (and one was fully target-like), cases in which the target form was compositionally built; see Appendix A.3 for details;

- **non-target-like** responses (NTL): ⇒1 forms used for DEM.2 or DEM.3; *or* ⇒2 forms used for DEM.1 or DEM.3; *or* ⇒3 forms used for DEM.1 or DEM.2; *or* ⇒1 and ⇒3 forms competing for the expression of DEM.2. This category is broken down in more detail in Appendix A.3.

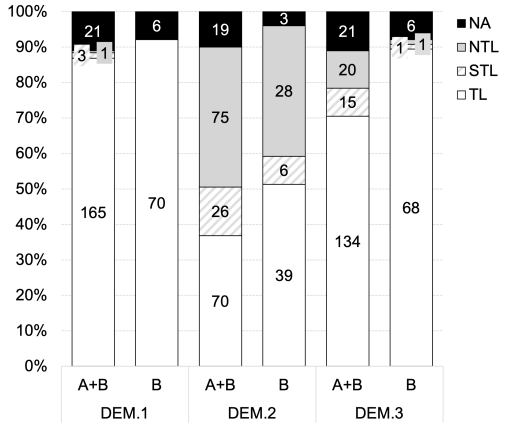


Figure 2.2: Results by deictic domain and by task

2.3.1.2 Results: The instability of the hearer-related domain

This section presents a descriptive statistics for the elicited data; no full statistical analysis was however possible, due to quantitative and qualitative problems with this preliminary sample, as mentioned above.

Figure 2.2 reports the results for ternary demonstrative systems in micro-contact. The results are organised by deictic domain: the results relative to the DEM.1 semantics (target form: ⇒1) are summarised in columns 1 and 2, those relative to the DEM.2 semantics (target form: ⇒2) in columns 3 and 4, and those relative to the DEM.3 semantics (target form: ⇒3) in columns 5 and 6. Each domain is thus represented by two columns: for each pair, the left-hand side column reports the cumulative results of both tasks (picture-sentence matching 'Task A' and semi-guided production 'Task B'), while the right-hand side one only reports the results for the semi-guided production task ('Task B'). This is due to the issues with the picture-sentence matching task mentioned in Section 2.3.1.1.2. The results are coded here as target-like (TL), semi-target-like (STL), non-target-like (NTL), or non-available (NA).

As Figure 2.2 shows, the speaker-related deictic domain and the non-participant-related one are overly stable, while the hearer-related domain is flagged as unstable by the high percentage of non-target-like responses. More specifically, for the speaker-related domain (DEM.1) 99.41% of (semi-)target-like ⇒1 forms have been elicited (n=168/169 elicited forms). The one non-target-like elicited answer is a ⇒2 form, and was produced by an *émigré* speaker of Sicilian in Belgium. If the results of the semi-guided production task alone are considered, instead, all responses given were formally target-like (100%, n=70/70 elicited forms).

The non-participant-related domain (DEM.3) is likewise very stable, as it

is expressed by (semi-)target-like ⇒3 forms in 88.17% of the elicited items (n=149/169 elicited forms). The remaining recorded forms are ⇒1 (n=14/169, 8.28%), ⇒2 (n=5/169, 2.96%) and optionally ⇒1/2 (n=1/169, 0.59%). If the results elicited through the semi-guided production task only are taken into account, however, this variation (and the amount of semi-target-like answers) falls considerably: ⇒3 forms are employed in 98.57% of the cases (n=69/70 elicited forms), and the only non-target-like response is a ⇒1 form, and was elicited from a heritage speaker of Calabrian in Argentina (the one semi-target-like response, instead, shows optionality between a ⇒2 form and a ⇒3 one: *émigré* speaker of Sicilian in Argentina). Thus, the higher rates of non-target-like (and semi-target-like) responses in A+B is to be traced back to an effect of task A: as already highlighted, the sentence-picture matching task elicited more ⇒1 forms than expected due to graphical and wider testing issues (see Section 2.3.1.1.2 and remarks in Andriani *et al.* 2022a; Terenghi 2022a).

These results are compatible with the following representation of ternary demonstrative systems in the examined Italo-Romance varieties:

(15) DEM.1 *and* DEM.3 *and their exponents*

DEM.1	DEM.2	DEM.3
⇒1 [99.41 ∼ 100%]	(*see below*)	⇒3 [88.17 ∼ 98.57%]

Instead, the expression of DEM.2 (the hearer-related semantics) shows more variation beyond the target-like forms and can therefore be regarded as less stable. The remainder of this section thus focuses on DEM.2 and the alternative ways attested in our dataset to complete the set of demonstrative forms in (15). An overview of the elicited answers for DEM.2 is provided by Figure 2.3.

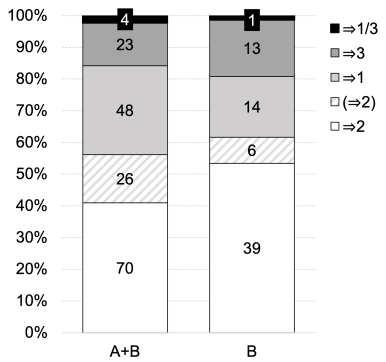


Figure 2.3: Results for DEM.2

The most common response for DEM.2 is a target-like ⇒2 form across tasks. Moreover, 56.14% forms are (semi-)target-like (n=96/171 elicited forms), and this figure slightly rises (61.64%; n=45/73) if the picture-sentence matching task (B) is considered in isolation. This option is fully compatible with a ternary demonstrative system, as shown by the following abstract system:[25]

(16) DEM.*2: ⇒2*

DEM.1	DEM.2	DEM.3
⇒1 [99.41 ∼ 100%]	⇒**2** [56.14 ∼ 61.64%]	⇒3 [88.17 ∼ 98.57%]

Non-target-like responses for DEM.2 are either of the ⇒1 type or of the ⇒3 type. The former occurs in 28% of the items elicited for DEM.2 (n=48/171 elicited items). If the semi-guided production task alone is considered, this percentage goes down, as already seen above for DEM.3: 19.18% (n=14/73 elicited items). This option is compatible with a participant-based binary system, as DEM.1 and DEM.2 have one and the same exponent:[26]

(17) DEM.*2: ⇒1*

DEM.1	DEM.2	DEM.3
⇒**1** [99.41 ∼ 100%]	⇒**1** [28 ∼ 19.18%]	⇒3 [88.17 ∼ 98.57%]

Instead, 13.45% of non-target ⇒3 forms has been elicited for DEM.2 (n=23/171 elicited forms). Following the decrease in ⇒1 forms as a Task A effect, that is if semi-guided production alone is considered, the figure rises to 17.81% (n=13/73 elicited forms). This option is compatible with a speaker-based binary system, as DEM.2 and DEM.3 are realised by means of the same form:[27]

[25]However, it must be stressed that intra-speaker variation is highly attested in the elicited responses: it is not the case that over half of our informants responded in a way compatible with a ternary system, but only a handful of them did (6, barring NA items, and 9 more if the results of the semi-guided production task only are considered). To appreciate the full variation, see the complete results in Appendix A.3.

[26]The disclaimer relative to intra-speaker variation in fn. 25 fully applies here, too, as only one speaker shows this system consistently (*émigré* Calabrian in Argentina).

[27]This system is almost consistently attested by one speaker (*émigré* Sicilian in Brazil, with one occurrence of ⇒1), and otherwise is consistently found in three more speakers if the semi-guided production task only is considered.

(18) DEM.*2: ⇒3*

DEM.1	DEM.2	DEM.3
⇒1 [99.41 ∼ 100%]	⇒**3** [13.45 ∼ 17.81%]	⇒**3** [88.17 ∼ 98.57%]

Finally, 2.3% of the elicited responses for the hearer-related domain showed optionality between ⇒1 and ⇒3 forms (n=4/171 elicited items; or 1.37%, i.e. n=1/73 elicited items in the semi-guided production task alone). This option would be compatible with either a system as the one presented in (17) or a system such as that in (18); none of these options is however consistently reported by one speaker.

Note that, in (17) and (18), only the patterns with conservative forms (i.e. in which the preserved forms are directly derived from the Latin demonstrative system, while the innovative ⇒2 form, introduced subsequently, is lost) are attested. At the present stage, it is not clear whether other patterns are present in microcontact and further research is needed to fully understand how these systems work.[28]

To conclude, the data collected show that ternary systems are unstable, with the responses for DEM.1 and DEM.3 at ceiling, as opposed to those for DEM.2, substantially at chance. This raises questions as to whether the attested patterns of variation in the realisation of DEM.2 are induced by contact or whether they can be traced back to endogenous change (possibly: in progress), by virtue of their compatibility with the diachronic developments presented in Section 2.2.

2.3.1.3 DEM.2 by contact variety

This section investigates whether the attested variation in the expression of the hearer-related domain is determined by differences across the demonstrative systems of the various contact varieties. Following the rationale of the *Microcontact* project, it does so by comparing the elicited forms for ternary demonstrative systems across the three different contact varieties (Spanish, Portuguese, and French) in a pairwise fashion. The aim is to assess whether the reorganisation patterns attested by the Italo-Romance ternary demonstrative systems differ as a function of the different contact languages, that is,

[28]To control for confounds, these results should be further considered separately for attrited and heritage speakers; preliminary data in this respect point towards non-significant differences, with attrited speakers giving overall 56.52% of (S)TL responses (n=78/138) and heritage speakers giving overall 54.55% of (S)TL responses (n=18/33). However heritage speakers show more optionality; moreover, while in Task B attrited speakers seem to marginally prefer NTL ⇒1 forms (20.69%; n=12/58), heritage speakers seem to prefer NTL ⇒3 forms (33.33%; n=5/15). These differences need to be verified with more data and, if confirmed, further investigated.

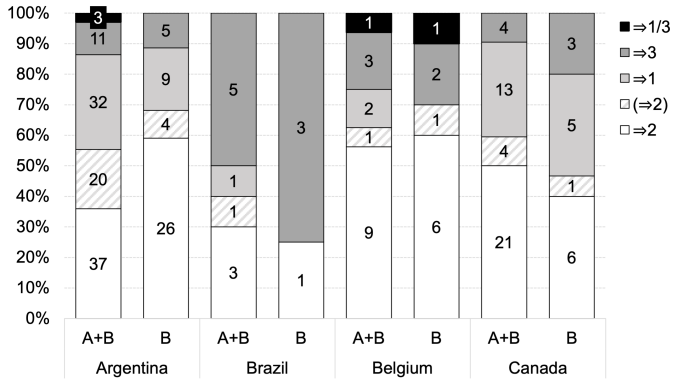


Figure 2.4: Hearer-related domain by contact variety

ultimately, if they undergo transfer from the demonstrative system of the contact varieties.[29]

Figure 2.4 reports the results of the pairwise comparison; the responses are organised by immigration country (Argentina, Brazil, Belgium, and Canada) because of the marginal differences attested across Quebec and Belgium French; whether these are significant, and, if so, whether they should be traced back to the fact that speakers from Quebec were also proficient in English or to other extra-linguistic differences is not clear at present and deserves further investigations.

Overall, Italo-Romance varieties show different patterns across microcontact contexts. Specifically, varieties in contact with Spanish show a high rate of target-like ⇒2 forms, especially if the semi-guided production alone is considered (Task B: 59.09%), and fewer ⇒3 (between 10.68 and 11.36%) than ⇒1 (with a task-dependent decrease: 31.07 to 20.45% across the two columns) forms. As regards varieties in contact with Brazilian Portuguese, we only have data from two *émigré* speakers of Sicilian, but these show generally very low occurrences of (semi)target-like ⇒2 forms (from 40% in the A+B column to 25% in Task B) and an overall preference for ⇒3 ones (from 30 to 75% in Task B). Finally, Italo-Romance varieties spoken in contact with French fall in between these two extremes, with relatively high rates of (semi-)target-like responses (see in particular Belgium, with 60% of TL responses), and with a preference for either ⇒1 (in Quebec: 30.95 to 33.33%) or ⇒3 (in Belgium: 18.75

[29]The issue can be explored further by comparing the different pairings available for each Italo-Romance variety (e.g. *does Sicilian in contact with Spanish show different patterns with respect to Sicilian in contact with French?*), and possible generation differences (e.g. *does heritage Sicilian in contact with Spanish show different patterns than heritage Sicilian in contact with French?*). However, due to the quantitative restriction of the present dataset, it is not possible to provide informative generalisations in these respects. Despite these limitations, a similar investigation (restricted to heritage speakers) was carried out in Terenghi 2022a.

to 20%).

Thus, cumulatively, ternary systems show different patterns in contact with different varieties. On the one hand, this seems to suggest that contact *per se* does not play a role in the reorganisation of ternary demonstrative systems: otherwise, we could have expected similar results across contact languages, regardless of cross-linguistic differences among the contact varieties. On the other hand, given the cross-linguistic variation attested by the expression of the hearer-oriented semantics (DEM.2) of ternary demonstrative systems, it is natural to investigate whether the demonstrative systems of the contact varieties have driven a parallel reorganisation in the demonstrative systems of the Italo-Romance ternary demonstrative systems, i.e. whether these results are consistent with transfer from the contact language.[30] This can be tested by comparing the results presented here to the language-specific contact-induced change predictions presented in opening Section 2.3.1 (see in particular item 2) and summarised here for convenience:[31]

- DEM.2: ⇒2 (compatible with ternary systems; see (16)) in Argentina and Brazil;
- DEM.2: ⇒3 (compatible with speaker-based binary systems; see (18)) in Quebec, Belgium, and Argentina;
- DEM.2: ⇒1 (compatible with participant-based binary systems; see (17)) in Brazil.

Having a closer look at the general patterns for the hearer-related domain with respect to the contact language, these predictions are not completely borne out. In fact, while it seems to be the case that the presence of a ternary system in Argentinian Spanish (at least in its formal variety) might have favoured the retention of ternary systems there, and the alternative Argentinian system (binary, speaker-oriented) might account for the high percentage of ⇒3 forms, the demonstrative systems attested by the other contact languages cannot straightforwardly account for the patterns attested in the Italo-Romance varieties spoken in contact with them. Specifically, Italo-Romance varieties spoken in contact with (speaker-based binary) French show high rates of ⇒2 forms (particularly in Belgium, where the percentage of TL responses is higher than in Argentina), besides a remarkable amount of ⇒1 forms in Canada, which is compatible with participant-based binary systems, unlike the dispreferred

[30] Note, however, that in our pilot fieldwork sessions we did not test all our informants in the respective contact languages. We cannot therefore be completely sure that they master the demonstrative system of the contact varieties.

[31] The following predictions hold for Pattern A reduced systems (see Section 2.2.3, that is: where DEM.1 and DEM.1/2 are still spelled out by ⇒1 and where DEM.2/3 and DEM.3 are spelled out by ⇒3). Pattern B and C reduced systems, instead, would include ⇒2 in one of the new new domain (new DEM.2/3 or new DEM.1/2); see (5) above; these patterns seem however unattested in the elicited data, as mentioned in Section 2.3.1.2 above, although more research is needed.

⇒3 forms (which would instead be expected under the hypothesis of contact-induced change). ⇒3 rates are instead extremely high, as already seen, for Italo-Romance (i.e. Sicilian) in contact with Brazilian Portuguese, although higher rates of ⇒1 (or of ⇒2) would have been predicted according to the contact-induced change hypothesis.

Overall, and taking into account that forms compatible with all types of systems have been elicited in all contact situations and that speakers show a considerable share of intra-speaker variation, it does not seem that the attested patterns can be accounted (exclusively) by appealing to language-specific contact-induced change. However, the quantitative and qualitative limits of the present sample do not allow for the performance of finer-grained pairwise comparisons, in line with the *Microcontact* project's design; thus, more data are necessary to investigate this question further.

2.3.1.4 Interim conclusions

This section presented first-hand data from Italo-Romance varieties, and specifically Sicilian, Abruzzese, and Calabrian, that (originally) display(ed) ternary demonstrative systems and that are currently spoken in contact with other Romance languages (microcontact). The data presented in the foregoing were elicited from two different populations: *émigré* speakers and heritage speakers; the results are preliminary and only allowed for some descriptive statistics, although these already indicate some strong generalisations.

The main one is that the exponents associated to the speaker-oriented semantics DEM.1 and to the non-participant-oriented semantics DEM.3 are stable (i.e. systematically consistent with the systems of the homeland varieties), whereas that associated with the hearer-oriented semantics DEM.2 is not. Instead, a high degree of intra- and inter-speaker variation is recorded (Section 2.3.1.2) in the expression of this latter domain. I thus explored whether the demonstrative systems of the contact varieties might be the source for this variation: the quantity and quality of the data notwithstanding, it can be tentatively concluded that this factor *alone* cannot straightforwardly account for the formal patterns recorded. Said otherwise, no direct effect of the demonstrative systems of the contact varieties can be systematically detected in the data.

This leads to the provisional conclusion that ternary demonstrative systems in languages spoken in microcontact do not undergo (language-specific) contact-induced change. Yet, their development was shown to match the process of reorganisation and reduction already described for the diachrony of those systems, as detailed in Section 2.2. Specifically, in both cases, ternary systems can be unstable and the instability typically targets the hearer-related deictic domain, which loses its dedicated marking and collapses with either the speaker-related domain (participant-based binary systems) or the non-participant-related one (speaker-based binary systems). To make the comparison more straightforward, Table 2.3 outlines the simplified systems (abstracting

Table 2.3: Patterns of change: Demonstratives in microcontact

Ternary (14)

DEM.1	DEM.2	DEM.3
⇒1	⇒2	⇒3

Binary, sp.-based

	DEM.1	DEM.2	DEM.3	
A	⇒1	⇒3		(18)

Binary, pt.-based

	DEM.1	DEM.2	DEM.3	
A	⇒1		⇒3	(17)

away from the intra- and inter-speaker variation), along the lines of the overview proposed for the diachronic patterns in Table 2.1 above.

The reduction of ternary demonstrative systems in contact is ultimately a case of simplification of innovative (Romance) ternary systems, but the patterns attested in this context only constitute a subset of those detected in diachrony: while the semantic variation is retained (speaker- *vs* participant-based systems), formal variation was not recorded in our data; instead, our speakers patterned in seemingly starting to lose the innovative ⇒2 form across both domains, which is best shown by taking into account the non-target-like responses given for the speaker- and non-participant-related semantics. As shown in 2.3.1.2 above (and for the complete data: see Appendix A.3), the Task B results for those domain are consistently target-like, with only one exception in the latter: this suggests that the hearer-oriented form has not consistently expanded into either the speaker-related or the non-participant-related deictic domain (as in patterns B and C in Table 2.1).

These differences notwithstanding, the possibility of linking the patterns of reduction of ternary demonstrative systems in microcontact to the patterns of reduction in diachrony suggests that demonstrative systems may undergo the same changes in diachrony and in contact alike. To further corroborate this, the next two sections review more data from different contact contexts which point towards the same conclusions.

2.3.2 Macrocontact

This section briefly concludes the discussion of the Italo-Romance ternary demonstratives data collected within the *Microcontact* project by comparing the results presented in the previous section with those of the control group,

namely Italo-Romance attrited and heritage speakers in the US, in contact with English. As English is not a variety that only minimally differs from our target varieties, this contact situation can be defined as "macrocontact" ("contact situations among maximally different languages", D'Alessandro 2021: 2).

Macrocontact data are crucial for the present discussion as they allow to ascertain whether the conclusions reached in Section 2.3.1 are generally valid, or whether they are the result of the specific contact context (namely, contact with closely related varieties). This is an issue worth investigating, as research carried out within the *Microcontact* project consistently highlighted that syntactic phenomena in microcontact typically show different developments with respect to the same phenomena tested in macrocontact situations. For an overview of such conclusions with respect to differential object marking and pro-drop-related facts, see Andriani *et al.* 2022b.

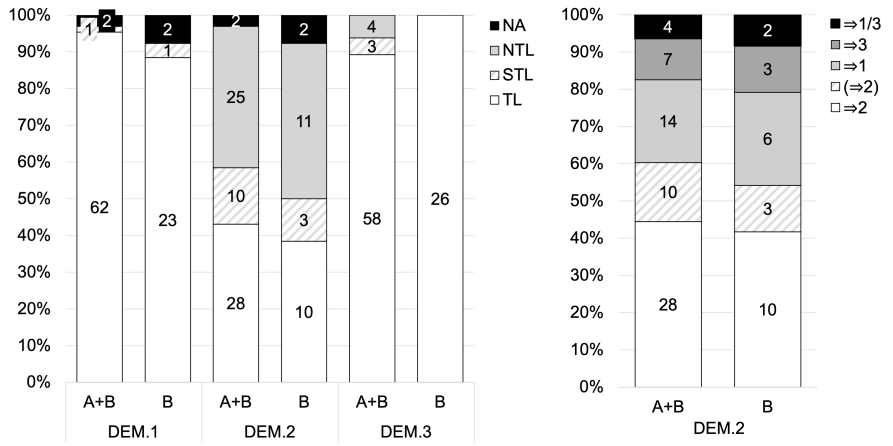
Fieldwork data from attrited and heritage Italo-Romance varieties spoken in contact with US English were collected in New York City between October 2019 and January 2020. The general background to the present section, with respect to both theoretical and methodological considerations, is the same as that already presented in Section 2.3.1 and will therefore not be repeated here, in the interest of space. It should however be noted that all informants from New York City were systematically tested by means of sentence translation, unlike in the microcontact fieldwork, because of difficulties related to the level of microvariation in the audio stimuli. Otherwise, the same tasks were performed.

This section presents the data elicited from 13 speakers of Sicilian and Abruzzese varieties, as shown in Table 2.4; again, additional socio-linguistic information relative to the participants is reported in Appendix A.2.

Table 2.4: US Participants

	ES	HS	Total
Sicilian	8	2	10
Abruzzese	1	2	3
Total	9	4	13

Figure 2.5a reports the results for all three deictic domains. Much in line with the microcontact results, also in macrocontact the speaker- and non-participant-related domains are overly stable. Specifically, the speaker-related domain (DEM.1) was expressed by a ⇒1 form in 100% of the cases (n=63/63; n=24/24 if Task B alone is considered); in only one case, beside the target-like ⇒1 form, a compositional answer was also given (heritage Sicilian: *chiddru ccà*, literally 'that here': N:DEM.3 A:DEM.1). The non-participant-related domain (DEM.3) is likewise systematically realised by means of a ⇒3 form: that is the case for 93.85% of the elicited forms (n=61/65) if the results of the two tasks are considered jointly, and for 100% of the forms elicited by means of Task B alone



(a) General results (b) Results for DEM.2

Figure 2.5: Ternary demonstrative systems in macrocontact

(n=26/26). The 4 non-target-like answers attested in Task A were given by the two heritage Abruzzese speakers: one produced a NTL ⇒2 form for DEM.3; the other produced a NTL ⇒2 form and two NTL ⇒1 forms for DEM.3; however, their fully TL responses in Task B suggest that, once again, these NTL answers should be construed as a task effect (see discussion in Section 2.3.1.1.2).

The hearer-related domain (DEM.2), instead, displays a significant amount of variation, with 39.68 to 45.83% of the available answers being NTL. Thus, once again, DEM.2 can be regareded as unstable, unlike DEM.1 and DEM.3. Figure 2.5b breaks down the variation in the realisation of DEM.2 further. Fully target-like responses were given in 44.44% of cases (n=28/63), which slightly decreases to 41.67% (n=10/24) if Task B alone is considered. Besides, semi-target-like responses (i.e. with optionality or where the target-like form is combined with a non-target-like one) were 15.87% of the total (n=10/63; 12.5%, n=3/24, if Task B is considered separately). These answers are substantially compatible with the retention of a ternary system, barring some formal variation (as in the abstract system in (16)). However, it should be noted again that a high level of intra-speaker variation was recorded, pointing perhaps to a change-in-progress situation: consistently (semi-)target-like responses were elicited from 5 speakers (one heritage Abruzzese speaker and one *émigré* Abruzzese speaker, who has however an unavailable answer; and 3 *émigré* Sicilian speakers); one more *émigré* Sicilian speaker responded in a consistently TL fashion in Task B alone. The full results are provided in Appendix A.3.

The remaining elicited answers are non-target-like. Among these, a clear preference is given to ⇒1 forms, which are recorded for 22.22% of the NTL responses (n=14/63); importantly, these responses are *not* the result of the

effect of Task A, as shown by the increase in ⇒1 forms if Task B is considered alone: 25% (n=6/24). These forms are compatible with a participant-based binary system (see the abstract system in (18)), but the disclaimer about intra-speaker variation applies again, as no speaker produced only NTL ⇒1 forms for DEM.2, and only one (heritage Abruzzese) did if the results of Task B alone are considered. Instead, two *émigré* Sicilian speakers show an overall preference for ⇒1 forms throughout the tasks and, in Task B, produced a ⇒1 form alongside either a TL ⇒2 form or an optional ⇒3 form.

11.11% of the elicited NTL forms were instead ⇒3 forms (n=7/63; 12.5% for Task B only: n=3/24). These forms are compatible with a speaker-based binary system (see the abstract system in (17)), but again no speaker showed this pattern consistently: only one speaker (heritage Sicilian) responded almost consistently with ⇒3 forms (with one case of optionality with ⇒1) in Task B.

In general, despite an overall preference for NTL ⇒1 forms, the elicited NTL answers show some level of optionality between ⇒1 and ⇒3 throughout the tasks, as also confirmed by the fully optional answers (cases in which ⇒1 and ⇒3 forms were both produced as equally valid for the expression of DEM.2 in a single test item): these were given in 6.34% of the cases (n=14/63; 8.33% in Task B, i.e. n=2/24).

Importantly, also in this case, as was discussed for the microcontact data in Section 2.3.1.3, the variation attested in the hearer-related deictic domain cannot be traced back to the demonstrative system of (American) English, which is a speaker-based binary system: *this/here* 'DEM.1' as opposed to *that/there* 'DEM.2/3'. While transfer from English would predict higher rates of ⇒3, the elicited Italo-Romance responses display a relatively high retention of (S)TL ⇒2 forms (between 69 and 63%) and, otherwise, a significant preference for ⇒1 forms. Hence, also in macrocontact, it seems possible to conclude that DEM.2 is unstable but that the reorganisation of originally ternary systems is not the effect of contact-induced change, but should rather be considered alongside the general endogenous evolution of ternary demonstrative systems.

Thus, the macrocontact data support the microcontact ones discussed in Section 2.3.1, providing additional preliminary evidence against explanations of the reduction of ternary demonstrative systems that rely exclusively on the effects of contact. Overall, it can be concluded that ternary demonstrative systems in the *Microcontact* project's sample are not affected by contact, but substantially mirror the change of similar systems in diachrony (albeit with somewhat less variation). The next section provides converging evidence from a different contact domain: that of Portuguese-lexified creole languages.

2.3.3 Portuguese-based creoles

This section completes the review of the patterns of change attested across Romance ternary demonstrative systems by considering the Portuguese-based creoles featured in the Atlas of Pidgins and Creoles Language Structures (APiCS; Michaelis *et al.* 2013b). For a general and theoretically-neutral introduction

to creoles (among other contact varieties), I refer the reader to the recent and comprehensive overview by Velupillai (2015). For more details and specific references about the Portuguese-based varieties considered in this chapter, instead, see Appendix B.

The APiCS collects data for 14 Portuguese-based creoles, spoken in West Africa and in South and South-East Asia.[32] This section focuses on Portuguese-based creoles for the following reasons: first of all, because Portuguese has (and had) a ternary demonstrative system of the type investigated in this section. In keeping with the Romance-oriented nature of this study, only Spanish-based creoles would have been a suitable option (in addition to, or instead of, the Portuguese-based ones). Size considerations made me opt for Portuguese-based creoles only. In fact, with 14 varieties, Portuguese-based creoles are the second biggest group of creoles reported in the APiCS, after the English-based ones (26 varieties), and they show a considerable amount of variation with three main compact groups: two in West Africa, one, more varied, in Asia. Yet, the sample is not too big, which makes it manageable, especially when it comes to fully considering the other contributing languages.

It should be noted that this research is limited by the lack of early data. There is a considerable gap in the documentation of the creole demonstrative systems from their early stages to more recent times: in fact, the first linguistic descriptions of the Portuguese-based creoles (and the first texts) only date to the mid-to-late 19th century (Ladhams 2009). Consequently, it is not possible to fully assess whether the attested reductions of the Portuguese ternary systems took place during the creolisation process and stayed then stable, or whether the earliest phases of Portuguese-based creoles retained the original Portuguese ternary system which only underwent reduction over time.

This issue notwithstanding, the present section aims at corroborating the findings of the previous sections, by showing yet another domain in which ternary demonstrative systems (such as the Portuguese one) evolved into binary ones, and by highlighting the patterns of reduction and the variation in semantics and morphology that these instantiate. While only the generalisations presented in Sections 2.3.3.3 and 2.3.3.4 are directly relevant to the general discussion of this chapter, the review of 15th and 16th centuries Portuguese demonstrative systems (Section 2.3.3.1) and of present-day creole demonstrative systems (Section 2.3.3.2) swiftly provide necessary background information for the generalisations proposed there.

[32] I exclude from the present discussion Saramaccan, a Caribbean English-based creole to which, nevertheless, Portuguese contributed in such a large measure as to be considered as an additional major lexifier (Saramaccan, Aboh *et al.* 2013). This contribution also extends to the demonstrative system of Saramaccan, where the (non-contrastive) article *di* (< English) combines with both English and Portuguese adverbs/reinforcers to yield deictic oppositions (A:DEM.1: *aki* 'here' (Portuguese *aquí* 'A:DEM.1'); A:DEM.2/3: *də* (English 'there'), *na-a-də* ('LOC-3SG-there'), or *ala* 'there' (Portuguese *ala* 'A:DEM.3')).

2.3.3.1 15/16th century Portuguese

As mentioned in Section 2.2, present day European Portuguese demonstrative systems can be described as ternary and person-oriented (as shown in (13a)); see, a.o. Ledgeway & Smith 2016, Dubert & Galves 2016; Valentim 2015; Cunha & Cintra 1985. The focus here is however on Portuguese demonstrative systems in diachrony, and specifically between the mid-15th century to the 17th century, that is when the Portuguese settlement and the subsequent creolisation mainly took place (see Ladhams 2009 for historical remarks).

The properties of 15th and 16th century Portuguese demonstratives are discussed by Teyssier (1981), who, on the basis of literary texts of the period concludes that:

- 15th century Portuguese (Teyssier 1981: 17–24): *esse* 'that near you' (N:DEM.2) is still partially anaphoric in function, in continuity with its source IPSE; adverbial demonstratives do not show any hearer-oriented adverbial form, although Teyssier (1981: 24) underlines that this conclusion might be the consequence of the lack of documentation;

- 16th century Portuguese (Teyssier 1981: 24–34): *esse* is stably used as the hearer-oriented demonstrative, rather than as an anaphoric demonstrative; the form *aí*/*ahi* 'there near you' (A:DEM.2) has fully emerged in the hearer-oriented adverbial function.

As Portuguese-based creoles started emerging from the very end of the 15th century onwards, and until the generalised decline of the Portuguese control over part of its colonies during the 17th century, it seems safe to assume that the Portuguese varieties that served as lexifiers encoded a three-way distinction between the area related to the speaker, the area related to the hearer, and that not related to either.

2.3.3.2 Portuguese-based creoles

The APiCS records 14 Portuguese-based creoles, which formed starting from the end of the 15th century (more details can be found in the references provided in Appendix B). These are conventionally divided into three groups, which I will discuss in turn: the two groups of West African creoles (Upper Guinea Creoles and Gulf of Guinea Creoles) and the Asian Creoles.

2.3.3.2.1 Upper Guinea Creoles The Upper Guinea Portuguese-based creoles discussed here are three Cape Verdean creoles (of Santiago, Brava, and São Vicente) and mainland Guinea-Bissau Kriyol and Casamancese Creole. For detailed information about the socio-historical context in which creoles developed, I direct the reader to the relevant APiCS survey chapters and to

Ladhams (2009). The demonstrative systems attested for the Upper Guinea Creoles follow (for references, see Appendices B.1 and B.3):[33,34]

(19) *Demonstratives: Upper Guinea Portuguese-based creoles*

	N:DEM.1	N:DEM.2/3	A:DEM.1	A:DEM.2/3
CVC/Santiago	es (...li), kel li	kel (...la)	li	la
CVC/Brava	es/kel (...li)	kel (...la)	li	la, lago
CVC/São Vicente	es (...li)	kel (...lá)	li	lá
Guinea-Bissau Kr.	e(s) (...li)	ki(l) (...la)	li	la
Casamancese Cr.	e(s) (...li)	e(s)/ke(l) (...la)	*(a)li*	*la*

The most noteworthy characteristics of these systems follow:

- All adverbial demonstrative systems present two forms, respectively derived from Portuguese *ali* 'A:DEM.3, punctual' and *lá* 'A:DEM.3, areal'. The latter retains its basic non-speaker-related semantics ('there'), whereas the former undergoes change to become the speaker-oriented term ('here'). That is, the variation between punctual and areal semantics is reanalysed in a deictic key and ultimately creates a new deictic opposition: *li* 'A:DEM.1' (here, close to me) and *la* 'A:DEM.2/3' (there, far from me). This pattern of change was not documented in the foregoing and is not attested elsewhere, to the best of my knowledge.

- Demonstrative-reinforcer constructions are predominant in the nominal domain, which, barring differences related to the demonstrative forms involved in the construction, points to the diminished strength of the original deictic value of nominal demonstratives (see e.g. Ledgeway & Smith 2016: 54.1.2). This is evidenced by the combination of (at face value) semantically non-compatible forms (e.g. Cape Verdean Creoles of Santiago and Brava: *kel li* 'N:DEM.3 A:DEM.1' = 'that here').

- Two possible hypotheses can be advanced with respect to the source of *es* and *e* (N:DEM.1 forms), assuming the same etymology for both: that they derive from Portuguese *este* 'N:DEM.1', by the reduction of the consonant cluster *st* (for which, and for related variation, see Baptista 2015, 2017), keeping by and large its speaker-oriented semantics; or that they straightforwardly derive from Portuguese *esse* 'N:DEM.2', which underwent a semantic shift ('that near you' > 'this near me'). As this type of

[33]Here I systematically use the labels presented in Section 1.2.4 above to refer to the deictic contrasts encoded in the demonstrative systems under discussion. For the descriptions given by the relevant APiCS surveys, see Appendix B.3.

[34]Guinea-Bissau Kriyol's demonstrative system is classified as ternary (Intumbo *et al.* 2013b: feature 33) under the assumption that the combination of the two non-participant-oriented forms (*ki(l) ... la* 'that there') denotes a referent located in an area further away from the speaker than is the case for the demonstrative form alone. However, such an interpretation is not supported by other available literature (Kihm 1994: 140–141).

semantic change has not been recorded in the diachronic overview (Section 2.2) and there are good featural grounds to rule it out (Chapter 6), I will tentatively assume that speaker-oriented nominal demonstratives in these varieties result from the retention of the Portuguese speaker-oriented term that underwent phonological simplification.

2.3.3.2.2 Gulf of Guinea Creoles The Gulf of Guinea Creoles reviewed in what follows are Santome (Forro), Angolar, Principense (Lung'Ie), and Fa d'Ambô (Annobonese). Once again, I refer to the dedicated APiCS surveys and to Ladhams (2009) for the discussion of the socio-historical context. The demonstrative systems of Santome, Principense, and Fa d'Ambô, as attested in the sources listed in Appendices B.1 and B.3, are as follows:[35]

(20) *Demonstratives: Gulf of Guinea Portuguese-based creoles*

	N:DEM.1	N:DEM.2	N:DEM.3	A:DEM.1	A:DEM.2	A:DEM.3
Santome	sɛ (*ku sa* (a)i), isɛ, isaki		sɛ (*ku sa* (a)la), isala	(n)ai		(n)ala
Principense	(i)sê	(i)xila		*na*, *ni*	*lala*	
Fa d'Ambô	se, (i)sai		(i)sala	yay		ala

The features of these systems most remarkable for the present purposes follow:

- Santome and Fa d'Ambô display a two-way deictic opposition between the participant-related deictic domain and the non-participant-related one (Ferraz 1979: 73; Hagemeijer *et al.* 2020: 45). Note, however, that the relevant APiCS database and survey sections (Hagemeijer 2013a,b for Santome; Post 2013a,b for Fa d'Ambô) simply report a proximal–distal opposition, without detailing its semantics further.

- The deictic contrasts of the Portuguese original nominal demonstrative system are systematically neutralised in the morphology and only realised by demonstrative-reinforcer constructions.[36] Nominal demonstratives stem from the combination of nominal *is(i)-* (cf. Portuguese *este* 'N:DEM.1' or *esse* 'N:DEM.2'),[37] with adverbial *ai* or, more restrictedly, *aki*

[35]Santome and Principense additionally encode a visibility contrast, unlike Portuguese; Fa d'Ambô makes a similar distinction (defined as "presentative" *vs* "absentative" by Post 2013a) across both nominal demonstratives. These distinctions are not dealt with in what follows.

[36]A partial exception is given by Santome, where, additionally, a relative clause version of the demonstrative-reinforcer construction is attested. (Reduced) relative clauses are part of a grammaticalisation process that results in fully fledged demonstrative-reinforcer constructions, as shown by Terenghi & Casalicchio (2019) for Italo-Romance.

[37]As no conclusive evidence is available, here I remain agnostic with respect to the etymological source of *is-* (cf. Portuguese *este* or *esse*). An alternative etymology altogether relates the demonstrative base to the copula *sa* (Rougé 2004: 261). However, the availability of the relative clause marker (*ku*) and an additional copular element (*sa*) in Santome (*sɛ ku sa*

(speaker- or participant-oriented function; cf. Portuguese *ai* 'A:DEM.2', *aqui* 'A:DEM.1'), or with adverbial *(a)la* (non-speaker- or non-participant-oriented function; cf. Portuguese *ala* 'A:DEM.3').

- The availability of the type *ai* in the participant- or speaker-oriented function (cf. Portuguese *aí* 'A:DEM.2') provides evidence that the hearer-oriented demonstrative adverb was well in use by the time the Portuguese settled (at least in this area). Portuguese *aqui* 'A:DEM.1' is instead lost, although it can be marginally found in Santome, frozen in its function of reinforcer in the nominal demonstrative series.

Angolar deserves a separate discussion: differently from the other Gulf of Guinea Creoles, its demonstrative system is reported to display a three-way distance opposition with respect to the deictic centre, i.e. the speaker (Maurer 2013b: feature 33, Maurer 2013a: section 5; see also Appendix B.3), as follows:

(21) *Angolar demonstratives* (Maurer 1995: 41 ff.)

	PROX	MED	DIST
N:DEM	*e*, *dhe*, *the*, isi-*(dh)e(-dhe)* 'this'	si, si-*e*, si-*dhe*, isi-dha 'that (near)'	dha, si-dha, isi-dha-dha 'that (far)'
A:DEM	nge(e), aki, ai 'here'	nha 'there (near)'	nha(la/ra), laya 'there (far)'

Note that the purported "medial" morphology in the nominal domain is built on an element (*si*) available throughout the system (see the other Gulf of Guinea Creoles for a similar demonstrative base: *(i)s-*) combined with *(dh)e* or *dha*, respectively also used in the "proximal" and in the "distal" series.[38] In the adverbial series, instead, "medial" is partly identical to "distal". This strongly suggests that only two degrees of distance from the speaker are encoded in the system ("proximal" and "distal", but no "medial"), which is therefore a speaker-based binary one. Importantly, even granting the genuineness of the system in (21), the contrastive reference to the hearer-related domain available in Portuguese is lost in Angolar, too. Given this reduction, and despite the possible development

(a)i) is at odds with this hypothesis. Besides, copulas across creoles are often derived from demonstrative forms; the same is true in diachrony (for an overview of the so-called copula cycle, see Lohndal 2009). The inverse pattern (the one suggested by Rougé 2004) does not seem to be typologically attested, instead.

[38] As regards the etymology of *dhe* and *dha*, the available literature does not give further information. The form *the*, instead, is explained by the phonetic substrate influence from Bantu languages (Kimbundu), and corresponds to the deictically underspecified *sɛ/sa* demonstrative forms attested in the other Gulf of Guinea Creoles (Maurer 2013a: section 4). Finally, *nge* stems from the combination of the nominal form *ngaa* (cf. Portuguese *lugar* 'place', Rougé 2004: 192, 448) with the post-nominal demonstrative form *e* 'this', literally meaning 'in this place'.

of a new distance-oriented contrast within the non-speaker-related deictic domain (there near *vs* there far), in what follows I regard Angolar demonstrative systems as simply encoding a two-way speaker-based deictic contrast: DEM.1 *vs* DEM.2/3. This is in line with the treatment for distance-oriented demonstrative systems proposed in Chapters 3 and 4.

2.3.3.2.3 Asian Creoles The Portuguese-based creoles spoken in South and South-East Asia (among which, only Diu Indo-Portuguese, Korlai, Sri Lanka Portuguese, Papiá Kristang, and now extinct Batavia Creole are reported by the APiCS) are geographically scattered, but nonetheless constitute quite a compact group socio-historically (see the relevant APiCS survey chapters reported in Appendix B.1, and Ladhams 2009).

Asian Portuguese-based creoles show the following demonstrative systems (for further information and references, see Appendices B.1 and B.3):

(22) *Demonstratives: Asian Portuguese-based creoles*

	N:DEM.1	N:DEM.2/3	A:DEM.1	A:DEM.2/3
Diu Indo-Portuguese	es	ikəl	aki	ali, la
Korlai	ye	əkəl/akəl	aki	ali
Sri Lanka Portuguese	isti	aka	akii	alaa
Papiá Kristang	isti/isi	aké	akí	nalí
Batavia Creole	iste	akel	*aki*	?

The main properties of these systems are:

- While there is some etymological variation in the nominal domain (with reflexes of both Portuguese *este* 'N:DEM.1' and *esse* 'N:DEM.2' in the speaker-oriented function), the adverbial domain is uniformly derived from Portuguese *aqui* and *ali* (respectively, 'A:DEM.1' and 'A:DEM.3, punctual'). Note that Korlai uses the Marathi speaker-oriented nominal demonstrative *ye* (Clements 1996: 101; Dhongde & Wali 2009: 51).

- Demonstrative-reinforcer constructions are not attested (see also: APiCS corpus); this seems to point to the strength of the deictic content of the demonstrative forms. One partial exception is given by Papiá Kristang, where both *isti* and *isi* are reported (cf., respectively, Portuguese *este* 'N:DEM.1' and *esse* 'N:DEM.2') for the speaker-related domain; this may point to an ongoing reduction of the original Portuguese ternary demonstrative system. Although the language description given by Baxter (2013a) records the opposition *isi*/*aké* 'PROX/DIST', the APiCS corpus shows more occurrences of *isti* than *isi* in the speaker-oriented function (see also Baxter 2013b: feature 33). Thus, it seems that the erstwhile hearer-oriented term (*isi*) is losing ground to the erstwhile speaker-oriented one (*isti*); in what follows, I tentatively assume this to be the

case, also by virtue of the parallelism with the demonstrative systems in the wider area.

With these descriptive notes in place, we can now turn to informed generalisations with respect to the demonstrative systems attested across Portuguese-based creoles. These concern the semantic organisation of the creole demonstrative systems (binary demonstrative systems), as compared to that of the languages in their genetic pools (Section 2.3.3.3); and the realisation of the new two-way contrasts (Section 2.3.3.4). A preliminary generalisation regards the etymology of the creole demonstrative forms: unsurprisingly, all of them but one (Korlai, *ye* DEM.1; but Angolar is not considered due to the unclear origin of *dhe* and *dha*) derive from the original Portuguese demonstrative forms.

2.3.3.3 Generalisations: Semantics

As regards the semantic facts, the descriptions in the previous sections clearly showed that the demonstrative systems of Portuguese-based creoles systematically lost one of the three original Portuguese forms, creating new binary systems both in the nominal and in the adnominal domains. This is the case regardless of the demonstrative systems of the other contributing languages, as synoptically reported in Table 2.5 (for further information on the demonstrative systems of the other contributing languages, see Appendix B.2).

Table 2.5: Demonstratives systems in Portuguese-based creoles

Creole	Contrasts	Contributing languages	Contrasts
		Portuguese = lexifier	**3**
CVC/Santiago	2/S$^{(a)}$	Wolof (Temne, Mandinka)	3π (2)
CVC/Brava	2/S$^{(a)}$	Wolof (Temne, Mandinka)	3π (2)
CVC/São Vicente	2/S	CVC	2
Guinea-Bissau Kr.	2/S	Wolof (Bak, Fula)	3π (4π/d-2$^{(b)}$/3d)
Casamancese Cr.	2/S$^{(a)}$	Wolof (Mandinka, Banyum)	3π (2, 3$d^{(c)}$)
Santome	2/P$^{(a)}$	Edo (Kikongo)	2 (3)
Angolar	2/S(3d)	Santome (Kimbundu)	2/P (3)
Principense	2/S$^{(a)}$	Edo (Yoruba, Kikongo)	2 (2/3d, 3π)
Fa d'Ambô	2/P$^{(a)}$	Edo (Yoruba, Kikongo)	2 (2/3d, 3π)
Diu Indo-Pg.	2/S	Gujarati (English, Hindi, Konkani)	2 (2)
Korlai	2/S	Marathi	2
Sri Lanka Pg.	2/S	Tamil (Sinhala, (Dutch, English))	2 (3π, (2))
Papiá Kristang	2/S	Malay (Southern Min)	2$^{(d)}$/3π (2)
Batavia Creole	2/S	Malay, Javanese (Dutch, Indo-Pg.)	2$^{(d)}$/3π, 3π (2)

[a] In N:DEM, binary opposition encoded in demonstrative-reinforcer constructions only.
[b] Bak A:DEM need further verification. [c] Banyum A:DEM: NA. [d] Malay N:DEM only.

In Table 2.5, 2S and 2P refer, respectively, to speaker-based and participant-based binary systems. 2 alone is used, instead, if the source does not explicitly differentiate between the two systems. Instead, 3π and $3d$ are used to distinguish person-oriented ternary systems (of the Portuguese type) from distance-oriented ones, respectively.[39]

Firstly, note that Guinea-Bissau Kriyol and Angolar have been described (e.g. in the APiCS), as attesting a distance-oriented three-way system: however, in Sections 2.3.3.2.1–2.3.3.2.2 above, I suggested that these systems be described as displaying a binary opposition instead, on the basis of data and other references (Guinea-Bissau Kriyol) and of compositionality and absence of formal distinction (Angolar). Secondly, it should be noted that the descriptions consulted for the demonstrative systems of the other varieties that contributed to the Portuguese-based creoles (see systems and references in Appendix B.2) are synchronic: no information, instead, is available for those varieties in the 15th and 16th centuries, i.e. at the time of the creolisation process.

On the basis of the available data, however imperfect, it might be suggested that different pools of features may result in similar demonstrative systems and that similar pools of features may result in different systems, hinting at a semantic reorganisation that is independent of the contact context, as seen in Sections 2.3.1 and 2.3.2. The first case is illustrated by the Asian creoles: they all display speaker-based binary systems, although their contributing languages showed considerably different systems. For the second case, instead, Principense and Fa d'Ambô can be compared: despite the identity of contributing languages, the resulting semantics are reportedly different (speaker- *vs* participant-based binary systems).

More in general, it can be concluded from the survey above that Portuguese-based creoles display binary demonstrative systems across domains, regardless of the input systems (Portuguese and the other contributing languages). The reduction brought in the majority of cases to a speaker-based semantics, although some systems are described as participant-based (Santome, Fa d'Ambô). Nonetheless, among such a small number of languages and despite the comparable etymologies and (mostly) semantics, a considerable amount of formal variation can be highlighted as regards how the original Portuguese ternary demonstrative systems are reduced. The next section explores the different patterns attested.

2.3.3.4 Generalisations: Formal variation

As shown in Section 2.3.3.2, Portuguese-based demonstrative systems show variation as to which forms of the original Portuguese demonstrative systems

[39]This distinction is relevant as distance-oriented ternary systems can be regarded as basic (person-oriented) binary systems with an additional distance opposition; for arguments in favour of this analysis, see the discussion in Section 3.2; for a structural analysis, see instead Chapter 4. Balanta, among the Bak languages mentioned for Guinea-Bissau Kriyol, is marked by '4' to refer to a person-oriented ternary system with an additional distance contrast, as illustrated by Creissels (to appear) and Creissels & Biaye (2016).

Table 2.6: Demonstrative systems in Portuguese-based creoles: variation

Creole	⇒1–3	⇒1/2–3	⇒2–3	⇒3–3	U+A:DEM
CVC/Santiago	✓N:DEM			✓A:DEM	(✓N:DEM ⇒3)
CVC/Brava	✓N:DEM			✓A:DEM	(✓N:DEM ⇒3)
CVC/São Vicente	✓N:DEM			✓A:DEM	
Guinea-Bissau Kr.	✓N:DEM			✓A:DEM	
Casamancese Cr.	✓N:DEM			✓A:DEM	(✓N:DEM ⇒1)
Santome		(✓A:DEM)	✓A:DEM		✓N:DEM (⇒1/2)
Angolar		✓A:DEM			? N:DEM
Principense		✓A:DEM			✓N:DEM (⇒1/2)
Fa d'Ambô			✓A:DEM		✓N:DEM (⇒1/2)
Diu Indo-Pg.	✓A:DEM		✓N:DEM		
Korlai	✓N:DEM, A:DEM				
Sri Lanka Pg.	✓N:DEM, A:DEM				
Papiá Kristang	✓A:DEM	✓N:DEM			
Batavia Cr.	✓N:DEM				

are retained to define the new binary deictic opposition: the creole systems have different sources from within the Portuguese demonstrative systems.

Table 2.6 synoptically reports the forms included in the resulting systems, highlighting formal variation both across creoles (within and beyond one and the same area) and within one and the same creole. The usual ⇒1, ⇒2, ⇒3 notation is employed to stress that the use of these forms does not correspond to their original Portuguese semantics (DEM.1 *vs* DEM.2 *vs* DEM.3) any more; rather, they are employed to define new two-way oppositions: between the speaker-related domain and the non-speaker-related domain in speaker-based binary systems (2/S: DEM.1 *vs* DEM.2/3); and between the participant-related domain and the non-participant-related one in participant-based binary systems (2/P: DEM.1/2 *vs* DEM.3). Additionally, the 'U' formal type refers to underspecified demonstrative forms, i.e. demonstrative forms that do not encode a deictic contrast in and of themselves, but only do so in combination with another form (from the adverbial series).

Each entry in Table 2.6 summarises one of the systems illustrated in Sections 2.3.3.2.1–2.3.3.2.3 above (n=31, four of which are optional and, as such, in brackets). As the table shows, different original Portuguese forms (as indicated by ⇒1, ⇒2, and ⇒3) contribute to the set of forms included in the new binary systems, both across creole varieties and (within one and the same variety) across domains. The evolution of the Portuguese original ternary demonstrative systems into the new binary systems will be illustrated in detail in the remainder of this section.

2.3.3.4.1 ⇒1–3 (column 1) In the first formal pattern of reduction, the original speaker-oriented (⇒1) and non-participant-oriented (⇒3) forms of the Portuguese system are preserved (Pattern A) to denote, respectively, the new speaker-related and non-speaker-related domains (cf. Sardinian (9a) and Aromanian (9b) in Section 2.2.3.1; and cf. the abstract system in (18) for the microcontact data, Section 2.3.1.2):

(23) a. *Nominal domain, Portuguese > Batavia Creole*

este	*esse*	*aquele*	>	*iste*	*akel*	*akel*
⇒1	⇒2	⇒3	>	⇒1	⇒3	⇒3

b. *Adverbial domain, Portuguese > Korlai*

aquí	*ai*	*ali/lá*	>	*aki*	*ali*	*ali*
⇒1	⇒2	⇒3	>	⇒1	⇒3	⇒3

That is: original hearer-oriented forms (⇒2; Portuguese: *esse*, *aí* 'DEM.2') are lost in both domains and the hearer-related deictic space is encoded by the erstwhile non-participant-oriented terms (⇒3), which expand their semantics to become generally non-speaker-oriented. This option is attested by 12 series (8 nominal ones, and 4 adverbial ones; n=12/31 demonstrative series from Table 2.6), but recall that the source of the *es*-like form in the nominal domain of the 5 Upper Guinea Creoles is not certain, and the form could also be traced back to Portuguese *esse* 'N:DEM.2' (see the discussion in Section 2.3.3.2.1). Additionally, this pattern is attested in the Saramaccan adverbial domain, too (*aki–ala*; see fn. 32).

2.3.3.4.2 ⇒1/2–3 (column 2) The second formal pattern displays optionality in the expression of the speaker- or participant-oriented (depending on the creole) domain: both the Portuguese speaker-oriented (⇒1: *este/aqui*, 'DEM.1') and hearer-oriented (⇒2: *esse/aí*, 'DEM.2') forms are attested, without detectable semantic differences. Note that this kind of optionality has not been detected in diachrony, but that it was provisionally found in the microcontact data (see Appendix A.3 for the full scale of intra-speaker variation). The non-speaker- or non-participant-oriented semantics (DEM.3) is instead expressed by the original Portuguese non-participant-oriented form (⇒3: *aquele/ali*, 'DEM.3'). This pattern (call it: A/C) can be illustrated as follows:

(24) a. *Nominal domain, Portuguese > Papiá Kristang*

este	*esse*	*aquele*	>	*isti* or *isi*	*aké*	*aké*
⇒1	⇒2	⇒3	>	⇒1/2	⇒3	⇒3

b. *Adverbial domain, Portuguese > Angolar*

aquí	*ai*	*ali/lá*	>	*aki* or *ai*	*nha(la)*	*nha(la)*
⇒1	⇒2	⇒3	>	⇒1/2	⇒3	⇒3

c. *Adverbial domain (reinforcers only), Portuguese > Santome*

aquí	*ai*	*ali/lá*	>	*-ai* or *-aki*	*-ai* or *-aki*	*-ala*
⇒1	⇒2	⇒3	>	⇒1/2	⇒1/2	⇒3

Thus, the original hearer-oriented forms (*isi*, cf. Portuguese *esse* 'N:DEM.2'; *ai*, cf. Portuguese *aí* 'A:DEM.2') are no longer contrastively used and are additionally not reported to refer to their original domains; rather, they are optionally used to denote the speaker-related domain (DEM.1, see Papiá Kristang, Angolar, and Pricipense), or the participant-related one (DEM.1/2, see Santome's reinforcers, possibly fossilised), for a total of n=4/31 series. For the non-speaker-oriented domain, forms that were originally restricted to the non-participant domain are used (⇒3; cf. Portuguese *aquele/lá* 'A:DEM.3').

2.3.3.4.3 ⇒2–3 (column 3) The third formal pattern attested across Portuguese-based creoles defines the new binary opposition by means of the original hearer-oriented (⇒2; cf. Portuguese *esse/aí*, 'DEM.2') and non-participant-oriented (⇒3; cf. Portuguese *aquele/lá*, 'DEM.3') forms (Pattern C). This pattern was only discussed for participant-based binary systems in diachrony (see Brazilian Portuguese (12a) and Catalan (12b), where the original hearer-oriented term expands to cover the speaker-related deictic domain, too); Santome falls in this typology (25b). Here, the pattern is attested for the speaker-based system of Diu Indo-Portuguese, too, where it seems that the original non-participant-oriented term (⇒3; cf. Portuguese *aquele/lá*, 'DEM.3') expanded to cover the hearer-related domain, too, and that the original hearer-oriented term (⇒2; cf. Portuguese *esse/aí*, 'DEM.2') shifted to denote the speaker-related domain, as shown in (25a):[40]

(25) a. *Nominal domain, Portuguese > Diu Indo-Portuguese*

este	*esse*	*aquele*	>	*es*	*ikəl*	*ikəl*
⇒1	⇒2	⇒3	>	⇒2	⇒3	⇒3

b. *Adverbial domain, Portuguese > Santome*

aquí	*ai*	*ali/lá*	>	*(n)ai*	*(n)ai*	*(n)ala*
⇒1	⇒2	⇒3	>	⇒2	⇒2	⇒3

This pattern is only attested, additionally, in Fa d'Ambô's adverbs (participant-based binary system), for a total of n=3/31 series; however, it might be also identified in the five Upper Guinea Creoles nominal *es* form, if their speaker-oriented forms derived from Portuguese *esse* 'N:DEM.2' rather than *este* 'N:DEM.1' (see discussion in Section 2.3.3.2.1).

[40]The exceptionality of the Diu-Indo Portuguese could perhaps point to the reconstruction of a phase with optionality similar to the one discussed for the second column of Table 2.6. Alternatively, Diu Indo-Portuguese *es* could be traced back to Portuguese *este* 'DEM.1' and the development likened to the ⇒1–3 one seen above (see column 1).

2.3.3.4.4 ⇒3–3 (column 4) The fourth formal pattern attested within the creole new binary demonstrative systems is restricted to the adverbial domain and consists of two originally non-participant-oriented forms (⇒3: cf. Portuguese *ali* and *lá* 'A:DEM.3') that are reinterpreted to yield the two-way deictic opposition between the speaker-related domain and the non-speaker-related one (Pattern D). The subscripts in (26) refer to the variation in ⇒3:

(26) *Adverbial domain, Portuguese > Cape Verdean Creole of Santiago*

aquí	*ai*	*ali/lá*	>	*li*	*la*	*la*
⇒1	⇒2	$\Rightarrow 3_{i/ii}$	>	$\Rightarrow 3_{i}$	$\Rightarrow 3_{ii}$	$\Rightarrow 3_{ii}$

Portuguese, like many other Romance varieties, displays more than one series of adverbial demonstratives (see also remarks in fn. 5): the relevant series here are the -*i* one and the -*a* one, yielding the opposition between *ali* and *lá* within the original Portuguese non-participant-oriented (A:DEM.3) term. This distinction can be described in terms of specificity: the -*i*-series refers to a specific area (also defined "punctual"), while the -*a*-series denotes a generic area (also referred to as the "areal" reading); in this case, both the specific and the generic areas are located in the non-participant-related domain, and can be understood as two different conceptualisations of that domain (with a clear extension difference: the specific/punctual area is more restricted, in size); for references, see Ledgeway & Smith (2016: 894).

In (26), the hearer- and the non-participant-related deictic domains are expressed by the erstwhile generic/areal non-participant oriented adverb *lá*, while the speaker-related domain is expressed by the erstwhile specific/punctual non-participant-oriented adverb *ali*, through an otherwise unattested, as far as I know, semantic shift: A:DEM.3 > A:DEM.1. This pattern is only attested in the adverbial domain of all five Upper Guinea Creoles (n=5/31 series).

2.3.3.4.5 U+A:DEM (column 5) The last pattern of reduction attested by the Portuguese-based creoles is restricted, instead, to the nominal domain: here, only one nominal form from the original Portuguese ternary system is preserved and, as such, does not encode any contrastive deictic features (typically, in these varieties, it also plays the function of the definite marker). The new binary oppositions are instead obtained compositionally, through the combination of the unary nominal form with the binary adverbs/reinforcers, i.e. ultimately, it depends on the semantics of the reinforcers (their formal patterns of variation mirror those of the adverbs, unless otherwise stated, and are reported in Table 2.6 and discussed in the relevant preceding paragraphs). Note that this development is largely attested in the diachrony of Romance languages, but is not discussed in this work as, ultimately, it represents the reduction of a binary system to a unary one (for the cases discussed here, one step of the reduction process is not documented).

(27) a. *Nominal domain, Portuguese* > *Cape Verdean Creole of Brava* (optional)

este	*esse*	*aquele*	>	*kel (li)*	*kel (la)*	*kel (la)*
⇒1	⇒2	⇒3	>	⇒3	⇒3	⇒3

b. *Nominal domain, Portuguese* > *Casamancese Creole* (optional)

este	*esse*	*aquele*	>	*es (li)*	*es (la)*	*es (la)*
⇒1	⇒2	⇒3	>	⇒1	⇒1	⇒1

c. *Nominal domain, Portuguese* > *Fa d'Ambô* (reinforcers excluded)

este	*esse*	*aquele*	>	*isai*	*isai*	*isala*
⇒1	⇒2	⇒3	>	⇒1/2?	⇒1/2?	⇒1/2?

Even in this case, there are some patterns of variation with respect to both the form that is preserved and the availability of other options. As regards the formal variation, the form retained from the original Portuguese ternary system can be the erstwhile non-participant-oriented (⇒3) one (as in the Cape Verdean Creole of Brava, in the example, and Santiago; cf. Portuguese *aquele* 'N:DEM.3'), it can be the erstwhile speaker-oriented (⇒1) one (as in Casamancese Creole; cf. Portuguese *este* 'N:DEM.1'; but see discussion in Section 2.3.3.2.1), or it can be difficult to reconstruct its actual etymology (⇒1 or ⇒2, as in Fa d'Ambô and in the other Gulf of Guinea creoles; see the discussion in Section 2.3.3.2.2).

As regards the availability of other patterns, the Upper Guinea Creoles show underspecified demonstratives in demonstrative-reinforcer constructions only optionally, and beside fully deictically specified combinations of nominal and adverbial demonstratives (Section 2.3.3.2.1); in the Gulf of Guinea Creoles, instead, the only nominal demonstrative forms attested (with the partial exception of Santome) are the underspecified ones, possibly reinforced (Section 2.3.3.2.2). Overall, unary nominal demonstratives are found in n=7/31 series, and in all cases can be (and typically: are) combined with a binary reinforcer to rebuild a binary opposition.

2.3.3.5 Interim conclusions

This section reviewed the demonstrative systems attested across Portuguese-based creoles and compared them to the demonstrative system recorded for 15th/16th century Portuguese. The major generalisations follow. Firstly, although creole demonstratives lexically continue the original Portuguese terms, they typically result from a semantic reduction: the ternary deictic opposition of Portuguese (DEM.1 *vs* DEM.2 *vs* DEM.3) is reduced to a binary one, most frequently with a speaker-based semantics (DEM.1 *vs* DEM.2/3), but in some cases with a participant-based ones (DEM.1/2 *vs* DEM.3), as discussed in Section 2.3.3.3. Secondly, an extremely high level of formal variation is recorded with respect to the forms of the original Portuguese system that are retained in the new demonstrative systems. This is the case both across different creoles

Table 2.7: Patterns of change: Demonstratives in Portuguese-based creoles

Ternary (16th c. Portuguese, §2.3.3.1)

DEM.1	DEM.2	DEM.3
⇒1	⇒2	⇒3

Binary, sp.-based

	DEM.1	DEM.2	DEM.3	
A	⇒1	⇒3		(23)
B	⇒1	⇒2		(—)
AC	⇒1/2	⇒3		(24a/b)
C	⇒2	⇒3		(25a)
D	⇒3_i	⇒3_{ii}		(26)

Binary, pt.-based

	DEM.1	DEM.2	DEM.3	
A	⇒1		⇒3	(—)
B	⇒1		⇒2	(—)
AC	⇒1/2		⇒3	(24c)
C	⇒2		⇒3	(25b)
D	?		?	(—)

and within one and the same creole: in fact, only two varieties preserved analogous forms across the two domains (Section 2.3.3.4). The patterns of change are summarised in Table 2.7.

Note that three patterns that were not attested elsewhere are found in the creole demonstrative systems: they are listed as Pattern AC (see discussion relative to column 2), Pattern C (newly attested for the speaker-based semantics only, i.e. Diu Indo-Portuguese in (25a)), and Pattern D (see the discussion relative to column 4); these are all extremely rare patterns. The most well attested pattern, as in the previous datasets, is instead the A pattern. The amount of variation within one and the same language also provides evidence that the attested outcome systems cannot be directly related to the demonstrative systems of the contributing varieties (see Section 2.3.3.3).

On a more general line, it can be noted that ternary demonstrative systems show a high degree of instability across the two domains in creoles, too, and in line with the main generalisation already seen in the two previous sections: namely, that the reduced binary systems consistently lost the means to exclusively refer to the hearer-related domain.

In spite of the reduced size of the sample, these results are in line with those from a preliminary analysis of all APiCS varieties lexified by languages with a ternary demonstrative system (n=26 for the nominal domain; n=24 for the adverbial one). In this bigger sample, too, creole demonstrative forms derive directly from those of the corresponding lexifiers in the overwhelming majority of cases, but tend to be organised in reduced demonstrative systems. Ternary

systems are retained in 5/26 contact varieties (19.23%) in the nominal domain and in 4/24 (16.67%) in the adverbial one; moreover, ternary systems mostly lost one term only (in the nominal domain, 16/21 instances of reduction are to a binary system and only 5/21 to a unary one, four of which are the four Gulf of Guinea Portuguese-based creoles discussed in Section 2.3.3.2.2). Furthermore, despite the general semantic uniformity (participant-based binary systems are reported only for Santome and Fa d'Ambô in Section 2.3.3.2.2), a great amount of formal variation in the patterns of reduction is attested, both across lexifiers and across the contact varieties lexified by one and the same language.

2.4 Conclusions

The foregoing presented an overview of the patterns of reduction of ternary demonstrative systems to binary (and, incidentally, unary) ones as attested across Romance. The empirical domains under investigation were the diachronic one (based on data collected by Ledgeway & Smith 2016; Section 2.2), and a few contact contexts: attrited and heritage Italo-Romance varieties in micro- and macrocontact (by means of first-hand fieldwork data; Sections 2.3.1 and 2.3.2), and Portuguese-based creoles (based on APiCS data; Section 2.3.3).

Romance varieties in diachrony attest variation both in their semantics (ternary systems evolved into speaker-based binary systems or into participant-based binary systems) and in their exponents (with the loss *vs* retention of the demonstrative forms originally dedicated to the hearer-related deictic domain). A slightly inferior level of variation was reported for Romance varieties in contact, instead: attrited and heritage Italo-Romance varieties only display semantic variation (speaker- *vs* participant-based binary systems with conservative exponents only), while Portuguese-based creoles tend to display new speaker-based binary systems, but show a high degree of formal variation (nine different paradigms to encode one and the same deictic contrast). A full outline of the variation discussed in this chapter is summarised in Table 2.8.

For each system, the number of the examples in which the pattern was discussed in the previous sections is indicated for convenience (examples (6)–(13) for diachrony; (17)–(18) for (micro-)contact; (23a)–(27) for creoles). As already highlighted in the foregoing discussion, the nominal and adverbial systems almost perfectly mirror each other (differences: the non-innovative, participant-based series is not attested for adverbs; patterns AC and D for the innovative, participant-based series are only attested for adverbial demonstratives, but not for nominal ones; pattern C for the innovative, speaker-based series is only marginally attested in the nominal domain alone), calling for an account of the available and unavailable patterns of semantic and formal variation.

This summary does not illustrate two further issues. First, languages can display different *formal* patterns across the two domains (see the discussions in Section 2.2.3 for diachrony, and in Section 2.3.3.4 for Portuguese-based creoles). This fact points away from otherwise very well conceivable frequency-based ac-

Table 2.8: Patterns of change: Summary

① **Latin > non-innovative Romance**

ⓐ Nominal demonstratives

Binary (Late Latin, (4))

N:DEM.1	N:DEM.2	N:DEM.3
⇒II		⇒III

Binary, sp.-based (§2.2.2.1)

N:DEM.1	N:DEM.2	N:DEM.3	
⇒II	⇒III		(6a)

Binary, pt.-based (§2.2.2.2)

N:DEM.1	N:DEM.2	N:DEM.3	
⇒II		⇒III	(7)

ⓑ Adverbial demonstratives

Ternary (Latin, (3))

A:DEM.1	A:DEM.2	A:DEM.3
⇒I	(⇒II)	⇒III

⟶

Binary, sp.-based (§2.2.2.1)

A:DEM.1	A:DEM.2	A:DEM.3	
⇒I	⇒III		(6b)

② **Innovative Romance > reduced Romance**

Ternary (Romance, §2.2.3, 2.3.1, 2.3.3.1)

DEM.1	DEM.2	DEM.3
⇒1	⇒2	⇒3

Binary, sp.-based

	DEM.1	DEM.2	DEM.3	
A	⇒1	⇒3		(9, 18, 23)
B	⇒1	⇒2		(10)
AC	⇒1/2	⇒3		(24a/b)
C	⇒2	⇒3		(25a)
D	⇒3_i	⇒3_{ii}		(26)

Binary, pt.-based

	DEM.1	DEM.2	DEM.3	
A	⇒1		⇒3	(12, 17)
B	⇒1		⇒2	(—)
AC	⇒1/2		⇒3	(24c)
C	⇒2		⇒3	(13, 25b)
D	?		?	(—)

counts for the attested variation. Second, languages can display even different *semantic* patterns across the two domains: while it has only been discussed for creoles, in which unary nominal demonstrative systems are found beside (and in fact: usually combined with) binary adverbial demonstrative systems, this is also very well attested elsewhere in Romance (especially: Gallo-Romance varieties in France and Italy).[41] The different semantic structure across domains, with adverbial demonstratives encoding more contrasts than nominal ones, needs an explanation, which will be left here for future research.

Overall, in the different contexts discussed in this chapter, it can be concluded that ternary demonstrative systems may be unstable, meaning that they may lose the contrastive encoding of the three deictic domains (DEM.1, speaker-related; DEM.2, hearer-related; DEM.3, non-participant-related) to collapse two of them into one and the same new deictic domain. One major generalisation that regards this reduction process, and that is clearly shown by Table 2.8, concerns the hearer-related domain: while, depending on the output system, either the speaker- or the non-participant-related domains retains a dedicated form, the hearer-related domain systematically loses its contrastive encoding. Moreover, and although this escapes the focus of this work, if binary systems are expanded into ternary ones again (as in the innovative Romance varieties, see Section 2.2.3), the domain that receives a new dedicated exponent is the hearer-related one. Thus, it seems that the hearer-related domain can be pointed out as the source of instability in ternary systems, in that it (possibly: cyclically) acquires and loses a dedicated exponent. This generalisation about the hearer-related domain needs to be accounted for.

Finally, the patterns of reduction are mostly comparable across the contexts examined here, overlooking the absence of formal variation in microcontact (Section 2.3.1.2; although further research is needed). This is good evidence that the observed patterns of reduction are not driven by the contact languages through transfer, nor by contact in and of itself; rather, an underlying cause should be identified for the similar reductions of ternary demonstrative systems across the different contexts.

The remainder of this work proposes that all these facts fall out of the combination of featural and structural facts that converge to define a metric for the (in)stability of person distinctions. This will be shown to ensure a principled account for the patterns observed in this chapter and for the gaps that have been highlighted in the reduction process. Chapters 5 and 6 show that a combination of person features (as illustrated in Chapter 3) and structural facts related to the internal structure of demonstratives (as put forth in Chapter 4) can capture the process of semantic reduction and account for the instability of ternary demonstrative systems and for how this process systematically targets at least the hearer-related domain in a principled way, while still not being at odds with the attested formal variation, and in fact entailing it.

[41] But see also Neapolitan or Brazilian Portuguese, as mentioned in the foregoing, for richer adverbial systems combining with poorer nominal ones.

CHAPTER 3

Demonstratives and person

3.1 Introduction

Chapter 2 collected examples of the development of Romance demonstrative systems in diachrony and contact. The review of these empirical domains showed converging results: in all scenarios, demonstrative systems can stay the same, but can also show a reorganisation that has semantic bearings. Typically, demonstrative systems can lose one term, which has an impact on the semantics of the system as a whole.

Before turning to an account for this development, it is necessary to spell out some crucial background assumptions about the featural analysis of demonstrative forms. The key assumption upon which this dissertation rests is that the theoretical primitives for (Romance) demonstrative systems are person features. At least intuitively, this seems to require one further assumption in turn, namely that Romance demonstrative systems be person-oriented. Given the prominence of these assumptions for the present work, it is necessary to provide a solid and thorough discussion of the evidence in their favour: this chapter is devoted to it.

This chapter is structured as follows. In Section 3.2, I first provide some background discussion on exophoric demonstrative systems by introducing the traditional distinction between person-oriented and distance-oriented demonstrative systems. In turn, I highlight that this distinction is not as categorical as presented by the literature, but that it can be overcome in favour of a fundamentally person-oriented approach to Romance demonstratives. Specifically, I review evidence from systems that blend person and distance contrasts to-

gether and suggest that the two interact with each other and, more precisely, that distance contrasts enrich more basic person oppositions, rather than the other way around. In Section 3.3, I introduce the person system assumed in this dissertation, the one put forward by Harbour (2016), and highlight some points of divergence in the present analysis. By going back to the examples shown in the previous Chapter, I illustrate how person features can apply to the demonstrative systems seen there. In Section 3.4, I compare this person-based account for the deictic contrasts encoded in demonstrative forms to an alternative proposed in the literature, namely an account in terms of locative features: proximal, medial, and distal (see Lander & Haegeman 2018a). Finally, in Section 3.5, I introduce a necessary disclaimer: in the case of demonstrative forms, we are dealing with two different sets of person features. One is included in the ϕ-set, signals DP-internal agreement, and undergoes DP-external agreement; one is instead associated with the very meaning of each demonstrative form and can be defined as the set of indexical person features. This work is mainly concerned with the latter set of features. Section 3.6 concludes.

3.2 Person anchoring in Romance demonstratives

As remarked at the outset, a recurring issue in the literature on exophoric demonstratives is the distinction between person-oriented (or person-based) demonstrative systems *vs* distance-oriented (or distance-based) demonstrative systems (Fillmore 1982: 48–50; Anderson & Keenan 1985: 282–286; Diessel 1999; Imai 2003; Harbour 2016 *i.a.*; but cf. Meira 2003 *et seqq.*; Lander & Haegeman 2018a). The opposition between these two systems can be summarised along these lines: person-oriented demonstrative systems make explicit reference to the speech-act participants (the speaker, the hearer), or to neither of them, and locate a referent (an object for nominal demonstratives, an area for adverbial demonstratives; see Section 1.2.3) in the vicinity of the speaker, in the vicinity of the hearer, or in the vicinity of neither of them, as in (1a). Distance-oriented demonstrative systems, instead, are organised around the relative distance of a referent in the external world with respect to the speaker, from which they define different degrees of distance, and typically: near the speaker (proximal), at an intermediate distance from the speaker (medial), and very far from the speaker (distal), as in (1b). One example for each system follows (for the glosses, see below):

(1) a. *Person-oriented: Japanese* (Iwasaki 2013: 291; glosses used there: 'speaker proximal', 'addressee proximal', 'distal')

	1	2	3
N:DEM	kore	sore	are
A:DEM	koo	soo	aa

b. *Distance-oriented: Scots* (The Scottish National Dictionary (SND), `https://dsl.ac.uk`, *s.v.*)

	PROX	MED	DIST
N:DEM	this	that	yon/thon
A:DEM	here	there	yonder/thonder

For convenience, and for the time being, in (1) I glossed the two systems with two different sets of glosses to best match their intuitive semantics.[1] For person-oriented demonstratives, I resorted to the glossing system already defined in Section 1.2.4: DEM.1 'near the speaker', DEM.2 'near the hearer', and DEM.3 'far from the speaker and the hearer'. For distance-oriented demonstratives, I turned to the Leipzig Glossing Rules, with the addition of the non-standard but widely used 'MEDial' gloss, to capture the intermediate distance. This system is in fact consistent with the series of distance degrees from the sole deictic centre, i.e. the speaker: DEM.PROX 'proximal', DEM.MED 'medial', and DEM.DIST 'distal'.

The distinction between these systems can only be detected in the middle term of ternary demonstrative systems, as pointed out by Anderson & Keenan (1985), Diessel (1999: 39) and Harbour (2016: 77), *i.a.* This can be seen in the examples in (1), where the middle term is interpreted as hearer-oriented in person-oriented systems (*sore* 'that near you', *soo* 'there near you'), but as defining an intermediate degree of distance from the speaker in distance-oriented systems (*that* and *there*, pointing to a referent that is far from the speaker, but closer than a referent defined by *yon* and *yonder*).

Against this background, in this section I argue that, even granting the traditional distinction between person- *vs* distance-oriented demonstrative systems, Romance demonstratives are person-oriented. This is hardly a new claim (see Ramat 2015: 586 and references therein), as in many Romance varieties it is clear that the hearer plays an anchoring role on a par with the speaker. Besides, I argue that this basic person-oriented semantics may be modified by additional distance-oriented contrasts; I do so on the basis of both Romance and non-Romance data. An overview of the systems discussed and of the relative arguments follows:

[1] See Chapter 4, and in particular 4.4.2, for a revision based on the account for the internal structure of demonstratives proposed there.

	System	Contribution
Participant-based binary systems (3.2.1)	DEM.1/2 *vs* DEM.3 (e.g. Catalan, Brazilian Portuguese)	Hearer's position relevant to demonstrative selection → person-oriented
Ambiguous ternary systems (3.2.2)	DEM.1 *vs* DEM.2 *vs* DEM.3 & DEM.PROX *vs* DEM.MED *vs* DEM.DIST (e.g. Spanish)	Speaker's & hearer's positions relevant to demonstrative selection (conversational dyad, Jungbluth 2003) → person-oriented
Additional distance contrasts (3.2.3)	DEM.1(+) *vs* DEM.2(+) *vs* DEM.3(+) (e.g. Braz. Portuguese, Mundari, Satawal)	Person information is primitive, distance information is added onto it and modifies it

3.2.1 Participant-based binary systems

Binary systems are generally taken to be uninformative about the underlying semantics of demonstratives (whether person- or distance-oriented). However, as discussed in Section 1.2.3 and widely exemplified in Chapter 2, binary systems differ with respect to the deictic oppositions that they encode: the semantics of speaker-based binary systems is not compatible with that of participant-based binary systems, as shown by Italian and Catalan, repeated here again for convenience:

(2) *Variation in binary systems: speaker-* vs *participant-based* (see Section 1.2.3)

Speaker-based Italian	N:DEM.1 *questo*	N:DEM.2/3 *quello*
Participant-based Catalan	N:DEM.1/2 *aquest*	N:DEM.3 *aquell*

In Italian, the speaker-related domain is opposed to the non-speaker related domain; in Catalan, instead, the participant-related domain, i.e. the space that includes the logical disjunction of the participants (speaker and/or hearer), is opposed to the non-participant-related one.

Although binary systems are typically (at least: tacitly) described in distance-oriented terms (proximal *vs* distal, i.e. near the speaker *vs* far from the speaker), the semantics of participant-based binary systems defies by itself the independence of the distance-oriented contrast from person, given the in-built reference to the position of the hearer. In fact, as stated above, distance-oriented demonstratives may only make reference to the speaker as the anchor, or reference point, for the computation of different distance degrees ('proximal', ('medial'), and 'distal'). Therefore, the participant *vs* non-participant contrast cannot be

plainly captured by such a system, as it would lose the information that distance is relativised to both speaker and hearer, rather than to the speaker alone: that is, both participants are (jointly or disjointly) referred to as the anchor, and the computation of the coordinates of the referent necessarily depends on the position of both (see e.g. Meira 2003). Hence, distance considerations cannot be claimed to be primitive in participant-based binary systems, but rather (if at all) to apply on top of person ones.

In fact, as Meira (2003: 8) points out for the demonstrative system of (spoken) Brazilian Portuguese: "an object placed at a large distance from the speaker is referred to with *esse* if the addressee is close to it, and with *aquele* if the addressee is not close to it". That is, the choice of demonstrative is influenced by the position of the hearer even if the deictic centre is the speaker. This is not expected under a purely distance-oriented approach, where only the speaker's location would be accessed.

In Brazilian Portuguese, the effect of the hearer's position can be made explicit in demonstrative-reinforcer constructions, i.e. under the combination of nominal and adverbial-like demonstratives:[2]

(3) *Spoken Brazilian Portuguese nominal demonstratives* (SG.M paradigm, from Meira 2003: 8; see also Meira & Guirardello-Damian 2018)

Local			Non-local		
Unmarked esse	S-centred esse aqui	A-centred esse aí	Unmarked aquele	Proximal aquele ali	Distal aquele lá

As already seen, the Brazilian Portuguese nominal demonstrative system can be described as opposing the area related to the discourse participants (taken without any finer-grained distinction) to the area not related to the discourse participants (see the two unmarked conditions). However, this same system also has means to further specify the participant-related region ("local") as being either speaker-related ("S-centred") or hearer/addressee-related ("A-centred"): it does so by combining the participant-oriented demonstrative *esse* and either the speaker-oriented reinforcer *aqui* or the hearer-oriented one *aí*.

As an aside, it is also worth noting that the very semantics of "classic" distance-oriented systems, with a PROX *vs* (MED *vs*) DIST partition, can still ultimately be reduced to a person semantics, as the different available terms define different distance degree from the deictic centre, i.e. the speaker. This is a common remark made against distance-oriented approaches to demonstrative systems (see e.g. Meira 2003; Lander & Haegeman 2018a).

[2]For demonstrative-reinforcer constructions, see fn. 18 in Chapter 2; for the nature of adverbial-like demonstratives as 'reinforcers', see in particular Bernstein 1997: 90–91; Roehrs 2010: 259–260; Terenghi 2021a: 313–314.

3.2.2 Romance ternary systems

The previous discussion provided evidence in favour of treating (Romance) participant-based binary systems as person-oriented, or as anchored to the speaker and the hearer. Here, I explore the issue further with respect to Romance ternary demonstrative systems, i.e. those that should be plainly captured as either person- or distance-oriented in a clear-cut way, according to the opening of this section (see discussion around (1) above). However, we shall see that the classification is not clear-cut in this respect either.

Romance languages that display ternary systems (see Ledgeway & Smith 2016 for a comprehensive overview) seem to be best amenable to the person-oriented interpretation of demonstrative systems, as acknowledged both in traditional synchronic and diachronic classifications and in more recent accounts (for an overview, see in particular Peemöller 2015 and references therein).

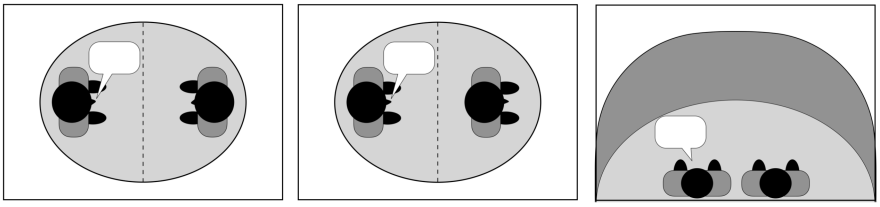
However, in their seminal paper on the issue, Anderson & Keenan (1985: 282) described Spanish as displaying a distance-oriented demonstrative system, although the same system has been traditionally described as person-oriented (*Nueva Gramática de la Lengua Española*, RAE 2009: 1269–1335; *Diccionario de la Lengua Española*, RAE 2014, *s.v.*; Alonso 1968 and, more recently, Tuten *et al.* 2016). Thus, Spanish demonstratives have a twofold description in the relevant literature, a traditional, person-oriented one (Spanish/A) as opposed to a more recent, distance-oriented one (Spanish/B):

(4)

	este	*ese*	*aquel*
Spanish/A	N:DEM.1	N:DEM.2	N:DEM.3
Spanish/B	N:DEM.PROX	N:DEM.MED	N:DEM.DIST

It might be possible that microvariation plays a role in the divergent descriptions given for Spanish; in this subsection, however, I discuss evidence from European Spanish that both systems may be concurrently present, as suggested by the conversational dyad approach (Jungbluth 2003, 2005).

The conversational dyad approach seeks to go beyond the dichotomy between person- *vs* distance-oriented demonstratives and to accommodate both interpretations within one and the same system by considering the perspective of both speaker and hearer, and by capitalising on their respective positions during conversations (for an overview, with a discussion of the main arguments and references to previous works, see Gómez Sánchez & Jungbluth 2015). The core idea is that three possible conversation settings can arise, according to the relative position of the speaker and the hearer: face-to-face, face-to-back, and side-by-side (Figure 3.1). Jungbluth (2003) argues that these three configurations correlate with the different interpretations associated to one and the same demonstrative system, namely: the person-oriented interpretation is linked to the first two settings, while the distance-oriented one to the last one.



a. Face-to-face b. Face-to-back c. Side-by-side

Figure 3.1: Conversational dyad approach: The three configurations

In the face-to-face (Figure 3.1a) and face-to-back (Figure 3.1b) configurations, respectively regarded as unmarked and as marked, a basic division of the space is made between the "inside" (in gray, in Figures 3.1a/b) and "outside" (in white, in Figures 3.1a/b) of the conversation space. The "inside" space is further organised into two opposed areas (separated by a dashed line, in Figures 3.1a/b): that on the speaker's side and that on the hearer's side, much in the same vein as the Brazilian Portuguese demonstrative-reinforcer construction seen in Section 3.2.1 above ("local", possibly specified as "S-centred" or "A-centred"; *vs* "non-local"). See examples by Jungbluth (2003: 19–26) for the use of *este*/*ese* for the (grey) inside space (speaker- *vs* hearer-oriented respectively), and *aquel* for the (white) outside one. Note that, if contrastivity is not needed, the inside space in face-to-face configurations is simply expressed by *este*: this is in line with the speaker-oriented value of *este*, as will become clearer thanks to the featural description introduced in Section 3.3 (see in particular fn. 12).

In the side-by-side configuration (Figure 3.1c), instead, the two participants share their cognitive space (in light gray, in Figure 3.1c) while observing what is in front of them. Thus, pending the availability of three demonstrative forms, this is the configuration in which it is possible to encode oppositions between a relatively near outside (or distant) space (in dark gray, in Figure 3.1c) and a further removed one (in white, in Figure 3.1c). See examples by Jungbluth (2003: 26–28) for the progressively increasing distance of the referent with respect to the participants encoded by *este* (lightgrey), *ese* (dark grey), and *aquel* (white).

Note however that, even in this distance-based approach, the definition of an inside *vs* outside space is still ultimately person-oriented. In fact, the outside space is defined as the complement to the space of the participants (inside; see again Figure 3.1): this is thus different from the classic distance-oriented system, where distance is exclusively computed with respect to the speaker's position. In Romance ternary demonstrative systems with a distance-oriented interpretation, the position of the hearer still has an impact on the system, both in the selection of the person-oriented *vs* distance-oriented semantics (different configurations; Figure 3.1), and in the meaning of the 'medial' and 'distal' terms

in distance-oriented configurations ('far/further away from the speaker *and the hearer*').

The language to which the conversational dyad approach has been most systematically applied to so far is Spanish. Considering the different speaker-hearer configurations that can be instantiated during conversations, this approach combines the traditional take on the semantics of Spanish demonstratives (person-oriented) with the line of study started by Hottenroth (1982), who first systematically proposed evidence for the distance-oriented interpretation of Spanish demonstratives (see Gómez Sánchez & Jungbluth 2015 for discussion and references). Accordingly, Spanish (in synchrony) can be defined as a dual-anchor system, i.e. one that includes a deictic term (the intermediate one: *ese* 'N:DEM.2/MED' and *ahí* 'A:DEM.2/MED' in Spanish) that can denote both proximity to the hearer (hearer-anchor, person-oriented) and intermediate distance from the speaker (speaker-anchor, distance-oriented). Similar results, on a smaller scale, have been obtained for Brazilian Portuguese (Jungbluth & Vallentin 2015, and references therein), but not for European Portuguese, that is consistently described as person-oriented (i.e., as displaying a speaker-anchor and a hearer-anchor): see Valentim (2015) and Dubert & Galves (2016: 422). However, Ledgeway & Smith (2016: 882–883) speculate on the possibility that more Romance languages that display a ternary system could be described as being, in fact, dual-anchor systems.

To sum up, Romance ternary systems have been traditionally described as person-oriented, although, for some of them, a competing distance-oriented semantics has been proposed. The two interpretations can be shown to co-exist within a given system, rather than to be mutually exclusive. This has been successfully modelled in descriptive conversational terms in the literature; in Section 6.4, I tentatively propose a syntactic account for this possibility building on the internal syntax proposed for demonstratives in Chapter 4.

3.2.3 Integration of person and distance information

The foregoing advocated against a strict dichotomy between person- and distance-oriented demonstratives by considering both binary (predominantly: participant-based) and ternary demonstrative systems that evade such a clear-cut classification. This section briefly shows that, whenever distance contrasts are made available in a demonstrative system, they can only be construed as modifying person oppositions, that is as applying only *after* the basic person-based semantics has been established.

Consider again Brazilian Portuguese demonstrative-reinforcer constructions, as presented in (3) above: there, person information (conveyed by the participant-based binary nominal demonstrative system: "local" *vs* "non-local") and distance information ("proximal" *vs* "distal") are integrated with respect to the non-participant-related term, *aquele* ("non-local"), which may be followed by either the non-participant-oriented, but nonetheless relatively close reinforcer *ali* ("proximal"), or by the likewise non-participant-oriented, but in this case

decidedly remote reinforcer *lá* ("distal"): *aquele ali* 'that far from us' *vs aquele lá* 'that very far from us'.

The same is true of the Brazilian Portuguese adverbial system considered on its own:

(5) *Brazilian Portuguese adverbial demonstratives* (see Meira 2003)

A:DEM.1	A:DEM.2	A:DEM.3	A:DEM.3+
aqui Here near me	aí There near you	ali There far f. us	lá There further away

Besides defining a typically person-oriented tripartition (as mentioned above: A:DEM.1 'here near the speaker', A:DEM.2 'there near the hearer', A:DEM.3 'there far from both'), the adverbial system of Brazilian Portuguese also encodes distance with respect to its A:DEM.3 term. As the glosses and translations show, each of the discourse atoms-related domains is contrastively encoded with respect to the others (A:DEM.1/2/3); in addition to this, the non-participant-related domain (A:DEM.3) is specified in terms of distance, to denote referents as relatively closer or further off the speaker and hearer anchors (A:DEM.3 *vs* A:DEM.3+).

Thus, Brazilian Portuguese encodes distance-oriented contrasts in the non-participant region of its demonstrative systems. However, the coexistence of a person-oriented and a distance-oriented semantics within the same system (adverbial demonstratives) and the possibility of its composition with a truly person-oriented system (nominal demonstratives) do not support a view according to which person- and distance-oriented systems stand in a categorical opposition to each other. Rather, for their interactions to converge, the two must be compatible at some level of analysis. The remainder of this subsection provides some evidence that person- and distance-oriented systems are indeed compatible in that they both underlyingly encode a person-based semantics, with the minimal speaker *vs* non-speaker person-oriented opposition ('near me' *vs* 'far from me') possibly enriched by distance-oriented contrasts ('relatively far from me' *vs* 'very far from me', *etc.*); for a structural implementation, see Chapter 4. As a full discussion of evidence in favour of this approach would take us too far afield, here I shall only briefly mention the strongest cases, and refer the reader to Terenghi (2021c) for a more detailed overview.

The clearest piece of evidence in favour of a person core modified by distance contrasts comes from varieties whose demonstratives encode degrees of distance from the hearer, besides the speaker. Within a distance-based system, different degrees of distance are picked out and contrastively encoded with respect to the speaker only. Said otherwise, distance-based systems (by definition) should not include reference to the hearer. However, although rare, some varieties are attested for which distance contrasts are encoded in parallel for the speaker-oriented and for the hearer-oriented term. The most remarkable such instance is

provided by Mundari (Munda, Austroasiatic; spoken in India, Bangladesh, and Nepal). Mundari encodes three different degrees of distance from the speaker, from the hearer, and from both of them, as follows:

(6) *Mundari* (Osada 1992: 68; Bhat 2004: 167)

	DEM.1	DEM.2	DEM.3
Nearest	ni	in	hin
Nearer	ne	en	hen
Near	na	an	han

Likewise, additional contrasts can be added to the hearer category, pointing again to person oppositions as primitive. Satawal, a Micronesian language spoken on Satawal, is a case in point, with contact oppositions applied to the hearer, besides the speaker:

(7) *Satawal* (Yoshida 1981, through Imai 2003: 22)

DEM.1+	DEM.1	DEM.2+	DEM.2	DEM.3
minne 'in S's hand'	minnen 'reachable by S's hand'	minna 'in A's hand'	minimu 'close to A'	minnan Dist

The exceptionality of Mundari and Satawal demonstrative systems lies precisely in the extra specification with respect to the hearer, which suggests that person distinctions are made before the distance/contact contrast. Marginally, note that in Satawal no such contact contrast is encoded for the distal term, i.e. the one that is far from the speaker and the hearer alike. This fact further points to the primacy of the person opposition in the system, as otherwise we could expect a basic binary system defined by the contact contrast (revolving around a postulated [±contact] feature), with the addition of person specifications only in some of the available cells. What we have instead is a system with person oppositions, with only some terms marked by contact contrasts, too.

This logic can be further applied to Brazilian Portuguese adverbial demonstratives above: as seen in (3)–(5), distance degrees are established in a non-uniform fashion across deictic centres (in this case: only one person-oriented term, the non-participant-related one, is marked by distance oppositions, too): this points to an underlying person-based organisation, as well, as it implies that the person-oriented opposition pre-exists the application of distance contrasts for some terms in the system only.

3.2.4 Person core, distance modification

In the previous subsections, I argued that the fundamental dichotomy between person- and distance-oriented demonstrative systems is not fully consistent with the actual semantics of demonstratives: rather, the basic opposition that all demonstrative systems encode is person-oriented, regardless of their (semantic) organisation (how many deictic oppositions are encoded) or of the traditional person- or distance-oriented description given for them. Specifically, Section 3.2.1 showed that participant-based binary systems cannot be captured by a plain distance-oriented system, as they encode the location of the hearer and this has an influence on the semantics of the system. Section 3.2.2 turned to a review of Romance ternary systems and showed that, although the interpretation of a subset of those systems swings between person- and distance-oriented according to pragmatic and extra-linguistic factors ("dual-anchor"), their nature is still ultimately rooted in person, too. Finally, Section 3.2.3 examined how distance information may be accommodated into the person-based semantics of demonstratives. Evidence discussed there (Brazilian Portuguese adverbial demonstratives and demonstrative reinforcer constructions, as well as varieties that encode different degrees of distance (or other distinctions) from the hearer) points to a formalisation in which distance is encoded "on top of" pre-existing person oppositions. This intuition will be fully incorporated into the internal structure of demonstratives in Chapter 4.

Further, by taking distance as a modification of person, it will be possible to integrate the results of the conversational dyad approach within the internal structure of demonstratives and to flesh out a diachronic extension. This latter aspect will be further explored in Section 6.4, building on an intuition by Meira (2003: 10) on the issue. Concretely, Meira discusses the case of Tiriyó (Cariban; Northern Amazonia), a distance-oriented ternary system in which the position of the hearer still seems to be playing a role: here, medial terms are used with referents located at an intermediate distance from the speaker, but also with referents that are very far from the speaker but near the addressee. Meira speculates that languages where the hearer's location is salient might grammaticalise the salience of the hearer by developing a dedicated semantic category: this yields a person-oriented system with a hearer-anchor, besides the speaker-one. I will capitalise on this and speculate, in turn, that indeed demonstrative systems can make use of person-oriented contrasts in distance function and, conversely, of distance-oriented contrasts in person function, which is relevant in the reorganisation patterns attested by demonstrative systems in diachrony and contact.

In conclusion, purported person- and distance-oriented systems seem less far apart than the literature would have them: rather, their co-occurrence suggests that they share primitives of analysis. Further, distance contrasts seem to consistently enrich a basic person system, suggesting that distance contrasts ultimately are parasitic on person-oriented ones.

Thus, in what follows, I take all demonstrative systems to be plainly person-

oriented, distance distinctions being only optional extensions of their person core. In this, and on the basis of the discussion above, I agree with Lander & Haegeman (2018a: 6) that "the 'distance-oriented' *vs* 'person-oriented' distinction is a false dichotomy" and follow their intuition that all additional contrasts (distance-oriented, visibility-oriented, *etc.*) encoded in demonstrative systems are to be derived by modification (p. 52 ff.).

However, I depart from their proposal in two respects. Firstly, I maintain that (person-oriented) demonstrative systems can be best derived by means of person features, rather than locative features. Secondly, I do not model modification as the insertion of a degree modifier (introducing distance contrasts) that interrupts the deictic functional sequence (in nanosyntactic terms). The remainder of this chapter explores the first point, while the discussion of the second one is delayed until Chapter 4, where I derive the internal structure of demonstrative forms by means of a prepositional-like approach.

3.3 Person features

As an aside, the discussion in the previous section showed that demonstrative forms are subject to a great deal of semantic variation, both within one and the same language and cross-linguistically. Besides, although this issue exceeds the scope of this work, demonstrative forms vary significantly with respect to several syntactic properties (e.g. their high *vs* low first-merge position inside the DP, their possible or impossible co-occurrence with the definite article; see Guardiano 2010 for a cross-linguistic overview). In line with the so-called Borer–Chomsky conjecture (Baker 2008a), the source of this variation can be ascribed to the features involved in the derivation: it should come as no surprise, then, that demonstratives have been argued to encode several features, which accounts for different semantic and syntactic effects.

Lists of features typically associated with demonstrative forms can be found for instance in Alexiadou *et al.* (2007: part II, chapter 1.4) and, more recently, in Poletto & Sanfelici (2018: 118–121) and include features that relate to: location, deixis, definiteness, referentiality, and contrast, alongside (some or all) inflectional ϕ features, for varieties that display DP-internal agreement. This dissertation focuses on exophoric demonstratives and, especially, on the spatial relations between the referent and the deictic centre and on their diachronic change. Therefore, the relevant features are the deictic and locative ones.[3] The former define the deictic centre in terms of discourse participants (speaker, hearer, neither of them), in line with Section 3.2, and are examined in the remainder of this chapter; the latter identify the location of a referent in relation to that deictic centre, and will be discussed in Chapter 4.

[3]All other features that characterise demonstrative forms will be left aside here, with the partial exception of inflectional ϕ features (discussed in Section 3.5 in relation to their indexical counterpart). For an overview and references regarding those other features, I refer the reader again to Alexiadou *et al.* 2007 and to Poletto & Sanfelici 2018.

This section is structured as follows: first, I introduce the person feature system put forward by Harbour (2016) (Section 3.3.1; for the discussion of alternative person systems, see Appendix C.3.3); I then show how this system fares in deriving the different demonstrative systems attested crosslinguistically (Section 3.3.2). Section 3.4 examines instead locative features, which constitute the main featural alternative to capture the indexical semantics of (person-oriented) demonstrative systems, and shows their shortcomings.

Before proceeding, I wish to address a conceptual issue. It is in fact by no means obvious that demonstrative forms should be analysed as primarily derived by person features, as will instead be argued for in what follows and as underlies this whole dissertation. Consider the traditional categories of deixis (see also Section 1.1): person deixis, space deixis, and time deixis, besides the later extensions of discourse and social deixis (see an overview in Diessel 1999: section 3.1 and references; see also Bühler 1934; Lyons 1977; Levinson 1983; *i.a.*). The general understanding is that demonstrative systems (be they nominal or adverbial) are instances of space deixis, and not of person deixis, which typically only includes personal pronouns and possessive forms. This is generally upheld regardless of the specific type of demonstrative system, whether (traditionally) person- or distance-oriented: demonstratives are taken to be ultimately rooted in the spatial domain, as they define a spatial relation between two referents.

However, the tie between space deixis and person deixis has been explicitly pointed out in traditional works and in typological investigations: Harbour (2016: 45–46) provides some considerations and references in this respect. As discussed in Section 3.2, it is undeniable that the semantic value of demonstrative systems can, even just intuitively, be brought back to person, with at least the basic opposition "near the speaker" (PROX) *vs* "far from the speaker" (DIST). Such a reduction of space to person is found in several traditional descriptions and accounts for spatial deixis. Consider, for instance, Fillmore (1966: 221), who identifies demonstratives as space deictics but then highlights the proximity of the space and person deictic categories, suggesting a unification of the two (building on Brugmann's (1904: 9 ff.) taxonomy of "Ich-Deixis", "Du-Deixis", and "Dér-Deixis"):

> Since the Speaker category of Person deixis refers to the speaker of the utterance, and since the Proximal category of Place deixis refers to the position of the speaker at the time of the utterance, it might be suggested that we are dealing here with a single deictic feature. (Fillmore 1966: 221)

However, as far as I know, generative theories of person do not typically include demonstratives and other so-called space deictics in their empirical domain (see e.g. Noyer 1992; Harley & Ritter 2002; Béjar 2003; Cowper & Hall 2004; Bobaljik 2008; Sonnaert 2018; Ackema & Neeleman 2018; *i.a.*). Following Harbour (2016), to the contrary, this work fully includes demonstrative systems within a formal and generative theory of person. Note that this does not

mean that demonstratives should be interpreted as pure person deictics: the internal structure of demonstrative and pronominal elements is different (see Chapter 4 and Section 6.5). Person features are regarded here as the derivational primitives for demonstrative systems; however, the spatial component is well represented in that same derivation, starting from the definition of the relevant ontology (Section 3.3.2 below).

3.3.1 The person feature system

The person feature system that I assume for my analysis is the action-on-lattice one proposed by Harbour (2016). Here I provide an introduction to the system (in abstract terms) as formulated there. In the next subsection, I show how Harbour applies it to the derivation of all and only the attested person-oriented deictic oppositions of demonstrative systems.

Harbour develops a system of binary person features, i.e. person features with two possible values (plus '+' or minus '−'). These primitives interact to define person categories and are shown to have vast empirical coverage (see Harbour 2016, and particularly section 8.3 for the discussion and solution of some challenging cases). A theoretical advantage of this system regards the avoidance of any extrinsic assumptions with respect to how person features are bundled and how they interact with each other: Harbour's person system is only constrained by computational/logical considerations. The main aspects of Harbour's proposal that will be crucial for the development of my account are linked to this last point and follow from a novel semantics for person features, regarded as actions on a lattice, rather than as attribute predications. The following overview of the system is heavily based on Harbour 2016: chapter 4.

Harbour's person theory rests on the (standard) assumption of speaker, hearer, and other(s), i.e. the discourse-related atoms, as the ontology for person. Following Harbour, the discourse atoms are indicated here by the following shorthands: 'i' for speaker, 'u' for hearer, and 'o', 'o'', 'o''' *etc.* for (different, multiple) other(s). Note that, *contra* other approaches, Harbour takes speaker and hearer to be unique, both for computational/theory-internal reasons that favour a smaller ontology, and for empirical and psychological ones (for a discussion, see Harbour 2016: section 4.2.1).

The person ontology is a mental representation of the external reality: for language to make reference to it, it is necessary that the ontology be accessed by the grammar. Harbour proposes that the mapping between the mental representation of the external world and its grammatical representation is achieved through the organisation of the discourse atoms into three different sets/structures. Specifically, he postulates that the relevant structures are defined as power sets of three specific subsets of the ontology, then rewritten as lattices for ease of notation.

The three subsets of the ontology that grant the grammar access to it are (from Harbour 2016: 71):

(8) a. subset #1 ("entire ontology"): $\{i,\ u,\ o,\ o',\ o'',\ ...\}$
b. subset #2 ("speaker alone"): $\{i\}$
c. subset #3 ("speaker plus hearer", i.e. participants): $\{i,\ u\}$

As (8) shows, there is no subset dedicated to the hearer alone. By virtue of this, Harbour defines these sets as "a series of egocentrically nested sets" (Harbour 2016: 74; "$\{i\} \subset \{i,\ u\} \subset \{i,\ u,\ o,\ o',\ o'',\ ...\}$", *ibid.*) and highlights how this results in an asymmetry between the speaker and the hearer; this is empirically validated (Harbour 2016: 74).

The next step to derive the three fundamental structures that the grammar employs to access the ontology is to derive the power sets of these sets, as follows (from Harbour 2016: 71, modified):

(9) a. power set #1: $\{\{\emptyset\},\ \{i\},\ \{i,\ o\},\ \{i,\ o'\},\ \{i,\ o''\},\ ...,\ \{i,\ o,\ o'\},\ \{i,\ o,\ o''\},\ ...,\ \{i,\ o,\ o',\ o''\},\ ...,$
$\{i,\ u\},\ \{i,\ u,\ o\},\ \{i,\ u,\ o'\},\ \{i,\ u,\ o''\},\ ...,\ \{i,\ u,\ o,\ o'\},$
$\{i,\ u,\ o,\ o''\},\ ...,\ \{i,\ u,\ o,\ o',\ o''\},\ ...,$
$\{u\},\ \{u,\ o\},\ \{u,\ o'\},\ \{u,\ o''\},\ ...,\ \{u,\ o,\ o'\},\ \{u,\ o,\ o''\},\ ...,\ \{u,\ o,\ o',\ o''\},\ ...,$
$\{o\},\ \{o'\},\ \{o''\},\ ...,\ \{o,\ o'\},\ \{o,\ o''\},\ ...,\ \{o,\ o',\ o''\},\ ...\}$
b. power set #2: $\{\{\emptyset\},\ \{i\}\}$
c. power set #3: $\{\{\emptyset\},\ \{i\},\ \{u\},\ \{i,\ u\}\}$

Finally, Harbour renders (notationally) these power sets as lattices ($\mathcal{L}$) of sets. The switch to the lattice notation is motivated by the overly complicated set-theoretic notation, as partially shown by (9). The three changes performed onto the sets in (9) to yield lattices are: firstly, a set $\{a,\ b,\ c\}$ is simply represented as abc; secondly, a subscript notation for lists is adopted, whereby (e.g.) "i_o abbreviates lattice elements that contain i and any number of o's, including possibly none" (Harbour 2016: 72); finally, the empty sets are removed for computational reasons.[4] Thus, the following lattices are obtained (from Harbour 2016: 73):

(10) a. lattice #1 ("π lattice, $\mathcal{L}_\pi$"): $\{i_o,\ iu_o,\ u_o,\ o_o\}$
b. lattice #2 ("author lattice, $\mathcal{L}_{au}$"): $\{i\}$
c. lattice #3 ("participant lattice, $\mathcal{L}_{pt}$"): $\{i,\ iu,\ u\}$

Summing up so far: the ontology for person is made up of speaker, i; hearer u; other(s) o, o', o'', *etc.* These are organised into three lattices (or power sets of different subsets of the ontology).

The grammar accesses the ontology by means of two features: [author] and [participant] (henceforth, also shortened as 'au'/'A', and 'pt'/'P', respectively).

[4]The removal of the empty sets turn the lattices into "atomic join-complete semilattices" (Harbour 2016: 73), but this is argued there to have no impact on the computation.

Each feature comes with either of two possible values (+ or −) and is hosted by a categorial head π (see Harbour 2016: section 4.2.3). Semantically, the categorial head π and the two features denote the lattices in (10) above:

(11) a. π head: $[\![\pi]\!] = \mathcal{L}_\pi = \{i_o,\ iu_o,\ u_o,\ o_o\}$
b. author feature: $[\![\text{author}]\!] = \mathcal{L}_{au} = \{i\}$
c. participant feature: $[\![\text{participant}]\!] = \mathcal{L}_{pt} = \{i,\ iu,\ u\}$

The key innovation of Harbour's system lies in the feature values. Without values, features would be simply inactive sets, i.e. they would lack a way to compose with π and with each other. The plus '+' and minus '−' values, instead, induce the features to perform lattice- (set-)theoretic operations on the π lattice/head, or on the result of previous applications of person features to π. The two values have their own semantics. + (in semantic notation: '$\oplus$', Harbour 2016: 75) denotes "disjoint, or pairwise, addition" (*ibid.*), i.e. an operation that takes every possible pairing of elements in the two sets and joins them together; it is indicated by '$\sqcup$', the symbol for disjoint union. − (in semantic notation: '$\ominus$', Harbour 2016: 75) denotes "joint, or cumulative, subtraction" (*ibid.*), i.e. an operation whereby every element in the active set (the one denoted by the active person feature) is subtracted from every element of the set to which the operation applies (π, or the set resulting from the application of another person feature to π); it is indicated by '\', the symbol for set complementation. The two operations are referred to, respectively, as "positive" and "negative" actions (Harbour 2016: 75). Thus, by performing a positive or a negative action on π, features operate different partitions of the π lattice that eventually result in different person categories. Here, for the sake of clarity, I report in full the computation of the positive and negative actions of the [author] feature on π; I refer the reader to Harbour (2016: chapter 4) for the full computations of the action of [participant] on π and of the successive actions of [author] and [participant] on the results of the function application of the other feature on π.

(12) a. 'disjoint addition', from Harbour 2016: 83:

$$\begin{aligned}
&[\![+\text{author}(\pi)]\!] = \\
&= [\![\pi]\!] \oplus [\![\text{author}]\!] = \\
&= \{i_o,\ iu_o,\ u_o,\ o_o\} \oplus \{i\} = \\
&= \{i_o \sqcup i,\ iu_o \sqcup i,\ u_o \sqcup i,\ o_o \sqcup i\} = \\
&= \{i_o,\ iu_o,\ iu_o,\ i_o\} = \\
&= \{i_o,\ iu_o\}
\end{aligned}$$

b. 'joint subtraction', from Harbour 2016: 84:

$$\begin{aligned}
&[\![-\text{author}(\pi)]\!] = \\
&= [\![\pi]\!] \ominus [\![\text{author}]\!] = \\
&= \{i_o,\ iu_o,\ u_o,\ o_o\} \ominus \{i\} = \\
&= \{i_o \backslash i,\ iu_o \backslash i,\ u_o \backslash i,\ o_o \backslash i\} = \\
&= \{\emptyset,\ o_o,\ u_o,\ u_o,\ o_o\} = \\
&= \{\emptyset,\ u_o,\ o_o\}
\end{aligned}$$

The results of the two different operations (as determined by the feature values: plus *vs* minus) of the [author] feature on π defines two subsets of π: $\{i_o, iu_o\}$ and $\{\emptyset, u_o, o_o\}$ (in (12a) and (12b), respectively). That amounts to saying that the function application of features to π results in the partition of π into two or more subsets. In (12), the two subsets describe a speaker-based partition of π: the speaker is included in the first subset (12a), and excluded from the second one (12b). Ultimately, this derives the deictic features for speaker-based binary demonstrative systems, such as the one attested in Italian: *questo* 'N:DEM.1', i.e. for referents 'near the speaker, *i* (and possibly the hearer, if the hearer is near the speaker, *iu*)' *vs quello* 'N:DEM.2/3', i.e. for referents 'far from the speaker (that is, in the area related to the hearer, *u*, if the hearer is sufficiently far away from the speaker; or in the 'other' area, *o*, that not related either to speaker or hearer)'.

Furthermore, if both features are active, the result of the action of the first feature on π is subsequently manipulated by the action of the second feature, making the ordering of compositions significant for the final result. That is, action-on-lattice person features are equivalent operators that perform non-commutative partitions on a lattice (set), rather than denoting (commutative) predicates, as under traditional approaches. This is a key aspect for the featural account to reductions in demonstrative systems proposed in Chapters 5 and 6 and specifically the issue will be better explored in Section 5.4.

The cross-linguistic variation in person systems is captured by Harbour by positing three parameters that regulate the activity of the two person features (from Harbour 2016: 78):[5]

(13) a. "The author feature is (not) present"
b. "The participant feature is (not) present"
c. "The author/participant feature composes with π first"

These parameters result in up to five possible partitions of the π lattice, as summarised in Table 3.1. Further, Harbour shows that these five partitions are the only ones attested in person(-related) systems.[6] In monopartitions, all person-related categories are conflated into one by the inactivity of both features: this is a very restricted possibility, but one attested for instance for some of the languages that differentially mark the direct object (those in which all direct objects that are animate are marked; Harbour 2016: 60). Bipartitions, where two categories (which may be the conflation of two or more elements included in π) are yielded by the only available feature within the system, are most commonly attested in spatial deictics (Harbour 2016: 54–59; see also Chapter 2). Finally, the activity of both features results in tripartitions (three contrastive categories,

[5]An ancillary parameter is proposed for tripartitions: "Tripartite o_o uses +author/−author" (Harbour 2016: 79). I will come back to this point in Section 5.4.

[6]This only applies to the organisation of a given person system as allowed by the syntax, and not to its morphological instantiation; for the distinction between partitions and (possibly syncretic) paradigms and a general methodological discussion, see Harbour (2016: chapter 2).

Table 3.1: Partitions of the π lattice (from Harbour 2016: 79)

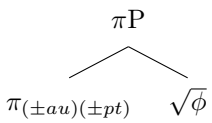
Parameters		Partition	
Features	Order	Size	Elements
{}		monopartition	i_o iu_o u_o o_o
{±author}		bipartition	i_o iu_o|u_o o_o
{±participant}		bipartition	i_o iu_o u_o|o_o
{±author, ±participant}	±pt(±au(π))	tripartition	i_o iu_o|u_o|o_o
{±author, ±participant}	±au(±pt(π))	quadripartition	i_o|iu_o|u_o|o_o

one of which that conflates two elements included in π) and quadripartitions (four contrastive categories, no conflation); these are cross-linguistically typical for person deixis (personal pronouns, possessive paradigms; see Harbour 2016: 50–54).

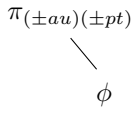
In what follows, I assume all aspects of Harbour's (2016) account as just laid out without further discussion, with two exceptions: the syntactic relation between π and the person features; and the person ontology for demonstrative forms. The latter will be addressed in the next subsection (and then again in Section 4.3), while I conclude this subsection by briefly discussing the former.

Harbour posits that the two person features are hosted on the categorial head π, which works as the locus for person in the syntax. This can be represented as in (14a), or, under mirror-theoretic assumptions, as in (14b):

(14) a. Harbour 2016: 77 (modified)



b. Harbour 2016: 76

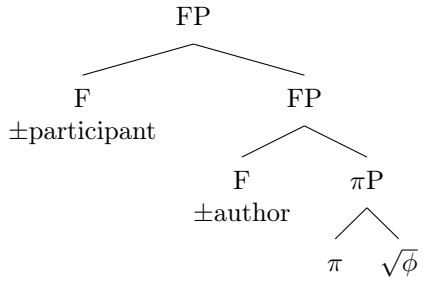


The ϕ component is left aside in what follows for simplicity, but can be regarded as "a special root denoting the domain of animates" (Harbour 2014a: 191), which is mapped onto the person ontology by π.[7]

Here, to the contrary, I assume a 1 Feature–1 Head architecture for grammar (see Section 1.3.3): therefore, I do not take the person features to be bundled on the π head, but to head their own phrase (loosely indicated as a Functional Phrase, FP), as in (15):

[7]In what follows, I will largely abstract away from $\sqrt{\phi}$, for the sake of brevity.

(15)



The scattering of the two features along the functional spine of person(-related) forms ultimately mirrors the proceeding of their (successive) semantic composition(s) with π. Note that this structural difference is still fully compatible with Harbour's (2016) system and its working and with minimalist assumptions alike, as pointed out in Harbour (2014a).[8] In fact, given that Merge is itself a set-theoretic operation, the feature set that in Harbour's account is hosted on π may be simply recreated along the functional spine. Moreover, following Harbour's suggestion (2016: 192), assuming the Zermelo–Fraenkel axiom of extension at numeration level bans repetitions of the same feature more than once within one and the same functional sequence, making sure that the system does not overgenerate.

The full import of the choice of having a sequence of FPs headed by the active features will become clear in Chapter 6, where the ordering of function applications and its structural correlate, merge position, will be used to derive the patterns of reduction attested in demonstrative systems.

3.3.2 Demonstratives and person features

The feature system exposed in Section 3.3.1 successfully captures person oppositions as attested in person(-related) systems, including demonstrative systems, as shown by Harbour (2016: chapters 3 and 4).[9]

However, here I assume that the ontology for demonstrative forms is slightly different than that for pronominal forms (see Chapter 4 for the implementation of this difference). This assumption is harmless, given the somewhat flexible nature of the ontology as last defined by Harbour (2016). Take i: i is the speaker atom or, said otherwise, there is an entity that, at a particular moment (that of the utterance), functions as the i by virtue of the action of speaking. Nothing prevents us from conceiving, at a given moment/utterance, a spatial entity, or a region, that "functions" as the speaker, i, by virtue of being spatially identifiable with a speaking action. That is, the ontology seems to allow for either

[8]For a similar distribution of features over the functional sequence, rather than bundled on the respective hosting head, see the structure for number features put forward by Smith *et al.* 2019.

[9]The full derivation of demonstrative forms is presented in Harbour 2016: chapter 7 and differs from the account proposed here in Chapter 4. For a comparison between the two accounts, see Appendix C.2.

person or space structures to be mapped onto the i, u, and o atoms. This implementation captures the understanding that person and space deictics pertain to separate, reciprocally impermeable domains (Harbour 2016: 45–46).[10] Besides, this proposal is fully compatible with Harbour's 2006 account, where the difference between person and space deictics is argued to trivially boil down to the choice of the atoms of the posited ontology: both a person and a space can be mapped onto one of the discourse atoms, resulting respectively in person and space deictics (Harbour 2006: 2, 6).

In what follows, I graphically indicate this ontological difference by adding a subscript χ (nominally inspired by Harbour 2016: 179; from Greek $\chi\hat{\omega}\rho o\varsigma$/*khôros* 'space') to the ontological elements and to π (see also Section 4.3):[11]

(16) a. $[\![\pi_\chi]\!] = \{i_{o_\chi},\ iu_{o_\chi},\ u_{o_\chi},\ o_{o_\chi}\}$
b. $[\![\text{author}]\!] = \{i_\chi\}$
c. $[\![\text{participant}]\!] = \{i_\chi,\ iu_\chi,\ u_\chi\}$

As shown in (16), I take locative forms to be based on the same primitives that also derive person forms (cf. (11)), but with a slightly different ontology, signalled by χ. To reiterate, χ indicates that the atoms for locative elements are regions in space, rather than individuals (unlike in person deictics proper). Thus, as the ontology changes, the lattices that are thereby generated change, too, yielding different deictics by means of uniform syntactic and semantic mechanisms. As such, spatial deictics can be derived by the same means that allow for the derivation of person indexicals (pronominal and possessive paradigms), but starting from different atoms: if regions, rather than individuals, are mapped onto the ontology, demonstrative systems result from the derivation. More concretely, in Chapter 4 I will assume that each spatial atom (that is: each of the regions i_χ, u_χ, o_χ that can be mapped onto speaker, hearer, and other(s), respectively) substantially denotes the *eigenplace* (Wunderlich 1991) or characteristic space (Harbour 2016) of that specific discourse atom. For instance, English *this* and *here* will refer to objects or regions located "in a space containing the speaker (and possibly others, including the hearer)" (Harbour 2006: 4), while *that* and *there* will denote object or regions located "in a space excluding the speaker (and possibly the hearer)" (*ibid*).

While I defer further discussion of these issues to Chapter 4, here I show how the feature system described so far can be unproblematically extended to demonstratives to capture all possible person oppositions attested across demonstrative systems. Within this person feature system, the deictic content of demonstrative systems is captured by the person featural specifications listed

[10] See Section 3.5 for remarks on this point in relation to agreement facts. Moreover, this technicality accounts for morphological differences between person and spatial deictics, which are only exceptionally syncretic despite being derived (by hypothesis) by the same machinery; for more remarks on this point, see Appendix C.2.

[11] Recall that subscript o's indicate in short that a given element may include any amount of o's (i.e. others), even none, following Harbour 2016: 72.

in Table 3.2, where each feature/function application is indicated by brackets (and recursively so).

The different partitions are now discussed in turn:

- Unary systems (monopartition)
  If no person feature is active, there is no composition with π_χ and therefore no partition of the π_χ lattice: this results in unary demonstrative systems, i.e. systems that do not display any opposition in the definition of the deictic centre. A language that displays a unary demonstrative system is French, where the only (here: masculine, singular) demonstrative forms are *ce* 'N:DEM' (adnominal demonstratives) and *celui* 'N:DEM' (pronominal demonstratives).
  Note that, despite the absence of person features, unary demonstratives are not deictically void, as they include the (unmodified) π_χ head: as such, rather than lacking a deictic centre, they carry as their deictic centre the entire π_χ set (that is, the entire discourse space). Further, unary demonstratives encode locational features, as they locate their referent with respect to that undifferentiated deictic centre: this issue will be more fully discussed in Section 4.3.1.1.

- Two binary systems (bipartitions): participant- and speaker-based
  If only one feature is active and composes with π, either of the two bipartitions arise, i.e. demonstrative systems that encode a two-way deictic opposition. This can be centred around the participants, yielding participant-based binary systems derived by [±participant]: a participant-based binary system is instantiated, for instance, by Catalan (*aquest* 'N:DEM.1/2': near the participants, $\{i_{o_\chi}, iu_{o_\chi}, u_{o_\chi}\}$; *aquell* 'N:DEM.3': far from the participants, $\{o_{o_\chi}\}$); otherwise, the two-way opposition can be centred around the speaker, resulting in speaker-based binary systems derived by [±author]: an instance of a speaker-based binary system is found in Italian (*questo* 'N:DEM.1': near the speaker, $\{i_{o_\chi}, iu_{o_\chi}\}$; *quello* 'N:DEM.2/3': far from the speaker, $\{u_{o_\chi}, o_{o_\chi}\}$).

- Ternary systems (tripartition)
  If both features are active and [±author] composes with π first and [±participant] subsequently composes with the result of the former function application, ternary systems are yielded, i.e. demonstrative systems that contrastively encode a three-way deictic opposition between the region occupied by the speaker i, that occupied by the hearer u, and that not occupied by either, o. Ternary systems are those traditionally defined as person-oriented, as exemplified by (some varieties of) Spanish: *este* 'N:DEM.1': near the speaker, $\{i_{o_\chi}, iu_{o_\chi}\}$; *ese* 'N:DEM.2': near the hearer, $\{u_{o_\chi}\}$; *aquel* 'N:DEM.3': far from both speaker and hearer, $\{o_{o_\chi}\}$.[12]
  Note here that, in the derivation of the non-participant-oriented term

[12]Recall that, under Jungbluth's (2003; 2005; see Section 3.2.2) account, the speaker-oriented term can also be used to refer to the joint space of the speaker and the hearer: this

Table 3.2: Person-oriented contrasts in demonstrative systems ⋆

System	Language	Partitions/System			
		i_{o_χ}	iu_{o_χ}	u_{o_χ}	o_{o_χ}
Unary	French	*ce* π_χ			
Binary, [pt]-based	Catalan	*aquest* +participant(π_χ)			*aquell* −participant(π_χ)
Binary, [au]-based	Italian	*questo* +author(π_χ)		*quello* −author(π_χ)	
Ternary	Spanish	*este* +participant(+author(π_χ))		*ese* +pt(−au(π_χ))	*aquel* +pt(±au(π_χ))
Quaternary	Paamese	*kele* +au(−pt(π_χ))	*ekok* +au(+pt(π_χ))	*kaisom* −au(+pt(π_χ))	*akēk* −au(−pt(π_χ))

⋆ i = speaker; u = hearer; o = other; $_o$ = any number of others; χ = the region associated to a given discourse-related atom.

aquel, the [author] feature has an ambiguous value: [±author]. Recall that action-on-lattice features denote operators that perform set-theoretic operations: that is, they do not predicate a property of their arguments (unlike traditional predicative features), but partition $\pi_{(\chi)}$ into subsets (which correspond to the different person categories) by means of their values. In this case, one and the same result ($\{o_{o_\chi}\}$) is obtained regardless of which operation the author lattice performs on $\pi_{(\chi)}$ (disjoint addition +author; or joint subtraction: −author). For details on how either the positive value or the negative one for [author] invariably result in the set $\{o_{o_\chi}\}$, see Harbour (2016: 92); for a reconsideration of the issue, see instead Section 5.4.2.

- Quaternary systems (quadripartition)
  If both features are active and [±participant] composes with π first and [±author] subsequently composes with the result of the former function application, quaternary systems are yielded, i.e. demonstrative systems that encode a four-way partition of the space, with one contrastive term for each of the elements of the ontology: speaker, i; hearer, u; other(s), o; and the joint term for speaker and hearer, iu (the inclusive term encompasses the region occupied by the speaker and the hearer: iu_{o_χ}). These systems are very rare and not attested in Romance languages, under current mainstream accounts (but see Chapter 5 for a different view); they will be discussed in more detail in Section 3.4.1 below and are here exemplified by Paamese, an Austronesian language spoken in Paama, Northern Vanuatu (Crowley 1982: 62): *kele* 'N:DEM.1EXCL': near the speaker, $\{i_{o_\chi}\}$;[13] *ekok* 'N:DEM.1INCL': near both participants, $\{iu_{o_\chi}\}$; *kaisom* 'N:DEM.2': near the hearer, $\{u_{o_\chi}\}$; *akēk* 'N:DEM.3': far from speaker and hearer, $\{o_{o_\chi}\}$.

As summarised in Table 3.2, this feature system derives up to five different partitions of the π_χ lattice, and, crucially, *cannot* derive more than those. Importantly, this neatly mirrors the attested cross-linguistic variation: the system does not undergenerate nor overgenerate. However, as seen in Section 3.2, it is possible for demonstrative systems to be richer, i.e. to show more than four contrastive forms: crucially, whenever that is the case, no additional person categories are encoded in the system (WALS, Diessel 2013a: Feature 41). Rather, as highlighted in Section 3.2.3, richer demonstrative systems can encode orthogonal distinctions, e.g. to denote contrasts in distance, or in contact with the anchor, or in visibility: these distinctions are parasitic on the person ones,

is in line with the featural derivation proposed here, as the speaker-oriented term denotes the set $\{i_{o_\chi}, iu_{o_\chi}\}$, which crucially also includes the hearer.

[13] Under action-on-lattice assumptions, the derivation of (DEM.)1EXCL by means of both [+author] and [−participant] does not entail any logical contradiction, as the featural derivation does *not* denote a person who is, at the same time, the author but not the participant, but simply a sequence of disjoint addition and joint subtraction performed over lattices/sets. This is a crucial difference with respect to traditional predicative features, which ban a {+author, −participant} specification on logical grounds.

as discussed in Section 3.2 and as formalised in the structural derivation introduced in Chapter 4.

3.4 Evidence for person features

In the previous section, I assumed that demonstrative systems, by virtue of their core person semantics, are to be naturally analysed by means of person features. Additional evidence in favour of such a treatment is put forward by Harbour (2016: section 7.2, but also 3.3.1), who further relates the featural content of person and space deixis on the basis of diachronic and morphological relationships (for other person-based analyses of demonstratives, see Höhn 2015; Bjorkman *et al.* 2019; Cowper & Hall 2019a).

However, another proposal advanced in the literature is that person-oriented demonstrative systems can be derived by means of locative features: this position is held most compellingly, and with most supporting arguments, by Lander & Haegeman (2018a) (see also Lander & Haegeman 2018b). In this section, I show that an analysis in terms of person features, rather than locative features, is more desirable.[14]

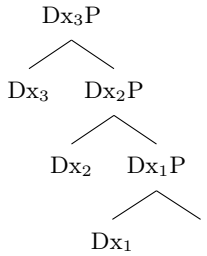
As mentioned in Section 3.2, Lander & Haegeman argue in favour of person-oriented demonstrative systems across the board, and account for distance contrasts as modifications of the person core. In this respect, my proposal echoes theirs closely. However, as also mentioned in Section 3.2.4, one of the main differences between our accounts is related to the primitives used to describe the basic person oppositions encoded in demonstrative systems. I assume the feature system proposed by Harbour (2016), as just outlined in Section 3.3. Lander & Haegeman (2018a), instead, adopt a feature system based on three unary locative features: proximal ('Dx_1'), medial ('Dx_2'), and distal ('Dx_3'), endowed with the following semantics (Lander & Haegeman 2018a: 3):

(17) a. Proximal/[Dx_1] 'close to speaker'
b. Medial/[Dx_2] 'close to hearer'
c. Distal/[Dx_3] 'far from speaker and hearer'

These features, under 1 Feature–1 Head assumptions (see also Section 1.3.3), are taken to be "associated with specialized functional heads which head functional projections in the syntax" (Lander & Haegeman 2018a: 3). The three heads are ordered in a functional sequence that is argued to be universal, on the basis of morphological evidence discussed in their paper:

[14]Note that (nominally) locative features are used within a wider theory of person by Ackema & Neeleman (2018: chapter 2; fn. 10 for an extension to demonstratives). Under their account, person systems are derived by the interaction of privative [PROximal] and [DISTal] features: although these names are chosen by virtue of the connection between person and space deictics, the two features are simple functions that operate on an egocentric set representation for person ($S_i \subset S_{i+u} \subset S_{i+u+o}$). [PROX] "operates on an input set and discards its outermost 'layer'" (Ackema & Neeleman 2018: 24); [DIST] "selects the outermost layer of its input set" (*ibid*); see Ackema & Neeleman 2018: chapter 2 for details.

(18) (Lander & Haegeman 2018a: 3)



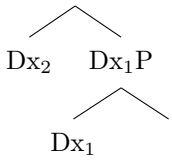
Finally, again on the basis of morphological evidence and compatibly with nanosyntactic tenets, Lander & Haegeman set to demonstrate that the features heading each phrase in the $Dx_3 > Dx_2 > Dx_1$ functional sequence are

> unary and additive, such that the structure underlying the Proximal reading corresponds to [Dx_1], the Medial reading corresponds to [Dx_2 [Dx_1]], and the Distal reading corresponds to [Dx_3 [Dx_2 [Dx_1]]] (Lander & Haegeman 2018a: 5)

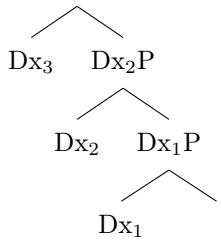
This is graphically shown by the following trees (from Lander & Haegeman 2018a: 5):

(19) a. Dx_1P ⇔ Proximal

b. Dx_2P ⇔ Medial



c. Dx_3P ⇔ Distal



That is, for the proximal reading to arise, only [Dx_1] needs to be present. However, for the medial interpretation to be yielded, [Dx_2] is not sufficient and [Dx_1] has to be merged in the structure, too; likewise, the distal reading is licensed by the presence of [Dx_3] *and* [Dx_2] and [Dx_1].

Note that, despite the consistency of the feature system built by the authors, its very foundation is intimately linked to a person-anchored semantics: as (17) shows, the definition of locative features makes reference to discourse participants as deictic centres, as is plainly expected under the assumption that demonstrative systems are always person-oriented. Given that proximal is defined as "close to speaker", medial as "close to hearer", and distal as "far from speaker and hearer" (Lander & Haegeman 2018a: 3), an analysis in terms of person features might seem more appealing, at least at first glance, as it hinges on simplex primitives. Lander & Haegeman reject it by discussing four possible

shortcomings of person-based accounts in which a single feature, [close], combines with person features to generate a tripartition: "close to 1", "close to 2", "close to 3" (Lander & Haegeman 2018a: section 2.4). This is crucially different from the person-based account adopted here, to which those flaws do not apply; for a full exploration of the issues raised by Lander & Haegeman, reviewed on both theoretical and empirical grounds, see Appendix C.1.

In the remainder of this section, instead, I show that an analysis of demonstrative systems rooted in person features is actually empirically more desirable than a locative-based one in two respects: the derivation of quaternary demonstrative systems (Section 3.4.1); and the derivation of additional indexical (number and gender) properties (Section 3.4.2).

3.4.1 Quaternary demonstrative systems

A locative-based analysis, such as the one proposed by Lander & Haegeman (2018a), only fares well with (up to) three person-based contrastive forms. However, as already mentioned in Section 3.3.2, some varieties display a four-way person contrast, whereby the area in proximity of both the speaker and the hearer is contrastively specified as opposed to both the region occupied by the speaker only and that occupied by the hearer only, besides the area that is far from both.[15]

Although these systems are not extremely common (Imai 2003: 22–23), they are attested, mostly across Austronesian languages, but also within other macro-families:[16]

(20) a. *Paamese* (Austronesian; Crowley 1982: 62)

N:DEM.1EXCL	N:DEM.1INCL	N:DEM.2	N:DEM.3
kele 'This near me'	ekok 'This near us'	kaisom 'That near you'	akēk 'That far f. us'

b. *Koho* (Austroasiatic; Jenny *et al.* 2014: 115)[17]

N:DEM.1EXCL	N:DEM.1INCL	N:DEM.2	N:DEM.3
dɔ 'This near me'	nɛ 'This near us'	dɛn/gɛn 'That near you'	həʔ 'That far f. us'

[15]These regions are further taken to be contiguous, as detailed in Section 6.5.2.1.

[16]Other Austronesian languages that display comparable systems are: Aklanon (Dela Cruz & Zorc 1968: 161–164, 185–186); Cebuano (Bunye & Yap 1971: 35–40); Marshallese (Bender *et al.* 2016: 179; Cowper & Hall 2019a); Palauan (Josephs 1975: 360); Waray-Waray (Harbour 2016: 51, 173 from Wolf & Wolf 1967).

[17]The distal term conveys the following semantics: "not visible, spatially or temporally; anaphoric, indicating old information" (Jenny *et al.* 2014: 115); an additional term, *daʔ*, is instead used in contrastive contexts only (*ibid*).

c. *Quileute* (Chimakuan; Andrade 1933: 246; only masculine/neuter forms reported here)

N:DEM.1EXCL	N:DEM.1INCL	N:DEM.2	N:DEM.3
yüˈx̣·o 'This near me'	saˈ'a 'This near us'	yiˈtca 'That near you'	ha 'That far f. us'

d. *Zialo* (Mande, Babaev 2010: 75–76)[18]

N:DEM.1EXCL	N:DEM.1INCL	N:DEM.2	N:DEM.3
sì 'This near me'	í 'This near us'	nà 'That near you'	nɔ̀ 'That far f. us'

The area denoted by DEM.1INCL 'near us' can be defined as inclusive, a parallel reading to that of the inclusive personal pronouns briefly mentioned in Section 3.3 (for more on clusivity, see Chapter 5). This interpretation is similar to that of the proximal term within a binary participant-based opposition (see e.g. Brazilian Portuguese in Section 3.2 and Catalan in Section 3.3), or, in Lander & Haegeman's terms, the syncretic expression of proximal and medial: [Dx_2 [Dx_1]]. While in participant-based binary systems the main opposition is between the area related to the participants, considered either jointly or disjointly, and that not related to them, a four-way system substantially further specifies, for the participant-oriented region, whether the specific region is the one of the speaker, the hearer, or both. That is, a dedicated encoding is provided for the two disjoint cases (speaker-anchored *vs* hearer-anchored) and for the joint one (speaker-and-hearer-anchored) alike. This process of further specification parallels the derivation for four-way demonstrative systems, where [±participant] is the first feature to enter into the derivation (see again Section 3.3).

Lander & Haegeman (2018a: 10) address clusivity facts: in line with their locative-based approach, they discuss the three features (proximal, medial, and distal) and consider whether they can be construed as inclusive. To avoid unnecessary details, I will only consider their discussion of clusivity in reference to the proximal feature, resulting in a contrastive term that expresses vicinity to both the speaker and the hearer (as in the examples in (20)); for a complete overview, see Lander & Haegeman (2018a: 10).

Although the inclusive reading ("close to us") is available (as mentioned by the authors and confirmed by Harbour 2016, Imai 2003, and Diessel 1999, *i.a.*), Lander & Haegeman construe it as not different from that associated to

[18]Zialo demonstratives also encode visibility distinctions: *mùnɔ̀* and *mùnɔ̀dà*, both translated as 'yonder', denote referents that are far from the discourse participants and invisible (Babaev 2010: 76).

the speaker-oriented term only ("close to me"). They do so on the basis of the apparent lack of uniformity with respect to the inclusive reading, as reported by Imai (2003: 22–23). There, the distinction between the 'near the speaker' reading and the 'near the speaker and hearer' one seems to be conflicting within the sample of languages reported to illustrate it. In fact, while in two varieties reported by Imai (Waray-Waray, Austronesian; Quileute, Chimakuan) the inclusive term is compatible with the description given above ('near the speaker and the hearer'), in one (Binukid, Austronesian) the so-called inclusive term appears to be used if the referent is significantly close to the speaker, while the so-called speaker-oriented one is used for a slightly bigger distance from the speaker.

On the basis of the rarity of the inclusive reading and of this inconsistency, the authors do not include systems that display the clusivity distinction in the core of their analysis and only make two preliminary proposals to account for four-way deictic contrasts (Lander & Haegeman 2018a: 10, fn. 3). In what follows, I consider these proposals and issues pertaining to them.

3.4.1.1 Proposal 1: Modification

On the one hand, Lander & Haegeman suggest that a distance/degree modifier could be involved in the derivation of such systems, on a parallel with systems that encode plain distance-oriented contrasts.

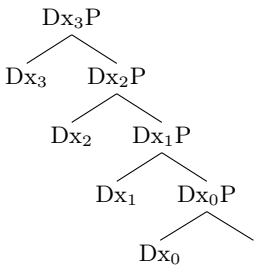
A modification-based approach works well for those cases in which the term labelled as inclusive actually denotes the closest referent to the speaker, as in Binukid. Binukid would thus display a ternary system where, in addition, two distance degrees are encoded in relation to the speaker (one for the immediate proximity, one for a looser proximity).

However, systems that do not present this inconsistency (e.g. all those reported in (20) and mentioned in fn. 16) are not amenable to this conclusion: there, DEM.1INCL is described as genuinely denoting the deictic domain of both speaker and hearer, and in fact as explicitly paralleling the clusivity distinction attested in pronominal systems (see e.g. remarks by Dela Cruz & Zorc (1968: 161) on Aklanon in this direction). As such, and given that distance modifications cannot introduce reference to the hearer by definition, as discussed in Section 3.2, a different explanation is needed.

3.4.1.2 Proposal 2: [Dx_0]

On the other hand, Lander & Haegeman tentatively derive the additional contrast by adding a new, lower feature ('Dx_0') to their universal functional sequence. Dx_0 is taken to denote the region related to the discourse participants (Lander & Haegeman 2018a: 10, fn. 3):

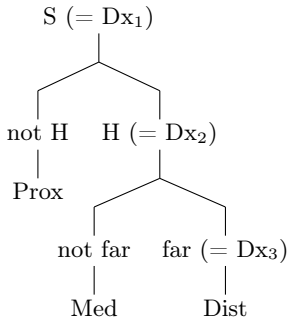
(21) a. Inclusive/[Dx_0] "close to the discourse participants"

b. 

This structure, however preliminary, presents some morphological and theoretical problems with respect to the merge position of Dx_0. As regards the morphological issue, the sequence-final position of Dx_0 is argued for on the sole basis of morphological containment relations instantiated by Binukid, where the reportedly "inclusive" form *ʔi* 'N:DEM.1INCL' is subsumed into the speaker-oriented one *ʔini* 'N:DEM.1'. However, as already discussed, the Binukid opposition *ʔi–ʔini* is admittedly best derived by means of distance modification (which is likewise compatible with the observed morphological compositionality), as the interpretation of the "inclusive" form is, crucially, non-inclusive, but rather "more" proximal.

3.4.1.2.1 Theoretical background. The theoretical issue is that Dx_0, as construed, is substantially incompatible with the "cumulative sub-classification of privative features" (Lander & Haegeman 2018a: 11) assumed by the authors for the other features.

To address this point, some additional background is necessary. The cumulative take on privative features (for which, see details in Caha 2009: 19–22) in nanosyntax results in the nested structure seen in (19) above, which the authors describe as follows: "S[peaker] is a subcomponent of H[earer], compositionally speaking. We take this to reflect the fact that the existence of H[earer] necessarily entails the existence of S[peaker]" (Lander & Haegeman 2018a: 12). Following Caha (2009), they represent the $Dx_3 > Dx_2 > Dx_1$ universal sequence as (from Lander & Haegeman 2018a: 11):[19]

(22) 

[19]The tree structure that represents the cumulative sub-classification of features mirrors the syntactic tree for those features. For a discussion, see Caha 2009: 23 ff.

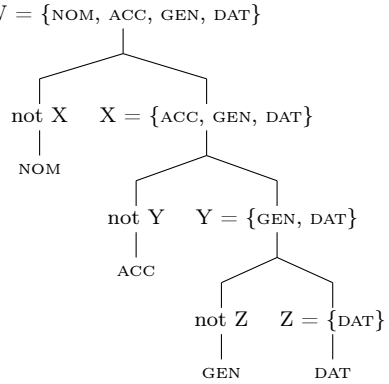
The featural specification of each element is the cumulative set of features that is read off the tree going bottom-up (Caha 2009: 21). Thus, for instance, the feature set for the Medial reading is $\{Dx_2, Dx_1\}$ (the two nodes that dominate it), while that for the Proximal reading is $\{Dx_1\}$ (the only node that dominates it): therefore, Proximal is included in Medial, as $\{Dx_1\} \subset \{Dx_2, Dx_1\}$.

Conversely, this means that each feature is associated with the set of interpretations that need it to be licensed, defining natural classes (Caha 2009: 21): thus, Dx_1 = {Proximal, Medial, Distal}, Dx_2 = {Medial, Distal}, and Dx_3 = {Distal}. In fact, Dx_1 dominates all nodes in the tree and is therefore associated with all interpretations, while Dx_3 only licenses the Distal interpretation at the bottom. Each feature, that is, "strips" one interpretation off the tree, making the level below its application more restrictive.

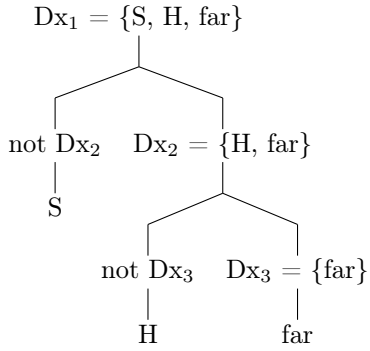
Importantly, the three interpretations refer to some primitive elements: therefore, it is more appropriate to refer to those when defining the extension of each feature (Caha 2009: 20–21): Dx_3 = {far}, as Lander & Haegeman indicate in their tree, but Dx_2 = {H, far}, and Dx_1 = {S, H, far}. This is implicit in their representation: where Lander & Haegeman write "not H" to derive the Proximal reading, we should actually interpret that as "not Dx_2", i.e. as the subtraction of the extension of the set Dx_2 ({H, far}) from the extension of the set Dx_1 ({S, H, far}), which correctly results in S only (hence, the Proximal interpretation). That is, moving top-down, at each bifurcation one feature is added, which progressively restricts the sets defined by each branching node by subtracting from their extension the extension of the set at the next branching node. Therefore, the cumulative subclassification structure presented by Lander & Haegeman (2018a: 11) should be revised as follows:[20]

[20]For a comparable structure for Case, see the combination of the two trees represented by Caha (2009: 20–21):

(i) W = {NOM, ACC, GEN, DAT}



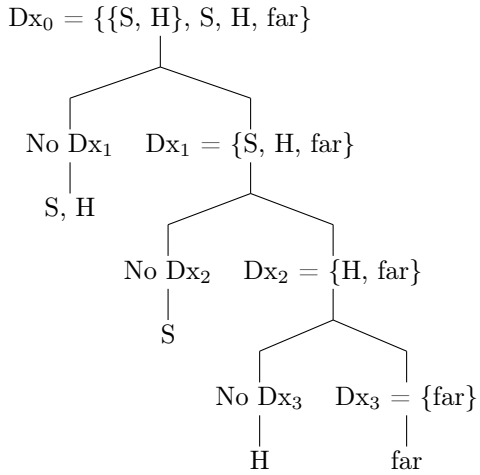
(23)



Note that this falsifies the authors' interpretation of the nested structure reported above: while it is the case that the featural definition of S (its dominating node(s), i.e. Dx_1 only) is a subcomponent of the featural definition of H (its dominating nodes, i.e. Dx_2 and Dx_1), it is strictly speaking not true that "S[peaker] is a subcomponent of H[earer]" (Lander & Haegeman 2018a: 12).

3.4.1.2.2 Theoretical issues with proposal 2. With this in place, we can go back to Lander & Haegeman's Dx_0 feature/head at the bottom of the functional sequence: in line with Caha (2009), Dx_0 will have to be placed at the top of the cumulative sub-classification tree, as follows:[21]

(24)



With this in place, consider again the definition of containment given by Lander & Haegeman (2018a: 12): "S[peaker] is a subcomponent of H[earer], compositionally speaking". Its extension to the Inclusive interpretation would be along

[21] As an aside, note that Dx_0 at the bottom of the functional sequence/top of the cumulative sub-classification tree means that the default ("unmarked") interpretation of demonstratives is the Inclusive one (just as, in Caha's Case hierarchy, the unmarked feature, the one at the bottom of the universal sequence/top of the cumulative sub-classification tree, is NOM). But this seems quite unlikely.

the lines of: "the union of S and H is a subcomponent of S, and S is a subcomponent of H". If Inclusive/Dx_0 is defined as {{S, H}, S, H, far}, Proximal/Dx_1 as {S, H, far} and Medial/Dx_2 as {H, far}, it is not the case that Inclusive is a "subcomponent" of Proximal ({{S, H}, S, H, far} $\nsubseteq$ {S, H, far}); further, it is not even the case that the Proximal is a "subcomponent" of Medial ({S, H, far} $\nsubseteq$ {H, far}). It is instead the case that Dx_0, the feature that defines the Inclusive, is also part of the definition of the Proximal and Medial, as it is the top node of the tree.

Even relaxing the interpretation to an informal version, whereby the speaker is included by the hearer as, intuitively, "the existence of H[earer] necessarily entails the existence of S[peaker]" (Lander & Haegeman 2018a: 12), the extension to the clusivity facts without defining a new atom for the inclusive reading (call it P(articipants), to be included in the extension of Dx_0 only) would run into problems: "the union of S and H is a subcomponent of S, and S is a subcomponent of H". In fact, the existence of the Speaker intuitively entails the existence of the Speaker, but not that of the Hearer (so the union of S and H cannot be a "subcomponent" of S), otherwise the existence of the Hearer could not entail the existence of the Speaker (which is required for S to be a subcomponent of H). Said otherwise, without a dedicated atom, such as P, we would be saying that S (Proximal) entails H (in the Inclusive) and is in turn entailed by H (in the Medial), which is a paradox. However, note that, P being an atom, it would have to be defined independently of S and H, which is not a trivial task and should be supported by independent reasons.

Therefore, as things stand, an approach to clusivity facts in demonstrative systems by means of cumulative privative locative features seems untenable on strict set-theoretic bases, unless a new independent atom is defined (which would however raise the question as to why we would call the corresponding interpretation "inclusive"). As the discussion in Section 3.3 showed, no such issues arise when deriving demonstrative systems by means of person features.

3.4.2 Extra indexical information

Another challenge to the locative-based approach to demonstrative systems comes from systems that encode extra indexical information about the deictic centre, which is assumed not to be possible by Lander & Haegeman (2018a: 14; see also Appendix C.1.3). Such systems, albeit extremely rare, are attested. For instance, it is possible to find indexical number and gender distinctions in Siwi Berber demonstratives, as reported by Souag (2014a,b). Here, hearer-oriented demonstratives also display gender and number agreement with the hearer:

(25) *Siwi Berber pronominal demonstratives* (SG.M forms; Souag 2014a: 538)

N:DEM.1	N:DEM.2SG.M	N:DEM.2SG.F	N:DEM.2PL	N:DEM.3
wa	wok	wom	werwən	wih
'Near me'	'Near you male'	'Near you female'	'Near you all'	'Far from us'

The following examples show the adnominal hearer-oriented term with a feminine singular referent *-t-* (cf. *w-* in (25)), used while speaking to different addressees (a male, a female, and a group):

(26) a. *Siwi Berber* (Souag 2014a: 539)

tasútət ta-t-**ók** ttəlla múddət-laʕmər
palm tree MOD-DEM.F.SG-**2:M.SG** 3F.SG.be at lifetime

'That palm tree has been around for ages.' (addressing a male)

b. *Siwi Berber* (Souag 2014a: 539)

ə́ntf-ax twərdət ta-t-**óm** msabb-kí
pick-1SG flower MOD-DEM.F.SG-**2:F.SG** because-2F.SG

'I picked this flower for your (f.) sake.'

c. *Siwi Berber* (Souag 2014a: 539)

mmwí-ɣ-asín-a i itadəm-ə́nnəw: g-úsəd g
say-1SG-3PL.DAT-PF to people-1SG.GEN IRR.3M.SG-come in
əlʕarbíyya ta-t-**érwən**
car MOD-DEM.F.SG-**2:PL**

'I told my family: he will come in that car.'

In (26), the demonstrative form always refers to a (syntactically) feminine entity in the external world: the *palm tree* in (26a), the *flower* in (26b) and the *car* in (26c). Hence, the syntactically feminine demonstrative root *t-* 'N:DEM.F.SG'. The demonstrative is completed by a suffix that encodes the person, number, and gender of yet another entity in the external world: the hearer, that is taken as the anchor for the location of the *palm tree*, the *flower* and the *car* above. In (26a) there is a male hearer (*-ók*), in (26b) there is a female hearer (*-óm*) and in (26c) there is a plural hearer (*-érwən*).

This (synchronically) striking pattern is most likely to be brought back to the grammaticalisation of a prepositional expression. Souag identifies *-ér-* (retained in *t-ér-wən* 'that near you.PL') as the relic of the preposition 'at', that was combined with 2nd person pronouns (that regularly encode gender and number), yielding a 'N:DEM at you' structure, which eventually grammaticalised. Some evidence for the same phenomenon is also reported for Quranic, Rāziè Arabic and probably Imperial Aramaic.

Albeit very rare (and resulting from a grammaticalised personal pronoun), the very existence of such additional contrasts and their non-transparency in the synchronic stage of the language can only be accounted for under a demonstrative system that is rooted in person distinctions. Within a person-based system, in fact, reference to the number of (one of) the deictic centre(s) is naturally derived by further compositions of number features with π (see Harbour 2016: chapter 6 for the integration of person and number, and Section 6.5 below for further details). Reference to their gender, instead, can either be conceived

as encoded on π directly or together with number. This is left here for future research in relation to the domain of demonstratives and pronominal forms, but see Ritter (1993) for gender located on N *vs* Num. A locative-based approach affords neither of these solutions and cannot naturally derive the additional indexical oppositions without extra assumptions.

To conclude, in this section I presented an alternative analysis of the deictic component of demonstratives in terms of locative features, and I provided arguments against their use as primitives in demonstrative forms due to empirical shortcomings. Person features, instead, do not run into similar problems and can therefore be defined as empirically superior to locative ones.

3.5 Indexical and ϕ person features

So far in this chapter I have argued that it is legitimate to characterise demonstrative systems in terms of person features. However, it is clear that the person features encoded in demonstrative forms, i.e. those that identify the anchor with respect to which a given referent is located, are distinct and independent from the person features of the ϕ-bundle encoded on all (pro)nominal expressions. In fact, although both the person categories expressed by demonstrative forms and those expressed in, say, pronominal paradigms can be captured by one and the same feature system (as shown in Section 3.3 above), person features of the ϕ set undergo the syntactic operation Agree, while person features that contribute to the indexical meaning of demonstrative systems do not. This is plainly shown by the comparison of personal pronouns and nominal demonstratives in varieties that display ternary systems, such as Tuscan ones:

(27) *Tuscan*

a. Te 'un mi=garb-i punto
you.2SG not me.DAT=like-2SG at-all
'I don't like you at all.'

b. Codest-o (bischero) 'un mi=garb-a
N:DEM.2-SG.M fool not me.DAT=like-3SG
'I don't like that fool (near you).'

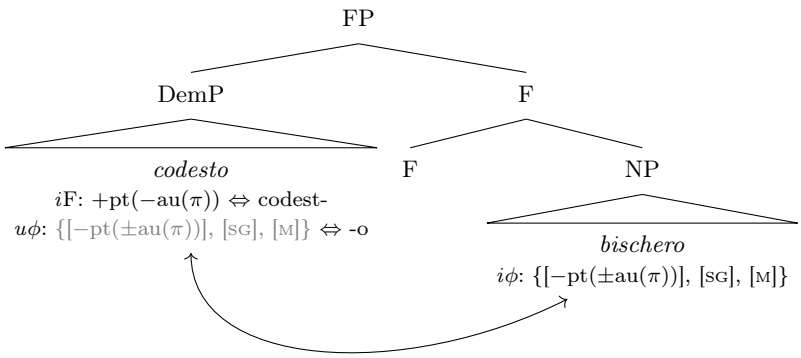
c. *Codest-o (bischero) 'un mi=garbi
N:DEM.2-SG.M fool not me.DAT=like-2SG

Tuscan has a (person-oriented) ternary demonstrative system whose terms perfectly parallel the indexical values of personal pronouns (Serianni 1997: 194–195; Vanelli & Renzi 1997: 112). Consider the difference between *te* and *codesto* in (27) above: the 2nd person singular pronoun *te* refers to the hearer, while the hearer-anchored demonstrative term *codesto* locates its referent (*bischero*) with respect to the hearer in the given speech context. Thus, despite the fact that both *te* and *codesto* make reference to the hearer, they do so at different levels:

this is mirrored by the fact that only the personal pronoun *te* controls verbal agreement, as shown in (27a), while the exact same bundle of person features encoded in the demonstrative form *codesto* does not (27b) and in fact cannot (27c). *Codesto*, even in the absence of the nominal head (*bischero*), triggers instead 3rd person agreement on the verb. The 3rd person features ultimately percolate from the referent of the demonstrative form, a common noun, and as such a non-participant within the discourse.

Thus, it can be suggested that the demonstrative form (*codesto*) carries two sets of person features. On the one hand, *codesto* refers to the hearer as the semantic anchor for the interpretation of the demonstrative form, which suggests that it carries the set of interpretable/valued ϕ (only: person) features that define the 2nd person: +participant(−author(π)).[22] On the other hand, the demonstrative carries a ϕ probe, i.e. a set of uninterpretable/unvalued ϕ features that gets its value by undergoing DP-internal agreement with the head noun, as exemplified in this deliberately simplified tree:[23]

(28)



The $u\phi$ set of features on the adjectival DemP contains number and gender, the features that undergo DP-internal agreement; person, on the contrary, does not typically undergo DP-internal agreement for 1st and 2nd person and only surfaces (if overtly encoded) with the default 3rd person agreement morpheme. This was first captured by Baker (2008b, 2011)'s Structural Condition on Person Agreement (SCOPA: "A functional category F can bear the features +1 or +2 if and only if a projection of F merges with an NP that has that feature,

[22]Note that I take these cases to be instances of valuation/interpretability matching, but I do not make any claim about the general validity of the Valuation/Interpretability Biconditional; for its discardment, see Pesetsky & Torrego 2007.

[23]Here, I use [singular] and [masculine] in a pre-theoretical fashion and make no claims about which feature systems account for the categories of number and gender. Moreover, I represent ϕ features as an unordered set of features; however, as already mentioned in Section 1.3.3, I posit that features are distributed over the functional spine in the internal structure of each form, in line with 1 Feature–1 Head assumptions; for my proposal for the internal structure of DemP, and for its syntax within the DP, see Chapter 4. Furthermore, consider that, as stated at the beginning of this section, other features such as definiteness and referentiality are left out here. Finally, note that, even though I referred to "DP-internal agreement", I do not make any claims about the specific operation at play here.

and F is taken as the label for the resulting phrase", Baker 2008b: 52), that provides a structural explanation for the difference between person features and number and gender features within the ϕ set.[24] However, I do include person in the ϕ set here, because 3rd person can be regarded as the default and because 3rd person ultimately surfaces in pronominal demonstratives, as attested by DP-external agreement in (27b).

Back to the derivation above, the uninterpretable/unvalued ϕ features on DemP get the relevant values, in this case: {[−participant(±author(π))], [singular], [masculine]}, upon valuation by the interpretable/valued ϕ features carried by the head noun *bischero*. Note that the person value of the interpretable features does not match that of the uninterpretable features and, furthermore, that the verb cannot possibly agree with the interpretable features, as (27c) shows. Thus, in opposition to the person features of the ϕ-set, the person features that define the deictic centre in the indexical part of the demonstrative are invisible to Agree: the 2nd person in the indexical base of the demonstrative does not enter any agreement relations with the verbal domain. The same is true for the 1st person pair (*io* 'I', *questo* 'N:DEM.1': *io garb-o* '1SG like-1SG' *vs questo garb-a/*garb-o* 'N:DEM.1 like-3SG/*like-1SG'), and for the 3rd person pair (*lui* 'him', *quello* 'N:DEM.3': *lui/quello garb-a* '3SG/N:DEM.3 like-3SG'), although only vacuously so due to the coincidence of indexical feature and ϕ-features. Demonstrative forms invariantly display an external 3rd person syntax (DP-internal and DP-external agreement), but they are also specified for another person value (1st or 2nd person or, vacuously, 3rd person) that refers to the deictic centre.[25]

Thus, I take this to suggest that person features encoded in demonstrative forms come in two different sets: interpretable and uninterpretable person features. The former refer to indexical person, i.e. the deictic centre with respect to which locative relations are established; the latter are the DP-internal/external agreement features. I take the two sets of person features to be simultaneously encoded in nominal demonstrative forms, and in fact, as shown in the tree in (28), to be spelled out by different morphemes. Interpretable person features are realised by the root of the demonstrative (*codest-*) and encode person-oriented deictic contrasts, while uninterpretable person features are realised by the inflectional ending (*-o* for SG.M), if present, and encode syntactic relations within the DP. Evidence for this morphological decomposition will be discussed in greater detail in Chapter 4.

[24] Alternative accounts for this difference include, by stipulation, regarding adjectives as ϕ-incomplete (and lacking person), or splitting features into Index and Concord and assuming that only Concord features (that include number, gender, and case), but not Index features (among which is person) are visible to adjectives.

[25] The inaccessibility of the indexical person features in demonstratives is tentatively derived here by capitalising on the internal structure of demonstratives. As will be argued in Chapter 4, person features in demonstratives are embedded under a (prepositional-like) functional head: it may be speculated that this external layer makes the lower person features opaque, blocking agreement. For a similar proposal for the inaccessibility of indexical person features to DP(-external) agreement in possessive forms, see Terenghi 2021d.

If nominal demonstratives always display the two sets of person features, adverbial demonstratives, instead, typically display only the interpretable person features; in fact, adverbial forms do not generally participate in the DP-external agreement syntax. The only exception to this that I know of is attested by Ripano, where the adverbial system does undergo agreement (D'Alessandro 2017: 27–28):

(29) *Ripano* (Paciaroni & Loporcaro 2018: 160, from Cardarelli 2010: 33)

l-i	ˈfjuːra	ʃˈta	ˈɛkː-i
DEF-M.PL	flower(M)	stay.PRS.3	here-M.PL

'The flowers are here.'

In all other cases, adverbial demonstratives only carry the interpretable person features and lack the uninterpretable ones.

3.5.1 Modelling the two sets of features

The presence of two sets of formal features on demonstrative pronouns and adjectives closely reminds of the distinction between Index and Concord features, key to the agreement account in HPSG (Pollard & Sag 1994; Wechsler & Zlatić 2000, 2003; Wechsler 2011). Roughly simplifying, Index features conform with the meaning of the agreement controller (i.e. the head noun) and agree within the clause (predicates and locally bound pronominals), while Concord features conform with the morphological form of the agreement controller and agree within the DP (determiners, attributive adjectives). Both types of features are arguably formal and enter syntactic agreement relations; however, they are usually identical to each other (see the Index-Concord matching constraint posited by Wechsler & Zlatić) and therefore not obvious to diagnose.

A strong argument in favour of the presence of two such sets of features is provided by cases of mixed agreement, i.e. cases in which a single noun triggers different agreement patterns on different agreement targets. These instances can be analysed as the result of a mismatch between the two types of features: hence, their existence is proved. Additionally, mixed agreement shows that such a mismatch is lexically encoded in the head noun *via* two distinct sets of features. The classic example is Serbian-Croatian collective common nouns ("hybrid nouns"), e.g. *deca* 'children', which carry {feminine, singular} Concord features determined by their declension class and {neuter, plural} Index features determined by their collective semantics:

(30) *Serbian-Croatian* (modified from Wechsler & Zlatić 2000: 816)

Ta	dobra	deca	su	došla
that.F.SG	good.F.SG	children.F.SG/N.PL	AUX.3PL	come.PTCP.N.PL

'Those good children came.'

As (30) shows, *deca* agrees DP-internally for Concord features (feature set: {feminine, singular}; see *ta*, *dobra*); at the same time, it agrees DP-externally for Index features (feature set: {neuter, plural}: see *došla*).

The distinction between Index and Concord features was originally developed to account for agreement mismatches with the noun head. However, demonstrative forms that carry two sets of (person) features are either nominal modifiers or pronouns, but definitely not nominal heads. Still, given the extension of the original account to other categories, such as quantifiers (Danon 2013) and polite person pronouns (Wechsler 2011), it seems at least possible to compare the Index-Concord distinction to the interpretable-uninterpretable one adopted above. And indeed, considering Index features as interpretable (and valued) features and Concord features as uninterpretable (and unvalued) features seems a natural way to incorporate such a distinction in Minimalism. Moreover, although the suggestion has only been sketched above (for a fully fledged account, see Chapter 4), I maintain that it is possible to link interpretable and uninterpretable features to specific morphemes, which is in line with Landau's (2016) configurational "adaptation" of the Concord-Index distinction: under this approach, concord features are taken to be all hosted on N, while index features are hosted on functional heads, and namely D for person, Num for number, and Num or N for gender (with cross-linguistic variation; see, again, Ritter 1993). On these bases, Landau accounts for the different patterns of agreement available, and especially for Index agreement inside the DP (ruled out instead by Wechsler & Zlatić 2000) in a derivational way.

Nonethess, the two sets of features involved in the definition of demonstrative forms cannot be plainly identified with Index and Concord features, under the following respects. Firstly, person is not a Concord feature in HPSG (and in the minimalist adaptations of the Index-Concord distinction: see Danon 2013; Landau 2016, and, along the same lines, Despić 2017, who employs "exclusively semantic" and "exclusively formal" features within a DM paradigm). Instead, a featural account for demonstratives needs two independent sets of person features: an interpretable one and an uninterpretable one. Granting the parallel proposed above would amount to postulating, besides an Index person feature, a Concord one, which is crucially unavailable both on HPSG theory-internal and on empirical grounds (as it would not be possible to rule out DP-internal person agreement, which is typologically very rare at best; consider, again, Baker's (2008b *et seqq.*) SCOPA).

Secondly, as (27b-27c) show, interpretable person features on demonstratives never trigger agreement, neither outside nor inside the DP. Index features, instead, do trigger agreement outside the DP (on locally bound pronouns and on predicates, e.g. (30)), and have been shown to do so, in some highly restricted cases, inside the DP, too (Landau 2016). Consider for instance the Kinyarwanda (Bantu) example reported by Landau, where the DP-internal quantifier 'all' agrees in person (2PL) with the subject:

(31) *Kinyarwanda* (Landau 2016: 981)

(Mwe) mw-ese mw-agi-ye ku i-duka.
2PL 2PL-all 2PL-PST.go-PERF to CL5-store

'All of you went to the store.'

Of course, if interpretable features were rather considered on a par with Concord features, the same mismatch in behaviour would be attested, only in the DP-internal context, leaving the problem unsolved.

Other forms for which two different sets of features have been posited are imposters (Collins & Postal 2012), i.e. DPs that, despite their 3rd person syntax, actually refer to a first (e.g. *yours truly*) or a second (e.g. *Madam*) person "notionally". What is relevant here is that pronouns can also be imposters (Collins & Postal 2012: chapter 18): this is the case when their antecedent is an imposter DP itself ("Daddy$_i$ said that he$_i$ needs to leave early"; Collins & Postal 2012: 217), for the person features value of which simple antecedence facts are invoked. More interestingly, Collins & Postal speculate on some specific constructions that can be argued to feature pronominal imposters: nurse *we*, royal *we*, editorial *we*, singular *they*, generic *you*. They argue that these non-anteceded pronouns carry some inherent ϕ feature values. Therefore, at least a subset of pronominal forms can be defined by two sets of features, which explains the mismatches between their morphology and their semantics.

However, demonstrative forms are quite different from imposters in that, besides being morphologically/syntactically 3rd person forms, they do indeed refer to a 3rd person (i.e. the NP they modify, or the referent of the pronominal form). Additionally, though, they must make reference to another external-world entity, i.e. the deictic centre with respect to which they locate their referent: this is encoded, as claimed above, by a separate set of person features (possibly distinct from the former, in case of speaker- and hearer-anchored forms). Therefore, demonstratives differ from imposters in that the two sets of person features actually denote different referents.

Furthermore, imposters are shown to have a complex structure, with the (syntactically 3rd person) DP_1 containing an invisible DP_2 which is a 1st or a 2nd person pronominal element. Therefore, different features are encoded in different DPs. Instead there is good morphological evidence to maintain that interpretable and uninterpretable person features may be linked to specific morphemes in demonstrative forms, as further shown in Section 4.4. This means both that the two sets of person features are properly spelled out and that they do not range over two DPs, but are encoded DP-internally (and, more precisely, demonstrative-internally).

Therefore, and despite the shared intuitions (two sets of features, possible structural implementation: see Landau 2016 for a full configurational approach to the Index/Concord distinction), the demonstrative data are clearly in need of a different implementation. In the next chapter, I will put forth a full proposal for the internal structure of demonstratives which indirectly accommodates for

both sets of features (indexical/interpretable and agreement/uninterpretable) as encoded in demonstrative forms.

3.6 Conclusions

In this chapter, I went through the main assumptions on which this dissertation rests. I provided evidence in support of a fundamentally person-oriented approach to Romance demonstrative systems (Section 3.2), and in turn I claimed that this semantics is best captured by a person-based theory for demonstrative forms (Section 3.3). Thus, I illustrated the person theory adopted in this work, the one proposed by Harbour (2016), and I showed that it successfully derives the attested variation in the domain of Romance demonstratives (and beyond). I then turned to a discussion of the features employed (person, *vs* locative: Section 3.4) and finally submitted that person features come in two different guises (Section 3.5): person features of the ϕ set, that undergo agreement, and indexical person features, both of which are carried by demonstrative forms.

This left us with a formalisation problem: although the availability of two different sets of (ϕ) features has already been assumed (most notably in HPSG), the available accounts are not compatible with the semantics of demonstrative forms, nor with the syntactic (in)activity of their indexical person features. In the next Chapter, I will provide a structural implementation that at the same time accommodates for the two guises of person features as involved in the semantics and in the syntax of demonstrative forms, and for the main conclusions presented in this Chapter: that person oppositions constitute the basic semantic opposition within demonstrative systems, and that any type of modification of the underlying person contrast is to be derived, indeed, exactly by means of modification.

CHAPTER 4

The internal structure of demonstratives

4.1 Introduction

Chapter 3 introduced evidence in favour of a person-oriented treatment of demonstrative systems and of an approach to the deictic oppositions that they encode based on person features. Besides, it showed that it is also necessary to account for distance-oriented oppositions in demonstrative systems. Such oppositions are not obligatory, as a demonstrative system can simply be modelled as encoding relation to one of the anchors, i.e. one of the discourse participants. Nonetheless, distance contrasts can be present: specifically, some arguments were presented that suggest that distance oppositions should be conceived as encoded "on top of" person-oriented ones, as modifications of the person-based semantic core.

However, this person-based approach seems to predict an unsubstantiable parallelism between demonstratives and personal pronouns.[1] Intuitive evidence suggests that such a conflation is not accurate: in many languages, the two sets of forms are paradigmatically expressed in different ways and carry different semantic oppositions. An example is English, which has three persons in its pronominal paradigms and only two in its demonstrative ones: in the latter, reference to the hearer is not contrastively encoded. Besides, Section 3.5 proposed that demonstratives, differently from personal pronouns, carry two different

[1] I am referring here to the structure of the respective systems, and not to formal identities across demonstratives and personal pronouns. The latter is in fact a widely attested grammaticalisation pattern: (endophoric) demonstrative > 3rd person pronoun. For a review of the grammaticalisation patterns that involve demonstratives, see Diessel (1999: chapter 6); for a minimalist account, see relevant sections in van Gelderen (2011).

sets of ϕ features (indexical and agreement) and showed that agreement phenomena do not target indexical person features in demonstratives, while they do so for the indexical features of personal pronouns. Thus, it was concluded that a different modelling of the person features encoded in demonstrative forms is necessary.

This chapter presents my proposal and provides some supporting morphological evidence for it. In short and informally, this proposal is built on the similarity between demonstratives and spatial (locative) prepositions. From an intuitive semantic viewpoint, demonstratives express a spatial relation to person: they locate their referent in the vicinity of (one of) the discourse participants, or of neither of them. That is, just like prepositions, they establish a spatial relation between two referents: ground and figure.[2] More specifically, demonstratives state that the figure (a referent) is located in a spatial configuration of vicinity with respect to the ground (the discourse atoms, modelled via person features following Section 3.3). This is compatible with the person-oriented semantics of demonstratives across the board. For instance, given a context in which I am near a book, I can utter *this book*: *this* will denote the spatial relation between two entities, the *book* (figure; demonstrative's referent) and *me* (ground), by saying that the book is near me. That is, *this book* roughly means something along the lines of "the book (that is) near me".

In light of this parallel, this chapter proposes that the derivation of the internal structure of demonstratives can be modelled on that of locative prepositions. Concretely, demonstratives are decomposed into a person component (the ground) and a spatial component (the locative features): the former is embedded under the latter, and the vicinity spatial relation is modelled in vectorial terms. This will be shown to naturally allow for distance modifications, deriving demonstrative systems that include additional distance oppositions, compatibly with the intuition that distance-oriented systems involve modification. Essentially, this proposal is in line with compositional approaches to demonstratives advanced by Leu (2007, 2008, 2015) and Roehrs (2010) for Germanic languages: demonstrative forms are not indivisible units, but have an internal structure that is built syntactically. However, such approaches have never been consistently put forth for Romance languages, which constitute the primary empirical domain for this study.

This chapter is structured as follows: in Section 4.2, I provide an overview of the semantic and syntactic approaches to prepositions on which I will build to derive the internal structure of demonstratives. In Section 4.3, I put forward my proposal for the internal structure of demonstratives and show how this novel structural implementation captures the semantic cross-linguistic varia-

[2]These terms were first introduced by Talmy (1972; see also Talmy 1978, 1983) and can be defined as follows: "[t]he Figure is a moving or conceptually movable entity whose path, site, or orientation is conceived as a variable, the particular value of which is the relevant issue. The Ground is a reference entity, one that has a stationary setting relative to a reference frame, with respect to which the Figure's path, site, or orientation is characterized" (Talmy 2000: 312).

tion attested across demonstrative systems by means of a unified analysis: this resolves the descriptive dichotomy between person- *vs* distance-based demonstratives altogether. Section 4.4 is devoted to morphological evidence in support of the proposed internal structure of DemPs: concretely, it shows how the morphology of Romance demonstratives neatly maps to the internal syntax advocated for here. Section 4.5 concludes.

4.2 A prepositional detour

This section lays the ground for the derivation of the internal structure of demonstratives by introducing some basic facts about locative prepositions. I briefly introduce the vectorial treatment for prepositions and its semantics, by referring mostly to Zwarts 1997 (Section 4.2.1): this information will be used here mainly as a background for a full understanding of the syntactic account for the extended projection of prepositions proposed by Svenonius (2003, 2006, 2008, 2010), to which I turn in Section 4.2.2 and which will be used as a baseline for comparison with demonstratives. I conclude by providing further arguments in favour of a parallel between prepositions and demonstratives (Section 4.2.3). On these bases, in Section 4.3 I propose a vectorial account for demonstrative forms.

4.2.1 A vectorial account for prepositions

Locative prepositions define the location of a referent, e.g. when used as the complement of the copula *be* or of any (stative) locative verb:[3]

(1) The raccoon was near the old oak tree.

In two independent lines of research (Zwarts 1995, 1997, 2005; Zwarts & Winter 2000: Vector Space Semantics; and O'Keefe 1996), prepositions have been defined through the geometrical notion of (Euclidean) vectors, i.e. geometrical objects (line segments) that have length and direction and that point from one point in space, the ground, or reference object (*the old oak tree*, in (1)), to another, the figure, or theme (*the raccoon*, in (1)). In what follows, I introduce the account for locative prepositions given by Zwarts (1997).

The local relation between the ground and the figure expressed in (1) can be captured as follows:

(2) *loc*(raccoon, *near*(the old oak tree))

First, the prepositional function (in this case: *near*) maps the ground to a region/place. Then, a general location function (*loc*) locates the figure in this

[3]Locative prepositions can also be the complement of non-locative prepositions: *from over the tree*. This case will be briefly discussed at the very end of this subsection and will prove important for the definition of adverbial demonstratives.

region. As a result, the location of the *raccoon* is defined in relation to that of the *old oak tree*, which serves as the relevant spatial anchor.

Zwarts proposes to formalise relative positions in vectorial terms: the region characterised by a preposition is derived by the set of vectors that originate from the ground and point towards the direction defined by the lexical semantics of that preposition. The figure is located at the end of one of these vectors (*raccoon*,$\boldsymbol{v}$). Formally, "a locative PP denotes a set of vectors taken from a 'universe' of vectors that is determined by the reference object NP" (Zwarts 1997: 68):

(3) a. $[\![[_{\text{PP}}\ \text{P NP}\ ]]\!] = \{\mathbf{v} \in \textit{space}\ ([\![\text{NP}]\!]) \mid \ldots\ \mathbf{v}\ \ldots\}$[4] (Zwarts 1997: 68)

b. $[\![[_{\text{PP}}\ \text{near}\ [_{\text{DP}}\ \text{the old oak tree}]]]\!] =$
$= \{\mathbf{v} \in \textit{space}\ ([\![\text{the old oak tree}]\!]) \mid \ldots\ \mathbf{v}\ \ldots\}$

Thus, a locative preposition is a function that takes as argument the region, i.e. the set of points where the ground is located, and that yields a set of vectors. The relevant set of vectors is determined by the lexical semantics of the preposition: each preposition defines a subset of the vector space by imposing conditions on the length and orientation of the vectors that originate from the ground. For details on *near*, see Section 4.2.3.

Note that the preposition only provides the prepositional function, while the figure is by no means part of its meaning. Rather, it is contributed by a type-shift operation (from locative prepositions to predicates), ultimately producing an existentially quantified conjunction:

(4) a. $\{\text{x} \in \text{E} \mid \exists\mathbf{v} \in [\![\text{PP}]\!] \wedge \textit{loc}(\text{x},\mathbf{v})\}$ (Zwarts 1997: 69)

b. $\{\text{raccoon} \in \text{E} \mid \exists\mathbf{v} \in [\![\textit{near}(\text{the old oak tree})]\!] \wedge \textit{loc}(\text{raccoon},\mathbf{v})\}$

The key argument for the vectorial analysis of prepositions comes from PP modification. As Zwarts argues, the vectorial approach is superior to an analysis that deals with points or primitive portions of space (i.e. regions) because it allows for a compositional account for PP modification. PP modification is instantiated in the following constructions by dimensional adjectives (*deep*), measure phrases (*one metre*), and adverbs (*right*), respectively:

(5) a. The raccoon was *deep* inside the old oak tree.

b. The raccoon was *one metre* behind the old oak tree.

c. The raccoon was *right* near the old oak tree.

Regions are unstructured sets of points, which makes them unmeasurable. Instead, for modification to be possible, modifiers have to refer to the ground so as to define distances and directions computed with respect to it. As such, they have to be able to access the ground itself, and not only the wider region

[4] Where "$\textit{space}(\text{x}) = \{\mathbf{v} \in \text{S} \mid \textit{loc}(\mathbf{v},\text{x})\}$" (Zwarts 1995: 409); S is the "union of an infinite set of vector spaces" (*ibid.*; the "universe" of vectors); ($\boldsymbol{v}$,x) indicates that "the beginning point of vector v is located at object x" (*ibid.*).

that contains it, as defined by the lexical semantics of the preposition. Vectors precisely allow for this, as, by definition, they encode distances and directions. Zwarts (1997) thus argues that semantic compositionality is only obtained if the denotation of PPs is defined in terms of vectors: while the modified PP denotes a set of vectors starting from the ground, its modifier ('Mod': AP, MeasP, AdvP) selects all and only the vectors having a specific length (|v|) and direction from it, in an intersective fashion:

(6) a. $[\![\text{Mod PP}]\!] = \{\text{v} \in [\![\text{PP}]\!] \mid \ldots \text{ v } \ldots\}$ (Zwarts 1997: 75)

b. The raccoon was one metre behind the old oak tree.

c. $[\![\text{one metre } [_{\text{PP}} \text{ behind the old oak tree}]]\!] = \{\text{v} \in [\![\text{behind the old oak tree}]\!] \mid |\text{v}| = 1 \text{ metre}\}$

That is: modifiers are functions that map the denotation of a PP (a set of vectors stemming from the ground, e.g. vectors that start at *the old oak tree* and point backwards) onto a subset of vectors, as indicated by modifier-specific length and direction conditions (e.g.: only the *one metre* long vectors).

4.2.2 Deriving the extended PP

Svenonius' (2003, 2006, 2008, 2010; a.o.) account for the extended PP is based on the vectorial treatment for prepositions laid out in Section 4.2.1, which Svenonius implements in a cartographic key: each function necessary to the semantics of the extended PP is introduced by a dedicated head in the functional spine. As each of these heads can be lexicalised at the same time, Svenonius ultimately defines the fine structure of PPs. In this subsection, I show how the derivation works and highlight the aspects upon which I will capitalise to derive the internal structure of demonstratives (Section 4.3). The discussion presented here is primarily based on Svenonius 2010.

Locative prepositions (recall: those that occur as the complement of locative verbs such as the copula *be*) are taken to head a LocP and to take, as their complement, the ground. Given the sentence "I saw a raccoon outside (of) that house", LocP will be:

(7) $[_{\text{LocP}}$ outside (of) $[_{\text{DP}}$ that house$]]$ (*to be revised*)

Semantically, the preposition maps the ground to the region it occupies by defining a set of vectors.

Svenonius further argues that this structure includes two additional functional heads, namely: a (lower) KP and a (higher) AxPartP. Concretely, KP, or Case Phrase (Lamontagne & Travis 1987), maps the ground to the region it occupies, i.e. its *eigenplace* (Wunderlich 1991) or *characteristic space* (Harbour 2016). K can be null or surface as a genitive case marker (such as the English preposition *of*). AxPartP, or Axial Part Phrase, optionally maps that region to a subregion defined by the axial parts, or axial structures, of the ground. Axial structures were first examined by Marr (1982) and Jackendoff (1983) in

relation to spatial cognition and can be defined as parts of an object (such as its sides, its front, its top, *etc.*). As such, they are linked to the shape of the given object and are identified by one of the object's axis. In Jackendoff's words,

> they are regions of the object (or its boundary) determined by their relation to the object's axes. The up-down axis determines top and bottom, the front-back axis determines front and back, and a complex set of criteria distinguishing horizontal axes determines sides and ends. (Jackendoff 1996: 14)

Thus, the structure in (8) is derived, where the region occupied by the ground ([KP [DP]]) is mapped onto one of its subregions by AxPartP, that is: of the whole region occupied by the house, we only take the sides. The set of outward-pointing vectors (as defined by the Loc head: *out*) starts from that specific set of points that constitutes the relevant subregion of the ground (rather than from the ground taken as a whole):

(8) $[_{\text{LocP}}$ out $[_{\text{AxPartP}}$ side $[_{\text{KP}}$ (of) $[_{\text{DP}}$ that house$]]]]$

LocPs, i.e. locative prepositions, give us information about the region within which the figure is located. For the figure to be introduced (similarly to the *loc* function in (2) above), Svenonius proposes that first a Deg[ree]P maps the set of vectors defined by LocP back to a region (the region defined by those vectors) and then a functional *p*P introduces the preposition's external argument, i.e. the figure, in its specifier:[5]

(9) $[_{p\text{P}}$ $[_{\text{DP}}$ raccoon$]$ p $[_{\text{DegP}}$ Deg $[_{\text{LocP}}$ out $[_{\text{AxPartP}}$ side $[_{\text{KP}}$ (of) $[_{\text{DP}}$ that house$]]]]]]$

Thus, the figure is located within the region defined by the vectors that start from the region occupied by the ground (or a subpart thereof) and that point to a direction determined by the lexical semantics of P.

Svenonius introduces PP modification in the extended PP by means of a Meas[ure]P hosted in the specifier of Deg_{μ}P, a type of DegP dedicated to modification, such that, when MeasP is present, DegP is substituted by a Deg_{μ}P that hosts MeasP in its specifier.[6] PP modification is conceived as introducing a length constraint on the set of vectors defined by LocP, in line with Zwarts' (1997) analysis (Section 4.2.1): MeasP selects a subset of the vectors denoted by the Loc head according to their length (specifically here: only the one metre-long vectors are considered):

[5]This approach to the introduction of the external argument is modelled on that of *v* (see Kratzer 1996), hence the head's name *p*. *p* is ultimately taken to encode the relational content of prepositions (mainly the notions of containment and support, possibly with some sub-types), and thus to specify the spatial configuration that holds of the figure with respect to the ground. For more details about the *p* category, see Svenonius 2003, 2008.

[6]Evidence in favour of the two flavours of Deg comes from linearisation facts, as discussed by Svenonius (2008: section 3).

(10) $[_{pP}$ $[_{DP}$ raccoon$]$ p $[_{Deg_{\mu}P}$ $[_{MeasP}$ one metre$]$ Deg_{μ} $[_{LocP}$ behind $[_{AxPartP}$ AxPart $[_{KP}$ K $[_{DP}$ the old oak tree$]]]]]]$

Note that Svenonius (2008: 69–71, 2010: 134–136) entertains the possibility that not all prepositions be derived along these lines: the account provided for so-called "bounded expressions" (Svenonius 2010), such as *upon*, *among*, or, crucially here, *near*, could be somewhat different. These are locative prepositions that, differently from so-called "projective expressions" (e.g. *outside*, *above*, *etc.*), inherently define some additional properties of the spatial relation that holds between the ground and the figure: such properties can be understood as a restriction on distance (*near*), as the implication of contact (*upon*), or as the definition of a complex spatial configuration (*among*, presupposing a complex ground). Projective prepositions, instead, all denote the vector region defined with respect to the ground only, without any further specification.

As Svenonius (2010: 135) remarks, projective prepositions can be modified by a MeasP, as modelled in (6) above, and partly repeated here in (11a), but this does not seem to be the case for bounded prepositions (11b–11d):

(11) a. The raccoon was one metre behind the old oak tree.
b. *The raccoon was one metre near the old oak tree.
c. *The raccoon was one metre upon the old oak tree.
d. *The raccoon was one metre among those old oak trees.

One possibility to account for these facts is that bounded prepositions are not associated to a vector space altogether, but are functions that map characteristic spaces onto complex regions (e.g. a vicinity region, or a region that is also defined by contact, *etc*). Given the unavailability of its vector space argument, MeasP could not apply in the case of bounded prepositions, deriving the incompatibility of PP modification with bounded prepositions.

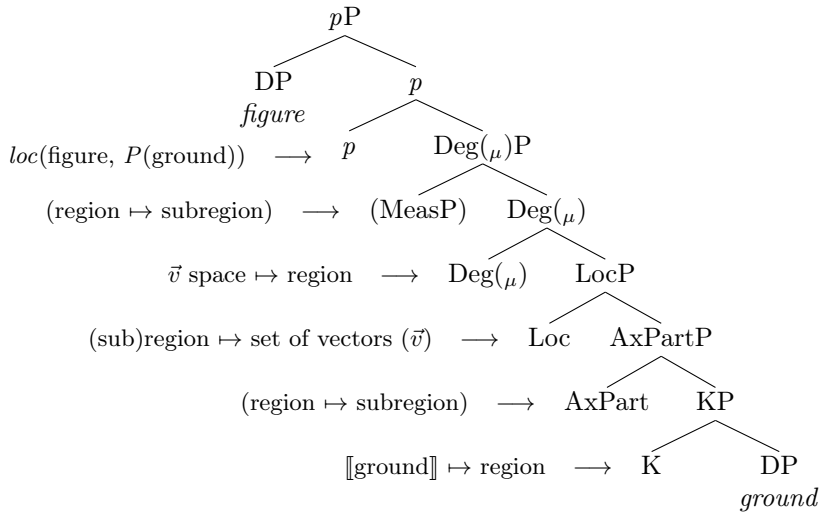
However, considering the compatibility (for some speakers) of directional adverbs with bounded prepositions, and taking the derivation of all types of PP modification to crucially hinge on the vectorial nature of the region defined by the preposition (as detailed in Section 4.2.1 following Zwarts 1997), Svenonius (2008: 69–71) proposes that bounded prepositions do in fact denote vector spaces, but spell out the Deg—Loc span (thus, not $Deg_{\mu}P$, barring MeasPs), to specify at once the direction and the length of the vectors:

(12) a. (?) The raccoon was diagonally near the old oak tree.
b. $[_{pP}$ $[_{DP}$ raccoon$]$ p $[_{DegP}$ $[_{AdvP}$ diagonally$]$ near $[_{LocP}$ ~~near~~ $[_{AxPartP}$ AxPart $[_{KP}$ K $[_{DP}$ the old oak tree$]]]]]]$

The derivation of extended PPs proposed by Svenonius (2010) thus follows:[7]

[7] I abstract away from Deix[is]P, an additional layer between DegP and LocP that provides "deictic information about proximity to a contextual center" (Svenonius 2010: 155) and can be lexicalised by demonstrative forms included within the PP (Korean examples, *ibid.*), or by particles (e.g. *I saw a raccoon* <u>*down*</u> *by that old oak tree*).

(13)



Finally, note that the complement of p can be embedded under a directional preposition, i.e. a preposition that denotes a path (typically: *from* or *to*):[8]

(14) a. I saw a raccoon staring [from near the old oak tree].

b. $[_{pP}$ $[_{DP}$ raccoon$]$ p $[_{PathP}$ from $[_{DegP}$ near the old oak tree$]]]$

Directional prepositions spatially specify their complement further, and determine whether that is to be interpreted as the source (*from*, as in the example above) or the goal (*to*) of a motion event.[9] In Section 4.3.3, I capitalise on these observations to account for the opposition between locative demonstrative adverbs (*here*, *there*) and their allative (*hither*, *thither* 'from here, there') and ablative (*hence*, *thence* 'to(wards) here, there') counterparts.

4.2.3 From prepositions to demonstratives

The derivation for demonstratives to be developed in this chapter rests on the informal parallelism between demonstratives and prepositions, whereby *this raccoon* can be regarded as denoting "the raccoon (that is) near me". In what follows, I provide a more formal comparison of (nominal) demonstratives and the preposition *near*.[10] As a starting point, let me provide the definition of *near* as put forward by Zwarts:[11]

(15) $[\![\text{near NP}]\!] = \{\text{v} \in \textit{space}\ ([\![\text{NP}]\!]) \mid |\text{v}| < r\}\ (r > 0)$ (Zwarts 1997: 70)

[8] I leave aside a full review of these prepositions: for the semantic modelling of their meaning, see Zwarts 1997, 2005; for further syntactic information, see Svenonius 2010, *i.a.*

[9] Additional information about a given motion event, and in particular in relation to the specific trajectory that it defines, can be contributed by some particles heading a higher DirP: *I saw a raccoon staring* $[_{DirP}$ *up* $[_{PathP}$ *from* $[_{DegP}$ *near the old oak tree*$]]]$.

[10] For a preliminary derivation of adverbial demonstratives, see Section 4.3.3.

[11] The original formulation contains *bij*, Dutch for 'near, close-by'.

More plainly, *near* denotes the set of vectors that originate from the ground and whose length is shorter than r, a pragmatically determined value.

Given the vectorial analysis, *near* can be described with respect to some specific properties that relate to regions as sets of vectors (Zwarts 1997: section 5): closure (under shortening, lengthening, and under rotation) and continuity (linear and radial), for which see below in this same subsection.

Demonstratives, just like locative prepositions, define the local relation between ground and figure: the ground is what is commonly referred to as deictic centre, or as anchor or *origo* (following Bühler 1934); the figure is the (possibly silent) NP modified by a nominal demonstrative (see Sections 4.3.2 and 4.3.3 for syntactic implementations). In *this raccoon*, the deictic centre (ground) is the speaker, or better: the area occupied by the speaker, while the figure is the raccoon. My proposal, to be fully outlined in the next section, is that the internal structure of demonstratives can be modelled in a fashion similar to that of *near*, as both establish a proximity spatial relation holding between figure and ground.

Concretely, I posit a proximity function NEAR that maps the space of the elements of the ontology for spatial deictics (regions related to speaker, i_{o_χ}; hearer, u_{o_χ}; and others, o_{o_χ}; see Section 3.3.2) onto their proximity region, i.e. the region of a limited size (according to the given context) located around them. This can be implemented in a vectorial fashion: the function NEAR denotes the set of vectors that originate at the different discourse-related atoms and that are shorter than a pragmatically determined value r:

(16) $[\![\text{this}]\!] = [\![\textsc{near}\ i_{o_\chi}]\!] = \{\mathbf{v} \in \mathit{space}([\![i_{o_\chi}]\!]) \mid |\mathbf{v}| < r\}\ (r > 0)$

In other words, part of the functional material inside *this* denotes the set of vectors that originate at i_{o_χ}, i.e. the region occupied by the speaker, and that are shorter than r. In turn, a preliminary representation of *this raccoon* would look like the following:

(17) $[\![\text{this raccoon}]\!] = \{\text{raccoon} \in \text{E} \mid \exists\mathbf{v} \in [\![\text{this}]\!] \wedge \mathit{loc}(\text{raccoon},\mathbf{v})\}$

Thus, *this raccoon* denotes an entity that is a raccoon and that is near the region occupied by the speaker. For a syntactic formalisation, see Section 4.3.2.

Note that the case for a pragmatically determined r, modelled on the denotation of *near*, is particularly well-suited for the description of demonstratives, as the space related to the different atoms denoted by π_χ seems to change according to the context. In fact, one and the same entity or area can be defined as near or far from one and the same region associated to a discourse participant according to the given context.

Take for instance context A, in which the speaker is reasonably close to a raccoon (say, two metres): the speaker will be able to refer to that raccoon by uttering *this raccoon* (and by pointing to it). Take instead context B, in which the speaker is two metres away from a raccoon, as in context A, but where a second raccoon is present, which is only one metre away from the speaker. Despite both being quite close, the speaker will now be able to refer to the

one-metre away raccoon as *this raccoon*, and to the two-metre away one as *that raccoon*, for contrastivity reasons. The difference between the two contexts can be modelled by taking r as pragmatically determined and, as such, readjustable according to the context: in context A, $r_{\mathrm{A}} \leq 2\mathrm{m}$, but in context B, $r_{\mathrm{B}} \leq 1\mathrm{m}$.

Evidence in favour of a vectorial analysis of demonstratives is provided by considering the properties of the proximity regions defined by NEAR: demonstratives display the same closure and continuity properties that, as mentioned above, can also be attributed to distance prepositions (e.g. *near*), as discussed by Zwarts (1997: section 5; and other works). In what follows, I discuss the issue in an informal and intuitive way; for formalisations, see Zwarts (1997: section 5).

A region is closed under an operation if, whenever that operation is performed on a vector within that region, the result will still yield a vector within that same region. As regards closure under shortening, if we take the region defined by a set of proximity vectors to one of the discourse atoms and make (one of) those vectors shorter, it will still define proximity to that discourse atom. As regards closure under lengthening, instead, if we take one vector defining the proximity-region of one of the discourse atoms and make it longer, it will *no longer* denote vicinity to that discourse atom.[12] Finally, as regards closure under rotation, if we take a vector from the region of one of the discourse atoms and rotate it (over a specific angle and in a plane), it will still be a vector of that region, i.e. vicinity is not sensitive to directionality. This largely holds for demonstratives too: assuming a single value for r in a given context (e.g. proximity is defined by means of vectors such that $r = 2\mathrm{m}$), any vectors shorter than r will still fall within the vicinity space, but any vectors longer than r will not. Further, any vectors with the same length r but a different direction is intuitively also pointing to something that falls within the vicinity space. However, directionality might play a role in the selection of demonstrative forms to some extent: consider the case of a referent located behind the ground. This is left here for future research.

Turning to topological continuity, that is: for a given function (here: the denotation of P), a property holds for every point in space defined by that function, *near* and demonstratives show both linear and radial continuity. Linear continuity amounts to saying that, taken any two vectors, u and w, belonging to a given region, if a third vector v is linearly between u and w (i.e. if v is a lengthening of u and is in turn lengthened by w), then v as well is in that region. Radial continuity, instead, amounts to saying that, taken any two vectors, u and w, belonging to a given region, if a third vector v is radially between u and w (i.e. if u and w form an acute angle and the shortest rotation from

[12]Not all prepositions are closed under lengthening. Zwarts draws a link between closure under lengthening and compatibility with PP modification: Ps closed under lengthening can be modified by MeasPs, whereas Ps not closed under lengthening cannot. In the case of *bij* (Dutch) and *near*, we have **twee meter bij NP*/**two meters near NP* (Zwarts 1997: 78–79), which suggests that these prepositions are *not* closed under lengthening. For a discussion on the modification of *near*, see Section 4.2.2.

the former to the latter crosses v), then v as well is in that region. Demonstratives vacuously satisfy these conditions (in default cases, only one vector is defined): it is intuitively true that, taken a vicinity region, if the distance or the direction denoted by a vector is comprised between the distance or direction of two other vectors belonging to that region, then the first vector will be part of that region. That is: if the vicinity region is defined by the combination of three (length-wise or radially) continuous vectors and the figure is located at the endpoint of the middle one, then the figure will also be included within the wider vicinity region.

In this section, I introduced in some detail the semantic and syntax of prepositions and I provided some initial support for a treatment of demonstrative forms along similar lines. On these grounds, in what follows I contend that demonstratives include a vectorial component.

4.3 The internal structure of DemPs

Building on the informal and the formal parallelisms between demonstratives and prepositions put forth so far, in this section I illustrate in full detail my proposal that the internal structure of demonstratives broadly mirrors the structure of the extended PP, as laid out by Svenonius (2010):

(18) a. x*PP* (Svenonius 2010)
$[_{\mathrm{Deg}_\mu\mathrm{P}}\ [_{\mathrm{MeasP}}$ 1 metre$]$ Deg_μ $[_{\mathrm{LocP}}$ in $[_{\mathrm{AxPartP}}$ front $[_{\mathrm{KP}}$ of $[_{\mathrm{DP}}$ the tree$]]]]]$

b. *DemP* (*current proposal, to be revised*)
$[_{\mathrm{DemP}}\ [_{\mathrm{MeasP}}$ (DISTANCE)$]$ NEAR $[_{\mathrm{FP}}\ [\pm\mathrm{A}/\pm\mathrm{P}]\ [_{\chi\mathrm{P}}$ OF $[_{\pi\mathrm{P}}\ \pi]]]]$

Thus, in parallel with the extended PP "one metre in front of the tree", I posit that the internal structure of DemP reads as "(one metre) near a specific discourse atom within ('of') the set of the current discourse atoms". The specific discourse atom may be the speaker, the hearer, both, or neither (as defined by the active person features in the given derivation and by their composition with π); otherwise, π, the set of current discourse atoms, may be not further specified (i.e. no person feature acts on π).

In this section, I explain my proposal in a stepwise fashion (Section 4.3.1) and lay out its implications for the DP-internal syntax of demonstratives, along with a preliminary structural implementation thereof (Section 4.3.2). On these bases, I show how my analysis can be applied both to nominal (pronominal and adnominal alike) and adverbial demonstratives (Section 4.3.3). But before proceeding, here I introduce some preliminary issues related to the structural comparison proposed in (18).

As the two structures in (18) show, one main difference with respect to the extended PP is the absence of an upper layer (akin to Svenonius' $\mathrm{Deg}_{(\mu)}$P in (18a)) in the internal DemP structure prosed in (18b). Recall that DegP (and

its variant Deg_{μ}P, which introduces a MeasP) maps the set of vectors denoted by the lexical semantics of the preposition that heads LocP onto the physical region defined by those vectors (the figure will be located inside that region by a functional *p* head). In what follows, I simply maintain that the figure, i.e. the (possibly silent) nominal modified by DemP, is located at the endpoint of one of the vectors that start at the relevant discourse atom, rather than within the region defined by the totality of those vectors (for some initial thoughts on how the figure is introduced, see Section 4.3.2).

This is due to two main reasons. Firstly, the postulation of an additional functional head does not seem to be supported by empirical evidence in the case of demonstratives, e.g. morphological decomposition (as discussed in Section 4.4 below). Secondly, on conceptual grounds, it seems preferable to assume that the figure be located at the endpoint of one single vector (or a small set thereof), rather than in the entire vicinity region. Intuitively, *this book* does not occupy the entire region near me, but only a subpart of it, the one I can refer to by pointing.

Further, note that I include a MeasP in the internal structure of demonstratives (e.g. *one metre*): this deserves some additional explanation. In fact, while in the case of projective prepositions a MeasP such as *one metre* provides the measure with respect to which a subset of the vectors defined by the preposition (e.g. *in*, (18a)) is selected, at least at face value no such modification is possible with bounded prepositions such as *near*, as discussed above with respect to example (11); see also fn. 12. Adverbial modification is instead compatible with *near*; thus, for readability, (18b) could be rather interpreted as "(very) near the relevant atom of the current set of discourse participants".

However, assuming a degree expression (such as *very*) as the modifier of the vicinity function NEAR would require extra structure to derive demonstrative systems that display more than one degree of distance from a given discourse atom. This case was discussed for Mundari in Section 3.2.4. The Mundari system is repeated here for convenience:

(19) *Mundari* (Osada 1992: 68; Bhat 2004: 167)

	DEM.1	DEM.2	DEM.3
Nearest	ni	in	hin
Nearer	ne	en	hen
Near	na	an	han

As (19) shows, given an anchor for the demonstrative form (as specified by the person features that act on the ground π; see (in 18b)'s FP), three distance degrees are possible with respect to it: a neutral one, and two "modified" ones. To derive them, DegP would have to be iterated, yielding a (VERY(VERY(NEAR))) sequence, i.e. with a degree modifier applying to the result of its previous application(s). This would make the structure overall heavy, while such a prolif-

eration of functions is not necessary under the assumption that the modifier is a MeasP. Under the MeasP hypothesis, in fact, different distances are straightforwardly captured by defining appropriate classes of vector lengths (according to the context): abstractly, these could be thought of as follows:

(20) a. class 1 (e.g. *ni*): $\vec{v} < r_{-n_2}$
b. class 2 (e.g. *ne*): $r_{-n_2} < \vec{v} < r_{-n_1}$
c. class 3 (e.g. *na*): $r_{-n_1} < \vec{v} < r$ (r: maximal $\vec{v}$ length for NEAR to apply)

Besides, there does not seem to be morphological evidence for the iteration of DegP, as shown in Section 4.4. However, as discussed with respect to example (12) above (see also Svenonius 2008: 69–71), the preposition *near* can be taken to simultaneously spell out two heads as a span: Loc, defining the relevant set of vectors that originate from the ground, and Deg, defining a measure for those vectors. Thus, Svenonius derives the incompatibility of *near* with (overt) MeasPs, as those would require a Deg_{μ}P rather than a DegP, under his account. Here, by this token, I take the abstract function NEAR to be always intrinsically modified by a contextually defined maximal vector length (beyond which the interpretation does not converge on the meaning of "vicinity"): as this modification hinges on distances, rather than degrees, I refer here to MeasP. In Section 4.4.3, I provide some initial evidence for the fact that MeasP and Dem are spelled out as a span by the same morphological unit.

One last preliminary issue worth mentioning here relates to the χ head introduced in the preliminary structure in (18b) and matching Svenonius' K(P). Recall that K is the *eigen* function, i.e. the function that gives the *eigenplace* of (the region occupied by) the ground-DP (see Wunderlich 1991 for the notion of *eigenplace*). Likewise, χ can be conceived of as a spatial function (from Greek *χῶρος/khôros* 'space', nominally following Harbour 2016: 179; but see Appendix C.2 for a comparison), that, under the structure in (18b), maps π (i.e. all its members: *i*, *iu*, *u*, and *o*) to the region it occupies.

However, this parallel is semantically less straightforward than it seems. In fact, taking regions to be convex (as standardly assumed in cognitive modellings; see e.g. Gärdenfors 2000), the set of the individual *eigenplaces* should not by default be equivalent to the sum of individual *eigenplaces*. That is, mapping π to its *eigenplace* by means of a spatial function χ does not equal to mapping the individuals in π to their *eigenplaces*, unless distributivity is forced upon the function, requiring extra assumptions and resulting in a semantically heavy model.[13] In what follows, I pursue a different implementation: as already anticipated in Section 3.3.2, I assume ontological differences across indexical systems. As explained there, the ontology for person as proposed by Harbour (2016) is rather flexible in nature and allows to define either individuals or regions as its elements. This is in line with previous research by Harbour

[13]Many thanks to Ora Matushansky and Joost Zwarts for raising these issues to my attention and, more generally, for discussing the ideas presented in this section with me.

(2006), who maintained that person and space deictics differ precisely in ontological terms, all else being equal (the person features and their syntax). This difference is rendered here with the addition of a subscript χ to indicate the elements of the spatial deictics ontology (regions, rather than individuals):

(21) a. $[\![\pi_\chi]\!] = \{i_{o_\chi}, iu_{o_\chi}, u_{o_\chi}, o_{o_\chi}\}$
b. $[\![\text{author}]\!] = \{i_\chi\}$
c. $[\![\text{participant}]\!] = \{i_\chi, iu_\chi, u_\chi\}$ (repeated from Section 3.3.2, (16))

Taking the atoms of space deictics (including demonstratives) to be spaces associated to persons, rather than persons subsequently mapped to spaces as in the functional sequence $\chi(\pi)$, makes the function compositions involved in the derivation of (the deictic centre of) demonstrative forms exactly parallel to those involved in the derivation of person oppositions in personal pronouns, as described in Section 3.3. Further, as the relevant atoms are already spaces, this solves the distributivity problem referred to above.

This ontological difference has structural bearings: in fact, the *eigenplace* function is already inherent to the denotation of the ground. As such, it is not necessary to introduce it by means of a dedicated head (χ). Thus, I drop the χP layer from the structure proposed in (18b) and I substitute π with π_χ, to refer to the modified ontology that collects regions associated to individuals, rather than individuals themselves:[14]

(22) *DemP* (*current proposal*)
$[_{\text{DemP}}\ [_{\text{MeasP}}\ \text{DISTANCE}]\ \text{NEAR}\ [_{\text{FP}}\ \pm\text{A}/\pm\text{P}\ [_{\pi_\chi\text{P}}\ \pi_\chi\,]]]]$

In short, demonstrative forms denote the set of vectors that originate from the ground, as defined by the function application of person features, [±author] and/or [±participant], to the ontology π_χ (FP and below), and that point to its vicinity, as defined by the function NEAR and its distance modification.

This concludes the preliminary discussion of my proposal, focused on how and why it departs from the structure of the extended PP put forth by Svenonius. With this in place, I assume without further discussion the derivation in (22) and move on to explain it in a stepwise fashion.

4.3.1 DemP step-by-step

My main claim in this chapter is that, given the informal and formal parallelisms that can be defined between demonstrative forms and prepositions, the internal structure of demonstratives can be modelled on the derivation for xPP as proposed by Svenonius (2010). Thus, demonstrative forms ultimately break down to the denotation of vicinity to the region occupied by one or more of the discourse atoms (i.e. the ground), much like a *near* locative PP.

Concretely, the person oppositions that can be regarded as primary in the semantics of demonstratives (in line with the discussion in Section 3.2) are

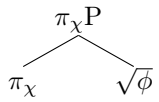
[14]For morphological evidence in favour of these two flavours of π, see Appendix C.2.

taken to be the argument of a spatial function (NEAR) that defines the set of vectors that originate from the (selected) ground and designates its vicinity. The extension of the vicinity region may be further modified by introducing contrastive classes of vectors in MeasP, yielding distance-oriented oppositions on top of the core person-oriented ones. The referent of the demonstrative (i.e. the figure) will be located at the endpoint of (a subset of) the relevant vectors, as preliminarily discussed in Section 4.3.2. In what follows, I go through the building blocks of the internal structure of demonstratives and explain their functioning in a stepwise fashion.

4.3.1.1 The person-related component

The derivation of demonstrative forms starts with the access to the ontology, denoted by the π_χ head merged at the very bottom of the functional spine:[15]

(23) a. $[\![\pi_\chi]\!] = \{i_{o_\chi},\ iu_{o_\chi},\ u_{o_\chi},\ o_{o_\chi}\}$

b. 

π_χ denotes the power set (or lattice) of the entire ontology, that is: the collection of regions associated to speaker i, hearer u, and other(s) o, o', o'', *etc.*

As discussed in Section 3.3, π_χ is the lattice onto which the person features perform their actions, as determined by their values (+ or −). Once again, under 1 Feature–1 Head assumptions (see Section 1.3.3), I take the active person features to head each its own functional phrase, which I provisionally call FP (if only one feature is active) or F_1P and F_2P: (if both features are active); this fully reproduces the ordering of the (successive) function compositions of person features with π_χ.[16]

Person features, when active, play a role similar to that of AxPartP: axial parts define a circumscribed subpart of the ground by making reference to its physical characteristics (i.e. according to the relevant axes: vertical, horizontal, sagittal); from there, the relevant vectors will originate. Although the regions denoted by the two person features do not correlate "axially" with topological properties of π_χ, they are likewise in a part-whole relation to it: specifically, the denotations of [author] and [participant] are both in a subset relation to that of π_χ:

(24) $[\![\text{author}]\!] \subset [\![\text{participant}]\!] \subset [\![\pi]\!]$
$\{i_{o_\chi}\} \subset \{i_{o_\chi},\ iu_{o_\chi},\ u_{o_\chi}\} \subset \{i_{o_\chi},\ iu_{o_\chi},\ u_{o_\chi},\ o_{o_\chi}\}$

[15] In what follows, for the sake of simplicity, I will be abstracting away from $\sqrt{\phi}$, the root used to refer to animate entities (Harbour 2014a: 191). For more on $\sqrt{\phi}$, see Section 3.3.1.

[16] Note that nothing in this account hinges exclusively on this point: it is possible to envisage the person features as bundled on the π_χ head, as proposed by Harbour (2016). Under this last option, the bundle of person features hosted by π_χ can crucially not be unordered, as under DM assumptions, but must be considered as partly ordered (see e.g. Georgi 2014 for extrinsically ordered ϕ bundles), to accommodate for variation in the ordering of the semantic compositions (see parameter (13c) in Section 3.3.1).

Moreover, by means of the operations that they perform on it, the person features partition the wider π_χ region into subregions, again in a fashion similar to AxPartP. Finally, the FPs that introduce the active person features are optional, just like AxPartP.

According to the available features, the whole typology of person contrasts encoded across demonstrative systems is derived by means of the function applications proposed by Harbour (2016) and illustrated in some detail in Section 3.3. For convenience, I report here the person-oriented deictic oppositions attested in demonstrative systems and their relative featural derivation:

(25) *Person contrasts encoded across demonstrative systems*

System	Feature(s)	Language	Partitions/System			
			i_{o_χ}	iu_{o_χ}	u_{o_χ}	o_{o_χ}
Unary	—	French	ce			
Binary/P	±P	Catalan	aquest			aquell
Binary/A	±A	Italian	questo		quello	
Ternary	±P(±A)	Spanish	este		ese	aquel
Quaternary	±A(±P)	Paamese	kele	ekok	kaisom	akēk

The absence of active person features (and, in turn, of FP), derives unary systems, where no person contrast is encoded, as is the case for French *ce* 'N:DEM.SG.M': *ce* is the only available demonstrative form (for the given ϕ features) and refers to the discourse space taken all together as the region in which the referent is located.

Note that this sets apart demonstratives and articles; in fact, although unary systems, at face value, do not have any deictic centre, they still retain a deictic semantics, even while lacking a person specification. Differently from non-demonstrative forms, demonstrative forms that lack a specific deictic centre still indicate that the identity of their referent is immediately accessible to the hearer, i.e. that their referent is physically located in the actual space in which the conversation takes place; thus, no inferencing is needed to identify that referent (see also Lyons 1999: 7–8, 17–21):[17]

(26) *French* (examples modelled on Lyons 1999: 7)

a. [Before a concert]
Qui est **le** chef d'orchestre ce soir?
who is DET.SG.M director of-orchestra this evening
'Who is the orchestra director tonight?'

[17]But see Kayne & Pollock (2010) for a different view, whereby *ce* is analysed as a definite article (rather than a deictic form) "specialized to require cooccurrence with a deictic element" (Kayne & Pollock 2010: 217), i.e. an overt (reduced) relative clause (and, most commonly, a reinforcer).

b. [Looking at photos of orchestra directors]
Qui est **ce** chef d'orchestre?
who is N:DEM.SG.M director of-orchestra
'Who is this/that orchestra director?'

The use of the definite article in (26a), which refers to an unknown referent, is only possible given the context: knowing that a concert is going to take place, it can be inferred that there will be an orchestra director (and that the latter is identical to the one being asked about). In (26b), instead, the specific orchestra director whose identity is unknown is immediately identifiable as the one in the photo, which is readily available in the extra-linguistic context. The direct link to the extra-linguistic context is provided by the demonstrative form (*ce*), whereas the referent of the definite article (*le*) is not immediately present in the extra-linguistic context, but must be additionally inferred from it.

I maintain that the ontology of spatial deictics, π_χ, and its combination with the proximity function NEAR (see Section 4.3.1.2) overall provide this semantic difference: in particular, π_χ ensures that the demonstrative form refers to the space related to the discourse participants even in the case in which no further (person) featural specification is provided, as for French *ce*. That is, unary demonstrative systems have as deictic centre the whole π_χ, i.e. the set of regions associated with the discourse-related atoms taken without any additional specifications (that is: without contrastive encoding of the different atoms), rather than having no deictic centre. Said otherwise, the absence of active person features does not correspond to the absence of an anchor and, in turn, of the spatial interpretation ultimately associated with demonstrative forms.

The other demonstrative systems are instead derived by the activity of one or both person features. As already discussed in Section 3.3.1, the two features are [author] and [participant], which denote the author and the participant lattices: according to the revised ontology, their semantics is as follows:

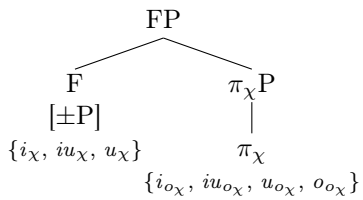
(27) a. $[\![\text{author}]\!] = \{i_\chi\}$

b. $[\![\text{participant}]\!] = \{i_\chi,\ iu_\chi,\ u_\chi\}$

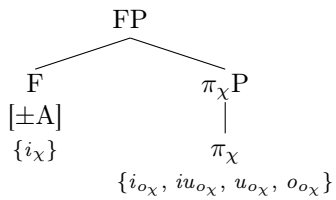
The two values, plus '+' and minus '−', determine the type of operation performed by the author and/or participant lattices on the π_χ lattice (or on the result of a previous composition with it) and, thus, derive the whole typology of its partitions.

In binary systems, π_χ can either be the argument of [±participant] or of [±author], deriving the semantic difference between participant-based binary systems (as in Catalan, (28a)) and speaker-based binary systems (as in Italian, (28b)), respectively:

(28) a. *Participant-based binary systems*

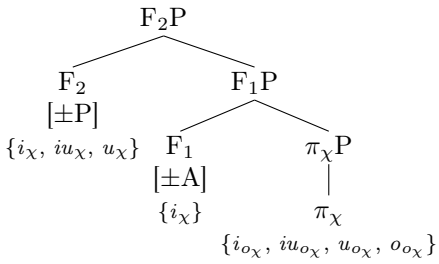


b. *Speaker-based binary systems*

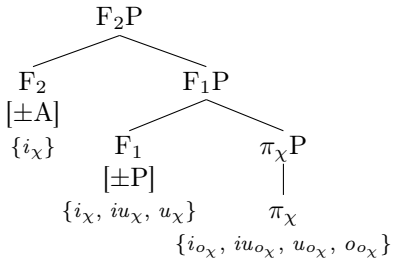


In ternary and quaternary systems, instead, both features are active, as summarised in (25): if [±author] composes with π_χ first, and [±participant] acts on the result of this first composition, then ternary systems are derived, as the one attested in some Sicilian varieties (29a); if, instead, [±participant] is the first to compose with π_χ, and [±author] subsequently composes with the result of this composition, a four-way person opposition (i.e. with the clusivity contrast) is derived, as in Paamese (29b):[18]

(29) a. *Ternary systems*



b. *Quaternary systems*



This exhausts the person-related semantic variation in demonstrative systems. In fact, the feature system presented in Section 3.3 derives the partitions listed in (25), but no other partition, as punctually demonstrated by Harbour (2016: chapter 4). Likewise, the discussion of the semantic variation presented in Section 3.2 showed that no other anchor for demonstratives can be defined beyond

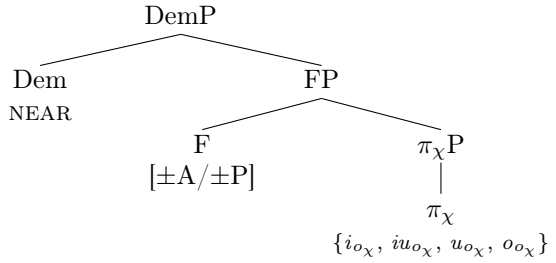
[18]Again, note that the recursive FPs are not crucial to the account to be developed here, but are assumed following a 1 Feature–1 Head architecture for syntax (see Section 1.3.3). In what follows, for brevity, I simply represent one FP, unless the featural composition of the specific example requires otherwise.

those listed in (25). Although the overview presented there by no means aims at an exhaustive cross-linguistic coverage, more comprehensive sources consulted (see in particular Diessel 1999,[19] 2013a; Imai 2003; Lander & Haegeman 2018a) reach the same conclusions; thus, according to the active person features, at this stage the derivation the person-oriented ground is complete.

4.3.1.2 The spatial component

The person-oriented ground (FP and below) is the argument of a NEAR function introduced by Dem: similarly to the locative preposition *near*, NEAR maps the ground to a set of vectors that start there and point to its vicinity:

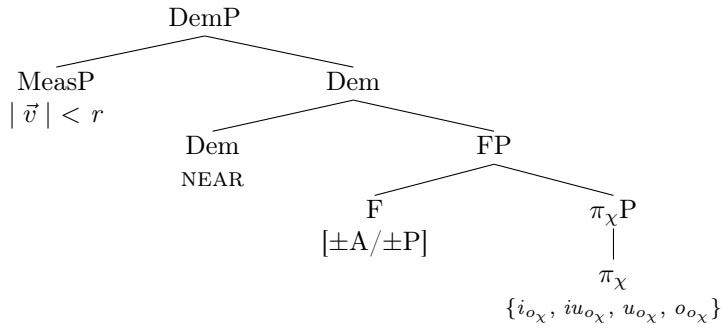
(30)



Note that demonstratives were already described as akin to vectors in Bühler's (1934) seminal treatment of deictic elements. Bühler, in fact, noted that demonstratives usually co-occur with pointing gestures. Specifically, he suggested that the deictic pointing associated to demonstratives serves the purpose of guiding the hearer's attention through the physical discourse space and towards the relevant figure. Diessel (2013b) further elaborated on this point by including, among the relevant pointing devices: manual pointing, eye gaze, and the general posture of the body. While the vectorial treatment proposed here is grounded in more formal considerations, Bühler's insight is further explored in Section 4.4.3, where I preliminarily argue that pointing gestures spell out the (otherwise null) Dem head and MeasP.

As already mentioned, the vectors' length is generally taken to be shorter than a pragmatically determined number r, which is introduced by MeasP and whose value depends on the given context:

(31)

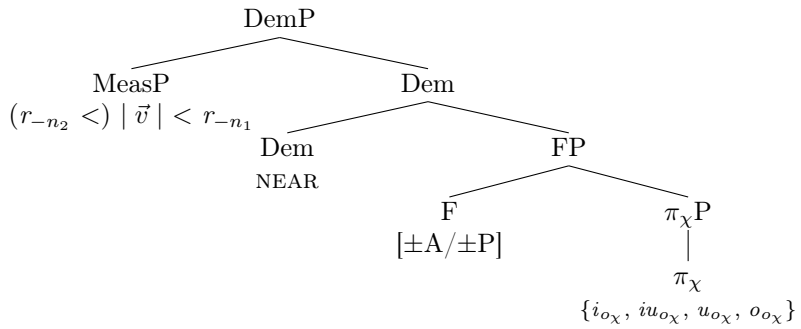


[19] "[P]erson-oriented systems may have up to four [deictic terms]" (Diessel 1999: 50).

Following the discussion in Section 4.2.2, and in particular Svenonius' (2008) treatment of bounded prepositions as spelling out both the Loc head and a higher Deg head, Dem can be taken to be spelled out together with a higher MeasP hosted in Spec,Dem, as a span (see Section 1.3.4); see Section 4.4.3.[20]

In Section 3.2, I showed that distance-based oppositions in demonstrative systems are to be regarded as modifying an underlying person-oriented contrast (see also Lander & Haegeman 2018a): here, I implement this intuition by maintaining that distance-based contrasts are incorporated within the structure proposed so far, and concretely that they are encoded by MeasP as contrastive classes of vector lengths:

(32)

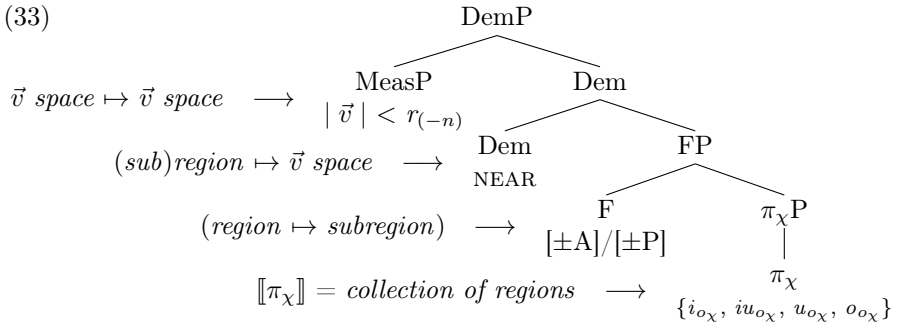


Thus, in demonstrative systems that display distance-oriented oppositions, MeasP does not only specify a default maximal length for the vicinity function to obtain (r), but it can make reference to as many different length classes as are encoded in the given system in a contrastive way (e.g. here: a class of shorter vectors, r_{-n_1}; or a class of vectors of intermediate length, $r_{-n_2} < \mid \vec{v} \mid < r_{-n_1}$, following the notation in (19)). Said otherwise, MeasP partitions vector lengths in different classes by setting upper and lower boundaries onto them. Varieties that encode a distance contrast use MeasP to contrastively modify the vector space relative to one or more of the deictic centres defined by the person features, deriving different degrees of proximity to any or all of the deictic centres. In each derivation, and for each context, the content of MeasP selects a subset of the vector space by imposing specific restrictions on the vectors' length.

To conclude, the functions of the different elements that constitute the internal structure of demonstratives introduced in (22) can be summarised as follows:

[20]This is further compatible with the proposal that Dem is spelled out by deictic gestures, as there is evidence that pointing itself is sensitive to distance contrasts; see Section 4.4.3 below.

(33)



The collection of regions denoted by π_χ, i.e. ultimately the physical space occupied by the discourse participants, and possibly a specific subset thereof (FP), is the origin of a set of vectors that describe the wider proximity region relative to those person-based regions (Dem, NEAR function). Proximity is computed in each and every pragmatic context and is formalised by imposing an upper limit (r) to the length of the vectors that define it (MeasP). If a language contrastively encodes different proximity areas (i.e. of different sizes), then it can be understood that MeasP introduces additional length limits that result in different classes of vectors. This is summarised in the tree above as r_{-n}, i.e. the maximal distance that still allows for a proximity interpretation (r), minus another pragmatically determined value that defines a different class of vector lengths (n).

4.3.2 Beyond DemP

Having laid out my proposal for the internal structure of demonstratives, here I briefly sketch its implications for the DP-internal syntax of DemP, especially inasmuch as the introduction of the demonstrative's referent (i.e. the figure, in prepositional terms) is concerned. The present discussion is carried out with an eye towards the derivation of the different demonstrative types (nominal *vs* adverbial), which will be presented in Section 4.3.3. Since the wider focus of this study lies in the relation between the internal syntax of demonstratives and the patterns of change in the encoding of deixis, however, I leave a fully fledged analysis to future research and only intend the following notes as a starting point therefor.

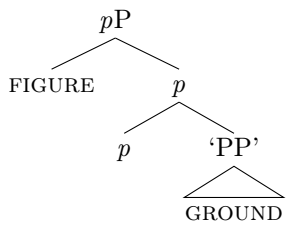
One of the main debates with respect to the DP-internal syntax of demonstratives concerns the first-merge position of DemP.[21] The two main opposing views are that demonstratives are merged in a high position in the DP, and possibly immediately below D (Cinque 2005; Roehrs 2010; *i.a.*); or that demonstratives are merged in a low position in the DP, very close to the NP and possibly right above it (Giusti 2002; Brugè 2002; Alexiadou *et al.* 2007;

[21] I assume that demonstratives are phrases, even when they seem to be heads (as in English "demonstrative determiners"): this has been a standard assumption since Giusti 1997, 2002 (see also Alexiadou *et al.* 2007: Part I, Chapter 4, and especially pp. 105 ff.).

Guardiano 2010; Leu 2015, Roberts 2017; *i.a.*). Under both approaches, cross-linguistic differences between the surface positions of demonstratives inside the DP are explained by DemP (and NP) movement, and constraints thereon. I also assume, without further discussion, that movement accounts for the surface position of demonstratives. In what follows, I illustrate the consequences of the analysis outlined in Section 4.3.1 above for the first-merge position of DemP.

Concretely, my proposal is modelled on the syntactic and semantic derivation for PPs. Recall that, in the xPP, the figure is inserted in the specifier of a functional pP as the external argument of the preposition (Svenonius 2003 *et seqq.*; see Section 4.2.2 and, specifically, (13)), in line with the neo-Davidsonian introduction of the (clausal) external argument through a functional v (Kratzer 1996). Simplifying, the introduction of the figure can be syntactically represented as follows:

(34)



Semantically, the spatial relation established between the ground and the figure of prepositions can be formalised by means of a type-shift operation (Zwarts 1997; Zwarts & Winter 2000; see Sections 4.2.1 and 4.2.3 above), whereby the location function (*loc*, in (2) and (4a) above; BE, in Zwarts 2014, following Jackendoff 1983) shifts the type of the PP from referential (PP denotes a purely spatial object) to predicative (examples modelled on Zwarts 1997: 60 and Zwarts 2014: 258–261):

(35) a. The raccoon near the tree.

b. *loc*(raccoon, *near*(the tree)) or BE(raccoon, NEAR(the tree))

Zwarts (2014) entertains the possibility that the shift-type function be recast syntactically as the head of a predicatively-conceived small clause,[22] where BE (or *loc*) establishes the relation between ground and figure (modified from Zwarts 2014: 261):

(36) [$_{\text{SC}}$ Raccoon [BE [$_{\text{PP}}$ near the tree]]]

This is compatible with the role of p in Svenonius' (2003) system, as explained above: for an explicit formalisation in this vein, see Pretorius 2017: 181 (p as "predicate-rendering").

[22]See Citko 2011 for an overview of small clauses.

If the parallel with prepositions that underlies my proposal for the internal structure of DemP is pursued with respect to the introduction of the demonstrative's referent, too, the foregoing implies a low first-merge position for demonstratives, at the very bottom of the extended NP. Note that such a low position is not the standard one for low demonstratives, which are argued to be first-merged above NP, instead, with instances of DP-final demonstratives derived by NP raising (as originally proposed for Spanish by Brugè 1996, 2002).[23]

Above, I was already working under the explicit assumption that the figure (i.e. the NP modified by DemP) is located at the endpoint of the (set of) vector(s) that start from (a subregion of) π_χ and have the topological properties defined by the NEAR function and its distance specifications: see in particular Section 4.2.3 for a preliminary formalisation. Here, I structurally implement this intuition by means of a functional head that establishes a relation between DemP and the figure: under this hypothesis, the figure is the external argument of the demonstrative, following the analyses of Svenonius (2003) and Zwarts (2014) for prepositions. Concretely, several implementations for the functional head, or relator, are possible. Here I quickly sketch (some of) them, but I remain substantially agnostic as to the exact formalisation.

The functional head involved in demonstrative constructions can be identified with the set-theoretic operation $\cap$ (intersection), following a speculation by den Dikken (2006: 17: "the relator [...] might uniformly be the logical operator '$\cap$', with predication being semantically represented as set intersection"). Once the referential value of DemP is established (the vicinity area relative to one of the discourse atoms), the functional head turns it into a predicate and introduces the figure, i.e. the subject of which that DemP is predicated, much as Zwarts' BE (2014; and 1997 *loc*):

(37) a. This raccoon = raccoon near i_{o_χ}
b. $\lambda x.\ \text{raccoon}(x) \wedge \text{BE}(x, \text{near}(i_{o_\chi}))$

Assuming the intersective semantics for the functional head ensures that, for x to be "this raccoon", x has both to be a raccoon and to be located in the vicinity of the speaker of the utterance. As Zwarts (2014: 261) shows, the attributive use of prepositions (*Ada is the girl near the station*, translated from Zwarts 2014: 261) produces a comparable intersective reading (*Ada is a girl* and *Ada is near the station*).

Similarly, the relator can be analysed as the logical operator for inclusion, i.e. as determining a set-theoretic subset relation '$\subseteq$'. As Manzini, Savoia, and Franco extensively argued in various works, an elementary inclusion predicative

[23] A partial exception is the "nP-internal xAP hypothesis" put forth by Leu (2015; see also 2007, 2008), who argues that demonstratives (and all adjectival modifiers, xAPs) are merged below NP as reduced relative clauses. However, Leu (2015: sections 3.5, 3.7), partially following Kayne's (1994) relative clause approach to adjectives, argues that the modified noun is merged inside the xAP, too, and crucially below its modifier(s). Thus, ultimately, the proposed first-merge position for DemP is low but prenominal, differently from what I am discussing here.

function underlies several constructions, among which locative relations, as proposed in most detail by Franco *et al.* (2021).[24] Taking inclusion to be, more concretely, an instantiation of the "zonal inclusion" relation (first proposed by Belvin & den Dikken 1997) would straightforwardly account for the inclusion of the figure within the physical zone denoted by DemP (i.e. the vicinity to (one of) the discourse atoms π_χ): figure $\subseteq$ DemP = near π_χ.

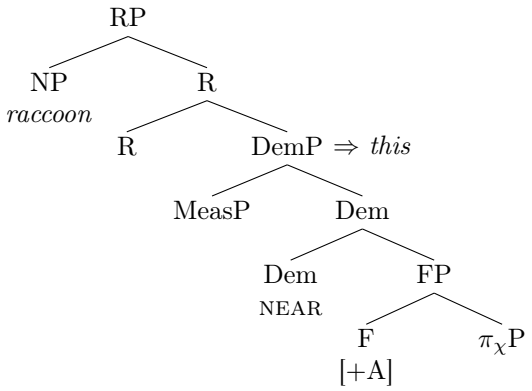
A more explicitly spatially-oriented relational head has been proposed by Gruber (2013) as part of the internal structure of indexical personal pronouns: there, a relational head $\pm$AT (cf. preposition *at*) establishes a "spatial relational predicate [...] that relates a sentient being to a certain location" (Gruber 2013: 29). Structurally, the "sentient being" is in the complement of $\pm$AT, while the anchoring "location" is in its specifier. $\pm$AT is inspired by the relational head with which Ritter & Wiltschko (2009) identify INFL: as such, INFL performs an anchoring function (specifically: it anchors the eventuality, lower in the structure, to the utterance, higher in the structure) and can be analysed as "a predicate of coincidence (+/− coin)" (Ritter & Wiltschko 2009: 156; see also Ritter & Wiltschko 2014). This way, the complement of the relational head can be anchored (or not) to the specifier according to whether it coincides (or not) with it in terms of time, space, or person.

These accounts show a directionality difference: assuming that the relator instantiates the set-theoretic operation of intersection '$\cap$' or inclusion '$\subseteq$' amounts to taking the first-merge position for DemP to be in the complement position, with the figure merged as its external argument in the specifier position: this is compatible with the available accounts for prepositions. Assuming an anchoring function in terms of (locative) coincidence, instead, leads to a higher first-merge position for DemP, in the specifier of the relational head, and in line with the accounts given for low demonstratives referred to above. This second option would be compatible with the $\supseteq$ operator (i.e. the reverse of $\subseteq$) proposed by Franco & Manzini (2017), too, although they restrict its occurrence mainly to instrumentals contexts. Despite the differences across these accounts, they all essentially share the idea that relational heads are to be regarded predicatively: this is in line with the approaches to p in the extended PP.

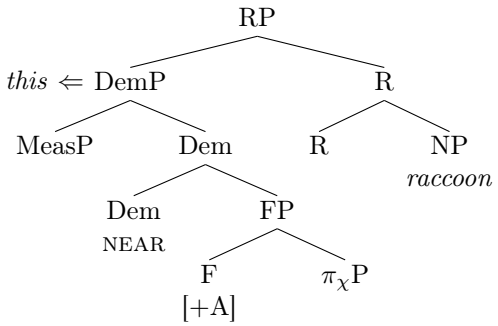
On these grounds, a provisional structural implementation follows. Note that I do not attribute any specific content to the functional head, for the time being, and simply borrow R ("relator") from den Dikken (2006; see below for an explicit comparison):

[24] Other constructions reduced to $\subseteq$ are: *have* auxiliary (Manzini & Savoia 2011: chapter 6); dative, genitive, and ablative case, possessives, and the corresponding inflectional morphology (Manzini & Savoia 2011: chapter 8; Franco *et al.* 2015; Manzini & Franco 2016); obliques (Franco *et al.* 2021). Moreover, Franco & Manzini (2017) argue that instrumentals instantiate the inverse relation, i.e. superset-of '$\supseteq$'.

(38) a. *DemP in complement position (“very low DemP”)*



b. *DemP in specifier position (“low DemP”)*



Under the first option, DemP is first-merged as the complement of the functional head, while the figure is in its specifier; under the second option, DemP is first-merged as the specifier of the functional head, while the figure is in its complement. In any event, I follow Leu (2015) in taking that DemP moves from its first-merge position and lands in the specifier of a FP above NP, i.e. its “cartographic” position, as determined most notably by Cinque’s research (see the discussion on Greenberg’s Universal 20 in Cinque 2005; Cinque 2020 shows preliminary evidence in favour of a finer-grained proposal, with distinct positions for deictic and anaphoric demonstratives and, for the former type, for proximal and distal ones). Which factors drive and constrain the movement of DemP from its putative (very) low first-merge position so that no overgeneration is engendered (especially with respect to Universal 20) is left for further research.

Likewise, I leave a full evaluation of the consequences of my account for the internal structure of DemP and its parallelism with prepositions for the DP-internal syntax of DemP to further investigation, especially (but not limitedly) with respect to the following issues:

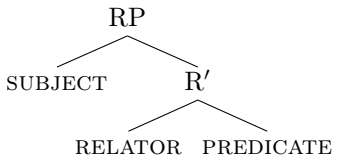
- the substantial content of the relational head and the formalisation of the relation between DemP and its figure. In this section, the relation is

clearly predicative in nature, but assuming that NP and DemP constitute a small clause (following Zwarts' 2014 intuition) does not in and of itself imply a predicative analysis: see Matushansky (2019) for an extended critique of predicative approaches to small clauses;

- if the predicative relation is upheld, a full evaluation of the relation of DemP and NP against den Dikken's (2006) account for predication relations is desirable. Under that analysis, predication is always mediated by a relator, which is an "abstract functional head[, i.e.] a placeholder for any functional head in the structure that mediates a predication relation between two terms" (den Dikken 2006: 15). As den Dikken extensively argues, the relation established by R is non-directional: accordingly, two predicative configurations can be envisaged. Note however that, on preliminary considerations, the inclusion of DemP into one of those structures is problematic under several counts.

  – Predicate-complement configuration:

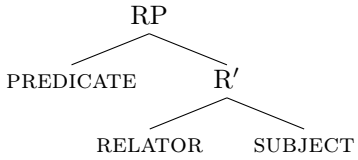
  (39) (den Dikken 2006: 3)

  Under this implementation, DemP has to move around the figure (Predicate Inversion). However, den Dikken takes this to be an instance of A-movement that is hardly implementable for DemP. Moreover, as den Dikken takes R to be a phase head and to mediate Predicate Inversion by moving and thus shifting the phase domain, the figure would be fully included in a lower phase and as such inaccessible to further operations. This is at least at odds with the realisation of DP-internal agreement; whether it could be taken that DemP mediates DP-internal agreement once it has valued its $u\phi$ features with NP is left for further research.

  – Predicate-specifier configuration:

  (40) (den Dikken 2006: 3)

  Under this configuration, and following den Dikken, DemP is expected to be frozen in Spec,R, preventing the surface order to be realised. Besides, phase-related considerations apply to this case as well. As an aside, note that in this case DemP would be the external

argument of the figure: while it is unclear how the type-shift operation could be ensured under this perspective, it should be pointed out that Roberts (2017) suggested that DemP be in fact the external argument of *n*.

For the sake of simplicity, in what follows I will only work with the "very low DemP" structure in (38a), i.e. DemP first merged as the complement of the relational head; however, every aspect of the following discussion can be recast in the "low DemP" configuration in (38b), as I remain agnostic as to the directionality of the relation.

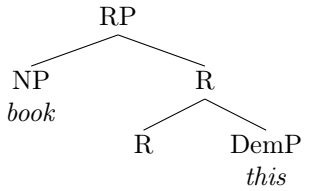
4.3.3 Nominal and adverbial demonstratives

Up to this point, I only addressed semantic and syntactic matters in relation to nominal demonstratives; nonetheless, Chapter 2 clearly showed that nominal and adverbial demonstratives behave in the same way in diachrony and contact alike. Besides, nominal and adverbial demonstratives have a comparable intuitive semantics: just as *this* can be reduced to "X near me/the speaker", *here* can be thought of as "(PLACE) near me/the speaker". Therefore, I assume that adverbial demonstratives (*here*, *there*) have a comparable internal structure: this is a prerequisite for the unitary explanation for the reduction patterns to be put forth in Chapters 5 and 6.

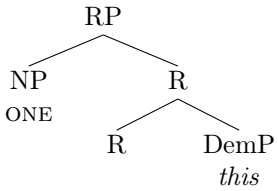
In this subsection, I give a structural account for the different classes of demonstratives. Specifically, I show how the internal structure of demonstratives is shared across demonstrative elements, and how categorial differences (and syntactic differences that are linked to those) depend on the syntactic environment in which these forms are first-merged.

In the foregoing, I proposed that (nominal) demonstratives introduce their figure by means of a relator (see Section 4.2.3 for a preliminary semantic approach and 4.3.2 for provisional syntactic implementations). The latter is a functional head that establishes a (possibly: predicative) relation between the figure NP and the DemP, which in turn defines the wider proximity region related to (one of) the discourse participants. Here, I posit that the NP is overt for adnominal demonstratives ("this book", (41a)), and covert for pronominal ones ("this ONE", (41b)):[25]

(41) a.



b.



[25] I use ONE in a pre-theoretic fashion to refer to the pronominal use of demonstratives, i.e. when they co-occur with an empty NP. See also Kayne (2005a) and Kayne & Pollock (2010) for the assumption of a silent THING or PERSON, for inanimates and animates respectively. Recall that a full account for the DP-internal syntax of demonstratives is left pending here.

Empirical evidence for the availability of a silent element, as in (41b), comes from varieties that lexicalise the empty NP. For instance, Korean pronominal demonstratives are formed by combining the relevant adnominal form (*i* 'N:DEM.1', *ku* 'N:DEM.2', *ce* 'N:DEM.3') with "a 'defective noun' which indicates the type of referent" (Diessel 1999: 20–21; examples from the same source):

(42) a. ku i
N:DEM.2 person
'That (one/person)/he/she/it.'

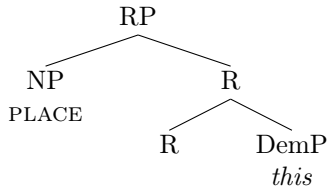
b. ce il
N:DEM.3 thing
'That (one/thing/fact).'

Moreover, I take DemP to possibly carry a set of uninterpretable ϕ features that need to be valued against the matching interpretable set on NP. This results in overt DP-internal agreement morphology on DemP, as shown in Section 4.4 below (see also the discussion in Section 3.5). Note that, with respect to the specific implementation assumed for the first-merge position of DemP (in the complement or in the specifier of R), and assuming that ϕ features are checked under c-command, under the "low DemP" hypothesis (DemP in Spec,R) the uninterpretable ϕ features are valued immediately via an Agree operation, while under the "very low DemP" hypothesis (DemP in complement position) they are valued while DemP is on its way to its specifier position higher up in the DP (its "cartographic" position).

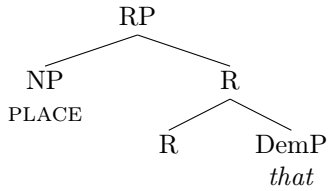
Adverbial demonstratives can be assumed to have the same syntax as nominal ones. Evidence for the derivation of adverbs along the lines proposed in Section 4.3.1 above comes for instance from adverbial demonstratives that encode directionality distinctions: these can be immediately captured as the lexicalisation of a higher path(-like) head, akin to the one proposed for directional prepositions (see Section 4.2.2). Consider the English series *here* 'here, locative', *hither* 'here, allative' and *hence* 'here, ablative': as this example shows, the path-related morphology is at the end of the word, which is consistent with the internal structure proposed in this chapter. Path oppositions are commonly attested in adverbial demonstratives cross-linguistically: for a systematic overview of 250 languages under this respect, see Nintemann *et al.* (2020).

Granting that adverbial demonstratives include a vectorial component and a person-oriented ground, they can be derived by means of a silent nominal argument as well, and concretely a silent PLACE head:

(43) a. *Here*



b. *There*



Proposals in this direction have been put forward on different grounds.

On empirical grounds, this approach is supported by languages in which adverbial demonstratives are transparently composed by an NP 'place' and a nominal demonstrative form. Again, Korean constitutes one such case:

(44) *Korean adverbial demonstratives* (Diessel 1999: 32)

A:DEM.1	A:DEM.2	A:DEM.3
yeki	keki	ceki
i eki	ku eki	ce eki
N:DEM.1 place	N:DEM.2 place	N:DEM.3 place

In generative literature, this idea was originally formulated by Katz & Postal (1964), who advocated for the following decompositions:

(45) a. There = at that (*the* + *at*) place
b. Here = at this (*the* + *is*) place (Katz & Postal 1964: 134–135)

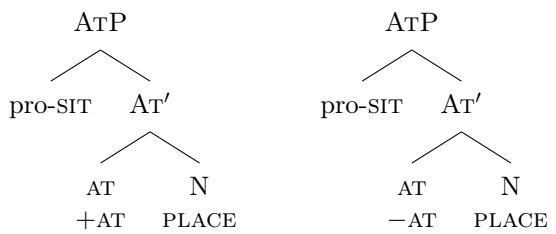
To capture the distribution of the preposition-drop, Katz & Postal propose that prepositions are dropped "before nouns which are composed of attached determiners plus pro-forms" (p. 135; thus *here*/*there*, but *at this*/*that place*).

Similarly, Kayne (2005a) argues that demonstrative adverbs contain a silent PLACE in their structure:

(46) a. here ⇔ THIS here PLACE
b. there ⇔ THAT there PLACE (Kayne 2005a: 67)

Finally, Gruber (2013: 197) derives *here* and *there* as follows:

(47) a. *Here* b. *There* (Gruber 2013: 197)



Here is derived if PLACE is located at the utterance location (pro-SIT), otherwise *there* is derived. This proposal captures instances of adverbial demonstratives that turn into indexical pronominal forms (i.e. 1st and 2nd person), which only differ with respect to the silent noun involved (PLACE for adverbs, as in (47); MAN for pronouns).

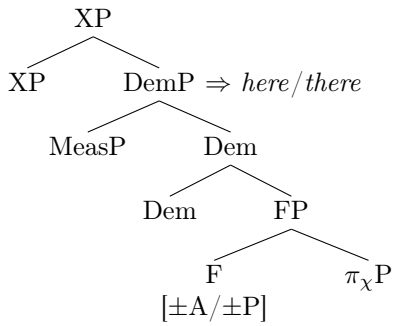
However, while the hypothesis of a silent PLACE enjoys a disparate array of supporting evidence (from morphology, syntax, and diachronic change), the issue is less straightforward than for the nominal domain. There is in fact at

least one question that deserves further attention, namely: given the hypothesis of an ultimately nominal structure, how does the adverbial status of adverbial demonstratives arise?

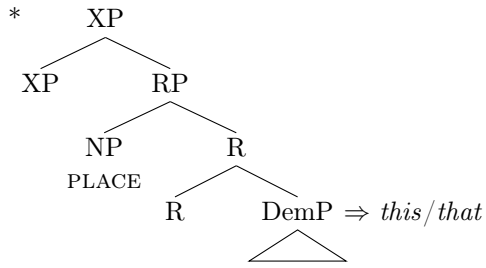
One option is to capitalise on the role of prepositions (see Katz & Postal 1964; Gruber 2013; see also the licensing condition for *here* and *there* proposed by Kayne 2005a: 71) in the derivation of adverbial demonstratives, as opposed to nominal ones. This naturally derives their non-occurrence in most argumental contexts. However, this does not follow straightforwardly from the present proposal and additional assumptions (e.g. a dedicated licensing condition) need to be postulated.

An alternative option is that, in the case of adverbial demonstratives, DemP does not undergo a type-shift operation, that is: adverbial demonstratives do not enter a predicative relation with an (external) argument (their figure), but retain a full referential status, as per the discussion in Section 4.3.2 (see also, more extensively, Zwarts 2014). This might derive their use as adjuncts:[26]

(48) a.



b. *



Here I remain agnostic with respect to the full formalisation of the internal structure of adverbial demonstratives. However, an account under which the latter are internally complex and modelled along the same lines as those explored in the foregoing for nominal demonstratives seems viable; besides, this

[26]One potential issue with this approach regards the uninterpretable ϕ set: adverbs (and demonstrative adverbs, too) do not generally enter into agreement relations and can be thought of as lacking the uninterpretable ϕ set. Yet, I assume the derivation up until Dem to be the same for nominal and adverbial demonstratives, which raises the question as to how to rule out agreement with adverbs at all. I leave this to further research.

approach may capture empirical observations related to adverbial demonstratives as well as theoretical intuitions.

As an aside, note that an analysis whereby demonstrative adverbs do not introduce a new figure is compatible with the use of adverbial-like forms in demonstrative-reinforcer constructions, already mentioned in Chapters 2 and 3. Most scholars (Bernstein 1997, 2001; Brugè 1996, 2002; Leu 2007, 2008, 2015; Roehrs 2010) regard reinforcers as demonstrative adverbs in their own right;[27] however, reinforcers clearly do not introduce a new figure:

(49) *Italian*

questa	cosa	qui	quello	ONE	là
N:DEM.1	thing	REINF.1	N:DEM.2/3		REINF.2/3

'This thing here' / 'That there'

In (49), the nominal demonstratives (*questa*, *quello*) and the reinforcers (*qui*, *là*) crucially refer to one and the same figure (a given thing, or a covert NP). In fact, reinforcers are typically analysed as strengthening or further determining the deictic component of the nominal demonstrative with which they combine (see e.g. Roehrs 2010: 227; variation with respect to their exact function may be reduced to the featural content of the nominal demonstrative, as proposed by Terenghi 2019, 2021a). Further, they have been related to information structure and may be ultimately regarded as focus markers (Bernstein 2001; Terenghi 2021a). In neither case do they seem consistent with the introduction of an additional, dedicated figure.[28]

4.4 Morphological compositionality

In the previous section, I proposed to extend the derivation of extended PPs to the internal structure of demonstratives. So far, the argumentation has proceeded on purely theory-internal bases: assuming a semantic parallelism between prepositions and demonstratives, I advanced a parallelism in derivation. Here, I illustrate instances of one-to-one mapping between the internal structure of demonstratives proposed in the foregoing and the morphology of demonstratives; for the Spell-Out model assumed here, see notes in Section 1.3.4.

[27]Note, however, that reinforcers may behave differently than demonstrative adverbs (see Bernstein 1997: 90–91; Roehrs 2010: 259–260). For an examination of the issue, see Terenghi (2021a: 313–314), where they are argued to be non-categorised demonstratives.

[28]I leave the syntax of reinforcers to future research. However, note that reinforcers cannot occur without a nominal demonstrative (Bernstein 1997: 91) and that they encode (minimally) person features (cf. their adverbial counterpart; see also French *-ci*/*-là* 'REINF.1/REINF.2/3', which provide the unary demonstrative *ce* 'N:DEM' with a fully specified deictic centre). Two preliminary options to capture their distribution are: reinforcers may be forms that lack both figure and ground and that spell out FP (see again the French case; however, this does not explain (49), where FP is already active); reinforcers may be construed as the by-product of Vocabulary Insertion (see a Fission account in Terenghi 2021a).

The empirical domain of this subsection is restricted to Romance languages and, for reasons of space, I only consider one example for each semantic type (number of person and distance oppositions encoded by the demonstrative system, across the two domains).[29] The overview presented here is conceived as comprehensive of all points of variation attested across the Romance family and provides a structural account for all types of demonstrative systems discussed in Chapter 2.

4.4.1 Person-oriented contrasts only

This subsection presents the variety of person-oriented contrasts encoded in Romance demonstratives. As quaternary demonstrative systems are not attested across Romance languages (at least, not overtly; for discussion, see Chapter 5), I will not treat them in detail here in the interest of space.[30]

4.4.1.1 Unary demonstrative systems

Unary demonstrative systems are demonstrative systems that only display one term and, as such, do not encode any deictic distinction (on their own): as discussed in Section 3.3.2 for French *ce*, unary systems are derived by the lack of composition of person features with π_χ, i.e. by taking the whole π_χ lattice as the ground.

Unary nominal demonstrative systems are instantiated most notably in Gallo-Romance varieties (for an overview, see Ledgeway & Smith 2016: sections 54.1.2, 54.1.7) and can always be combined with a reinforcer (i.e. a DP-internal adverbial-like demonstrative; see Section 4.3.3): this compositionally yields a binary (or, less frequently: ternary) distinction. Given that unary nominal demonstratives can also be used on their own, in which case they plainly instantiate the absence of partitions of π_χ, I will treat such systems here in their own right.[31] Here I consider some Friulian varieties in which the nominal demonstrative series only consists of the original distal demonstrative (*kel*), as attested by its compatibility with both the proximal and the distal reinforcer:

[29]Preliminary evidence from a wider set of languages (see the WALS' feature 41 dataset, Diessel 2013a) suggests that the morphological decomposition of demonstratives into a series of morphemes that spell-out the syntactic heads/semantic functions layered inside DemP is typologically valid. I leave such a wider cross-linguistic study to future research.

[30]For a discussion of the morphology of Waray-Waray (Austronesian), see Terenghi 2021c.

[31]In varieties with unary (nominal) demonstrative systems, the conditions on the use of reinforcers vary cross-linguistically; typically, however, reinforcers are dispreferred in non-exophoric contexts (see for instance their incompatibility with demonstratives modified by relative clauses in French: *ce*(**ci*/*là*) *que*... 'N:DEM(*REINF.1/REINF.2/3) that...'), unless the construction is fully grammaticalised (as is the case in some French varieties: Bernstein 1997: 96).

(50) *Friulian* (with microvariation; Ledgeway & Smith 2016: 881)

ke-l	(ka)	ke-l	(la)
N:DEM-SG.M	here	N:DEM-SG.M	there
'This (here)'		'That (there)'	

As suggested by the glossing, *kel* can be taken to be bimorphemic. This becomes clear once the plural form, *ke-i* 'DEM-PL.M', is considered, too. Singular and plural forms share a *ke-* morpheme and are differentiated by the inflectional endings *-l* and *-i*. As such, I take *kel* to be compositional and, concretely, to spell out the demonstrative base π_χ (*ke-*) and the uninterpretable ϕ features (e.g. *-l* 'SG.M'):

(51) *Unary systems, Friulian*

[$u\phi$	[MeasP]	[Dem	[F_2	[F_1	[π_χ]]]]]
-l	ø				ke-

As regards the uninterpretable ϕ features, henceforth '[$u\phi$]', in Section 3.5 I assumed that demonstratives encode a set of [$u\phi$] independent of the set of indexical person (and, more rarely, number and gender) features that contribute to the semantics of the demonstrative form (see also the discussion in Section 4.3.3 above). More concretely, for the current discussion, I take the [$u\phi$] set to be encoded high in the internal structure of demonstratives, possibly on the Dem head: this would be sufficient to ensure its ability to interact with the relevant features within the DP even under the view that a word is a phase. Evidence for a high position comes from the linearisation of [$u\phi$] in Romance languages, where the exponent of [$u\phi$] is linearised at the end of the word (inflectional ending), in compliance with the Mirror Principle (Baker 1985). Thus, in what follows, I represent [$u\phi$] at the top of the sequence of elements inside DemP.

Note that unary systems are cross-linguistically extremely rare (in WALS' feature 41, Diessel 2013a only reports them for 7 languages, out of 234 considered). Interestingly, such systems do not seem to be available in the adverbial domain: the extensive collection of demonstrative adverbs gathered by Nintemann *et al.* (2020; 250 languages) does not present any system that only has one demonstrative adverb (see Nintemann *et al.* 2020: Appendices I–V for the full sets of forms). One possible exception may be instantiated by French original non-speaker-oriented *là* 'there', which more and more consistently also covers the speaker-related domain (most notably in the expression: *Je suis là* 'I am here', lit.: 'I am there'). However, and despite the semantic change in progress in the French adverbial series, an additional form is available, namely *là-bas* 'down there' (lit.: 'there-down'), that regularly denotes longer distances and entertains thus a (partial) binary opposition with *là*.

4.4.1.2 Binary demonstrative systems: participant-based

Participant-based binary demonstrative systems consist of two terms that define a two-way deictic opposition between the space of the discourse participants and the space of the non-discourse participants: as illustrated in Section 3.3.2 for Catalan *aquest–aquell*, participant-based binary demonstrative systems are derived by the activation of the [±participant] feature, which composes with π_χ to yield a bipartition.

Participant-based binary demonstrative systems are well-represented among Ibero-Romance (including Brazilian Portuguese), Sardinian, and southern Italo-Romance varieties (for a full review, see Ledgeway & Smith 2016: sections 54.1.5.1–54.1.5.2, 54.2.3). For illustration purposes, I consider here the Barese pronominal system (upper-southern Italo-Romance, Andriani 2017):[32]

(52) *Barese* (Andriani 2017: 118–119)

cù-ss-ə	cù-dd-ə
N:DEM-1/2-SG.M	N:DEM-3-SG.M
'This (near me/you/us)'	'That (far from us)'

The Barese system presents a demonstrative base, *cu-*, followed by dedicated person-oriented morphology: *-ss-* for the participant-oriented semantics, *-dd-* for the non-participant-oriented semantics. The DP-internal [$u\phi$] agreement morphemes in Barese all reduced to -ə : as such, -ə can be regarded as (undifferentiated) inflectional material. Note however that Barese is a metaphonetic variety (Andriani 2017: 72), i.e. one in which original final high vowels (-U for SG.M, -I for PL.M) triggered raising of the tonic mid-vowel (cf. the non-metaphonetic forms *chè-ss-ə* 'N:DEM-1/2-SG.F' and *chè-dd-ə* 'N:DEM-3-SG.F'). As such, the distinctive inflectional morphology is actually word-internal, rather than at the end of the word, and the tonic vowel can be regarded as spelling out [$u\phi$]. However, given the historical origin of the word-internal inflection, I will simply represent -ə as associated to [$u\phi$]. With this remark in mind, the Barese system can be represented (albeit in a simplified way) as follows:

(53) *Binary systems, participant-based: Barese*

[$u\phi$	[MeasP]	[Dem	[F_2	[F_1	[π_χ]]]]]
-ə	ø			-ss-$_{[+P]}$	cu-
-ə	ø			-dd-$_{[-P]}$	cu-

The transparent morphological composition of demonstrative forms is sometimes also attested in the adverbial domain, as is the case for Catalan:

[32]The adnominal system shows the same semantic organisation, but an etymologically different exponent in the participant-oriented term: *stu*, from an erstwhile speaker-oriented form (see the discussion in Section 2.2.3.2).

(54) a. *Catalan* (Ledgeway & Smith 2016: 892, 895)

a-quí	a-llí
A:DEM-1/2	A:DEM-3
'Here (near me/you/us)'	'There (far from us)'

b. *Binary systems, participant-based: Catalan*

[$u\phi$	[MeasP]	[Dem	[F_2	[F_1	[π_χ]]]]]
	ø			-quí$_{[+P]}$	a-
	ø			-llí$_{[-P]}$	a-

Here, the demonstrative base *a-* is followed by the participant-oriented morphology (*-quí*) or by the non-participant-oriented morphology (*-llí*). No agreement material is available, as is usually the case for adverbs.

4.4.1.3 Binary demonstrative systems: speaker-based

Speaker-based binary demonstrative systems are made up of two forms that create a two-way deictic opposition between the space related to the speaker and the space not related to the speaker: as shown in Section 3.3.2 for Italian *questo–quello*, speaker-based binary demonstrative systems are derived by the composition of the [±author] feature with π_χ to yield a bipartition.

Speaker-based binary demonstrative systems are present all across the Romance domain, from south American Ibero-Romance varieties to Romanian varieties, and are the most well-attested ones (for a survey, see Ledgeway & Smith 2016: sections 54.1.1, 54.2.1). In what follows, I examine the Megleno-Romanian nominal demonstrative system:

(55) *Megleno-Romanian* (Daco-Romance; Ledgeway & Smith 2016: 879)

ts-ist-a	ts-el-a
N:DEM-1-SG.F	N:DEM-2/3-SG.F
'This (near me)'	'That (far from me)'

The Megleno-Romanian forms show a demonstrative base *ts-*. Next come two different morphemes, *-ist-* or *-el-*, that respectively denote the speaker-related and the non-speaker-related domains. Finally, *-a* is the [$u\phi$] agreement inflection marker (for SG.F):

(56) *Binary systems, speaker-based: Megleno-Romanian*

[$u\phi$	[MeasP]	[Dem	[F_2	[F_1	[π_χ]]]]]
-a	ø			-ist-$_{[+A]}$	ts-
-a	ø			-el-$_{[-A]}$	ts-

Likewise, in the adverbial domain, the system of the upper-central Italo-Romance variety of Amerino is morphologically transparent:

(57) a. *Amerino* (Ledgeway & Smith 2016: 891)

atto-kuà	atto-llà
A:DEM-1	A:DEM-2/3
'Here (near me)'	'There (far from me)'

b. *Binary systems, speaker-based: Amerino*

[$u\phi$	[MeasP]	[Dem	[F_2	[F_1	[π_χ]]]]]
	ø			-kuà$_{[+A]}$	atto-
	ø			-llà$_{[-A]}$	atto-

4.4.1.4 Ternary demonstrative systems

Ternary demonstrative systems consist of three contrastive terms, resulting in a three-way deictic opposition between the space related to the speaker, the space related to the hearer, and the space not related to either of them: as discussed in Section 3.3.2 for Spanish *este–ese–aquel*, ternary demonstrative systems are derived by the activation of both [±author] and [±participant], which compose with π_χ in this order, resulting in its tripartition.

Ternary demonstrative systems are still well attested in Ibero-Romance and central and southern Italo-Romance varieties and come in two main types: ternary systems in which the hearer-oriented term is only used in pragmatically marked cases (typically: to express the hearer-related area in contrast to the speaker-related one), or ternary systems in which the hearer-oriented term is used systematically (for an overview, see Ledgeway & Smith 2016: sections 54.1.3–54.1.4, 54.2.2, 54.2.4; see also Section 2.2.3.2). Here I only focus on the latter type, as exemplified by some Sicilian varieties (Ledgeway & Smith 2016: 884):

(58) *Sicilian* (Mussomeli; Ledgeway & Smith 2016: 885)

chi-st-u	chi-ss-u	chi-ddr-u
N:DEM-1-SG.M	N:DEM-2-SG.M	N:DEM-3-SG.M
'This (near me)'	'That (near you)'	'That (far from us)'

Sicilian nominal demonstrative forms share the demonstrative base *chi-*. This is followed by the person-oriented morphology, spelled out as a span:[33] *-st-* for 'near the speaker', $+P(+A(\pi_\chi))$; *-ss-* for 'near the hearer', $+P(-A(\pi_\chi))$; and *-ll-* for 'far from both', $-P(\pm A(\pi_\chi))$.[34] In turn, these morphemes are followed by the [$u\phi$] inflection (*-u* 'SG.M'):

[33]For a one-to-one mapping between person features and morphology, see the morphological decomposition of Waray-Waray (Austronesian) nominal demonstratives in Terenghi 2021c.

[34]Recall that, to derive $\{o_o\}$ in tripartitions, the feature value of [author] is ambiguous (Harbour 2016: 92). I reconsider this issue in Section 5.4.2.

(59) *Ternary systems: Sicilian* (*Mussomeli*)

[$u\phi$	[MeasP]	[Dem	[F_2	[F_1	[π_χ]]]]]
-u	ø		-st-$_{[+P(+A)]}$		chi-
-u	ø		-ss-$_{[+P(-A)]}$		chi-
-u	ø		-ddr-$_{[-P(\pm A)]}$		chi-

A comparably transparent morphology is displayed by Teramano (upper-southern Italo-Romance) adverbial demonstratives:

(60) a. *Teramano* (Ledgeway & Smith 2016: 892)

e-cchə	e-ssə	e-llə
A:DEM-1	A:DEM-2	A:DEM-3
'Here (near me)'	'There (near you)'	'There (far from us)'

b. *Ternary systems: Teramano*

[$u\phi$	[MeasP]	[Dem	[F_2	[F_1	[π_χ]]]]]
	ø		-cchə$_{[+P(+A)]}$		e-
	ø		-ssə$_{[+P(-A)]}$		e-
	ø		-llə$_{[-P(\pm A)]}$		e-

Note that the Teramano adverbial system, like many other adverbial demonstrative systems in the area, is not based on the original Latin demonstrative adverbs, but rather displays the reflex of the presentative form ECCU 'behold' in the speaker-oriented function and analogical forms modelled on the nominal demonstrative series in the hearer-oriented and non-participant-oriented functions (see Ledgeway & Smith 2016: 892).

4.4.2 Demonstrative systems with distance contrasts

Person-rooted demonstrative systems can encode, on top of the person-oriented semantic contrasts, distance contrasts. Such contrasts can be built consistently around each term of a given system (as in the Mundari case, see (19)); however, it is more common for them to be encoded with respect to one person-related domain only, and typically distance modifications are restricted to the non-participant-oriented deictic domain.[35] Demonstrative systems that contrastively encode distance oppositions display at least one term more than systems that display the same type of person-oriented semantics, but where no term is modified by distance. For instance, binary systems (i.e systems that define a two-way contrast between the speaker and the others, or the participants

[35]For instance, Nintemann *et al.* (2020) collected 250 adverbial demonstrative systems: out of these, 72 can be described as displaying a distance contrast, 63 of which encode different degrees of distance with respect to the non-participant-related domain only.

and the non-participants) display three or more terms when further modified by distance.

Romance languages do display distance contrasts on top of person ones, as discussed in Section 3.2.2, but, typically, the different distance degrees are not encoded transparently and cannot be isolated from the remaining morphology. One exception in this respect is provided by the Brazilian Portuguese adverbial demonstrative system, which was already discussed in Section 3.2. There, the basic person-oriented ternary system also encodes a distance contrast, restrictedly to the non-participant-oriented term:

(61) *Brazilian Portuguese* (Meira 2003: 8)

a-qui	a-í	a-l-i
A:DEM-1	A:DEM-2	A:DEM-3-NEAR
'Here (near me)'	'There (near you)'	'There (far from us; relatively close-by)'
(a)-l-á		
A:DEM-3-FAR		
'There (far from us; further away)'		

Brazilian Portuguese adverbial demonstratives all show the demonstrative base, *a*-, with the exception of the far distal term, where the initial *a*- has mostly fallen out of use. The two person features are spelled out synthetically as a span, as usual in Romance languages: -*qui* for 'near the speaker', $+\mathrm{P}(+\mathrm{A}(\pi_\chi))$; -*í* for 'near the hearer', $+\mathrm{P}(-\mathrm{A}(\pi_\chi))$; -*l*- for 'far from both', $-\mathrm{P}(\pm\mathrm{A}(\pi_\chi))$.[36] This last term is further specified for two distinct classes of vector lengths, according to the content of MeasP: the -*i* form refers to something that is not in the domain of the participants, but that is relatively nearby, whereas the -*á* form is used for referents that are decidedly removed from the participants. That is, MeasP defines a (contextually determined) cut-off point for vector lengths, thus yielding two (in this case) different classes that get each its own exponent. The overall decomposition of the Brazilian Portuguese demonstrative adverbs is as follows:

(62) *Ternary systems, distance modification: Brazilian Portuguese*

[$u\phi$	[MeasP]	[Dem	[F_2	[F_1	[π_χ]]]]]
	ø		-qui$_{[+\mathrm{P}(+\mathrm{A})]}$		a-
	ø		-í$_{[+\mathrm{P}(-\mathrm{A})]}$		a-
	-i ($\vec{v} < r_{-n}$)		-l- $_{[-\mathrm{P}(\pm\mathrm{A})]}$		a-
	-á ($r_{-n} < \vec{v} < r$)		-l-$_{[-\mathrm{P}(\pm\mathrm{A})]}$		(a-)

Note that the -*i*/-*a* series are otherwise well attested across Romance adverbial demonstratives, where they encode a punctual reading (-*i*) or a more vague,

[36] See Section 5.4.2 for a discussion of the ambiguous [±author] feature.

areal one (-*a*), as illustrated in Sections 2.2.3.1 and 2.3.3. As such, they are compatible with the speaker-oriented term, too: interestingly, they are reinterpreted as encoding a distance-oriented meaning only for the non-participant-oriented term, in line with the wider cross-linguistic tendency to explicitly mark distance oppositions only for distal terms.[37]

4.4.3 Spelling out Dem

In the foregoing, I illustrated morphological evidence that Romance nominal and adverbial demonstratives can be decomposed into morphemes that match the internal structure of DemP. The discussion can be summarised as follows:

(63) *Romance demonstratives and their morphological decomposition*

	$u\phi$	[MeasP	[Dem	[F_2	[F_1	[π_χ]]]]]
Unary$_{\text{N:DEM}}$	✓	ø				✓
P-based binary	✓$_{\text{N:DEM}}$	ø			✓$_{[\pm\text{P}]}$	✓
A-based binary	✓$_{\text{N:DEM}}$	ø			✓$_{[\pm\text{A}]}$	✓
Ternary	✓$_{\text{N:DEM}}$	ø		✓$_{[\pm\text{P}(\pm\text{A})]}$		✓
Ternary + DIST	—$_{\text{A:DEM}}$	✓$\vec{v} \lesseqgtr r_{-n}$		✓$_{[\pm\text{P}(\pm\text{A})]}$		✓

As (63) highlights, transparent demonstrative systems display a demonstrative base followed by one or more morphemes for the active person features, in turn possibly followed by a morpheme for different distance degrees, according to the content of MeasP. Besides, nominal demonstratives show an overt inflectional marker for the [$u\phi$] set.

Throughout the discussion in this section, I have been assuming that MeasP and Dem are spelled out by one and the same morpheme, and overtly so only in case the given demonstrative system shows additional distance oppositions. While this assumption is not fundamental for any aspect of the present proposal, I suggested that this might be the case in light of Svenonius' (2008) discussion of the incompatibility of overt measure modification and bounded prepositions, such as *near* (see the introduction to Section 4.3 and, for the discussion of the prepositional data, Section 4.2.2). Regardless of whether this implementation is granted or not (in the latter case, two dedicated null morphemes that spell out Dem and MeasP have to be assumed), it might come as a surprise that the Dem head, despite its being necessary to introduce the set of vectors that move from the person-rooted ground of demonstratives and point to the figure, is not overtly lexicalised but (possibly) in few cases. This notably poses a challenge for its acquisition, and that of demonstratives altogether, to name the main problem only.

[37] Once again, for a discussion of morphologically transparent distance-oriented oppositions in non-Romance varieties, and especially for the derivation of traditional distance-oriented ternary systems, see the discussion of Kabyle (Berber) in Terenghi 2021c.

As anticipated in Section 4.3.1.2 and following an intuition by Bühler (1934, and further by Diessel 2013b), I would like to suggest that Dem is the locus of the deictic pointing gestures that quite systematically tend to accompany the exophoric uses of demonstratives, to which I refer as deictic co-speech gestures (see also Terenghi 2022b).[38] Although exophoric demonstratives and deictic co-speech gestures can be thought of as not being mutually dependent, there is a growing body of evidence showing that they are in fact intimately related and that their uses correlate. Firstly, some languages have been described for which the co-occurrence of exophoric demonstratives and deictic co-speech gestures is mandatory: this is the case for instance for Goemai (West Chadic), Kilivila (Oceanic), Yucatec (Mayan), Warao (Warao), and Tiriyó (Cariban) (see Diessel & Coventry 2020: 6 and references therein). Secondly, whenever they co-occur, demonstratives and deictic co-speech gestures are "tightly temporally coordinated, [...] suggesting that they are planned and organized together in speech production" (Mesh *et al.* 2021: 3). Besides, neurocognitive research suggests that they are interrelated in speech interpretation, too (Peeters *et al.* 2015; Mesh *et al.* 2021: 3). Thirdly and finally, it has been shown that, whenever deictic co-speech gestures are not available (e.g. if the interlocutors do not see each other), rates of use of demonstratives are lower: in their stead, referential descriptions are used (Diessel & Coventry 2020: 6–7 and references). Conversely, whenever demonstratives co-occur with gestures, the latter show a fuller extension (e.g. arm extension) and a longer duration (Cooperrider *et al.* 2021).

As such, it can be proposed that deictic co-speech gestures are fully integrated into the use of exophoric demonstratives and can be seen as concretely embodying their vectorial component, expanding on Bühler's intuition. Gestures, in fact, point to the referent, instructing on the direction of the vectors, and are physically anchored in one of the discourse atoms (the speaker), i.e. they start from a subregion of π_χ, fully mimicking the spatial component of DemP. That is, demonstratives can be taken to be spelled out multi-modally, partly verbally and partly manually, compatibly with their internal structure as proposed in the foregoing.

Granting that Dem can be spelled out by deictic co-speech gestures, additional evidence can be put forth for the hypothesis that Dem and MeasP are spelled out together: in fact, the use of demonstratives and gestures is sensitive to differences with respect to the scale of the context in which the referent is located. As such, it can be maintained that gestures also inform of the length of the vectors involved in the derivation of demonstrative forms. For an overview of the relation between demonstratives and deictic co-speech gestures on the one hand, and (increase in) scale on the other, see Mesh *et al.* (2021 and references therein). For one thing, as they discuss, the co-occurrence of demonstratives

[38]Manual pointing is perhaps the prototypical such gesture, but other deictic co-speech gestures include, for instance, eye gaze and head or chin pointing. I thank Ora Matushansky for suggesting to me that the out-of-the-blue use of demonstratives is possibly infelicitous in the absence of pointing, thereby steering my attention towards this line of research.

with deictic co-speech gestures increases as the scale grows and as the distance of the referent rises (but, for the requirement of co-occurrence of proximal demonstratives and pointing, see Diessel & Coventry 2020: 6 and references). Moreover, it has been shown that the pointing arm in manual gestures tends to be higher as the distance of the referent increases, across cultures (and possibly across species): this strategy goes under the name "*far-is-up*: the farther the target, the higher the pointing arm" (Mesh *et al.* 2021: 3 and references).

Finally, note that endophoric demonstratives arguably do not encode a proper vector semantics, as opposed to the exophoric forms considered so far: in those cases, there is no pointing to the extralinguistic context, but only, metaphorically, to the (intra)linguistic one. Yet, endophoric demonstratives can be formally identical to exophoric ones, despite bearing a different interpretation: this observation can be accommodated by assuming that the multi-modal Spell-Out is restricted to exophoric demonstratives, yielding a systematic difference when it comes to externalisation. This has bearings on the diachrony of demonstrative forms: as argued by Diessel (1999: chapter 6), endophoric demonstratives can be seen as the first stage towards the grammaticalisation of demonstratives into *i.a.* pronominal elements, determiners, and complementisers, which likewise do not include a vectorial component in their internal structure. These diachronic developments could be related to the progressive loss of the null, and thus harder to acquire, Dem head of endophoric demonstratives.

To conclude the discussion, in this section I provided morphological evidence for the internal structure of DemP, as proposed in Section 4.3 on the basis of the parallelism with the extended PP (Section 4.2): specifically, I showed that demonstrative forms can transparently map the different heads contained within DemP in their morphology and I speculated that this mapping be multimodal, as verbal pieces of morphology are complemented by deictic co-speech gestures.

4.5 Conclusions

This chapter put forward a vectorial analysis for the internal structure of demonstrative forms that captures the semantic variation attested across demonstrative systems in a unitary way. The proposed derivation is modelled on the analysis for the extended PP advanced by Svenonius (2010 and previous works; for the vectorial formalisation, see instead Zwarts 1997 and other works; cf. Section 4.2): building on this, it was proposed that person- and distance-oriented contrasts can be related to different parts of the internal structure of DemP, in line with the conclusions reached in Chapter 3 on more interpretation-based grounds (see Section 4.3). Concretely, person-oriented oppositions, that were taken to be the semantic core of demonstrative forms, can in turn be construed as the core of the syntactic structure. This is further embedded under a spatial

function: a vectorial component mediates the relation between the (person-oriented) ground and the demonstrative's referent. The length of the relevant vectors is constrained by a measure phrase, and can be contrastively expressed there, deriving distance-oriented oppositions.

This twofold nature of demonstrative forms, rooted in person but still clearly spatial in interpretation, sets demonstrative and pronominal forms apart, a *desideratum* that was left unsatisfied in the previous chapter. Further, the structural implementation proposed here accommodates for the availability of two sets of person features within the DemP, as suggested on the basis of evidence from DP-internal agreement patterns in Section 3.5. Specifically, the two sets of features are located in different domains of the structure of demonstratives: the interpretable one is embedded low down inside the structure; the uninterpretable one is encoded at the periphery and, if available, overtly establishes the link between DemP and the figure. Given their different positions, the latter, but not the former, can undergo DP-internal and external agreement.

Evidence for the account developed in this chapter was collected in Section 4.4, which showed that the morphology of Romance languages maps quite transparently onto the different pieces of the internal structure of demonstratives.

Taken together, this chapter and the previous one conclude my (synchronic) analysis for the demonstrative systems presented in Chapter 2: that is, for each synchronic stage of the varieties presented there, I have now laid out a featural and a structural proposal. The next chapters will show how featural and structural considerations interact in deriving the reductions attested when those systems are instead considered in their diachrony.

CHAPTER 5

Featural complexity and feature loss

5.1 Introduction

The last two chapters put forth my proposal as to how indexicality is encoded in demonstrative forms. On the basis of (novel) empirical and theoretical evidence, Chapter 3 argued that indexical oppositions in demonstrative forms are encoded by means of person features. Further, Chapter 4 implemented this conclusion by advancing that the internal structure of demonstratives includes a pronominal-like component embedded under a (vectorial) prepositional-like structure.

Building on these premises, this chapter and the following one finally address the main questions of this study, and namely: how one can formalise and account for changes in the encoding of indexicality in demonstrative systems, both in diachrony and in contact; and why semantic reductions of the types illustrated in Chapter 2 are only attested in demonstrative systems and not in other indexical systems, particularly in pronominal ones.[1] In what follows, a featural and structural account is proposed to capture the patterns of change which affect the encoding of indexicality across Romance ternary demonstrative systems.

As a starting point, a comprehensive overview of the relevant reduction patterns is summarised in Table 5.1 for convenience. There, each pattern is re-

[1] In this respect, I merely focus on the structural stability of pronominal paradigms, where crucially 2nd person pronouns (type: *you*) are systematically retained, differently from hearer-oriented demonstratives (type: *that/there near you*). This is not to say that pronominal systems are impermeable to change, as already mentioned in Section 1.1: on the contrary, they are highly unstable from the morphological perspective (see e.g. Cappellaro 2016 for an overview), which is however an orthogonal issue with respect to the present work.

Table 5.1: Patterns of change: Summary

Nominal system (input = Late Latin: N:DEM.1/2 *vs* N:DEM.3 ⇒II-II-III)			
Non-innovative Romance (2.2.2)	Speaker-based: N:DEM.1 *vs* N:DEM.2/3	Participant-based: N:DEM.1/2 *vs* N:DEM.3	
	⇒II-III-III (Ladin: *chësc–chël*, (2.6a))	⇒II-II-III (Old French: *cist–cil*, (2.7))	
	Speaker-based: N:DEM.1 *vs* N:DEM.2/3	Participant-based: N:DEM.1/2 *vs* N:DEM.3	*Pattern:*
Innovative Romance: input = N:DEM.1–N:DEM.2–N:DEM.3 ⇒1–2–3 (diachrony: 2.2.3; Italo-Romance: 2.3.1; Portuguese: 2.3.3)	⇒1–3–3 (Sardinian: *kústu–kúḍḍu*, (2.9a); (2.18); Batavia Creole: *iste–akel*, (2.23a))	⇒1–1–3 (Neapolitan: *chisto–chillo*, (2.12a); (2.17))	A_n
	⇒1–2–2 (L.Am. Spanish: *este–ese*, (2.10a))	⇒1–1–2 (—)	B_n
	⇒*1/2–3–3* (Papiá Kr.: *isti/isi–aké*, (2.24a))	⇒1/2–1/2–3 (—)	AC_n
	⇒*2–3–3* (Diu Indo-Pg: *es–ikəl*, (2.25a))	⇒2–2–3 (Braz. Pg.: *esse–aquele*, (2.13a))	C_n
	⇒3–3–3 (CVC/Brava: *kel li–kel la*, (2.27a)) *or* ⇒1–1–1 (Casamancese Cr.: *es li–es la*, (2.27b)) *or* ⇒1/2–1/2–1/2 (Fa d'Ambô: *isai–isala*, (2.27c))		D_n
Adverbial system (input = Late Latin: A:DEM.1 *vs* (A:DEM.2) *vs* A:DEM.3 ⇒I–(II)–III)			
Non-innovative Romance (2.2.2)	Speaker-based: A:DEM.1 *vs* A:DEM.2/3	Participant-based: A:DEM.1/2 *vs* A:DEM.3	
	⇒I–III–III (Galician: *acá–alá*, (2.6b))	⇒I–I–III (—)	
	Speaker-based: A:DEM.1 *vs* A:DEM.2/3	Participant-based: A:DEM.1/2 *vs* A:DEM.3	*Pattern:*
Innovative Romance: input = A:DEM.1–A:DEM.2–A:DEM.3 ⇒1–2–3 (diachrony: 2.2.3; Italo-Romance: 2.3.1; Portuguese:2.3.3)	⇒1–3–3 (Aromanian: *aoa–aclo*, (2.9b); (2.18); Korlai: *aki–ali*, (2.23b))	⇒1–1–3 (Tarantino: *qua–addà*, (2.12b); (2.17))	A_a
	⇒1–2–2 (Occitan: *aicí–aquí*, (2.10b))	⇒1–1–2 (—)	B_a
	⇒*1/2–3–3* (Angolar: *aki/ai–nha(la)*, (2.24b))	⇒1/2–1/2–3 (Santome: *-ai/-aki–-ala*, (2.24c))	AC_a
	⇒2–3–3 (—)	⇒2–2–3 (Catalan: *aquí–allí*, (2.13b); Santome: *(n)ai–(n)ala*, (2.25b))	C_a
	⇒3_i–3_{ii}–3_{ii} (CVC/Santiago: *li–la*, (2.26))	? (—)	D_a

illustrated by means of the relative example from Chapter 2; example numbers (in brackets) and the relevant Sections (in the first column) are reported for further reference.

The left-hand side of Table 5.1 reproduces the attested patterns in the reduction to speaker-based binary systems (DEM.1 *vs* DEM.2/3: type "this/here near me" *vs* "that/there far from me"). The right-hand side one, instead, displays the attested patterns in the reduction to participant-based binary systems (DEM.1/2 *vs* DEM.3: type "this/here near me and/or you" *vs* "that/there far from me and you"). The forms included in the reduced system are indicated by a sequence including two among ⇒1, ⇒2, and ⇒3 (or ⇒I, ⇒II, ⇒III for non-innovative varieties; see again the discussion around (1) in Chapter 2 for a full explanation of this notation), the original exponents for DEM.1, DEM.2, and DEM.3, respectively. The semantic reduction is represented by the repeated exponent for two originally separated domains, to signal that they are now conflated and spelled out by one and the same exponent. For instance, in Sardinian nominal demonstratives, the erstwhile hearer-related and non-participant-related deictic domains (N:DEM.2 and N:DEM.3) are conflated into an undifferentiated non-speaker-related deictic domain (N:DEM.2/3), which is realised by the original exponent for N:DEM.3, i.e. ⇒3; the speaker-related deictic domain (N:DEM.1) and its original exponent (⇒1) are instead preserved. This is thus represented as ⇒1–3–3, following the conventions adopted in Chapter 2.

The general conclusions that were drawn from Chapter 2 are repeated here for convenience:

(1) *Generalisations*

a. Ternary demonstrative systems are unstable and tend to reduce to binary systems in diachrony and contact alike;

b. whenever this reduction takes place, the indexical domain that is invariably affected by change is the hearer-oriented one (DEM.2), in spite of semantic and formal differences in the actual patterns of reorganisation: DEM.2/3, spelled out as either ⇒3 or ⇒2, in speaker-based binary systems; or DEM.1/2, spelled out as either ⇒1 or ⇒2, in participant-based binary systems.

This raises questions as to why ternary systems are generally unstable and why we see those specific reduction patterns, with the systematic loss of the hearer-related domain and the few possible gaps attested in Table 5.1. Assuming that the consistency of the reduction process across diachrony and contact, across semantically different systems (speaker-based *vs* participant-based semantics), and across demonstrative categories (nominal and adverbial demonstratives are affected in comparable ways) is not coincidental, a unitary explanation for the patterns of reorganisation of ternary systems is called for. In this work, I take the instability of ternary demonstrative systems and the systematic loss of the hearer-oriented semantics to result from the interplay between the featural

and structural factors that underlie the derivation of demonstrative forms, as introduced in Chapters 3 and 4.

This chapter explores the former: building on the featural approach to the encoding of indexicality in demonstrative forms proposed in Chapter 3, in Section 5.2 I recast the main conclusions from Chapter 2 in featural terms. Specifically, I propose the following descriptive generalisation:

(2) *Featural and structural generalisation* (to be revised)
Binary demonstrative systems are derived by the loss of the last person feature to enter into the derivation of erstwhile ternary systems; this mechanism also captures the attested semantic and formal variation.

In the rest of the chapter, I investigate what drives feature loss. In a nutshell, I propose that ternary demonstrative systems can be regarded as complex, both because of the length of their featural derivation (Section 5.3) and because they include computationally complex categories (Section 5.4). I thus suggest that featural complexity determines feature loss, bringing about the reduction of ternary systems into binary ones (Section 5.5). The discussion of the structural underpinnings of the generalisation in (2), instead, is delayed to Chapter 6.

5.2 A featural approach to variation

Following the discussion in Chapter 3, I take (at least Romance) demonstrative systems to be person-oriented, i.e. ultimately rooted in person distinctions, and that their deictic component is captured by person features. Specifically, I assume the person system put forward by Harbour (2016): before proceeding, I quickly review its main properties.

Recall that Harbour (2016) regards person features as denoting lattice-on-lattice actions. Concretely, in Section 3.3.1 we saw that the real-world ontology (i.e. the discourse-related atoms: speaker i; hearer u; other(s) o, o', o'', *etc.*) is manipulated by the grammar by means of three set-theoretic structures, which are notationally rendered as lattices (or better: "atomic join-complete semilattices", Harbour 2016: 73). Two of these lattices are the person features proper, [author] and [participant], which denote the power sets of two proper subsets of the ontology:

(3) a. $[\![\text{author}]\!] = \{i\}$
b. $[\![\text{participant}]\!] = \{i, iu, u\}$ (Harbour 2016: 73–74)

The person features perform set-theoretic operations on the π lattice, which denotes the power set of the entire ontology:

(4) $[\![\pi]\!] = \{i_o, iu_o, u_o, o_o\}$ (Harbour 2016: 73–74)

The two features perform an action on π by means of their two possible values, i.e. either + (plus) or − (minus). These denote two different set-theoretic operations, as detailed in Section 3.3.1, following Harbour (2016: chapter 4).

Table 5.2: *Partitions of the π lattice* (from Harbour 2016: 79; see Section 3.3.1)

Parameters		Partition	
Features	Order	Size	Elements
{}		monopartition	$i_o\ iu_o\ u_o\ o_o$
{±author}		bipartition	$i_o\ iu_o \mid u_o\ o_o$
{±participant}		bipartition	$i_o\ iu_o\ u_o \mid o_o$
{±author, ±participant}	±pt(±au(π))	tripartition	$i_o\ iu_o \mid u_o \mid o_o$
{±author, ±participant}	±au(±pt(π))	quadripartition	$i_o \mid iu_o \mid u_o \mid o_o$

As advanced in Sections 3.3.2 and 4.3, I take the ontology for spatial deictics to minimally differ from that for person deictics: the latter consists of the discourse-related atoms proper, whereas I maintain that the former consists of the points in space that the discourse-related atoms occupy. I notate the ontology for spatial deictics by an additional subscript χ: e.g. π_χ, i_{o_χ}, *etc.*

Finally, for the present purposes, it should be kept in mind that Harbour (2016) derives the cross-linguistic variation attested in person-related systems through parametric differences in the activation of features and in the ordering of operations. As regards the former, [author] and [participant] can both be active, one of them can be inactive, or they can both be inactive. As regards the latter, either [author] or [participant] will perform its action on π first (if both are active). Table 5.2 summarises how this system captures variation in the domain of person(-related) systems (spatial deictics have additional subscript χs).

Accordingly, at face value, the systems discussed in Chapter 2 and reviewed in Table 5.1 above are derived as follows (see also Section 3.3.2):

(5) a. Ternary systems: both [author] and [participant] are active, [author] composes with π first. (to be revised)

i. DEM.1 $\leftrightarrow$ +participant(+author(π_χ))
ii. DEM.2 $\leftrightarrow$ +participant(−author(π_χ))
iii. DEM.3 $\leftrightarrow$ −participant(±author(π_χ))

b. Speaker-based binary systems: only [author] is active.

i. DEM.1 $\leftrightarrow$ +author(π_χ)
ii. DEM.2/3 $\leftrightarrow$ −author(π_χ)

c. Participant-based binary systems: only [participant] is active.

i. DEM.1/2 $\leftrightarrow$ +participant(π_χ)
ii. DEM.3 $\leftrightarrow$ −participant(π_χ)

5.2.1 Clusivity distinctions in demonstrative systems

At this juncture, one remark is in order. Up until this point, I have treated ternary systems as a substantially uniform class. However, starting from Ledgeway's 2004 seminal paper, it has been shown that some seemingly ternary systems do not straightforwardly align with canonical tripartitions, in that one of their forms (according to the specific variety: either the hearer-oriented one, ⇒2; or the speaker-oriented one, ⇒1) is restricted to contexts in which emphatic and contrastive reference to the semantics that that form spells out is needed (respectively: hearer-related deictic domain, DEM.2; or speaker-related deictic domain, DEM.1). In all other cases, they are substituted by the other form, which can accordingly be defined as having a general participant-oriented flavour: that is, ⇒2 is substituted by ⇒1 in some varieties, while ⇒1 is substituted by ⇒2 in other varieties. Thus, rather than the system in (6a), we get one of those in (6b):

(6) a. *Canonical ternary demonstrative systems*

DEM.1	DEM.2	DEM.3
⇒1	⇒2	⇒3

b. *Seemingly ternary demonstrative systems*

DEM.1	DEM.2	DEM.3
⇒1	⇒1 / (⇒2)	⇒3
(⇒1) / ⇒2	⇒2	⇒3

The systems in (6b) are however not compatible with a ternary system analysis, as that in (5a) above. To informally show this, consider ternary pronominal systems: the systems in (6b) would translate to the (optional, and contextually-determined) expression of 2nd person by means of the 1st person pronoun (e.g. *I*, instead of *you*, in English), or to the (optional, and contextually-determined) expression of 1st person by means of the 2nd person pronoun (e.g. *you*, instead of *I*). This is not possible within a canonical ternary pronominal system.[2]

This state of affairs has been discussed by Ledgeway (2004; see also, at least, Ledgeway 2009: 195–212, and in particular: 200–205) for the nominal demonstrative system of old Neapolitan (and, more restrictedly, for the adverbial

[2]This can also be shown from a more formal standpoint. In line with the person system adopted here, in ternary systems ⇒1 (e.g. English *I*) spells out 1st person, which may only denote i_o (the speaker (and others)) and iu_o (the speaker and hearer (and others)), but not u_o (the hearer (and others)). Likewise, ⇒2 (e.g. English *you*) spells out 2nd person, which may only denote u_o (the hearer (and others)), but crucially not i_o (the speaker (and others)). The use of ⇒1 for 2nd person (*I* for u_o) and of ⇒2 for 1st person (*you* for i_o) is thus not compatible with a ternary system.

demonstrative system of modern Neapolitan), on which the present discussion is based.[3] However, the same account can be extended to several other southern Italo-Romance varieties, as discussed again by Ledgeway (2004: 89–90, fn. 42), on the basis of a preliminary sample of southern Italo-Romance texts.

Two crucial facts led Ledgeway (2004) to propose a new formalisation for the seemingly ternary demonstrative systems of old Neapolitan and other southern Italo-Romance varieties. The first is the reported "confusion" between the purported speaker-oriented form (⇒1) and the purported hearer-oriented one (⇒2), as attested by the 19th century descriptive grammars of those varieties. Concretely, ⇒1 forms were reported to be used instead of ⇒2 and *vice versa*, with different substitution patterns and frequencies across varieties.

The second is the generalised lower frequency of the hearer-oriented form (⇒2) in the diachrony of old Neapolitan, both in comparison to the other demonstrative forms available in the system (i.e. the speaker-oriented one, ⇒1; and the non-participant-oriented one, ⇒3) and, restrictedly to the encoding of the hearer-related deictic domain, with respect to the speaker-oriented form (⇒1). More precisely, in the sample of old Neapolitan texts surveyed by Ledgeway, ⇒2 forms constitute 6.4% of the total occurrences of nominal demonstratives (n=155/2419); of those, roughly half are used exophorically (46.45%, n=72/155), the remaining half (53.55%, n=83/155) being employed in the (endophoric) textual function (Ledgeway 2004: 87). Further, within Ledgeway's sample, ⇒2 forms are not systematically employed to refer to the hearer-related deictic domain (N:DEM.2, i.e. 'that near you') and are instead substituted by ⇒1 forms (originally speaker-oriented: N:DEM.1) in about two-thirds of the instances (N:DEM.2 = ⇒2: 33.6%, n=72/214; N:DEM.2 = ⇒1: elsewhere; Ledgeway 2004: 88). This is unexpected if a plainly ternary account is given for the demonstrative system of old Neapolitan, as briefly discussed for (6) above.

Thus, Ledgeway (2004) concludes that a revision of this class of seemingly ternary demonstrative systems, where the definition of the speaker- and hearer-related deictic domains can no longer be regarded as systematic, is called for. Concretely, he proposes that systems of the type of (6b) should be analysed as follows:

(7) *Seemingly ternary systems* (adapted from Ledgeway 2004: 74)

⇒1		⇒2		⇒3
Exclusive	Inclusive	Exclusive	Inclusive	Exclusive
[+1]	[+1]	[−1]	[+1]	[−1]
[−2]	[+2]	[+2]	[+2]	[−2]

In (7), ⇒1 and ⇒2 are given two possible readings: exclusive and inclusive.

[3]Following Ledgeway (2004: 73, fn. 33), old Neapolitan refers here to Neapolitan as used up until the 19th century; modern Neapolitan refers instead to the variety spoken from the 19th century onwards.

In their exclusive uses, ⇒1 (e.g. the Neapolitan type CHISTO) carries [+1, −2] as person features and is only used to refer to the speaker-related domain (N:DEM.1), while ⇒2 (e.g. the Neapolitan type CHISSO) carries [−1, +2] and is only employed for the hearer-related domain (N:DEM.2). In their inclusive uses, instead, ⇒1 and ⇒2 are both specified as [+1, +2] and, as such, equally refer to the participant-related domain as a whole; according to Ledgeway (2004: 74), the only semantic difference between them is that the main deictic centre is identified with the speaker for ⇒1 and with the hearer for ⇒2.

More concretely, given the low frequency of ⇒2 in old Neapolitan, that system can ultimately be analysed as an essentially binary system that opposes ⇒1 (N:DEM.1 or N:DEM.1INCL semantics, which include the deictic domains of speaker and, the latter, of the hearer, too) and ⇒3 (N:DEM.3 semantics, i.e. the non-participant-related deictic domain):

(8) *Old Neapolitan demonstratives: Ledgeway's (2004: 89) proposal*

CHISTO (⇒1)	CHILLO (⇒3)
[+1]	[−1]
[±2]	[−2]

⇒2 is instead analysed as a marginal, additional term dedicated to the hearer-related deictic domain and used under marked pragmatic conditions only; eventually, the argument goes, ⇒2 is lost because of its low frequency.[4] Similar accounts can be put forth to capture systems in which the participant-related domain (N:DEM.1/2) came to be expressed by ⇒2, while it was ⇒1 that underwent loss.

However, some additional facts do not straightforwardly warrant the analyses in (7) and (8). Firstly, as already mentioned, the substitution of ⇒2 (type: CHISSO) by means of ⇒1 (type: CHISTO) for the hearer-related domain (N:DEM.2) is extremely common throughout the old Neapolitan phase, whereas ⇒2 is only rarely used instead of ⇒1 to refer to the speaker-related deictic domain (N:DEM.1), and only in the textual deictic function (two occurrences) or in late examples (two occurrences) in Ledgeway's corpus (see Ledgeway 2004: 78–79, 84; Ledgeway 2009: 201, 205).[5] However, this asymmetry does not follow

[4]Note that, despite similar frequency facts, no similar reduction is attested in the adverbial system of Neapolitan, where the hearer-oriented adverb (type LLOCO/⇒2) is still very much in use in present-day Neapolitan. Conversely, a comparable low frequency for the hearer-related term has not been described for canonical ternary systems: yet, those systems, too, can reduce to binary ones, as shown in Chapter 2. Both facts elude a frequency-based account in these terms.

[5]The role of endophoricity in the emergence of non strictly hearer-oriented readings for CHISSO/⇒2 (Ledgeway 2004: 79) exceeds the scope of the present work, but deserves further investigations. As to the late occurrences of CHISSO/⇒2 instead of CHISTO/⇒1 for N:DEM.1, these can be seen as formal relics of an erstwhile semantic opposition recorded in the final stage of the reduction process. The hypothesis that, at this stage, CHISTO and CHISSO both spell-out N:DEM.1/2 is further compatible with the "confusion" reported by 19th century

from the featural approach proposed by Ledgeway: given the equivalent featural specification of the two inclusive forms in (7), we would rather expect them to be substantially interchangeable, contrary to facts (the only well attested inclusive use is associated to CHISTO/⇒1). Therefore, I do not take that there is enough evidence to postulate an inclusive value for CHISSO/⇒2, too, within the old Neapolitan system. Extending this logic to all southern Italo-Romance varieties that display similar ternary systems, only either ⇒1 or ⇒2 may have an inclusive reading, but not both, leading to the two different substitution patterns illustrated in (6b): this will become pivotal in the discussion in Section 6.3.3.3.

Secondly, under Ledgeway's approach in (7), ⇒1 and ⇒2 in their inclusive function carry the same person features: [+1, +2]. While this should result in a completely comparable interpretation, and although their referent is generally taken to be in the proximity of both participants, the two terms are described as pointing to different deictic centres (Ledgeway 2004: 74). More specifically, the speaker is the main deictic centre for ⇒1 (Neapolitan CHISTO type); the hearer is instead the main deictic centre for ⇒2 (Neapolitan CHISSO type). However, this difference does not naturally fall from their featural definitions, as proposed by Ledgeway (see (7)). This formal complication disappears once ⇒2 (CHISSO) is taken not to be used inclusively in old Neapolitan, a hypothesis supported by the empirical facts discussed in the previous paragraph. Rather, the distribution of CHISSO/⇒2 can be captured by the combination of two conditions: CHISSO/⇒2 is used when the hearer is the deictic centre and the referent is accordingly located in the hearer-related deictic domain (N:DEM.2 'near you'); and it is used under specific pragmatic conditions only, i.e. if a distinction is needed for the wider participant-related domain. Besides, whenever those conditions are satisfied, ⇒1 (CHISTO) is used in its exclusively speaker-oriented function to refer to referents located in the deictic domain of the speaker (N:DEM.1), in contrast to that of the hearer. Instead, whenever a further partition of the participant-related domain is not needed, CHISTO/⇒1 may be used as the general participant-oriented indexical form (N:DEM.1/2): in this case, the deictic domain referred to is that of both participants, which can however be primarily conceived as centred on the speaker, given the in-built egocentricity of the person system adopted here (see again the discussion around example (8) in Section 3.3.1): this accounts for the speaker-oriented interpretation highlighted by Ledgeway, in spite of the generally inclusive semantics.

Finally, despite the impossibility of analysing old Neapolitan-like demonstrative systems as canonical ternary systems highlighted by Ledgeway, their full reduction to a substantially participant-based binary demonstrative systems (as in (8)) is likewise not fully implementable from a featural point of view. In fact, as acknowledged by Ledgeway, old Neapolitan did have the means to refer exclusively to the speaker-related domain (N:DEM.1, CHISTO/⇒1) and, more importantly, to the hearer-related one (N:DEM.2, CHISSO/⇒2), albeit non-

grammars.

systematically. These marginal uses are however not formally captured by a simple binary system:

(9) a. N:DEM.1/2 (CHISTO/⇒1) ↔ $+\text{participant}(\pi_\chi) = \{i_{o_\chi}, iu_{o_\chi}, u_{o_\chi}\}$
b. N:DEM.3 (CHILLO/⇒3) ↔ $-\text{participant}(\pi_\chi) = \{o_{o_\chi}\}$
c. N:DEM.1 (CHISTO/⇒1) ↔ $? = \{i_{o_\chi}\}$
d. N:DEM.2 (CHISSO/⇒2) ↔ $? = \{u_{o_\chi}\}$

Rather, it seems that an additional speaker-based opposition is needed "on top of" the participant-based deictic opposition, to tell apart the "exclusive" speaker-oriented and hearer-oriented uses, (9c)–(9d). This is smoothly captured by recasting Ledgeway's fundamental insights in the action-on-lattice feature system assumed in this work. Under Harbour's (2016) system, the composition of [±author] with the result of the functional sequence $\pm\text{participant}(\pi_\chi)$ defines a system with a clusivity distinction, that is a system that defines four person(-related) categories, rather than just three: speaker *i* (1EXCL); hearer *u* (2); union of speaker and hearer *iu* (1INCL); others *o* (3). Thus, I propose that demonstrative systems which do not make a systematic distinction within the participant-related deictic domain, but which do have the means to make one (under the suitable pragmatic conditions), are ultimately to be construed as quaternary demonstrative systems, i.e. demonstrative systems with a clusivity distinction (see Section 3.4.1), where [participant] composes with π_χ first and [author] composes with the result of this composition:[6]

(10) a. DEM.1EXCL, ⇒1 ↔ $+\text{author}(-\text{participant}(\pi_\chi)) = \{i_{o_\chi}\}$
b. DEM.1INCL, ⇒1/2 ↔ $+\text{author}(+\text{participant}(\pi_\chi)) = \{iu_{o_\chi}\}$
c. DEM.2, ⇒2 ↔ $-\text{author}(+\text{participant}(\pi_\chi)) = \{u_{o_\chi}\}$
d. DEM.3, ⇒3 ↔ $-\text{author}(-\text{participant}(\pi_\chi)) = \{o_{o_\chi}\}$

Although in the old Neapolitan demonstrative system there is syncretism between the exponents for N:DEM.1EXCL and N:DEM.1INCL (⇒1), I maintain that they are not conflated, i.e. that the syntax nonetheless provides the means to distinguish them. The different derivations yield ⇒1's different interpretations: exclusively speaker-oriented or more loosely participant-oriented, including the hearer's deictic domain.[7] The same is true, to the best of my knowledge, for

[6] A conceivable alternative is that these systems are instead ternary and that the interpretation of one of them as exclusive or inclusive (in the case of Old Neapolitan: *chisto*) is pragmatically determined. However appealing this hypothesis might be, it is not viable for two main reasons. Empirically, we see that pragmatic considerations do not affect the choice of pronouns in quaternary pronominal systems proper (i.e., under no circumstances can 1EXCL be used instead of 1INCL for pragmatic reasons in languages that contrastively encode the two categories); assuming that the derivation of demonstrative forms is parallel to that of personal pronouns (as is done in this work; for more on this, see in particular Section 6.5), we have to conclude that the same must hold for demonstratives. Theoretically, it is not straightforward to model the purported influence of pragmatics on the lexical semantics of a given form.

[7] Conflation (as opposed to syncretism) can be defined as the absence of an opposition in a given language's syntax, rather than in that language's morphology (McGinnis 2005); see again Section 1.2.3.

all other Romance seemingly ternary demonstrative systems: that is, the exponent for DEM.1INCL is always syncretic with either that for DEM.1EXCL (⇒1) or that for DEM.2 (⇒2), as implicitly outlined in (6b). Here, I disambiguate the syncretism by adding a subscript 'I' to ⇒1 and ⇒2 in their inclusive use (i.e. as exponents for DEM.1INCL: ⇒1_I and ⇒2_I). Note that the availability of two cross-linguistically different patterns of syncretism may be taken to further support the hypothesis that DEM.1INCL was indeed available in these systems (as opposed to a conflation hypothesis).

I envisage two possible ways in which demonstrative systems like the one in (10) came about in Romance: either they can be conceived as the direct continuation of the Late Latin substantially participant-based binary system, with the opposition between the speaker-related deictic domain and the hearer-related deictic domain eventually added on top of the basic ±participant(π_χ) sequence by the introduction of the new [±author] feature; or, after the innovative ternary system of Romance languages was constituted (DEM.1 *vs* DEM.2 *vs* DEM.3, ⇒1–2–3; see Table 5.1), a parametrical change in the ordering of feature compositions took place, shifting from a ternary system (where [author] operates on π_χ first) to a quaternary one (where [participant] operates on π_χ first). I remain agnostic as to which of these reconstructions represents the actual development and leave the issue for further assessments.

In what follows, I refer to canonical ternary demonstrative systems (see (6a)) as "ternary systems" and to systems as the one in (10) as "quaternary systems"; however, whenever the distinction between the two types of systems is immaterial to the discussion, I will simply indicate both systems jointly as "(qua)ternary systems".

5.2.2 Capturing the reduction

Granting the discussion in the previous section, the demonstrative systems listed in (5) need to be revised as follows:

(11) a. Ternary systems: both [author] and [participant] are active, [author] composes with π first:

i. DEM.1 ↔ +participant(+author(π_χ))
ii. DEM.2 ↔ +participant(−author(π_χ))
iii. DEM.3 ↔ −participant(±author(π_χ))

b. Quaternary systems: both [author] and [participant] are active, [participant] composes with π first:

i. DEM.1EXCL ↔ +author(−participant(π_χ))
ii. DEM.1INCL ↔ +author(+participant(π_χ))
iii. DEM.2 ↔ −author(+participant(π_χ))
iv. DEM.3 ↔ −author(−participant(π_χ))

c. Speaker-based binary systems: only [author] is active:

i. DEM.1 ↔ +author(π_χ)
ii. DEM.2/3 ↔ −author(π_χ)

d. Participant-based binary systems: only [participant] is active:

i. DEM.1/2 $\leftrightarrow$ $+\text{participant}(\pi_\chi)$
ii. DEM.3 $\leftrightarrow$ $-\text{participant}(\pi_\chi)$

Furthermore, following Ledgeway (2004), it can be assumed that quaternary demonstrative systems reduced to binary participant-based ones. Instead, no inclusive semantics seems to be recorded for the demonstrative systems that eventually reduced to speaker-based: therefore, it can be maintained that speaker-based binary systems resulted from canonical ternary systems. This allows to establish systematic genetic links between ternary systems and speaker-based binary systems, on the one hand, and quaternary systems and participant-based binary systems, on the other:[8]

(12) a. Ternary systems $= \pm\text{participant}(\pm\text{author}(\pi_\chi)) >$
Speaker-based binary systems $= \pm\text{author}(\pi_\chi)$
b. Quaternary systems $= \pm\text{author}(\pm\text{participant}(\pi_\chi)) >$
Participant-based binary systems $= \pm\text{participant}(\pi_\chi)$

The featural descriptions for the different demonstrative systems attested across Romance and the generalisation on their genetic relations in (12) provide a handle to descriptively capture the reduction process. The two resulting systems, in fact, are characterised by a shorter featural description (one active feature) than the one needed for their respective input system (two active features). More specifically, the one feature that remains active after the reduction has taken place is the one that composed directly with π_χ in the original system; the feature that composed with the result of a preceding featural composition with π_χ, instead, is no longer active in the reduced demonstrative systems (this empirical observation will be recast as a structural constraint on feature loss, the Last in–First out principle, in Chapter 6):

(13) a. Ternary > speaker-based binary: $\cancel{\pm\text{pt}}(\pm\text{au}(\pi_\chi))$
b. Quaternary > participant-based binary: $\cancel{\pm\text{au}}(\pm\text{pt}(\pi_\chi))$

As (13) shows, the availability of two orderings of compositions naturally captures the attested semantic variation. Besides, it immediately predicts the loss of the hearer-related semantics: given that the assumed feature inventory does not include a dedicated feature for the hearer, but only derives the hearer-related semantics by the (set-theoretic) composition of two primitive features, the loss of one feature straightforwardly amounts to the loss of the hearer-related semantics. Additionally, following the discussion in Section 5.2.1, the

[8]Note that clusivity distinctions in demonstrative systems are decidedly rare (as already discussed in Section 3.4.1): this seems to be mirrored by the relative rarity of participant-based systems, both in Romance and beyond (Harbour 2016 and Lander & Haegeman 2018a, who provide the most extensive overviews of participant-based binary demonstrative systems to date, only record them for Bulgarian, outside the Romance domain, and for Apurinã and, possibly, Fijian and Basque outside the Indo-European one).

DEM.1EXCL semantics can be likewise identified as the one that undergoes systematic loss in the reduction of quaternary systems: in fact, on a par with DEM.2, DEM.1EXCL loses its contrastive encoding in favour of a general DEM.1/2 category (i.e. participant-oriented, without further distinctions).

Of course, however, the intuition that the attested patterns of reduction are driven by the loss of the last feature to enter into the derivation of a given demonstrative system raises the question as to why feature loss is triggered at all. The remainder of this chapter investigates how feature loss can be given a principled explanation, accounting for the overall instability of (qua)ternary demonstrative systems and of the DEM.2 and DEM.1EXCL semantics within them.

In a nutshell, I argue that the answer lies in the featural characterisation of the demonstrative systems under investigation and propose that the instability of (qua)ternary demonstrative systems hinges on their computational complexity. More concretely, I submit that feature loss is triggered by two interrelated featural complexity conditions which rest exclusively on the feature system assumed in this work, requiring no further assumptions. The former condition, description length, underlies the complexity of (qua)ternary demonstrative systems (as opposed to binary ones) on the basis of their longer derivation (Section 5.3). The latter condition, monotonicity bias, defines more specifically the complexity of DEM.2 and DEM.1EXCL (as opposed to the other person-related categories within (qua)ternary demonstrative systems) on the basis of the sequences of feature values involved in their derivations, which are analysed as non-monotonic (Section 5.4). Crucially, (qua)ternary systems and non-monotonically derived person-related categories within them (DEM.2 and DEM.1EXCL) are diachronically unstable. I take this instability to be plainly related to their complexity and their simplification to result from third factor principles determining a derivation which is computationally more efficient (Section 5.5).

5.3 Description length as complexity

In this section, I propose that (qua)ternary demonstrative systems are complex, where complexity is understood in terms of minimum description length, or, simplifying, how many primitives are needed to correctly describe a given system. Besides, I argue that the specific length of the description that yields (qua)ternary systems (hence their complexity) is necessary for the derivation of DEM.2 and DEM.1EXCL; these categories could conversely not be derived by a system with a shorter description length (hence: less complex), such as binary systems.

Minimum description length is one of the ways in which reference to Kolmogorov complexity is made (Kolmogorov 1968; for a comprehensive overview, see Li & Vitányi 2019). Kolmogorov complexity substantially relates to how much information is needed to describe a given system, i.e. how long the de-

scription for that system should be (where the description is a binary string that generates the system that it describes). In other words, Kolmogorov complexity provides a measure of the regularity inside a string: the more regularity the string contains, the more it will be possible to compress it, i.e. to represent it by means of a shorter description. For instance, take the following sequences:

(14) a. 0101010101
b. 1001011100

In spite of the fact that both sequences contain 10 characters, the first one can be regarded as simpler than the second one, in that it can be described as "5 times *01*". The second sequence, instead, can only be described as "1001011100", i.e. itself.

This notion of complexity has been assumed in linguistics, including, most importantly here, as a measure of syntactic complexity (see Biberauer 2019c: section 2 and references therein). In the present context, I implement the hypothesis that complexity equals description length by assuming that description length translates to the length of the featural derivation, with longer derivations being more complex than shorter ones. Note that this is a derivational implementation of a largely descriptive concept of complexity: Kolmogorov complexity is in fact also commonly referred to as descriptive complexity. Concretely, I refer to the set- (or lattice-)theoretic operations brought about by the person features (see again Sections 3.3 and 5.2) to claim that sequences of function applications onto $\pi_{(\chi)}$ are computationally more complex than single function applications.[9] That is, in a nutshell, two features are more complex than one.

By virtue of the person system adopted here (see again (11)), (qua)ternary demonstrative systems are yielded by two person features, whereas binary demonstrative systems are derived by means of one single person feature. Then, if complexity relates to description length, such that more complex descriptions contain more information, the definition of (qua)ternary systems by means of two features makes them more complex than binary ones, derived by one feature alone.

Importantly, the complexity of (qua)ternary systems can be brought back to the 2nd person semantics (i.e., here, the hearer-related deictic domain: DEM.2), and the exclusive 1st person semantics (i.e., here, the exclusively speaker-related deictic domain: DEM.1EXCL), which they include. This is shown by the fact that the feature inventory necessary to derive DEM.2 and DEM.1EXCL is a superset of that necessary to derive DEM.1(INCL) and DEM.3 and, as such, the former makes the system sufficient to also derive the latter categories. The opposite is however not true. The following discussion illustrates this by applying an argument proposed by Harbour (2011) for number features to the person domain (see Appendix C.3.1.1 for exemplification).

[9]Empirical evidence for this claim might be sought in processing: this is left for future research.

Consider first ternary demonstrative systems and speaker-based binary systems (the two are diachronically related, in line with the generalisation in (13) above):

(15) a. *Ternary systems*

i.	DEM.1 (near me)	+participant(+author(π_χ))
ii.	DEM.2 (near you)	+participant(−author(π_χ))
iii.	DEM.3 (far from us)	−participant(±author(π_χ))

b. *Speaker-based binary systems*

i.	DEM.1 (near me)	+author(π_χ)
ii.	DEM.2/3 (far from me)	−author(π_χ)

DEM.2 in (15a) is derived if [author] is active, as also required for the derivation of the simple two-way opposition DEM.1 and DEM.2/3 in (15b), and if the [participant] feature is active, too. This latter requirement, i.e. the activation of [participant], is crucially not necessary for the derivation of DEM.1 and DEM.2/3.

Two notes are in order. First, the value of [author] is ambiguous between + and − in the 3rd person of ternary systems (here: DEM.3 in (15a-iii)): for the moment, I simply assume that in fact its value is [−author], an issue to which I will come back with an explanation for in Section 5.4.3. Accordingly, the loss of [−participant] in (15a-iii) would leave [−author] behind. Second, while in binary systems [−author] indicates the "far from *me*" deictic domain (DEM.2/3; see (15b)), in ternary ones (in combination with [−participant]) it derives the "far from *us*" deictic domain (DEM.3; see (15a)). I take this difference to be driven by additional number considerations: while the speaker i is, by assumption, unique (as mentioned in Section 3.3.1; see discussion in Harbour 2016: section 4.2.1), the participants, i.e. the (logical) disjunction of speaker i and hearer u, may be non-unique. In ternary systems, the presence of the hearer is given by default: as a consequence, the definition of the non-participant-oriented semantics is relative to both speaker i and hearer u, i.e. a plural entity ("far from *us*"). This is however not the case in binary systems, where the deictic domain of the hearer is not contrastively encoded. As such, I regard the "far from *us*" *vs* "far from *me*" difference across (15a) and (15b) as orthogonal to the issue discussed here.

With these remarks in place, the derivation of DEM.2 can be argued to make the system sufficient to also derive DEM.1 and DEM.(2/)3, and naturally so. In fact, the additional [±participant] feature present in (15a) is overall redundant in the derivation of DEM.1 and DEM.3, and does not strictly speaking affect it, as it co-varies with [±author] and, as such, does not create contrasts other than that already encoded by [±author]:

(16)

i.	DEM.1 (near me)	+participant(+author(π_χ))
ii.	DEM.3 (far from us)	−participant(−author(π_χ))

The opposite does not hold: the feature inventory for speaker-based binary oppositions (15b) is in fact a subset of that for three-way deictic oppositions (15a) and can only (minimally *and* maximally) derive a two-way opposition:

(17)
i. $+\text{author}(\pi_\chi)$ $\rightarrow$ DEM.1 (near me)
ii. $-\text{author}(\pi_\chi)$ $\rightarrow$ DEM.2/3 (far from me)
iii. $\rightarrow$ *DEM.2

Let us now turn to quaternary and participant-based binary demonstrative systems (for their diachronic relation, see (13)):

(18) a. *Quaternary systems*

i. DEM.1EXCL (near me) $+\text{author}(-\text{participant}(\pi_\chi))$
ii. DEM.1INCL (near us) $+\text{author}(+\text{participant}(\pi_\chi))$
iii. DEM.2 (near you) $-\text{author}(+\text{participant}(\pi_\chi))$
iv. DEM.3 (far from us) $-\text{author}(-\text{participant}(\pi_\chi))$

b. *Participant-based binary systems*

i. DEM.1/2 (near us) $+\text{participant}(\pi_\chi)$
ii. DEM.3 (far from us) $-\text{participant}(\pi_\chi)$

In this case, it is impossible to derive DEM.1EXCL without also having the means to derive DEM.1INCL and DEM.3, whose basic contrast is defined by [±participant] alone; furthermore, DEM.2 is made available by the activation of the same features involved in the definition of DEM.1EXCL, but with the opposite value settings. Despite the seeming symmetry between DEM.1EXCL and DEM.2 in quaternary systems, note that the availability of the latter does not by itself imply the former (and therefore the clusivity opposition): as seen in (15a) above, the presence of DEM.2 may also imply DEM.1 and DEM.3 in tripartitions, and is therefore not conclusive in quaternary systems. This shows that the feature inventory necessary for the derivation of the DEM.1EXCL makes the system sufficient to also derive DEM.1INCL, DEM.3, and DEM.2 without further assumptions. The opposite is not valid, as the one feature that derives the participant-based bipartition in (18b) is only a subset of those that derive DEM.1EXCL (and by extension: DEM.2) and could not capture a four-way opposition.

Thus, the increased length of the featural derivation for (qua)ternary systems is necessary to derive DEM.2 and DEM.1EXCL. These may only be obtained by the activation of both person features, as no dedicated primitive underlies their semantics. This fact suggests that these two categories have a higher complexity level, as opposed to other categories, and is in line with the second generalisation which emerged from Chapter 2: namely, that DEM.2 and DEM.1EXCL (following the revision in Section 5.2.2) are systematically lost in the reduction process.

In sum, feature loss (which intuitively formalises the reduction of (qua)ternary demonstrative systems) creates a shorter derivation for demonstrative forms,

which ultimately causes an overall reduction in complexity. The loss of one feature, in fact, shortens the description length of the system, making it less complex while at the same time yielding a system that can only encode fewer deictic contrasts (a binary system, without the possibility to encode DEM.2 and DEM.1EXCL). This indicates that the evolution of (qua)ternary demonstrative systems should be characterised as a simplification process: feature loss can thus be preliminarily understood as being triggered by a general tendency to reduce complexity.

Before dealing further with this suggestion and with its structural underpinnings (the feature which undergoes lost is the last one to be merged; see Chapter 6), in the next section I explore the complexity of DEM.2 and DEM.1EXCL in more detail, considering the specific feature values that are involved in the derivation of the two unstable person(-related) categories.

5.4 (Non-)monotonicity as complexity

In this section, I argue that DEM.2 and DEM.1EXCL are more complex than the other person-related categories in (qua)ternary demonstrative systems because of the values of the features involved in their derivations. These constitute sequences of non-uniform values across person features (+/− or −/+), which I construe as non-monotonic sequences of functions and regard as complex because of a general bias towards monotonic derivations.

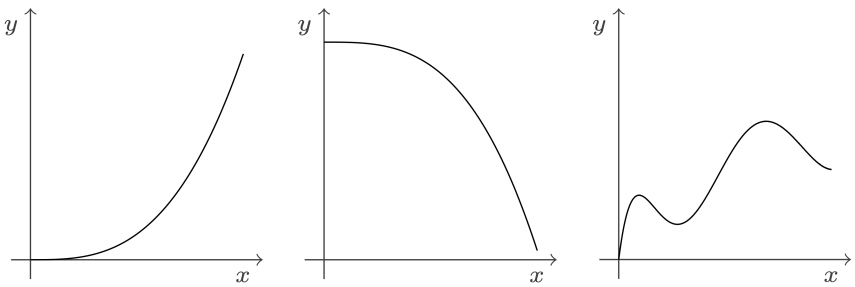
My argumentation proceeds as follows: firstly, I give some background to the concept of monotonicity and its applications in linguistics (Section 5.4.1). Secondly, expanding on some speculations by Harbour (2016: 91–92), I propose that (non-)monotonicity can be regarded as a legitimate property of action-on-lattice featural derivations (Section 5.4.2). Crucially, this property defines two new natural classes within person(-related) systems: one consists of monotonically derived forms (including DEM.1(INCL) and DEM.3); the other consists of non-monotonically derived forms (including DEM.2 and DEM.1EXCL). Finally, I propose that the latter set of forms can be regarded as more complex because of a general bias towards monotonic computation (Section 5.4.3). I will thus ultimately suggest that the complexity of non-monotonically derived person(-related) categories (namely, DEM.2 and DEM.1EXCL) contributes to driving feature loss, which results in the reduction of (qua)ternary systems to binary ones and implies the loss of DEM.2 and DEM.1EXCL, according to their featural derivations (see the discussion in Section 5.3).

5.4.1 Background

Monotonicity is a (mathematical) property that refers to whether, given an interval of values for a function, those values are entirely non-decreasing (monotonically increasing function, Figure 5.1a) or entirely non-increasing (monotonically decreasing function, Figure 5.1b). If the values in the given interval are

instead partly increasing and partly decreasing, the function is non-monotonic (Figure 5.1c).

Figure 5.1: Monotonic and non-monotonic functions



a. Monotonically increasing b. Monotonically decreasing c. Non-monotonic

Formally:

(19) a. A function f is monotonically increasing if, for x_1 and x_2 such that $x_1 \leq x_2$, then $f(x_1) \leq f(x_2)$ in a given domain.

b. A function f is monotonically decreasing if, for x_1 and x_2 such that $x_1 \leq x_2$, then $f(x_1) \geq f(x_2)$ in a given domain.

c. A function f is non-monotonic if, for x_1 and x_2 such that $x_1 \leq x_2$, then neither $f(x_1) \leq f(x_2)$ nor $f(x_1) \geq f(x_2)$ is ensured in a given domain.

That is, a monotonic function consistently preserves (increasing) or reverses (decreasing) the partial order $x_1 \leq x_2$. A non-monotonic function, instead, does both, thereby obliterating the ordering altogether.

Far from being relevant at mathematical level only, monotonicity has been detected in several other cognitive modules, among which language.

5.4.1.1 Monotonicity in language

The grammar's sensitivity to (non-)monotonicity has been extensively documented and monotonicity-related properties have been uncovered, among others, for quantifiers (starting from the seminal treatment by Barwise & Cooper 1981), gradable adjectives (as formalised by Heim 2000), but also, lately, for several morphosyntactic phenomena, such as constraints on clitic clusters (Graf 2019).[10] Ultimately, in all these cases, monotonicity amounts to the consistent

[10] A different, grammar-design-oriented implementation of the concept of monotonicity is proposed by Biberauer (2017, 2019b), who regards monotonicity as "generaliz[ation] over as large a domain as possible to create formally defined domains sharing a particular property" (Biberauer 2019b: 69) and provides examples related to the derivation of the Final-over-Final Condition and "phrasal coherence" in nominalisation and verbalisation. This will be better discussed in Section 5.4.3.

preservation or reversal of the relevant partial ordering: subset relations for quantifiers, degrees for gradable adjectives, underlying syntactic hierarchies in morphosyntax.

The partial ordering relevant for quantifiers is that which exists between two sets, A and B, where A is a subset of B (e.g. A = "trees that blossom beautifully"; B = "trees that blossom"): this ordering, expressed by entailment relations, can be preserved (20a) or reversed (20b):

(20) a. Monotonic increasing (or upward monotonic/entailing) quantifiers, e.g. *some*:
   i. If A $\subseteq$ B, then *some* A $\rightarrow$ *some* B.
   ii. Some trees blossom beautifully $\rightarrow$ Some trees blossom
   b. Monotonic decreasing (or downward monotonic/entailing) quantifiers, e.g. *few*:
   i. If A $\subseteq$ B, then *few* B $\rightarrow$ *few* A.
   ii. Few trees blossom $\rightarrow$ Few trees blossom beautifully

The entailment relation between two partially ordered sets is preserved by upward monotonic quantifiers, such as *some* (20a), and reversed by downward monotonic quantifiers, such as *few* (20b).

Besides, as first observed by Fauconnier (1979) and formalised by Ladusaw (1979), the licensing of negative polarity items (NPIs) is sensitive to such monotonicity conditions: only downward monotonic elements may license NPIs. For instance, the NPI *ever* is licensed in the scope of a downward monotonic quantifier, such as *few* (*few trees ever blossomed that beautifully*), but not in the scope of an upward monotonic quantifier, such as *some* (**some trees ever blossomed that beautifully*).

Gradable adjectives (e.g. *tall*), i.e. adjectives that denote a gradient property such that the entities that display that property can be ordered according to the degree to which they display it, also show similar properties (Seuren 1978; Fauconnier 1979). Concretely, given a pair of gradable adjectives (e.g. *likely–unlikely*), the negative member licenses NPIs (*It's unlikely that they'll ever visit again*) and downward monotonic entailments (*It's unlikely to happen* $\rightarrow$ *It's unlikely to happen tomorrow*), while the positive member does not license NPIs (**It's likely that they'll ever visit again*) but licenses upward monotonic entailments (*It's likely to happen tomorrow* $\rightarrow$ *It's likely to happen*).

Heim (2000) formalises the semantics of gradable adjectives as denoting monotonic functions, which in layman's terms amounts to saying that an entity that displays a given property to a degree d also displays that same property to all degrees d', d'' *etc.* lower than d.[11] That is, someone who is tall x cm is also tall $x-1$, ..., $x-n$ cm.

Recently, Graf (2019) proposed monotonicity properties for morphology, morphosyntax, and syntax, too. Here, the relevant notion of ordered sequence is

[11]"A function f of type ⟨d,et⟩ is monotone iff $\forall x \forall d \forall d'$ $[f(d)(x) = 1$ & $d' < d \Rightarrow f(d')(x) = 1]$" (Heim 2000: 41).

given by the underlying hierarchies assumed as inherent to several morphosyntactic domains. The proposed monotonicity constraints hold of how those hierarchies are mapped onto their actual morphological exponents: concretely, the exponents must be mapped onto the underlying hierarchies preserving the order of those hierarchies.

Let me illustrate the rationale of this proposal by focusing on the derivation of *ABA patterns for adjectival-stem suppletion. The background is provided by Bobaljik's (2012) argument that the suppletion patterns cross-linguistically attested in adjectival gradation are not accidental, but rather reflect the underlying structure of the different degrees of adjectives, as illustrated by the containment hypothesis represented in (21):

(21) a. [[[ADJECTIVE] COMPARATIVE] SUPERLATIVE]
b. *[[ADJECTIVE] SUPERLATIVE] (Bobaljik 2012: 4)

Graf's (2019) monotonicity argument goes as follows: given the ordered set of adjectival degrees (positive, contained by comparative, contained by superlative, (21)), the set of its possible surface realisations has to be mapped to it ensuring that its order is preserved, by monotonicity. This rules out *ABA patterns, as follows. If three realisations of the adjectival stem are available, each one of them will be mapped to one degree only (monotonic: ABC): e.g., for English, *little* for the positive, *less* for the comparative, *least* for the superlative. If only one realisation of the adjectival stem is available, it will be mapped to all degrees at once (monotonic, AAA): e.g., for English, *warm* for the positive, *warmer* for the comparative, *warmest* for the superlative. However, if only two realisations of the adjectival stem are available, then their mapping cannot reverse the order of the underlying hierarchy as presented in (21): thus, only contiguous degrees in (21) can get the same exponent, by monotonicity (ABB: *bad–worse–worst*), but not non-contiguous ones (*ABA: *bad–worse–*baddest*), as the latter mapping would not preserve the ordering of the underlying hierarchy.[12]

Monotonicity accounts along these lines have been proposed for various *ABA-like patterns found, for instance, in case suppletion paradigms and in constraints on clitic clusters (Graf 2019); in bans on movement and Case assignment and in omnivorous number agreement (Graf 2020); in patterns of tense syncretism and in gender resolution rules (Moradi 2020).

5.4.1.2 Monotonicity bias

Monotonic computation has been shown to be preferred to non-monotonic computation. The main area of investigation in this respect is that of quantifiers, both theoretically, by considering their verification procedures, and empirically, by considering their learnability.

[12] AAB is excluded in the adjectival-stem suppletion for independent reasons: see Bobaljik 2012.

The count complexity related to monotonic quantifiers, i.e. the number of inferences necessary for a given verification procedure, is lower than that related to non-monotonic quantifiers (van Benthem 1986: 207–209; Geurts & van der Slik 2005). Said otherwise, the minimal verification procedure for a sentence containing a monotonic quantifier is less complex (i.e. requires fewer verification "steps") than the minimal procedure for a sentence containing a non-monotonic quantifier.

For instance, given a set A with n elements, the behaviour of a restricted subset of elements is sufficient to prove or disprove a quantified statement. The minimal numbers of elements are given below for some quantifiers (table reduced from van Benthem 1986: 208):

(22)

Quantifier	Confirm	Refute	Total
all	n	1	n+1
some	1	n	n+1
precisely one	n	2	n+2

As (22) shows, it takes only one element to confirm or refute a quantified statement including an upward entailing quantifier: if at least one element is found in A for which the statement does not hold (*all*), then that statement is refuted as a whole; if instead at least one element is found in A for which the statement holds (*some*), then that statement is verified as a whole. To verify a statement containing a non-monotonic quantifier (e.g. *precisely one*), instead, one more element is needed: in this case, only if two elements are found in A for which the statement holds can that statement be refuted.

Conversely, monotonic quantifiers have been experimentally shown to be less complex to learn than non-monotonic quantifiers (van de Pol *et al.* 2019; Steinert-Threlkeld & Szymanik 2019). Further, it has been suggested that the preference for monotonic computation could be the result of a general learnability pressure (Carcassi *et al.* 2021 for a discussion).

5.4.1.3 Monotonicity beyond language

As mentioned, monotonicity is also relevant for other (extra-linguistic) cognitive domains: most notably, besides mathematics, its role has been investigated for logics. In logics, and contrary to everyday reasoning, monotonicity (or weakening) warrants the validity (or the invalidity) of an argument even if new premises are added to it. For instance, given (23a), (23b), and (23c), we should conclude (23d):

(23) a. Typically, mammals give birth to live young.
b. Monotremes lay eggs.
c. The platypus is a mammal.
d. ∴ The platypus gives birth to live young.

However, this is contrary to facts, as platypuses are monotremes (a class of mammals) and do as such lay eggs. This is captured, in everyday reasoning, by the additional premise in (24a). Accordingly, the conclusion is as in (24b):

(24) a. The platypus is a monotreme.
b. ∴ The platypus lays eggs.

In default logic, however, and despite the premise added by (24a), the conclusion in (23d) remains valid: that is, in the absence of contrary information in the original set of premises, the default interpretation for *typically* is assumed (hence: the platypus, which is a mammal, is expected to give birth to live young). Formally, this can be represented as follows:

(25) $\mathrm{A}_1, ..., \mathrm{A}_n \vDash \mathrm{B} \Rightarrow \mathrm{A}_1, ..., \mathrm{A}_n, \mathrm{C}_1, ... \mathrm{C}_n \vDash \mathrm{B}$

Everyday reasoning is not captured by classic monotonic reasoning; to capture it, non-monotonic reasoning (or non-monotonic logic) has been proposed. However, classic monotonic reasoning has been proven to be computationally less complex than non-monotonic reasoning (Gottlob 1992). As such, the bias towards monotonic computation can be defined as generally cognitive, rather than specific to language.

Taking stock, monotonicity considerations have been shown to apply to various linguistic and extra-linguistic domains. Beside a clear sensitivity of the grammar to (non-)monotonicity, a general bias towards monotonic sequences has been identified, which can be regarded as cognitive, rather than domain-specific. In what follows, I propose that monotonicity is also relevant in the syntax of the person domain (but for reasons that diverge from those that underlie Graf's 2019 morphosyntactic account).

5.4.2 (Non)-monotonicity in the person domain

As was already mentioned in Sections 3.3.2 and 5.3, the features that derive the 3rd person of ternary systems (in demonstrative systems: DEM.3) are ambiguous between two value settings for the [author] feature. Harbour (2016: 92) speculates that the two possible derivations could be considered in terms of (non-)monotonicity: concretely, (26a) constitutes the monotonic derivation for 3rd person and (26b) the non-monotonic one, by virtue of the sequence of feature values that they involve (−/− *vs* +/−):

(26) a. −participant(−author(π))
b. −participant(+author(π))

Harbour (2016: 91–92) demonstrates that the specific value for [author] is immaterial to the result of this derivation: both operations result in $\{o_o\}$. Rather, the different syncretism patterns cross-linguistically available in ternary person-related systems are taken to be evidence for variation in this respect: syncretisms between 2 and 3 point to a [−author] derivation for 3 (hence forming

a natural class with 2: e.g. Dutch *je gaat* 'you go.2SG=3SG' / *het gaat* 'it go.2SG=3SG'); syncretisms between 1 and 3, instead, suggest that [+author] is used (natural class with 1; e.g. German *wir lesen* 'we read.1PL=3PL' / *sie lesen* 'they read.1PL=3PL'). This additional aspect of variation is assumed to be regulated by a dedicated (sub-)parameter (Harbour 2016: 92).

Further, Harbour considers the [+author] setting as possibly "more marked in a semantic sense" (2016: 92) due to the non-monotonic values of the two features involved in the derivation ("it serves no obvious purpose to add the author in if one is only to undo the action [...] next", *ibid.*). As such, the non-monotonic derivation is taken to be generally disfavoured by language acquirers, and avoided where possible (i.e. whenever the primary linguistic data do not clearly instruct on the contrary).

Here, I develop this intuition about the role of (non-)monotonicity in 3rd person in tripartitions by pinning it onto principled grounds. Intuitively, indeed, the (non-)monotonicity of a sequence of feature values can be linked to whether that sequence is uniform (or harmonic: $+/+$; $-/-$), or whether it is non-uniform (or non-harmonic: $+/-$; $-/+$); this is informally reminiscent of the (non-)monotonic functions illustrated in Figure 5.1, and in particular of the fact that the slope of a tangent line to a point is consistently positive or consistently negative in monotonic functions, but partly positive and partly negative in non-monotonic functions. However, this intuition holds at the representational level and is fundamentally stipulative: nothing prevents us from thinking that a sequence of two different feature values ($+/-$; $-/+$) is preferable, for instance because it provides maximal differentiation between those values (respecting a general distinctness requirement which was shown to hold of different patterns of distribution; for a comprehensive overview, see Richards 2010: chapter 2 and, for the same principle holding beyond syntax, the Obligatory Contour Principle).[13]

Against this background, I show that this intuition is in fact well motivated at the derivational level, too, where it hinges on the nature of feature values under an action-on-lattice semantics for person features (Section 5.4.2.1). Further, I speculate that feature values (i.e. the specific set-theoretic operations) interact with the set-theoretic relations among the three relevant lattices ($[\![\pi]\!]$, $[\![\text{author}]\!]$, and $[\![\text{participant}]\!]$) in a way similar to that discussed for quantifiers and gradable adjectives (Section 5.4.2.2). As a consequence, I argue that the extension of this reasoning line to all person(-related) categories is naturally warranted and show that two new natural classes can be defined on these grounds: that of the monotonically derived person(-related) categories, and that of the non-monotonically derived ones (Section 5.4.2.3). This will naturally feed into the discussion in Section 5.4.3, where I argue that non-monotonic person categories are more complex because of a general monotonicity bias.

[13] I thank Ad Neeleman for raising this issue and encouraging me to find a principled account for the concept of (non-)monotonicity as applied to person features.

5.4.2.1 Feature values in action-on-lattice features

Feature values play a key role for the action-on-lattice feature system assumed in this work (following Harbour 2008, 2014a, 2016, *i.a.*): under this approach, + (plus) and − (minus) denote set-theoretic operations (disjoint addition and joint subtraction, respectively, as detailed in Section 3.3) that ultimately derive the various person categories.

This semantics for feature values is in sharp contrast with their traditional one, whereby + and − predicate (or not) an attribute of an entity. Consider for instance the 1st person category. Traditionally, 1st person may be analysed as carrying a monovalent [speaker] or [1] feature, or a binary [+speaker] feature. Regardless of the exact machinery (privative or binary features) and of nominal differences (in the case of 1st person, different labels have been used for the relevant feature: [(±)1], [(±)speaker], [(±)author], *etc.*), these solutions uniformly flag the 1st person as the speaker of the utterance by predicating for it the "speaker" property:

(27) $\lambda x.\ \text{speaker}(x)$

To compare the role of feature values across frameworks, let us focus on binary features of the type [±F] only. Under traditional accounts, the two possible feature values are taken to denote the positive (+) or negative (−) predication of an attribute to an entity (see some traditional theories of binary features, e.g. Noyer 1992, Halle 1997, Bobaljik 2008). The action-on-lattice approach to person features is radically different: [+author] does not predicate the "author" (or "speaker") property of an entity. Rather, it denotes the set-theoretic operation (+, or better: ⊕, i.e. disjoint addition) that the set denoted by ⟦author⟧ ($\{i\}$, i.e. the speaker, in the person ontology) performs on another set, π (where $[\![\pi]\!] = \{i_o,\ iu_o,\ u_o,\ o_o\}$):

(28) Disjoint addition: (Harbour 2016: 83; repeated from Section 3.3.1)

$$
\begin{aligned}
&[\![+\text{author}(\pi)]\!] = \\
&= [\![\pi]\!] \oplus [\![\text{author}]\!] = \\
&= \{i_o,\ iu_o,\ u_o,\ o_o\} \oplus \{i\} = \\
&= \{i_o \sqcup i,\ iu_o \sqcup i,\ u_o \sqcup i,\ o_o \sqcup i\} = \\
&= \{i_o,\ iu_o,\ iu_o,\ i_o\} = \\
&= \{i_o,\ iu_o\}
\end{aligned}
$$

That is, under this approach, the [author] feature is construed as an inert element, much in the same vein as a natural number: just as 2 denotes the cardinality of a set with two members, [author] denotes a set containing one member only, the speaker i. There is nothing more to the denotation of person features than this. To derive person categories, an operator is needed, which induces sets to compose with each other, much in the same spirit of arithmetic operations. + (for natural numbers addition) and ⊕ (for lattices disjoint addition) are two such operators: then, just as 2+3=5, $[\![\pi]\!] \oplus [\![\text{author}]\!] = \{i_o,\ iu_o\}$.

Thus, if features are considered as denoting actions on lattices, rather than as predicates, feature values immediately acquire a key derivational role: without them, the derivation of person categories would simply be impossible, as no operation could be performed on the $\pi_{(\chi)}$ lattice. Feature values, that is, mediate between the operands, namely the active person features, and the $\pi_{(\chi)}$ head, by denoting the specific operations that the former perform on the latter.

Granting this semantics for feature values, the intuition holding at the representational level (uniform sequences of feature values are monotonic and non-uniform sequences of feature values are non-monotonic, by virtue of their (mis)matching feature values) receives a justification in derivational terms: uniform configurations of values across features consist in the reiteration of one and the same function, or lattice-theoretic operation (either consistent disjoint addition: $+/+$; or consistent joint subtraction: $-/-$), while non-uniform configurations of feature values require that two different operations are performed (disjoint addition and joint subtraction, in either order: $+/-$ or $-/+$). Considering the sequence of feature values as operators, rather than as substantially semantically void $+$'s and $-$'s, provides formal grounds for the assumption that representational (non-)uniform feature values should be derivationally recast as (non-)monotonic sequences of features.

Importantly, by capitalising on the role of feature values in the derivation of person categories, this approach warrants that (non-)monotonicity considerations should be legitimately extended to all person categories, rather than being limited to the derivation of 3rd person, as under Harbour's (2016) intuition. This extension is even desirable, as otherwise some extrinsic mechanisms would be needed to ascribe (non-)monotonicity to 3rd person alone. As such, I maintain that the grammar itself is systematically sensitive to the (non-)monotonicity of the sequence of feature compositions.

5.4.2.2 (Non-)monotonicity and set-theoretic relations

In Section 5.4.2.1, the (non-)monotonicity of the feature sequence was related to whether functions (or lattice-theoretic operations) are preserved or not throughout the functional sequence. In this section, I speculate that one additional argument can be adduced for monotonicity within the person domain. As discussed in Section 5.4.1, monotonicity refers more precisely to the preservation, reversal, or obliteration of partial orderings: crucially, the lattices involved in Harbour's (2016) person system instantiate one such ordering, as they stand in nested subset relations (see again the discussion in Section 3.3.1):[14]

(29) $$\begin{array}{lcl} [\![\text{author}]\!] & \subseteq & [\![\text{participant}]\!] \quad \subseteq \quad [\![\pi]\!] \\ \{i\} & \subseteq & \{i,\ iu,\ u\} \quad \subseteq \quad \{i_o,\ iu_o,\ u_o,\ o_o\} \end{array}$$

[14] Although here I only discuss person deixis (π), the same applies for the spatial deictic ontology, marked by the subscript χ (π_χ, *etc.*).

That is, the denotation of the ⟦author⟧ lattice is a subset of the denotation of the ⟦participant⟧ lattice, which in turn is a subset of the denotation of the whole ⟦π⟧ lattice. By transitivity, here I simply consider ⟦author⟧ as a subset of ⟦π⟧.

Let us now examine how disjoint addition (+) and joint subtraction (−) affect this subset relation. When either operation is performed on π, we can expect ⟦author⟧ to still be a subset of this result (ultimately preserving the ordering across sets), or not (reversing instead the ordering). Both possibilities are attested: specifically, disjoint addition preserves the ordering ⟦author⟧ $\subseteq$ ⟦π⟧ (30a), while joint subtraction substantially obliterates it (30b):

(30) a. i. ⟦author⟧ $\subseteq$ ⟦+author(π)⟧
$\{i\} \subseteq \{i_o,\ iu_o\}$ (= 1)

ii. ⟦author⟧ $\subseteq$ ⟦+participant(π)⟧
$\{i\} \subseteq \{i_o,\ iu_o,\ u_o\}$ (= 1/2)

b. i. ⟦author⟧ $\nsubseteq$ ⟦−author(π)⟧
$\{i\} \nsubseteq \{u_o,\ o_o\}$ (= 2/3)

ii. ⟦author⟧ $\nsubseteq$ ⟦−participant(π)⟧
$\{i\} \nsubseteq \{o_o\}$ (= 3)

That is, ⟦author⟧, which is the subset of all other sets, is in a subset relation with the result of the positive action of any feature with ⟦π⟧ (30a), but is not in a subset relation with respect to the result of the negative action of any feature with ⟦π⟧ (30b). This is reminiscent of the interactions that upward and downward monotonic quantifiers have with subset and entailment relations, as discussed in Section 5.4.1.1. Note, however, that in the domain of person features only subset relations and not entailments can be considered, as we are not dealing with propositional elements.

Now, crucially, when the second operation is performed (i.e. when the second person feature is merged, along with its positive or negative value), these set-theoretic relations are unaffected if that feature has the same value as the first feature (monotonic sequences of feature values: series '*i*' throughout (31), shown by the regular arrows), but are further obliterated if the second feature has the opposite value with respect to the first one (non-monotonic sequences of feature values: series '*ii*' throughout (31), indicated by the dashed arrows; there is an exception to this, (31b-ii), marked by a squiggly arrow)):

(31) a. ⟦A⟧ $\subseteq$ ⟦+A(π)⟧

$\nearrow$ *i.* ⟦A⟧ $\subseteq$ ⟦+P(+A(π))⟧ / $\{i\} \subseteq \{i_o, iu_o\} = 1$

$\dashrightarrow$ *ii.* ⟦A⟧ $\nsubseteq$ ⟦−P(+A(π))⟧ / $\{i\} \nsubseteq \{o_o\} = 3$

b. $[\![\mathrm{A}]\!] \nsubseteq [\![-\mathrm{A}(\pi)]\!]$
- *i.* $[\![\mathrm{A}]\!] \nsubseteq [\![-\mathrm{P}(-\mathrm{A}(\pi))]\!]$ / $\{i\} \nsubseteq \{o_o\} = 3$
- *ii.* $[\![\mathrm{A}]\!] \nsubseteq [\![+\mathrm{P}(-\mathrm{A}(\pi))]\!]$ / $\{i\} \nsubseteq \{u_o\} = 2$

c. $[\![\mathrm{A}]\!] \subseteq [\![+\mathrm{P}(\pi)]\!]$
- *i.* $[\![\mathrm{A}]\!] \subseteq [\![+\mathrm{A}(+\mathrm{P}(\pi))]\!]$ / $\{i\} \subseteq \{iu\} = 1_{\text{INCL}}$
- *ii.* $[\![\mathrm{A}]\!] \nsubseteq [\![-\mathrm{A}(+\mathrm{P}(\pi))]\!]$ / $\{i\} \nsubseteq \{u_o\} = 2$

d. $[\![\mathrm{A}]\!] \nsubseteq [\![-\mathrm{P}(\pi)]\!]$
- *i.* $[\![\mathrm{A}]\!] \nsubseteq [\![-\mathrm{A}(-\mathrm{P}(\pi))]\!]$ / $\{i\} \nsubseteq \{o_o\} = 3$
- *ii.* $[\![\mathrm{A}]\!] \subseteq [\![+\mathrm{A}(-\mathrm{P}(\pi))]\!]$ / $\{i\} \subseteq \{i_o\} = 1_{\text{EXCL}}$

Thus, in this domain, it can be hypothesised that monotonicity amounts to the preservation or obliteration of the original $[\![\text{author}]\!] \subseteq [\![\pi]\!]$ ordering throughout: more precisely, positive monotonic sequences (+/+) consistently preserve the ordering, while negative monotonic sequences (−/−) consistently obliterate it. On the contrary, in non-monotonic sequences (+/− or −/+) the second operation reverses the subset relations established by the first. This generalisation holds for all non-monotonic sequences with one exception: +participant(−author(π)), which derives 2nd person(-related categories) in ternary systems (see (31b-ii)). Note, however, that (31b) represents the only case in which $[\![\text{author}]\!]$ is stripped from $[\![\pi]\!]$: it can perhaps then be suggested that, in this case, the original subset relation is in a way intrinsically obliterated and that, because of this, the positive action brought about by +participant cannot reverse it.

Despite this one exception that still needs a principled account, this speculation seems to preliminarily suggest that (non-)monotonicity in the person domain may indeed be ultimately construed by referring to the preservation or obliteration of the basic subset relations instantiated by the three person-related lattices. I leave further investigations on the matter to future research.

5.4.2.3 New natural classes

In the foregoing, by capitalising on the role of feature values, I proposed that (non-)monotonicity is a natural property of the feature sequence which derives person categories.[15] As such, I propose that the grammar is consistently sensitive to the (non-)monotonicity of the overall sequence of functions involved

[15] In principle, the same rationale can be applied to any sequence of action-on-lattice features: although a full investigation of this issue exceeds the scope of this work, preliminary indications that support this hypothesis come from the number domain, as briefly discussed in Section 6.5.2.2.3.

in the derivation of the different person categories included in (qua)ternary systems (i.e. those that require two person features to be merged) and that it sets apart monotonic derivations (uniform sequences of values across features: +/+; −/−) and non-monotonic ones (non-uniform sequences of values across features: +/−; −/+). These can be construed as two different natural classes: in this section, I briefly show that attested syncretism patterns support this analysis, providing evidence for this (thus far: theory-internal) proposal.

Monotonically-derived person categories constitute the monotonic natural class ('class I', (32a)): in this case, as the feature values co-vary, they can be rewritten by means of the α notation. Non-monotonically-derived person categories (i.e. derived by different operations across operands: α and $-\alpha$), can be instead construed as belonging to the non-monotonic class ('class II', (32b)):

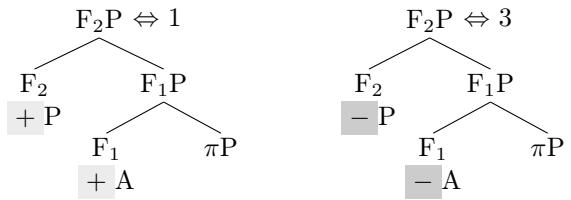
(32) a. Class I: αP(αA(π)) for tripartitions;
αA(αP(π)) for quadripartitions.

b. Class II: $-\alpha$P(αA(π)) for tripartitions;
$-\alpha$A(αP(π)) for quadripartitions.

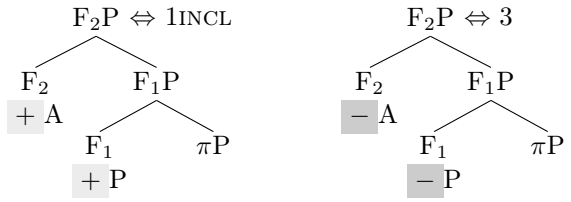
A full sample of the relevant derivations is given in (33) for Class I person(-related) categories and in (34) for Class II person(-related) categories:[16]

(33) *Class I: Monotonic derivations*

a. *Ternary systems*



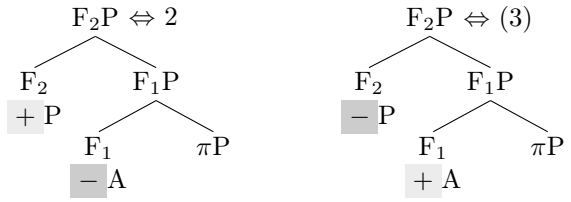
b. *Quaternary systems*



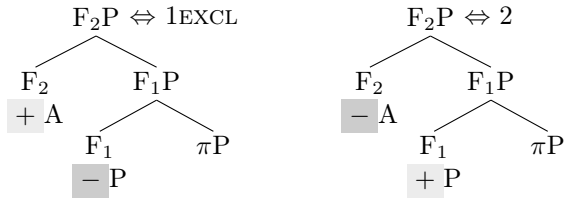
[16]Since I propose (non-)monotonicity as a property of the person domain as a whole, the derivations in (33) and (34) are partial and only include the active features (along with their values). This basic structure for person indexicals is then to be implemented according to the internal syntax of pronominal and demonstrative forms. Specifically, demonstrative forms include a π_χP, rather than a πP, and a higher DemP (see Chapter 4); personal pronouns, instead, typically also involve number features and a higher D level (for some remarks on the internal structure of personal pronouns, see Section 6.5.2).

(34) *Class II: Non-monotonic derivations*

a. *Ternary systems*



b. *Quaternary systems*



Thus, in ternary systems, the feature values that derive 1st person forms constitute a monotonic sequence (+/+), those that derive 2nd person forms constitute a non-monotonic sequence (+/−), and those that derive 3rd person forms are ambiguous between two value settings for the [author] feature, according to Harbour's (2016) account. In Section 5.4.3, I propose that only the monotonic derivation for 3rd person is actually implemented, while the non-monotonic one, while in principle possible, is bled by a general monotonicity bias. In quaternary systems, instead, the derivations for 1st person inclusive and 3rd person are monotonic (respectively: +/+ and −/−), whereas the derivations for 1st person exclusive and 2nd person are non-monotonic (+/− and −/+).

These natural classes are well grounded, as they capture attested person syncretism patterns: the availability of (non-)monotonic patterns of syncretism in morphology supports the hypothesis that the grammar is sensitive to the (non-)monotonicity of feature sequences. As a full exemplification and discussion of the syncretism cases exceeds the scope of the present work, I limit myself here to listing some instances and references (see also Terenghi 2021b, 2022c).

Quaternary systems present two patterns of (non-)monotonic syncretism: 1INCL/3 and 1EXCL/2. 1INCL/3 (class I) is very rare and some examples are presented in Cysouw 2009: 155–156. 1EXCL/2 is instead slightly more common and has been discussed, most notably, in relation to Mam's enclitic *(y)a* (Noyer 1992: section 2.1.6) and to person plural suffixes in Cheyenne (Despić & Murray 2018).[17] More instances of this pattern can be found in Cysouw 2009: 156–157.

[17]Despić & Murray (2018: 225) made a preliminary proposal in the direction pursued here: "The common property of first person exclusive and second person [...] is that they each have one [+] and one [−] value. [...] It is, thus, expected [...] that some languages could in principle treat these three different combinations of [+] and [−] values as natural classes." Note that, under the traditional approach to features adopted by Despić & Murray, there is no room

Turning to ternary systems, and assuming that the non-monotonic derivation for 3rd person is ruled out on independent grounds (see Section 5.4.3), here the only relevant syncretism pattern is given by 1–3 in tripartitions (class I), which is most famously attested across Germanic languages in the verbal inflection domain; other examples are provided in Cysouw 2009: 45–48.

Note that Classes I and II differ significantly from traditional natural classes. The latter are built on shared features and shared values (in the case of binary systems): for instance, two forms which are both derived by [+participant] and which also include either [+author] or [−author] (i.e. 1st person and 2nd person, respectively) can be analysed as a natural class by virtue of their shared [+participant]. The natural classes proposed here are instead defined according to feature values only, i.e. abstracting away from the actual features (see again (32)). This is how this proposal captures all three types of syncretism along with the traditional ones and with one and the same feature inventory: competing analyses cannot instead do so.

Crucially for the present discussion, Classes I and II also sit across the divide of diachronic (in)stability: DEM.1EXCL and DEM.2 were shown to undergo loss in the evolution of (qua)ternary demonstrative systems; DEM.1(INCL) and DEM.3, instead, were shown to be diachronically stable. In the next section, I will relate this to a bias towards monotonic computation, which makes non-monotonic (Class II) derivations disfavoured in language acquisition and hence prone to undergo loss.

To sum up, in this section I proposed that (non-)monotonicity is a natural property of the derivation of person categories which rests on the semantics of feature values and is possibly reflected by the (more or less consistent) preservation or obliteration of the basic subset relation $[\![\text{author}]\!] \subseteq [\![\pi]\!]$.[18] To reiterate, if the value of the first feature to be merged in the functional sequence is preserved by the value of the second one (+/+: 1st person in tripartitions, 1st person inclusive in quadripartitions; −/−: 3rd person in tripartitions and quadripartitions), the overall sequence denotes one and the same operation (disjoint addition or joint subtraction) and is construed as monotonic; otherwise, if the value of the second feature does not preserve that of the first (+/−: 2nd and, marginally, 3rd person in tripartitions; 1st person exclusive and 2nd person in quadripartitions), the overall sequence denotes two different operations and is analysed as not monotonic.

Importantly, we saw that monotonicity creates two natural classes that clearly set apart stable and unstable demonstrative categories: DEM.2 and DEM.1EXCL are non-monotonically derived and have been shown to be unstable

for an explanatorily adequate definition of natural classes by means of feature values only; they are instead fully justified if feature values are regarded as denoting different operations and as possibly having ramifications with respect to the subset relations among the system's primitives.

[18]This is a novel perspective on the role of monotonicity in syntax, which systematically differs from the line of research initiated by Graf (2019), whereby monotonicity effects arise in the mapping of syntactic hierarchies of features to their morphological exponents.

(Chapter 2); DEM.1(INCL) and DEM.3, instead, are monotonically derived and are stable in the development of demonstrative systems. In the next section, I propose that non-monotonic computation is to be regarded as complex because of a general monotonicity bias.

5.4.3 Monotonicity bias and person systems

Recall at this juncture that Harbour (2016: 92) suggested that the monotonic derivation for 3rd person in ternary systems could be seen as preferred to the non-monotonic one in acquisition. However, if monotonicity is regarded as a trivial property of the action-on-lattice person features, which is then not limited to one specific person category (following Section 5.4.2), it should be concluded that preference for monotonic computation is likewise to be invoked as a general principle of featural derivation that applies to the whole person domain.

More concretely, and following up on the general monotonicity bias mentioned in Section 5.4.1.3, in this section I propose that Classes I and II correlate with different complexity levels: non-monotonic derivations (Class II) are to be conceived as more computationally complex than monotonic ones (Class I), just as it has been argued to be the case in other linguistic domains (for instance, quantifiers) and in other cognitive domains (for instance, (non-)monotonic logics). Ultimately then, and on strictly computational bases, non-monotonic sequences can be argued to be overall dispreferred in acquisition and, in turn more, prone to change (Section 5.5).

One consequence of this proposal concerns the very ambiguity in the derivation of 3rd person in ternary systems (see again (26)). According to Harbour (2016: 92), the twofold derivation for 3rd person in tripartitions, in spite of the non-monotonic derivation being "marked", is evidenced by the concurrent availability of 1/3 (non-monotonic 3rd person) and 2/3 (monotonic 3rd person) syncretism patterns. Under the current proposal, the availability of the 1/3 syncretism is however captured by the natural class for monotonic derivations, that is: plainly taking 3rd person to be monotonically derived. On closer inspection, the current proposal does away with the non-monotonic feature configuration for 3rd person altogether: that is, and regardless of its principled availability, it can be concluded that the non-monotonic sequence $-\text{participant}(+\text{author}(\pi))$ is avoided because of its complex computation (non-monotonic) and ultimately bled, under the pressure of the competing (and equivalent, result-wise) monotonic sequence $-\text{participant}(-\text{author}(\pi))$.

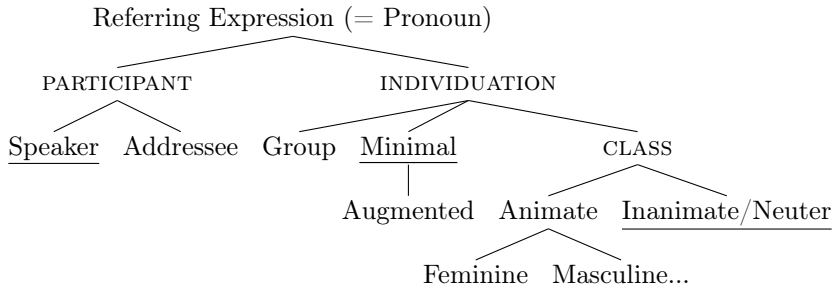
Some initial evidence in favour of the monotonicity bias in the domain of person features is provided by some acquisition facts. The bias towards monotonic derivations, in fact, makes a straightforward prediction about the order of acquisition of person categories (and, particularly, of pronominal ones): Class I person(-related) categories, instantiating monotonic sequences of operations, are expected to be learnt before Class II person(-related) categories, which instantiate instead non-monotonic sequences of operations. More specifically, the

following predictions can be advanced: in ternary pronominal paradigms (i.e. without the clusivity distinction), 1 and (monotonic) 3 will be acquired before 2; in quaternary paradigms (i.e. with the clusivity distinction), 1INCL and 3 will be acquired before 1EXCL and 2 (in number-neutral systems or in plural paradigms).[19] Note that the predictions made for ternary systems are comparable, despite the different premises, to those made by Harley & Ritter (2002) on the basis of their feature geometry.

While it should be pointed out that no large-scale investigation of this issue is available to date and that, to the best of my knowledge, no generalisations are available with respect to the order of acquisition of person categories in quadripartitions, the first set of predictions seems to be preliminarily borne out: 1 and 3 are the person categories typically acquired first, while the acquisition of 2 always follows that of 1 (see Harley & Ritter 2002: 499). This is further supported by data from the acquisition of person inflection, where 3 and 1 are consistently acquired first (Ackema & Neeleman 2018: 256).

Harley & Ritter (2002) take the attested patterns to follow from their feature geometry (35) and from the default values that this encodes (see also Appendix C.3.3):

(35) *Feature geometry* (from Harley & Ritter 2002: 486)



Establishing a parallel with phonological geometries, they argue that the order of acquisition of personal pronouns follows the feature geometry top-bottom and additionally tracks the default options provided by UG (those underlined, in (35)). In the case of person distinctions, this means that either the Participant node (with its default value: speaker) or the Individuation node will be activated first, leading to 1 and/or 3 to precede 2. Hence, under Harley & Ritter's (2002) approach, additional stipulations have to be made about both the hierarchic organisation of those features and their default values (briefly, a geometry), beside the basic assumption of a specific feature system, namely privative (person) features.

[19]Similar predictions should be made for demonstrative forms, too. The ordering of acquisition of different demonstrative forms is largely unexplored: a very preliminary (and extremely limited in scope) research performed on the CHILDES database by Diessel & Coventry (2020: 6), however, seems to confirm this prediction, as it found only 3.9% of DEM.2 forms among the total of demonstrative forms produced by Japanese infants.

Under the current proposal, instead, the same predictions are intrinsic to the adopted action-on-lattice (person) features: once it is assumed that feature values denote set-theoretic operations, interplays between those values and monotonicity effects in acquisition naturally fall out as a consequence of third factor, thus avoiding extrinsic stipulations.

The rationale behind the monotonicity bias is further compatible with some more general considerations related to learning, as initially proposed by Roberts (2007: 275) and Biberauer & Roberts (2012) and following works: the authors focus on the acquisition of parameter hierarchies, i.e. combinations of interrelated parameters that act together and govern cross-linguistic variation (see Appendix C.3.1.2) and present evidence building on which they can postulate a "conservative learner" guided by the "input generalisation" principle. Concretely, the learner is defined conservative because of their tendency to extend the setting of the first parameter in a given hierarchy (established according to the given input) to all embedded parameters, by hypothesis: this is defined as input generalisation. This preliminary setting will however be switched if consistent positive evidence is found in the primary linguistic data (PLD).[20] That is, the conservative learner will set parameters as efficiently as possible, as summarised by the NONE > ALL > SOME template (inferable from Biberauer & Roberts 2012 and originally defined in Biberauer & Roberts 2013).

Importantly here, Biberauer (2017, 2019b) subsequently intuitively formalised these considerations as being shaped by monotonicity, which is intended as the tendency that learners have "to generalize over as large a domain as possible to create formally defined domains sharing a particular property" (Biberauer 2019b: 69).[21] Cross-linguistic evidence adduced by Biberauer for a monotonicity-based formalisation of the NONE > ALL > SOME path (in terms of property sharing over domains) is found in distribution of head-finality across syntactic domains (which results in Final-over-Final-Condition-compliant patterns only: Biberauer 2019b: 70; and see Sheehan *et al.* 2017) and in patterns of categorisation, whereby once an originally verbal structure has been nominalised, it cannot undergo a new verbalisation ("Phrasal Coherence": Biberauer 2019b: 71 and, for an overview and references, Panagiotidis 2014: 136 ff.).

The idea of input generalisation can then be related *a fortiori* to how the values of action-on-lattice features are set in the derivation of person categories: in this case, the "conservative" learner's preferred option will be the generalisation of the first operation performed on π (+ or −) to the whole sequence of operations on π (+/+ or −/−), hence deriving a monotonic sequence of operations (and, possibly, systematically preserving or obliterating the basic subset

[20]This has been experimentally verified by Culbertson & Newport (2015) who uncovered a strong harmonic bias in children (and slightly less so in adults: Culbertson *et al.* 2012), whereby harmonic word order patterns, i.e. those that preserve the head-directionality, are preferred to non-harmonic ones.

[21]However, note that monotonicity here does not have a clear formal correlate in set theoretic and general partial ordering facts, but is, in a way, more rooted in the representation of a given derivation.

relation $[\![\text{author}]\!] \subseteq [\![\pi]\!]$). Only if the input instructs against this generalisation, i.e. if it contains explicit and consistent evidence in favour of a different action within the same functional sequence, will the generalisation be halted and a non-monotonic sequence of functions be yielded instead ($+/-$ or $-/+$).

To conclude, monotonicity considerations can be regarded as the second computational complexity factor that characterises (qua)ternary demonstrative systems, along with their description length, as discussed in Section 5.3. Since (qua)ternary systems are derived by the activation of two features (longer description), they also necessarily contain non-monotonically derived categories (DEM.2, DEM.1EXCL), which further enhances their computational complexity. Building on these observations, in the next Section I take the computational complexity entailed by non-monotonic functional sequences to be the trigger for the simplification process that affects (qua)ternary demonstrative systems.

5.5 Third factor and feature loss

Sections 5.3 and 5.4 discussed two featural complexity conditions: description length and (non-)monotonicity of the derivation. Importantly, these two conditions can be shown to be entwined: as was already pointed out in Section 5.3, the longer featural derivations that underlie (qua)ternary system are due to the presence of DEM.2 and DEM.1EXCL. These categories are in fact not derived by a dedicated primitive (under the system assumed in this work), but rather need two features, which further must not co-vary. That is, the activation of two features (longer description) necessarily involves at least one non-monotonic category, which further enhances the complexity of (qua)ternary systems. Finally, the foregoing discussion indicated that the evolution of (qua)ternary systems into binary ones ultimately results in a decrease in complexity: feature loss makes the system insufficient to perform non-monotonic derivations, complying with the bias towards the less burdensome monotonic ones, and, concurrently, determines a shorter description length for the derivation of the remaining person(-related) categories, making them overall less complex.

Against this background, in this section I propose that the presence of complex non-monotonically derived person(-related) categories in (qua)ternary systems (namely, DEM.2 and DEM.1EXCL) is ultimately the trigger for feature loss. The rationale can be sketched as follows. As the bias towards monotonic computations (Section 5.4.3) favours fully monotonic feature sequences, non-monotonic derivations can be thought of as being converted, by hypothesis, into monotonic ones during acquisition. This is achieved by the systematic generalisation of the value of the first feature to compose with π_χ throughout the functional sequence, in line with the principle of "input generalisation" (Roberts 2007: 275 and Biberauer & Roberts 2012; see Section 5.4.3). However, this first pass (monotonic) derivation cannot derive the semantic distinctions between originally non-monotonic and monotonic person categories in (qua)ternary systems: specifically, DEM.2 is derived as DEM.3 in ternary systems (36a) and as

DEM.1INCL in quaternary ones (36b); DEM.1EXCL is instead derived as DEM.3 in quaternary systems (36c):

(36) a. DEM.2 $\leftrightarrow$ $+\mathrm{P}(-\mathrm{A}(\pi_\chi))$ preliminarily derived as $-\mathrm{P}(-\mathrm{A}(\pi_\chi))$
[cf. DEM.3 $\leftrightarrow$ $-\mathrm{P}(-\mathrm{A}(\pi_\chi))$]

b. DEM.2 $\leftrightarrow$ $-\mathrm{A}(+\mathrm{P}(\pi_\chi))$ preliminarily derived as $+\mathrm{A}(+\mathrm{P}(\pi_\chi))$
[cf. DEM.1INCL $\leftrightarrow$ $+\mathrm{A}(+\mathrm{P}(\pi_\chi))$]

c. DEM.1EXCL $\leftrightarrow$ $+\mathrm{A}(-\mathrm{P}(\pi_\chi))$ preliminarily derived as $-\mathrm{A}(-\mathrm{P}(\pi_\chi))$
[cf. DEM.3 $\leftrightarrow$ $-\mathrm{A}(-\mathrm{P}(\pi_\chi))$]

If the input provides consistent positive evidence for the differentiation of the feature sequence, the monotonicity bias can be disregarded, leading to a more computationally demanding derivation but also to a full semantic differentiation in the system.[22] Otherwise, as the monotonic derivations in (36) necessarily involve systematically co-varying features, one of the two features in the derivation comes to be regarded as fully redundant and is as such not postulated by subsequent generations of acquirers. Thus, a general preference for shorter derivations ultimately leads to feature loss, which can be shaped as a version of Feature Economy whereby only the formal features necessary for the derivation are postulated by the learners (see below).

As such, the loss of the originally "offending" feature combination can be considered as a way to optimise computation. Beside precluding non-monotonic derivations, feature loss results in the reduction of (qua)ternary systems to binary ones, yielding a further complexity reduction. Recasting this proposal in minimalist terms amounts to regarding the monotonicity bias as third factor; feature loss, which leads to less burdensome computations, can then be fully explained as third-factor-driven.

According to Chomsky's (2005) biolinguistic approach, third factor principles are general cognitive principles involved in the "development of the language faculty" (2005: 6) in an individual, alongside two other factors: universal grammar (UG), with which all humans are genetically endowed and which in its most minimalist implementation only includes Merge (and, possibly, Agree); and the primary linguistic data (PLD), which constitute the linguistic input to which any individual is exposed. Crucially, third factor principles are not language-specific, but are instead also relevant for other cognitive domains and pertain to "data processing, structural architecture, and computational efficiency" (Chomsky 2005: 9). The exact set of these principles is matter of much debate, but there is some agreement in regarding principles belonging to the last two categories as possibly playing a crucial role in language design, under the assumption that language is designed in the most efficient way possible, in the spirit of the Strong Minimalist Thesis (see e.g. Chomsky 2008: 135). Concretely, this means that language must optimally meet the legibility

[22] What may be considered "consistent" positive evidence, both quantitatively and qualitative, is however unclear. A modelling of this aspect, if at all possible, is left for future investigations.

requirements imposed by the two interfaces whereby language is interpreted (Conceptual-Intentional system, C-I) and externalised (Sensory-Motor system, S-M). In this sense, third factor principles are taken to significantly contribute to the optimal design of language.

My proposal is that the monotonicity bias is one such third factor principle: in fact, beside favouring overall less onerous derivations, in line with other computational efficiency metrics, it represents a general cognitive principle, which ranges well beyond the Faculty of Language (see Section 5.4.1.3). Moreover, some authors include mathematical principles, such as monotonicity, among third factor principles as a default (see e.g. Chomsky 2004: 105–106; Carstairs-McCarthy 2007); and recall that Biberauer (2017, 2019b) already suggested that monotonicity is closely related to optimal language design, though by a slightly different rationale. Granting this, the hypothesis that feature loss is driven by a third factor (the monotonicity bias) further naturally fits within current diachronic generative syntax research: under this framework, the key assumption is

> that the workings of third factor principles should be noticeable in language change as well. Since third factors bias the acquisition, a language learner may simplify the input in accordance with third factors resulting in more economic derivations.
>
> (van Gelderen 2021: 1)

In fact, much language change is currently explained as being determined by third factor principles aimed at enhancing the efficiency of the derivation. The vast majority of such accounts are devoted to grammaticalisation: far from being able to make justice to their wealth of insights, in the next paragraph I limit myself to providing some core references.

One of the first approaches that analyse syntactic change as determined by general efficiency and economy principles can be identified in Longobardi's (2001) "minimize feature content", involved in the grammaticalisation (or "featural simplification") process attested by CASA(M) 'home' > *chez* 'at/to' in French. Following the same intuition, Roberts & Roussou (2003) accounted for a host of grammaticalisation paths in the T, C, and D domains by referring to "structural simplification", where a structural representation for a string is taken to be simpler than any of its alternatives containing more formal features (p. 201). This idea was then developed by Roberts (2007: chapter 3), who maintained that reanalysis is driven by a general "preference for simplicity of postulated derivations or representations" (p. 291); this was in turn linked to "Input Generalisation", a cognitive principle which shapes acquisition (pp. 174–175; see also Section 5.4.3). This proposal was further reworked by Biberauer & Roberts (2012), who hypothesised that "Feature Economy" and "Input Generalisation" are possibly the main principles that underlie language acquisition and, as such, syntactic change. "Feature Economy" was also proposed in several works by van Gelderen (2007, 2009, 2011, 2017, *i.a.*) as a general economy principle that determines grammaticalisation. This is formulated as "Minimize the

semantic and interpretable features in the derivation" (van Gelderen 2011: 17), and captures the progressive reanalysis of semantic features as interpretable features and, in turn, as unterpretable features, defining linguistic cycles.

An exception to the focus on grammaticalisation is provided by the "Principle of Morphosyntactic Feature Economy" proposed by Slobodchikoff (2019) to account for the loss of the dual number category in the diachrony of Slavic languages. In short, Slobodchikoff posits that the featural definition for the dual category is "marked" and must be therefore modified so as to get rid of its "markedness" and achieve a more efficient derivation.

Note that all these principles of economy are fully linguistic in scope, as evidenced by their reference to "(formal) features", "derivation", "morphosyntax", and other concepts of this ilk. As such, they cannot be straightforwardly identified as third factors. However, Biberauer (2017, 2019a,b) and van Gelderen (2021) argue that these economy principles are in fact shaped *by* third factor principles. In particular, Biberauer proposes that Feature Economy and Input Generalisation are the "linguistic reflexes" (Biberauer 2019a: 212) of "Maximise Minimal Means" (MMM), whereby the acquirer is taken to exploit the minimal resources available in a given stage of the acquisition process to the maximum. MMM is defined as "a generally applicable learning bias harnessed by the acquirer during acquisition" and "a principle of structure building, facilitating [...] efficient computation" (Biberauer 2019b: 49). From a diachronic syntax perspective, MMM results in some specific paths of change, including some "recycling" effects that are widely attested in grammaticalisation. Crucially, however, neither the definition nor, as a consequence, the domain of application of MMM can be limited to the Faculty of Language, making it a suitable third factor principle. Likewise, van Gelderen revises different types of principles of economy (see above) arguing that, although they "help speakers acquire and use lexical and grammatical items" (2021: 3), they are not third factors given their scope, but that they should nonetheless be regarded as modelled by third factor principles (MMM, but also Minimal Search, Determinacy, and Structural Economy).

Likewise the monotonicity bias proposed in the foregoing can be thought of as belonging to the set of third factor principles that shape the grammar design but are not limited to it. The reduction of demonstrative systems can then be regarded as one of the linguistic instantiations of this bias, which maximises the efficiency of the computation by barring suboptimal (i.e. non-monotonic) derivations and ultimately yields, as a side effect, a less complex derivation also for those categories that already complied with it (shorter description length). Another such instantiation can be identified in the loss of the dual category discussed by Slobodchikoff (2019). Assuming the monotonicity bias (and different primitives for number than Slobodchikoff 2019; see Appendix D.2), this reduction process can be likewise accounted for on pure third-factor bases, while doing away with stipulated markedness relations and language-specific tools such as Morphosyntactic Feature Economy. A preliminary analysis in this direction is advanced in Section 6.5.2.2.3.

This concludes the discussion related to the featural complexity conditions (description length, Section 5.3; non-monotonic derivation, Section 5.4) that underlie feature loss. If these conditions on featural complexity are met (i.e. in (qua)ternary systems), the monotonicity bias (third factor) might induce the loss of one of the two active person features, leading to the reduction of (qua)ternary systems to binary ones. In what follows, I turn to a structural factor that instead constrains feature loss and that will be shown to ultimately derive the attested patterns of reduction in demonstrative systems.

Before proceeding, it should be noted that feature loss does not apply of necessity: as the current (micro-)variation in Romance demonstratives attests (see Ledgeway & Smith 2016 for an overview), (qua)ternary systems may remain stable. In what follows, the actuation of feature loss is taken to be subject to a language-specific complexity tolerance threshold, which rules in the attested variation in this respect; how to formalise this threshold is left however for further research. Moreover, it is known that (qua)ternary systems can be reinstated in the diachronic development of a language, leading to more (featurally and computationally) complex systems (see again Ledgeway & Smith 2016 for data, and Stavinschi 2012 for an analysis): these cases are likewise to be regarded as resulting from changes in the posited complexity tolerance threshold for a given language.[23]

5.6 Conclusions

In this chapter, I proposed a featural account for the reduction attested by (qua)ternary demonstrative systems across Romance languages, both in diachrony and in (micro-)contact, as illustrated in Chapter 2. To do so, I built on the conclusions of Chapters 3 and 4 with respect to the encoding of indexicality in demonstratives: indexicality is encoded in demonstrative forms by means of person features, which are embedded under a spatial structure and constitute the core of the DemP. An additional preliminary assumption was discussed in Section 5.2.1, where I argued that a class of seemingly ternary systems should be in fact construed as consisting of underlyingly quaternary demonstrative

[23]Interestingly, non-monotonic derivations tend to result from other processes which, in part, are seen as leading to a more economic computation. This is most notably the case of grammaticalisation: for instance, the dual number (which requires a non-monotonic derivation: see Section 6.5.2.2.3 and Appendix C.3.1.1) quite commonly results from the grammaticalisation of the numeral "two" (Kuteva *et al.* 2019: 443–444). A grammaticalisation account for the emergence of non-monotonic derivations is also partially feasible for demonstratives, where some instances of DEM.2 are built out of a 2nd person marker (see e.g. Tuscan varieties: *codesto* 'N:DEM.2', but originally from a reflex of ECCU TIBI ISTU(M) 'behold *to you* this'). In the case of demonstratives, an additional factor that might be at play is the pragmatic "prominence" of the hearer, which might require a dedicated exponent. In this sense, the reintroduction of a non-monotonic sequence could be conceived of as proceeding from informal pragmatic factors, which are generally taken to be at odds with the principles of good language design, leaving language in a constant tension state between these two poles (see e.g. van Gelderen 2021 for discussion).

systems, i.e. systems that make a clusivity distinction: across Romance varieties, the inclusive form is systematically syncretic with either the speaker- or the hearer-oriented term ($\Rightarrow 1_I$ or $\Rightarrow 2_I$, with cross-linguistic variation).

Granting this, I revisited the generalisations that emerged from Chapter 2, (37a), by means of person features, which ultimately resulted in a featural description of the attested patterns of change, (37b):

(37) a. (Qua)ternary demonstrative systems may reduce to binary systems; this reduction primarily affects the encoding of DEM.2 and DEM.1EXCL (in spite of semantic and formal differences in the actual patterns of reorganisation).

b. a. Ternary > speaker-based binary: $\cancel{\pm\text{pt}}(\pm\text{au}(\pi_\chi))$

b. Quaternary > participant-based binary: $\cancel{\pm\text{au}}(\pm\text{pt}(\pi_\chi))$

The insight is that the reduced binary systems arise from the loss of the last person feature that entered into the derivation of the original (qua)ternary systems (a descriptive generalisation which will be recast as a structural constraint on feature loss in Chapter 6: the Last in–First out principle); the attested semantic variation falls out of the availability of two orderings of compositions, and the loss of DEM.2 and DEM.1EXCL is likewise naturally predicted by the fact that they are both derived by the composition of two features (and not by a dedicated primitive). The loss of one of those features implies the loss of the non-primitive semantics altogether.

I thus proposed that the trigger for feature loss lies in the complexity of the featural specifications of the systems involved. Concretely, (qua)ternary systems were shown to be complex (where complexity is understood in terms of description length; Section 5.3) and their complexity was further linked to the presence of DEM.2 and DEM.1EXCL, which are non-monotonically derived (Section 5.4). Because of a general (third factor) monotonicity bias, non-monotonically derived person(-related) categories can be regarded as prone to undergo simplification: this can only be achieved by losing one of the two features, which amounts to moving from a (qua)ternary system to a binary one (Section 5.5).

If this explains feature loss, (37b) suggests that such loss is not indiscriminate, but rather exclusively targets the most peripheral feature involved in the derivation. In Chapter 6, I address the structural underpinnings of (37b) and propose that, if the featural complexity conditions exposed in the foregoing are met, the timing of function application decides which feature may be dropped from the functional sequence (following the Last in–First out logic, which ultimately determines structural (in)stability); this will be shown to correctly derive the patterns of semantic and formal variation summarised in Table 5.1.

CHAPTER 6

A structural constraint on feature loss

6.1 Introduction

Chapter 5 recast the main conclusions from Chapter 2 in featural terms as follows:

(1) a. Ternary > speaker-based binary: $\cancel{\pm\text{pt}}(\pm\text{au}(\pi_\chi))$
b. Quaternary > participant-based binary: $\cancel{\pm\text{au}}(\pm\text{pt}(\pi_\chi))$

There, it was proposed that (qua)ternary demonstrative systems can be regarded as complex, both because of the length of their featural derivation and because they include computationally complex categories (the non-monotonically derived ones). Further, feature loss was argued to depend on featural complexity and to be ultimately driven by third factor principles of efficient language design (specifically: the monotonicity bias). Specifically, if the featural derivation for at least one category in the system is not monotonic (and, by extension, if the system as a whole is computationally complex), one feature may be lost to comply with the monotonicity bias, thereby reducing the overall level of complexity of the derivation.

However, feature loss is not indiscriminate, as outlined by (1), but rather seems to only affect the second and last action-on-lattice feature to enter into the derivation for person-related categories, i.e. the feature that operates on the result of a previous operation. The first action-on-lattice feature to act on the relevant head (in this case: π_χ) seems instead to be stable. This chapter addresses the structural side of the descriptive generalisation in (1) and proposes that its key empirical observation should be recast as a structural constraint

on feature loss, the Last in–First out principle. In a nutshell, feature loss, as engendered by featural complexity, is structurally constrained such that the merge position of the relevant feature ultimately determines its (in)stability.

Section 6.2 discusses the Last in–First out principle in more detail and proposes that it is intrinsic to the feature system assumed in this work and follows naturally from the considerations advanced in Section 5.5: thus, capitalising on the nature of action-on-lattice features, the ordering of compositions with π_χ (and, under the 1 Feature–1 Head architecture adopted here: the relative merge positions of the relevant features) is proposed as the major determinant of feature loss.[1] Finally, it is shown how this structural constraint on feature loss warrants the semantic variation attested across the reduced systems. With this in place, Section 6.3 provides a detailed account for the patterns of variation attested across Romance demonstrative systems, especially from the formal viewpoint. In particular, it shows how the Last in–First out principle determines both the attested patterns of reduction and some of the possible gaps uncovered in Chapter 2 (see also Section 5.1). Alternative accounts for the reduction patterns discussed here are in principle conceivable; these are discussed and rejected in Appendix C.3.

Section 6.4 reconsiders the semantic variation between (person-oriented) ternary demonstrative systems and binary demonstrative systems encoding distance oppositions from a diachronic perspective and tentatively suggest that the latter might result from the former following a similar process of reduction. In this case, however, the unstable person feature is not lost, but reanalysed as a distance marker (capturing both diachronic and synchronic oscillations between person- and distance-oriented systems; see Section 3.2).

Finally, Section 6.5 discusses how the Last in–First out principle derives the asymmetry attested across indexical systems as well. In short, the opposition between unstable demonstrative systems and stable pronominal ones is reduced to the opposition between number-neutral demonstrative systems on the one hand and pronominal paradigms, which instead include number features in their derivation, on the other. By the Last in–First out principle, this section proposes that number features prevent person feature loss in pronominal paradigms, deriving the asymmetry across indexical systems.

6.2 Last in–First out and semantic variation

As already remarked, the generalisation in (1) suggests that feature loss is not random, but, rather, that it only affects the last feature to be merged into a given functional sequence. This section argues that this pattern is not

[1] The Last in–First out principle is not an *ad hoc* structural condition on feature loss: instead, it may be invoked to explain why feature loss as attested for demonstrative systems is not attested in pronominal paradigms; further, it accounts for other reduction patterns that affect the number domain of pronominal paradigms. These issues are discussed in Section 6.5.

coincidental, but that it follows from a general structural constraint on feature loss; capitalising on the insight in (1), I will refer to this constraint as the Last in–First out principle ('LIFO'), which can be informally defined as follows:

(2) *Last in–First out principle*
A feature can only be lost if it is merged last within a given functional sequence.

LIFO reminds of Jakobson's (1941) regression hypothesis, whereby language loss is understood to reverse language acquisition, such that linguistic elements that were acquired last are lost first (see Keijzer 2010 and previous works for discussion, especially in relation to attrition in non-pathological populations). However, this parallelism is limited: while the regression hypothesis was developed on the basis of patterns observed by comparing the loss of previously acquired material and the acquisition of that very same material, LIFO (as proposed here) is primarily intended to capture the loss of a formal feature *during* the acquisition process. In other words, LIFO captures the (micro-)diachronic difference between the grammars of two subsequent generation of speakers, the most recent of which does not acquire a feature available in the grammar of the least recent one. Instead, LIFO is not necessarily predicted to affect features that have been fully acquired. On the one hand, this is compatible with the general stability of demonstrative (and, more general, indexical) elements in bilingual populations (see again Section 2.3 for discussion); on the other hand, it captures the reduction of demonstrative systems as a case of endogenous change, as observed in Chapter 2.

Besides, the ordering relation between elements ("first" *vs* "last") is merely a reflection of the temporal ordering in acquisition and, conversely, loss in Jakobson's approach, but is formally construed as the ordering of feature compositions here, by virtue of the action-on-lattice nature of the features under consideration: that is, "first" strictly speaking refers to the first feature to perform an action on the π_χ lattice. Under the person systems assumed here, in fact, the ordering of person features in the derivation is fully meaningful and derives the semantic difference across ternary and quaternary systems: as already discussed, if [±author] is the first feature to compose with π_χ, a ternary system is derived; if instead the first feature to perform its action on π_χ is [±participant], then a quaternary system follows. This is an additional difference of action-on-lattice features with respect to traditional features, which can be characterised instead as commutable collections of attributes.

Following Harbour (2016), the ordering of compositions can be regarded as regulated by a dedicated parameter. As such, the loss of the first feature to enter into the derivation for a given system would ultimately imply a parametric change which would be unaccounted for: concretely, if for instance in the sequence +participant(−author(π_χ)) [−author] were to undergo loss in the simplification of the non-monotonic derivation, the resulting system would have [+participant] composing with π_χ first, which would constitute a vacuous parameter shift without an immediate principled explanation. As such, LIFO can

be conceived of as a consequence of the action-on-lattice nature of the relevant features; likewise, feature stability can be captured as a correlate of compositional primacy, that is: the first feature to compose with π_χ (call it: primary) is stable, unlike the second (and last) feature to compose with the result of the first composition (call it: non-primary).

It should be noted at this juncture that the present focus on the ordering of compositions is not substantially divergent from Jakobson's focus on the ordering of acquisition: in fact, the first feature to compose with π_χ is also the first feature to be acquired, following the discussion in Section 5.5. There, I proposed that, given the role of the monotonicity bias in shaping acquisition, non-monotonically derived forms are preliminarily derived monotonically (by input generalisation). However, if the value of the non-primary feature in the target non-monotonic category is not switched to its opposite, then two categories within the acquired system are effectively collapsed into a single monotonic derivation (see (36) in Chaper 5). The systematic co-variance of the feature values within the system ultimately leads to the redundancy of the non-primary feature. In fact, the second feature to compose with π_χ does not add any new contrasts that were not already encoded by the first one: again, this is merely determined by the ordering of compositions. As a consequence, subsequent generations of learners will not postulate the non-primary feature, as it does not serve any obvious distinctive purpose inside the system, and that feature will be lost.

On these bases, I maintain that LIFO (and therefore feature (in)stability) fully hinges on compositional grounds: a feature is not (un)stable because of its semantics or other inherent properties, but because of its role in the derivation (redundant or not) and, in turn, because of its (non-)primary composition with π_χ. Non-primary features ("last") are predicted to be the first to be lost in language change. This insight is not present in the original formulation of the regression principle.

Further, in line with the 1 Feature–1 Head ('1F1H') architecture adopted here (see Section 1.3.3), "first" should be in turn construed structurally as the first feature to be merged in a given functional sequence (and, as such, the first to apply to π_χ). Thus, ultimately, LIFO as proposed here predicts feature stability and constrains feature loss on the basis of structural considerations, making feature (in)stability contingent on a structural condition (merge position). Note however that, barring the 1F1H architecture, the importance of the ordering of compositions for the formulation of LIFO would still apply and derive the same observations; the only difference under other architectural assumptions would be the impossibility of recasting these conclusions in structural terms.

The idea that (in)stability and structural factors might be related had already been explored by Polinsky (2018: 63–65), who, building on the resilience of indexical elements (such as tense, determiners, and person) in heritage grammars, informally related their stability to their "structural salience", referring to the fact that they are encoded in the top layer of the relevant domains. On the contrary, elements that are not "structurally salient", i.e. encoded lower

down in the same domains, tend to be unstable and are more prone to undergo change or loss. Evidence for this claim is provided by stability differences between person (stable, high) and number (unstable, low) in the ϕ domain, and between tense (stable, high) and aspect (unstable, low) in the IP domain. Thus, ultimately, structure affects stability as (heritage) speakers are posited to be "sensitiv[e] to the topmost projection of a domain" (Polinsky 2018: 63).

Likewise, building on the discussion above, I propose that stability is contingent on structure, but I put forth a different implementation of this intuition: namely, unstable features are merged higher up in the structure than stable features. This is due to the fact that the merge position is determined by the ordering of the compositions with π_χ: primary features, i.e. features that compose with π_χ first, are merged *before* non-primary features, i.e. features that compose with the result of a previous composition with π_χ, simply because syntactic derivations proceed bottom-up. Thus, under this hypothesis, structural salience equals "compositional salience": the most salient feature is the most deeply embedded one. This reversal of Polinsky's (2018) intuition might be explained by the difference in domains of investigation: Polinsky refers mostly to the word-level and beyond, while the present account is focused on the word-internal syntax.

Furthermore, the observation that feature loss affects the highest feature in the functional sequence is immediately reminiscent of approaches to language acquisition and structure building such as the truncation model (Rizzi 1993/4) and the Growing Trees view (Friedmann *et al.* 2021), whereby acquisition is argued to closely adhere to the structure of the tree moving bottom-up and banning "gaps" in the structure (with two portions of the tree being acquired, but not one structurally between them). Similarly to the working of these models, in fact, LIFO determines that, whenever a structurally higher head is merged in the functional sequence, all lower heads must be merged, too. This parallel is further supported by the possibility of defining LIFO in implicational terms, which will be explored in Section 6.5.

In conclusion, I formalised the intuition that feature loss is not indiscriminate, as shown in (1), by proposing a condition on it, LIFO; I further argued that LIFO is fundamentally rooted in the compositional properties of the person features assumed in this work and that, as a consequence, it is neatly related to structural considerations. Thus, a more formal definition of LIFO follows:

(3) *Last in–First out principle (formal)*
LIFO is a structural condition on feature loss, whereby feature loss is modelled as following the merge position of the relevant action-on-lattice features in an implicational fashion. An action-on-lattice feature can only be lost if it is merged last, and thus composes with the relevant lattice last, in a given derivation.

Note that, by virtue of the featural factors that underlie feature loss (complexity, (non-)monotonicity), I maintain that only action-on-lattice features may be identified as primary or non-primary, while no claim is made as to other types

of features. This implies that it should be possible to extend this rationale to the syntax of any form that is derived by means of action-on-lattice features, but not beyond those; I leave the wider investigation of this issue to future research, but will show how the present account may be extended to account for typological variation in pronominal systems in Section 6.5.2.2, providing independent evidence in favour of LIFO.

With this in place, let us briefly consider which ramifications LIFO has on the semantics of the new binary systems. I already referred to the semantic consequence of the loss of one feature in the syntax: this reduction in the derivation necessarily implies a reduction in the amount of oppositions available to the given system, as the extra opposition(s) afforded by that feature is/are not available anymore. Now, crucially, the structural constraint on feature loss proposed here has an additional consequence: if only the "last" feature can be lost, i.e. the most peripheral one, the semantic variation between speaker- and participant-based binary systems naturally falls out from the availability of two different input systems (ternary *vs* quaternary demonstrative systems, derived by two different orderings of operations). In fact, the loss of non-primary [±participant] in tripartitions leaves [±author] to define a speaker-based bipartition; the loss of non-primary [±author] in quadripartitions, instead, leaves [±participant] to define a participant-based bipartition. Thus, the structural factor that constrains feature loss grants a rationale to the diachronic relation expressed by the generalisation in (1).

The semantic variation across demonstrative systems in Romance reduces then to parametric variation in the input systems. As seen in Chapter 2, the other major source of variation across Romance demonstratives is formal, which is discussed in the next section and shown to be likewise constrained by LIFO.

6.3 Patterns of formal reduction

The feature complexity conditions discussed in Chapter 5 may result in the loss of one of the features merged in the derivation of demonstrative forms; by LIFO (Section 6.2), that feature may only be the last to be merged into the relevant functional sequence.

In this section, I review how this hypothesis derives all the attested patterns of formal reduction. Given the semantics of the reduced systems as defined by the feature that is retained under LIFO, in fact, there is still a wealth of variation as regards which forms from the original, non-reduced system are retained in the new, reduced system to encode the new binary semantic oppositions. These different forms were originally employed as exponents of dedicated deictic domains; however, with feature loss, pairs of forms with identical featural content (ultimately: synonyms) were left in the systems undergoing reduction. Evidence for this state of affairs comes from diachronic stages in which a language showed optionality between two forms, such as the cases of "confusion" reported by 19th century grammars for some southern Italo-Romance varieties

(as mentioned in Section 5.2.1). Formal variation thus amounts to which of these (new) synonyms is preserved.

In what follows, I review each new system from a featural standpoint. The discussion is organised by reduction patterns (as listed in Table 5.1) and will also show how some of the unattested reduction patterns (the gaps in Table 5.1) are correctly ruled out by LIFO.

6.3.1 Non-innovative Romance varieties

I start the discussion by reviewing non-innovative Romance demonstrative systems (see Section 2.2.2). These are singled out here because they show different input systems than those attested by innovative Romance varieties. Specifically, non-innovative Romance demonstrative systems stemmed from the binary Late Latin systems and never introduced a new demonstrative term, unlike innovative Romance varieties. The features of the input demonstrative systems are given in (4), following the discussion in Section 2.2:[2]

(4) a. *Nominal demonstratives*

N:DEM.1	N:DEM.2	N:DEM.3
ISTE, ⇒II $+\mathrm{P}(\pi_\chi)$		ILLE, ⇒III $-\mathrm{P}(\pi_\chi)$

b. *Adverbial demonstratives*

A:DEM.1	(A:DEM.2)	A:DEM.3
HIC, ⇒I $+\mathrm{P}(+\mathrm{A}(\pi_\chi))$	(*various*, ⇒I/II/III) $+\mathrm{P}(-\mathrm{A}(\pi_\chi))$	ILLIC, ⇒III $-\mathrm{P}(\pm\mathrm{A}(\pi_\chi))$

Note that non-innovative nominal demonstrative systems are substantially irrelevant for the illustration of the mechanisms of reduction of (qua)ternary demonstrative systems into binary ones, as they continue the already reduced Late Latin system.

6.3.1.1 Speaker-based semantics

Non-innovative demonstrative systems with a speaker-based semantics have the shape ⇒II–III–III in the nominal domain (see Ladin *chësc–chël*) and ⇒I–III–III

[2]At this juncture, it is worth recalling that not much research is available with respect to Late Latin adverbial demonstratives. Building on the adverbial demonstrative systems attested across Romance languages, it may be postulated that the hearer-oriented term was retained in the Late Latin system, as suggested by Tuscan varieties *costì* < ECCU ISTIC 'behold A:DEM.2'. See the discussion in Section 2.2.

in the adverbial domain (see Galician *acá–alá*); they were discussed in Section 2.2.2.1.[3]

The nominal system is not straightforwardly derivable from the Late Latin one by the already discussed mechanisms. Rather, I appeal to a general independent process called "subjectification", which affects the meaning of the forms involved so that they more closely match the speaker's perspective. Subjectification was first formalised in these terms by Traugott (1989: 35: "meanings tend to become increasingly based in the speaker's subjective belief state/attitude toward the proposition [i.e.] become more subjective"; the term was borrowed from Langacker 1985) to account for the rise of epistemic readings for modals, modal adverbs, and assertive speech act verbs. This notion has been employed by Stavinschi (2012) to explain the cyclic evolution of demonstrative systems. Specifically, Stavinschi argues that participant-based binary systems (⇒II–II–III, just as the input system in this case: participant-related deictic domain *vs* non-participant-related deictic domain) will eventually evolve into a speaker-based binary system (⇒II–III–III: speaker-related deictic domain *vs* non-speaker-related deictic domain), "through the subjectification [...] of the proximal term, which is increasingly used to single out the Speaker's area (1st), as distinct from all the remaining space, including the space of the Hearer (2nd), previously designated by the same proximal term" (Stavinschi 2012: 88–89).

Against the background of the present study, this process can be formalised as a parametric switch: the input system was derived with [±participant] composing with π_χ first (or, better, vacuously so, as [±author] is not merged); the new system, instead, is derived with [±author] composing with π_χ (vacuously) first. Note that, although the [±author] feature is not active in the input demonstrative system, it is found for instance in pronominal systems, making it retrievable and extensible to the demonstrative domain, too.

The adverbial system, assuming a plainly ternary input system as the one illustrated in (4b), is derived through the loss of the non-primary [±participant] feature:

(5) ⇒I ↔ ~~+participant~~(+author(π_χ))
⇒II ↔ ~~+participant~~(−author(π_χ))
⇒III ↔ ~~−participant~~(−author(π_χ))

This leaves two synonyms: ⇒II (a reflex of the original hearer-oriented form) and ⇒III (a reflex of the original non-participant-oriented form, granting a monotonic derivation for it), and ⇒III is eventually preserved in the [−author] function. I speculate that ⇒III is favoured because of its (originally) monotonic derivation.

[3]Other conceivable patterns for the adverbial domain are ⇒II–III–III (parallel to that attested by the nominal domain) and ⇒I–II–II (parallel to Pattern B discussed in Section 6.3.2.2). These possibilities arise from the (assumed) encoding of the hearer-related deictic domain (A:DEM.2 / ⇒2) in the Late Latin adverbial system. However, neither of these conceivable other systems is attested, to my knowledge.

Note however that, although differences between nominal and adverbial demonstrative systems are well attested (see e.g. Neapolitan binary nominal system *vs* quaternary adverbial one: Section 5.2.1), I am not aware of any case in which the two systems also differ as to their parametric setting, as would be the case here (in the nominal system, [±participant] vacuously composes with π_χ first; in the adverbial system, [±author] composes with π_χ first). If the Late Latin adverbial system instantiated instead the same deictic organisation as the nominal one, *contra* the systems reported in (4b) above, the input forms would be derived as follows (possibly with two additional entries for the hearer-oriented deictic domain and the exclusively speaker-oriented one):

(6) $\Rightarrow$I $\leftrightarrow$ +participant(π_χ)
$\Rightarrow$III $\leftrightarrow$ −participant(π_χ)

If so, just as in the nominal system, no direct relation could be established between the input and output systems; rather, the subjectification process mentioned above (Traugott 1989; Stavinschi 2012) could be assumed to have driven the parametric change in the ordering of feature compositions in this case, too.

6.3.1.2 Participant-based semantics

Non-innovative demonstrative systems with a participant-based semantics have the shape $\Rightarrow$II–II–III in the nominal domain (see Old French *cist–cil*) and are not attested in the adverbial domain; see Section 2.2.2.2.

Old French-like systems are simply the preservation of the original Late Latin system (reinforcer by ECCU 'behold'):

(7) $\Rightarrow$II $\leftrightarrow$ +participant(π_χ)
$\Rightarrow$III $\leftrightarrow$ −participant(π_χ)

As such, they do not require any further explanation.

6.3.2 Innovative ternary systems > binary speaker-based semantics

I now turn to innovative ternary demonstrative systems in Romance languages, i.e. systems that include a new dedicated hearer-oriented term, as discussed in Section 2.2.3. These systems constitute the input for the new Romance speaker-based binary systems, on which I focus in what follows. The features of innovative ternary systems are given in (8), following the discussion in Section 2.2.3:

(8) a. *Nominal demonstratives*

N:DEM.1	N:DEM.2	N:DEM.3
ECCU-ISTE, $\Rightarrow$1 +P(+A(π_χ))	ECCU-IPSE, $\Rightarrow$2 +P(−A(π_χ))	ECCU-ILLE, $\Rightarrow$3 −P(±A(π_χ))

b. *Adverbial demonstratives*

A:DEM.1	A:DEM.2	A:DEM.3
ECCU-HIC, ⇒1 $+\mathrm{P}(+\mathrm{A}(\pi_\chi))$	*various*, ⇒2 $+\mathrm{P}(-\mathrm{A}(\pi_\chi))$	ECCU-ILLIC, ⇒3 $-\mathrm{P}(\pm\mathrm{A}(\pi_\chi))$

Note that the derivation of ⇒3 includes the ambiguous [±author] feature. By the monotonicity bias (Section 5.4), I assume that the monotonic derivation for ⇒3 is the preferred one, leading to the most common [−author] setting.

The new speaker-based binary demonstrative systems are derived by the loss of the non-primary [±participant] feature: $\cancel{\pm\mathrm{P}}(\pm\mathrm{A}(\pi_\chi))$. In what follows, I discuss the formal variation attested across the resulting systems.

6.3.2.1 Speaker-based: Pattern A

Pattern A speaker-based binary demonstrative systems have the shape ⇒1–3–3: for the nominal domain, see Sardinian *kústu–kúḍḍu*, a.o.; for the adverbial domain, see Korlai *aki–ali*, a.o.; see Sections 2.2.3.1, 2.3.1.2, and 2.3.3.4.1.

Both systems are straightforwardly derived from the input one by the loss of the non-primary [±participant] feature:

(9) ⇒1 ↔ $\cancel{+\text{participant}}(+\text{author}(\pi_\chi))$
⇒2 ↔ $\cancel{+\text{participant}}(-\text{author}(\pi_\chi))$
⇒3 ↔ $\cancel{-\text{participant}}(-\text{author}(\pi_\chi))$[4]

After feature loss, the original hearer-oriented term (⇒2) and the original non-participant-oriented term (⇒3) are derived by the same [−author] feature; hence, all else being equal, they compete to spell out the same semantic value (DEM.2/3).

In Pattern A systems, the competition was eventually won by ⇒3. That is, in the resulting binary systems, the original speaker-oriented form (⇒1) is used to refer to the speaker-related deictic domain, [+author]; the original non-participant-oriented form (⇒3), instead, is used to refer to the non-speaker-related deictic domain, [−author], substantially in continuity with its previous function.

6.3.2.2 Speaker-based: Pattern B

Pattern B speaker-based binary demonstrative systems have the shape ⇒1–2–2: for the nominal domain, see some Latin American Spanish varieties *este–ese*; for the adverbial domain, see some Occitan varieties *aicí–aquí*. Section 2.2.3.1 discusses this pattern.

Pattern B demonstratives may be derived from the input system through the loss of the non-primary [±participant] feature:

[4] As per the monotonicity bias.

(10) $\Rightarrow 1 \leftrightarrow$ ~~+participant~~$(+\text{author}(\pi_\chi))$
$\Rightarrow 2 \leftrightarrow$ ~~+participant~~$(-\text{author}(\pi_\chi))$
$\Rightarrow 3 \leftrightarrow$ ~~−participant~~$(\pm\text{author}(\pi_\chi))$

As per the monotonicity bias, ⇒3 might be straightforwardly derived by [−author], rather than [+author]. However, this is not strictly speaking guaranteed by the reduced systems (and differently from the case of Pattern A in 6.3.2.1 above). Thus, a priori, either of the following pairs of new synonyms might be established:

(11) a. $+\text{A}(\pi_\chi) \leftrightarrow \Rightarrow 1$ (old speaker-oriented) *and*
$+\text{A}(\pi_\chi) \leftrightarrow$ non-monotonic $\Rightarrow 3$ (old non-participant-oriented)

b. $-\text{A}(\pi_\chi) \leftrightarrow \Rightarrow 2$ (old hearer-oriented) *and*
$-\text{A}(\pi_\chi) \leftrightarrow$ monotonic $\Rightarrow 3$ (old non-participant-oriented)

Either way, the competition in Pattern B systems resolved in favour of ⇒1 and ⇒2: the former retained its original speaker-oriented semantics, while the latter enlarged its deictic domain from its original hearer-oriented semantics to the general non-speaker-oriented one. This is compatible with its featural composition, which includes the primary [−author] feature.

6.3.2.3 Speaker-based: Pattern C

Pattern C speaker-based binary demonstrative systems have the shape ⇒2–3–3, which is only attested in the nominal domain of Diu Indo-Portuguese (*es–ikəl*); see Section 2.3.3.4.3.

This pattern is not derivable under the account proposed here. In fact, the loss of the non-primary [±participant] feature leaves ⇒2 and ⇒3 with the same derivation (assuming the originally monotonic derivation for the latter):

(12) $\Rightarrow 2 \leftrightarrow$ ~~+participant~~$(-\text{author}(\pi_\chi))$
$\Rightarrow 3 \leftrightarrow$ ~~−participant~~$(-\text{author}(\pi_\chi))$

Thus, both ⇒2 (*es*) and ⇒3 (*ikəl*) yield a non-speaker-oriented DEM.2/3 reading. As such, no two-way speaker-oriented opposition may be established between them. Some options to account for the Diu Indo-Portuguese system may be suggested.

First, it may be the case that the Diu Indo-Portuguese system is not directly derived from the ternary Portuguese one, but from the reduction of a quaternary version thereof (i.e. a two-way participant-based system: ⇒2–2–3, for which see the regular derivation as presented in Section 6.3.3.3 below). Under this hypothesis, ⇒2–2–3, derived by [±participant], would evolve into ⇒2–3–3, derived by [±author], by subjectification (Traugott 1989; Stavinschi 2012), as already discussed for non-innovative speaker-based binary systems in 6.3.1.1. However, this would raise the question as to why this pattern is not attested more often in the contexts reviewed in this study.

Second, *contra* the discussion in Section 2.3.3.2.3, it may be proposed that the form *es* is a reflex of the original Portuguese *este* (N:DEM.1, i.e. ⇒1) rather than of *esse* (N:DEM.2, i.e. ⇒2). In this case, the Diu Indo-Portuguese system would be plainly construed as Pattern A and straightforwardly follow from feature loss, as discussed in 6.3.2.1.

Third, it is possible that the semantic description of the Diu Indo-Portuguese system is inaccurate and that in fact it should be characterised as participant-based (and thus be a fully motivated instantiation of Pattern C, as per 6.3.3.3). This semantics is not currently attested in the area, but it should nonetheless be recalled that many of the Indo-Portuguese varieties are extinct and not documented (see Cardoso 2009: 6).

Here, pending further research, I remain agnostic as to which option is on the right track.

6.3.2.4 Speaker-based: Pattern AC

Pattern AC speaker-based binary demonstrative systems have the shape ⇒1/2–3–3: for the nominal domain, see Papiá Kristang *iste*/*isi*–*aké*; for the adverbial domain, see Angolar *aki*/*ai*–*nha*. See the discussion in Section 2.3.3.4.3.

This pattern may be conceived as a transitional one, from A to C; however, as discussed in 6.3.2.3, Pattern C is possibly spurious for speaker-based binary systems as it does not directly follow from the feature loss mechanism. This applies thus here, too: in fact, the variation in the exponent for the speaker-oriented term (⇒1, the original speaker-oriented form, or ⇒2, the original hearer-oriented form) is not naturally derived from the loss of the non-primary [±participant] feature:

(13) ⇒1 ↔ ~~+participant~~(+author(π_χ))
⇒2 ↔ ~~+participant~~(−author(π_χ))
⇒3 ↔ ~~−participant~~(−author(π_χ))[5]

As (13) clearly shows, while ⇒1 carries [+author], ⇒2 carries [−author] and should as such not be optionally available beside ⇒1 in the speaker-oriented function. A possible explanation is that ⇒2 has undergone subjectification (see 6.3.1.1 above), in this case as well. However, some doubts may be raised over the genuineness of this pattern, too, which is only attested in the nominal demonstratives of Papiá Kristang and in the adverbial demonstratives of Angolar.

In Papiá Kristang, *isi* (⇒2) is recorded for the speaker-related domain by Baxter (2013a: section 5), while *isti* (⇒1) is recorded for the speaker-related domain by Baxter (2013b: feature 33) and is more widely attested in that function in the APiCS *corpus*.[6]

[5] As per the monotonicity bias.

[6] Within the APiCS *corpus*, *isti* is recorded in four elicited sentences (42-5, 42-53, 42-91, 42-114) and in four naturalistic sentences (42-10, 42-18, 42-48, 42-56). *Isi* is instead recorded for one naturalistic sentence only (42-171).

Likewise, in Angolar, *ai* (⇒2) is recorded, alongside *aki* (⇒1) by Maurer (1995: 41 ff.), but is not attested in the APiCS *corpus*. There, only one occurrence of *nge* ('this place, i.e. here', see Section 2.3.3.2.2; sentence 36-52) is present for the speaker-related domain, which can be analysed as including the (postponed) unary demonstrative *e*. Besides, Gulf of Guinea creoles have been reported to display a participant-based two-way deictic opposition: it may thus also be conceived that the semantics of the system has been poorly documented and that the Angolar system is rather a participant-based binary one. As such, it would be naturally derived through the loss of non-primary [±author] (i.e. Pattern AC, ⇒1/2–1/2–3), as discussed in 6.3.3.4 below.

Overall, Pattern AC is possibly spurious and very marginal, possibly in line with the difficulties in its featural derivation under LIFO.

6.3.2.5 Speaker-based: Pattern D

Pattern D demonstrative systems only retained one form related to one and the same deictic domain (in the original system) and generalised it across the entire new system.

Nominal demonstratives may reduce up to the point that only one of the original forms is preserved: whenever this is the case, that form does not retain any contrastive deictic meaning by itself; deictic oppositions are instead typically encoded by composition with a reinforcer (an adverbial-like form), as widely attested both in diachrony and in contact. However, strictly speaking, reduced nominal demonstrative systems of this type do not encode a (speaker-based binary) distinction and, rather, their person featural content may be regarded as null: these forms simply amount to "NEAR π_χ" (see Section 4.3.1). Besides, unary systems result from the reduction of (already reduced) binary systems: only for creoles are these intermediate steps in the reduction process not documented. Although I do not review these reduced nominal systems here, the same principles proposed above apply: unary systems are derived from binary ones by feature loss (with the assumption that a change in the language-specific complexity threshold has taken place; see discussion in Section 5.5).

The adverbial domain is instead worth discussing more in detail: Pattern D speaker-based binary demonstrative systems have the shape ⇒3_i–3_{ii}–3_{ii} (see the Cape Verdean Creole of Santiago *li–la*), as discussed in Section 2.3.3.4.4. That is, two forms that originally referred to the non-participant-oriented domain (and carried an additional meaning difference: punctuality for the *-i*-series, areality for the *-a*-series; see the discussion in Sections 2.3.3.1, 2.3.3.2.1, and 2.3.3.4.4) are reinterpreted as defining a two-way speaker-based contrast.

I propose that this, too, may be derived by the process of feature loss, but only assuming that both the monotonic derivation and the non-monotonic one were available in the input system, and further assuming a reanalysis process, whereby the two forms derived by the ambiguous value setting [±author], but set apart by an additional semantic difference, became univocally associated to either [+author] or [−author]. Concretely, this process might have been

driven by the original punctual *vs* areal semantics of the two forms, with the reinterpretation of punctual as [+author] and of areal as [−author], possibly again as an effect of subjectification (see 6.3.1.1 above). The loss of non-primary [±participant] leaves two new pairs of synonyms in the system:

(14) $\Rightarrow 1 \leftrightarrow \cancel{+\text{participant}}(+\text{author}(\pi_\chi))$
$\Rightarrow 2 \leftrightarrow \cancel{+\text{participant}}(-\text{author}(\pi_\chi))$
$\Rightarrow 3_i \leftrightarrow \cancel{-\text{participant}}(+\text{author}(\pi_\chi))$
$\Rightarrow 3_{ii} \leftrightarrow \cancel{-\text{participant}}(-\text{author}(\pi_\chi))$

Here, $\Rightarrow 1$ and $\Rightarrow 3_i$ are derived by [+author], while $\Rightarrow 2$ and $\Rightarrow 3_{ii}$ are derived by [−author]. Eventually, $\Rightarrow 3_i$ and $\Rightarrow 3_{ii}$ are retained. Thus, a novel two-way speaker-based opposition is established by virtue of the ambiguous [±author] featural specification between two forms originally restricted to the non-participant-oriented domain. This process is considerably less straightforward than the ones reviewed for the previous patterns and is, perhaps unsurprisingly, extremely rare. To the best of my knowledge, it is only attested for the Upper Guinea Portuguese-based creoles (see Section 2.3.3.2.1), both within and beyond the Romance domain.

Besides, note that a similar development is in principle available in nominal demonstrative systems, too. However, the nominal system lacks additional semantic distinctions that make multiple forms available for one and the same deictic domain, which could, eventually, be reanalysable in terms of a speaker-based opposition (unlike the widespread availability of parallel adverbial series). As such, a similar development would be impossible to distinguish form one in which only the nominal non-participant-oriented form ($\Rightarrow 3$) is preserved across the entire system, resulting in a unary system.

6.3.3 Innovative quaternary systems > binary participant-based semantics

I finally turn to innovative quaternary demonstrative systems in Romance languages, i.e. systems in which a dedicated hearer-oriented term was present and, additionally, either the speaker-oriented term or the hearer-oriented one had a homophone that referred to the underspecified (i.e. general) participant-related deictic domain (the inclusive use), as discussed in Section 5.2.1. These systems constitute the input for the new Romance participant-based binary systems, which are the topic of the following discussion. The features of innovative quaternary systems are given in (15), in line with the discussion in Section 5.2.1:

(15) a. *Nominal demonstratives*

N:DEM.1EXCL	N:DEM.1INCL	N:DEM.2	N:DEM.3
ECCU-ISTE, $\Rightarrow 1$ $+\text{A}(-\text{P}(\pi_\chi))$	[$\Rightarrow 1_I$ or $\Rightarrow 2_I$] $+\text{A}(+\text{P}(\pi_\chi))$	ECCU-IPSE, $\Rightarrow 2$ $-\text{A}(+\text{P}(\pi_\chi))$	ECCU-ILLE, $\Rightarrow 3$ $-\text{A}(-\text{P}(\pi_\chi))$

b. *Adverbial demonstratives*

A:DEM.1EXCL	A:DEM.1INCL	A:DEM.2	A:DEM.3
ECCU-HIC, $\Rightarrow$1 $+\mathrm{A}(-\mathrm{P}(\pi_\chi))$	[$\Rightarrow 1_I$ or $\Rightarrow 2_I$] $+\mathrm{A}(+\mathrm{P}(\pi_\chi))$	*various*, $\Rightarrow$2 $-\mathrm{A}(+\mathrm{P}(\pi_\chi))$	ECCU-ILLIC, $\Rightarrow$3 $-\mathrm{A}(-\mathrm{P}(\pi_\chi))$

The availability of two alternative homophony patterns (the inclusive term may coincide with the speaker-oriented one, $\Rightarrow$1, or with the hearer-oriented one, $\Rightarrow$2) will be shown to naturally derive two different formal patterns (see 6.3.3.1–6.3.3.3). In what follows, the inclusive homonyms are indicated by a subscript I ('inclusive'): $\Rightarrow 1_I$, $\Rightarrow 2_I$.

The new participant-based binary demonstrative systems are derived by the loss of the non-primary [±author] feature: $\cancel{\pm}\mathrm{A}(\pm\mathrm{P}(\pi_\chi))$. The following discussion focuses on the formal variation attested across the resulting systems.

6.3.3.1 Participant-based: Pattern A

Pattern A participant-based binary demonstrative systems apparently have the shape $\Rightarrow$1–1–3: for the nominal domain, see Neapolitan *chisto–chillo*, a.o.; and for the adverbial one, see Tarantino *qua–addà*, a.o. See examples in Sections 2.2.3.2 and 2.3.1.2.

Both systems are straightforwardly derived from the input one through the loss of the non-primary [±author] feature and by assuming that the inclusive demonstrative form is identical to the exclusively speaker-oriented one:[7]

(16) $\Rightarrow 1 \leftrightarrow \cancel{+\text{author}}(-\text{participant}(\pi_\chi))$
$\Rightarrow 1_I \leftrightarrow \cancel{+\text{author}}(+\text{participant}(\pi_\chi))$
$\Rightarrow 2 \leftrightarrow \cancel{-\text{author}}(+\text{participant}(\pi_\chi))$
$\Rightarrow 3 \leftrightarrow \cancel{-\text{author}}(-\text{participant}(\pi_\chi))$

[+participant] derives the originally monotonic inclusive term ($\Rightarrow 1_I$) and the originally non-monotonic hearer-oriented term ($\Rightarrow$2); [−participant], instead, derives the originally monotonic non-participant-oriented term ($\Rightarrow$3) and the originally non-monotonic exclusive speaker-oriented term ($\Rightarrow$1). All else being equal, either form in each pair can be reanalysed as realising the new participant-oriented and non-participant-oriented domains.

In Pattern A systems, the competition was eventually won by $\Rightarrow 1_I$ and $\Rightarrow$3. Hence, in the resulting binary systems, the original inclusive ($\Rightarrow 1_I$, i.e. a homophone of the original exclusively speaker-oriented form) is used to refer to the participant-related deictic domain, [+participant], in substantial continuity with its original function; the original non-participant-oriented form ($\Rightarrow$3),

[7]Assuming, instead, that DEM.1INCL is spelled out by $\Rightarrow 2_I$ would leave no $\Rightarrow$1-like form that is [+participant] in the reduced system. Pattern A systems, in fact, would then only involve $\Rightarrow$1 and $\Rightarrow$3, which would both be [−participant].

instead, is preserved to refer to the non-participant-related deictic domain, [−participant].

6.3.3.2 Participant-based: Pattern B

Pattern B is not attested in binary participant-based demonstrative systems. Systems showing Pattern B would have the shape ⇒1–1–2 (cf. Pattern B in speaker-based binary systems: there, too, the original exponent for the non-participant-related domain ⇒3 is lost; see 6.3.2.2). However, this Pattern is not derivable. Consider first the case in which ⇒1 is, indeed, $\Rightarrow 1_I$:

(17) $\Rightarrow 1 \leftrightarrow \cancel{+\text{author}}(-\text{participant}(\pi_\chi))$
$\Rightarrow 1_I \leftrightarrow \cancel{+\text{author}}(+\text{participant}(\pi_\chi))$
$\Rightarrow 2 \leftrightarrow \cancel{-\text{author}}(+\text{participant}(\pi_\chi))$
$\Rightarrow 3 \leftrightarrow \cancel{-\text{author}}(-\text{participant}(\pi_\chi))$

The loss of the non-primary [±author] leaves the following pairs (see 6.3.3.1): $\Rightarrow 1_I$ and ⇒2 for [+participant], ⇒3 and ⇒1 for [−participant]. However, a Pattern B system would only include $\Rightarrow 1_I$ and ⇒2 (type: CHISTO–CHISSO), both of which carry a [+participant] feature.[8] Thus, no participant-based binary opposition could be established between the two forms, as no form derived by [−participant] is available. This would require one of the [+participant] features to become [−participant], but no principled mechanism could allow for this change.

Consider instead the case in which ⇒2 is, rather, $\Rightarrow 2_I$:

(18) $\Rightarrow 1 \leftrightarrow \cancel{+\text{author}}(-\text{participant}(\pi_\chi))$
$\Rightarrow 2_I \leftrightarrow \cancel{+\text{author}}(+\text{participant}(\pi_\chi))$
$\Rightarrow 2 \leftrightarrow \cancel{-\text{author}}(+\text{participant}(\pi_\chi))$
$\Rightarrow 3 \leftrightarrow \cancel{-\text{author}}(-\text{participant}(\pi_\chi))$

Here, too, the loss of the non-primary [±author] leaves two pairs (see also 6.3.3.3): $\Rightarrow 2_I$ and ⇒2 for [+participant], ⇒3 and ⇒1 for [−participant]. Granting the syncretism pattern in this inventory, a Pattern B system would only include ⇒1 and $\Rightarrow 2_{(I)}$ ($\Rightarrow 1\text{–}1\text{–}2_{(I)}$).[9] Although these two forms do instantiate a two-way participant-based deictic contrast, ⇒1 carries the [−participant] feature, whereas $\Rightarrow 2_{(I)}$ carries the [+participant] one: this is the inverse of the putative Pattern B system, where ⇒1 should be derived by [+participant] and $\Rightarrow 2_{(I)}$ by [−participant].

As a value inversion between the two features cannot take place, Pattern B may only be instantiated, rather, as $\Rightarrow 2_{(I)}\text{–}2_{(I)}\text{–}1$ (type CHISSO–CHISTO for nominal demonstratives). That is, the original inclusive form $\Rightarrow 2_I$ (syncretic with the original hearer-oriented form, ⇒2) should be employed in the

[8] The inclusion of ⇒3 in the resulting system would simply give a ⇒1–1–3 system (Pattern A, see 6.3.3.1), or a ⇒2–2–3 system (Pattern C, see 6.3.3.3).

[9] See fn. 8 for the exclusion of ⇒3 in this case.

participant-related deictic domain, while the original exclusively speaker-oriented form ⇒1 should be employed in the non-participant-related deictic domain.

Despite this evolution is conceivable and, in strictly featural terms, derivable, it is not attested. Why that is the case (if the gap is not accidental), I leave to further research. For the time being, I hypothesise that this might be due to an informal pragmatic principle: the system resulting from the reduction as sketched above would in fact use (a homonym of) the original speaker-oriented form in the non-participant-related deictic domain. Given the general egocentricity of the feature system assumed here and forces such as subjectification (see discussion in 6.3.1.1), the relegation of (a homonym of) the speaker-oriented term to the non-participant-related domain seems at best unlikely.

6.3.3.3 Participant-based: Pattern C

Pattern C participant-based binary demonstrative systems apparently have the shape ⇒2–2–3: see Brazilian Portuguese *esse–aquele* for the nominal domain and Santome *(n)ai–(n)ala*, a.o., for the adverbial one. These systems are discussed in Sections 2.2.3.2, 2.3.3.4.2, and 2.3.3.4.3.

Both systems are derived from the input system by the loss of the non-primary [±author] feature:

(19) $\Rightarrow 1 \leftrightarrow \cancel{+\text{author}}(-\text{participant}(\pi_\chi))$
$\Rightarrow 1_I \leftrightarrow \cancel{+\text{author}}(+\text{participant}(\pi_\chi))$ *or* $\Rightarrow 2_I \leftrightarrow \cancel{+\text{author}}(+\text{pt}(\pi_\chi))$[10]
$\Rightarrow 2 \leftrightarrow \cancel{-\text{author}}(+\text{participant}(\pi_\chi))$
$\Rightarrow 3 \leftrightarrow \cancel{-\text{author}}(-\text{participant}(\pi_\chi))$

As in the case of Pattern A, also here two pairs of new synonyms are created: [+participant] is involved both in the derivation of the originally monotonic inclusive term ($\Rightarrow 1_I$ or $\Rightarrow 2_I$) and of the originally non-monotonic hearer-oriented term (⇒2); [−participant] is instead involved in the derivation of the originally monotonic non-participant-oriented term (⇒3) and of the originally non-monotonic exclusive speaker-oriented term (⇒1). That is, these forms have the same semantics.

In Pattern C systems, the competition is won by ⇒2 or, if available, $\Rightarrow 2_I$, and by ⇒3. That is, in the resulting binary systems, the original hearer-oriented form (⇒2) or the original inclusive one ($\Rightarrow 2_I$, its homophone) is used in the participant-oriented function, [+participant]; the original non-participant-oriented form (⇒3), instead, is preserved in the non-participant-oriented function, [−participant].

6.3.3.4 Participant-based: Pattern AC

Pattern AC participant-based binary demonstrative systems seemingly have the shape ⇒1/2–1/2–3 and are only marginally attested in the adverbial do-

[10]Pending further research, the exact pattern of syncretism and, as a consequence, of reduction may not be reconstructed at this stage.

main and, more specifically, in Santome reinforcers *-ai*/*-aki*–*-ala* (see Section 2.3.3.4.2).

As its shape suggests, this pattern constitutes an in-between stage between Pattern A ($\Rightarrow 1_I$–1_I–3), where $\Rightarrow 1_I$ carries [+participant], and C ($\Rightarrow 2_{(I)}$–$2_{(I)}$–3), where $\Rightarrow 2_{(I)}$ carries [+participant].[11]

Thus, after the loss of the non-primary [±author] feature, we have:

(20) $\Rightarrow 1 \leftrightarrow \cancel{+\text{author}}(-\text{participant}(\pi_\chi))$
$\Rightarrow 1_I \leftrightarrow \cancel{+\text{author}}(+\text{participant}(\pi_\chi))$
$\Rightarrow 2 \leftrightarrow \cancel{-\text{author}}(+\text{participant}(\pi_\chi))$
$\Rightarrow 3 \leftrightarrow \cancel{-\text{author}}(-\text{participant}(\pi_\chi))$

The two pairs of new synonyms are $\Rightarrow 1_I$ and $\Rightarrow 2$, for [+participant] (the former originally monotonically derived, the latter not) and $\Rightarrow 3$ and $\Rightarrow 1$, for [−participant] (again, the former, but not the latter, originally monotonically derived). While the competition between $\Rightarrow 3$ and $\Rightarrow 1$ is resolved in favour of $\Rightarrow 3$, that within the former pair lingers on in the system, yielding the optionality still very marginally attested by the reinforcer system of Santome.

Note that, as we know, the Santome adverbial system further developed into a Pattern C participant-based binary system (as mentioned in Section 6.3.3.3 above). Thus, going beyond the optionality stage attested (possibly in a fossilised fashion) by Santome reinforcers, the competition between $\Rightarrow 1_I$ and $\Rightarrow 2$ eventually resolves not in favour of $\Rightarrow 1_I$, as in Pattern A (6.3.3.1), but in favour of $\Rightarrow 2$, as in Pattern C (6.3.3.3).

6.3.3.5 Participant-based: Pattern D

Pattern D demonstrative systems generalised one form of the original system to all deictic domains. As discussed in relation to Pattern D speaker-based binary systems (6.3.2.5), nominal systems in which only one form is preserved and, as such, does not encode any deictic contrasts are not included in the present survey (even though their combination with a series of demonstrative adverbs yields deictic oppositions, compositionally).

Pattern D is not attested under other conditions with a participant-oriented semantics, neither in the nominal nor in the adverbial domain, despite being in principle conceivable. In fact, given the featural derivations discussed in Section 5.2.1 (see the systems in (15) above), systems in which DEM.1INCL is syncretic with DEM.1(EXCL) have, at face value, one and the same form ($\Rightarrow 1_{(I)}$) which is however derived either by [+participant] (DEM.1INCL; see Neapolitan *chisto* in Section 5.2.1) or by [−participant] (DEM.1EXCL; see (again!) Neapolitan *chisto* in Section 5.2.1), once the non-primary [±author] is lost. As such, they stand in a binary opposition to each other.

[11] Note that, to derive the optionality attested by the Santome reinforcers series, $\Rightarrow 2_I$ cannot be available; in fact, Pattern AC implies two [+participant] forms, one of which syncretic with $\Rightarrow 1$. Given that the input systems discussed in (15) only present one inclusive form (either $\Rightarrow 1_I$ or $\Rightarrow 2_I$), for Pattern AC to be derived, $\Rightarrow 1_I$ is needed (and not $\Rightarrow 1$, [−participant]), and thus only $\Rightarrow 2$ can be available.

However, the syncretism between the two forms makes the pattern undetectable without further semantic differences: these are not available in nominal systems, as also mentioned in 6.3.2.5. The adverbial domain, instead, might encode additional contrasts, e.g. in terms of punctuality *vs* areality, which may in turn be reanalysed as strictly person-oriented (as was the case for the Upper Guinea Creoles discussed in 6.3.2.5). The availability of such semantic distinctions seems to be restricted across (qua)ternary systems (e.g. only one possible instance is reported for the Calabrian variety of Saracena by Ledgeway & Smith 2016: 895), which might explain why no such type of evolution is attested in the participant-oriented semantics. This gap may be accidental or require an explanation: I leave the examination of this issue to future research.

6.3.4 Summary

In the foregoing, I showed how the hypothesis that demonstrative systems across Romance varieties lose the non-primary person feature correctly accounts for the attested (and unattested) patterns of semantic and formal reorganisation in diachrony and contact alike.

The results of the pattern-by-pattern discussion for innovative demonstrative systems are summarised in Table 6.1. The lightly shaded cells indicate patterns that are only marginally attested and potentially spurious, while the darkly shaded ones indicate patterns that are not attested. Patterns for which no straightforward derivation is granted by the simple feature loss mechanism advocated for in this chapter are marked by a bold-faced asterisk in front of the term(s) that are incompatible with the relevant reductions.

6.4 Distance contrasts

So far, I discussed cases in which the computational complexity related to the featural derivation of at least one form in a given demonstrative system determined the loss of the non-primary feature across that whole system. In this section, I speculate that feature loss might be avoided and computational complexity could rather be eased otherwise.

The hypothesis that I wish to tentatively advance here is that a different mechanism which might derive ultimately less complex systems is the reanalysis of the non-primary feature as a distance marker. This derives the reduction of (qua)ternary demonstrative systems into distance-oriented ones, as well as ambiguous demonstrative systems that simultaneously encode a (ternary) person-oriented semantics and a distance-oriented one (the choice is constrained by pragmatic factors, as per Jungbluth's 2003 conversational dyad approach; see the discussion in Section 3.2.2).

Before seeing more in detail how this idea might be implemented, it is worth reminding that distance-oriented demonstrative systems only take the speaker as their deictic centre and define different degrees of distance (typically: three)

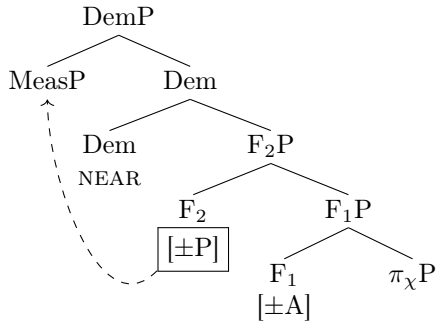
Table 6.1: A featural and structural account

Nominal system (input = innovative Romance: N:DEM.1 *vs* N:DEM.2 *vs* N:DEM.3 $\Rightarrow$1–2–3 / N:DEM.1EXCL *vs* N:DEM.1INCL *vs* N:DEM.2 *vs* N:DEM.3 $\Rightarrow 1\text{–}1_I/2_I\text{–}2\text{–}3$)		
Speaker-based $\Rightarrow 1 \leftrightarrow \cancel{+}\mathrm{P}(+\mathrm{A}(\pi_\chi))$; $\Rightarrow 2 \leftrightarrow \cancel{+}\mathrm{P}(-\mathrm{A}(\pi_\chi))$; $\Rightarrow 3 \leftrightarrow \cancel{-}\mathrm{P}(\pm\mathrm{A}(\pi_\chi))$	Participant-based $\Rightarrow 1 \leftrightarrow \cancel{+}\mathrm{A}(-\mathrm{P}(\pi_\chi))$; $\Rightarrow 1_I/2_I \leftrightarrow \cancel{+}\mathrm{A}(+\mathrm{P}(\pi_\chi))$; $\Rightarrow 2 \leftrightarrow \cancel{-}\mathrm{A}(+\mathrm{P}(\pi_\chi))$; $\Rightarrow 3 \leftrightarrow \cancel{-}\mathrm{A}(-\mathrm{P}(\pi_\chi))$	*Pattern:*
$\Rightarrow 1_{(+\mathrm{A}(\pi_\chi))}\text{–}3\text{–}3_{(-\mathrm{A}(\pi_\chi))}$	$\Rightarrow 1_I\text{–}1_{I\,(+\mathrm{P}(\pi_\chi))}\text{–}3_{(-\mathrm{P}(\pi_\chi))}$	A_n
$\Rightarrow 1_{(+\mathrm{A}(\pi_\chi))}\text{–}2\text{–}2_{(-\mathrm{A}(\pi_\chi))}$	$\Rightarrow 1_I\text{–}1_{I\,(+\mathrm{P}(\pi_\chi))}\text{–}{*}2_{(+\mathrm{P}(\pi_\chi))}$ / $\Rightarrow {*}1\text{–}{*}1_{(-\mathrm{P}(\pi_\chi))}\text{–}{*}2_{(1)(+\mathrm{P}(\pi_\chi))}$	B_n
$\Rightarrow 1_{(+\mathrm{A}(\pi_\chi))}/{*}2_{(-\mathrm{A}(\pi_\chi))}\text{–}3\text{–}3_{(-\mathrm{A}(\pi_\chi))}$	$\Rightarrow 1_I/2\text{–}1_I/2_{(+\mathrm{P}(\pi_\chi))}\text{–}3_{(-\mathrm{P}(\pi_\chi))}$	AC_n
${*}\Rightarrow 2_{(-\mathrm{A}(\pi_\chi))}\text{–}3\text{–}3_{(-\mathrm{A}(\pi_\chi))}$	$\Rightarrow 2_{(I)}\text{–}2_{(I)\,(+\mathrm{P}(\pi_\chi))}\text{–}3_{(-\mathrm{P}(\pi_\chi))}$	C_n
Adverbial system (input = innovative Romance: A:DEM.1 *vs* A:DEM.2 *vs* A:DEM.3 $\Rightarrow$1–2–3 / A:DEM.1EXCL *vs* A:DEM.1INCL *vs* A:DEM.2 *vs* A:DEM.3 $\Rightarrow 1\text{–}1_I/2_I\text{–}2\text{–}3$)		
Speaker-based $\Rightarrow 1 \leftrightarrow \cancel{+}\mathrm{P}(+\mathrm{A}(\pi_\chi))$; $\Rightarrow 2 \leftrightarrow \cancel{+}\mathrm{P}(-\mathrm{A}(\pi_\chi))$; $\Rightarrow 3 \leftrightarrow \cancel{-}\mathrm{P}(\pm\mathrm{A}(\pi_\chi))$	Participant-based $\Rightarrow 1 \leftrightarrow \cancel{+}\mathrm{A}(-\mathrm{P}(\pi_\chi))$; $\Rightarrow 1_I/2_I \leftrightarrow \cancel{+}\mathrm{A}(+\mathrm{P}(\pi_\chi))$; $\Rightarrow 2 \leftrightarrow \cancel{-}\mathrm{A}(+\mathrm{P}(\pi_\chi))$; $\Rightarrow 3 \leftrightarrow \cancel{-}\mathrm{A}(-\mathrm{P}(\pi_\chi))$	*Pattern:*
$\Rightarrow 1_{(+\mathrm{A}(\pi_\chi))}\text{–}3\text{–}3_{(-\mathrm{A}(\pi_\chi))}$	$\Rightarrow 1_I\text{–}1_{I\,(+\mathrm{P}(\pi_\chi))}\text{–}3_{(-\mathrm{P}(\pi_\chi))}$	A_a
$\Rightarrow 1_{(+\mathrm{A}(\pi_\chi))}\text{–}2\text{–}2_{(-\mathrm{A}(\pi_\chi))}$	$\Rightarrow 1_I\text{–}1_{I\,(+\mathrm{P}(\pi_\chi))}\text{–}{*}2_{(+\mathrm{P}(\pi_\chi))}$ / $\Rightarrow {*}1\text{–}{*}1_{(-\mathrm{P}(\pi_\chi))}\text{–}{*}2_{(I)(+\mathrm{P}(\pi_\chi))}$	B_a
$\Rightarrow 1_{(+\mathrm{A}(\pi_\chi))}/{*}2_{(-\mathrm{A}(\pi_\chi))}\text{–}3\text{–}3_{(-\mathrm{A}(\pi_\chi))}$	$\Rightarrow 1_I/2\text{–}1_I/2_{(+\mathrm{P}(\pi_\chi))}\text{–}3_{(-\mathrm{P}(\pi_\chi))}$	AC_a
$\Rightarrow {*}2_{-\mathrm{A}(\pi_\chi))}\text{–}3\text{–}3_{(-\mathrm{A}(\pi_\chi))}$	$\Rightarrow 2_{(I)}\text{–}2_{(I)\,(+\mathrm{P}(\pi_\chi))}\text{–}3_{(-\mathrm{P}(\pi_\chi))}$	C_a
$\Rightarrow 3_{i\,(+\mathrm{A}(\pi_\chi))}\text{–}3_{ii}\text{–}3_{ii\,(-\mathrm{A}(\pi_\chi))}$	$\Rightarrow 1_{I_i}\text{–}1_{I_i\,(+\mathrm{P}(\pi_\chi))}\text{–}1_{ii\,(-\mathrm{P}(\pi_\chi))}$	D_a

with respect to that anchor (see discussion in Section 3.2). Although the unavailability of distance-oriented contrasts for participant-based binary systems (i.e. where different degrees of distance would be established with respect to both participants at once) is left unaccounted for here, the typological conclusion that can be drawn from this observation is that the process of reanalysis (rather than deletion) of the non-primary feature is somehow restricted to proper ternary systems. Said otherwise, it seems that only [±participant] may be reanalysed as a distance marker, and not [±author].

My hypothesis is that the computational complexity which arises from reiteration of featural applications and from the non-monotonicity of the sequence of functions in ternary system is eased by the reanalysis of the non-primary action-on-lattice person feature as a MeasP, in some cases, rather than by dropping that feature altogether:

(21)



That is, [±participant] loses its original value (action-on-lattice person feature) and gains a new one, namely it defines the cut-off point for different classes of vector lengths, possibly by virtue of its wider relation to the universe of discourse. As such, classes are defined whereby different degrees of distance from the speaker are established, so that referents that are in the discourse universe are referred to as contrastively closer than referents that are not (medial *vs* distal). Said otherwise, [±participant] would be reanalysed as defining the length with respect to which different classes of distance with respect to the ground, i.e. the speaker alone, are defined (e.g. [+participant] = medial; [−participant] = distal).

Note that this would be an instance of Head-to-Spec[ifier] upwards reanalysis, i.e. a non-canonical type of reanalysis (cf. for instance van Gelderen 2011: e.g. 2.4, for an overview of Spec-to-Head reanalysis and its account in terms of Feature Economy). Nonetheless, a similar type of development has been documented for German quantifying words such as *viel* 'much/many' by Sapp & Roehrs (2016) and Roehrs & Sapp (2016): the authors link this novel type of reanalysis to a degrammaticalisation process triggered by analogy. Here, I leave the wider theoretical framework in which this change from person feature to distance marker may be formalised for future research.

Granting the speculation that this change is indeed possible, however, three facts would be captured. Firstly, and despite this type of evolution did not re-

ceive much attention in the foregoing, (person-oriented) ternary systems are attested which reduced to (distance-oriented) ternary systems, i.e. (in the present framework) to binary systems which further encode a distance opposition for one of their person specifications. Interestingly, whenever this is the case, the distance opposition is not reported to be available in the original system and the hearer-oriented semantics is not recorded for the innovative, reduced system, suggesting indeed that the two stages might be linked, as hypothesised above. Such evolution has been described for instance for Ternate and, possibly, Zamboanga Chabacano, two Spanish-based creoles (see APiCS, respectively: Sippola 2013c: section 5 and Sippola 2013d: feature 33; and Steinkrüger 2013b: feature 33).

Secondly, recall the hypothesis, advanced by Meira (2003: 10), that distance- and person-oriented contrasts in demonstrative systems are diachronically related (see Section 3.2). Meira proposed that distance-oriented demonstrative systems which are nonetheless sensitive to the position of the hearer (as the Tiriyó one in the 2003 paper) may eventually encode the salience of the hearer by means of a dedicated semantic category, thus developing a person-oriented ternary demonstrative system. This process is the inverse of the one reviewed here and can be formally implemented as such (downward reanalysis of a distance marker to a person feature, whose content may be modelled on that of the independently available [±participant] feature in the pronominal system).[12] The availability of the inverse process may further suggest that indeed there is some kind of continuity between person and distance contrasts.

Thirdly and finally, some demonstrative systems (e.g. Spanish; but see Ledgeway & Smith 2016: 882 for more) have been described as encoding a person-oriented semantics and a distance-oriented one at the same time, and according to the relevant pragmatic setting (see again Section 3.2.2): under some configurations, the middle form in the relevant system references the position of the hearer; under other configurations, it defines an intermediate degree of distance from the speaker (conversation dyad approach: see Jungbluth 2003 and later works). These systems may be conceived as displaying optionality as to the interpretation and merge position of the non-primary [±participant] feature and, as such, as representing an intermediate stage in the transition between the two systems.

These few and tentative remarks suggest that the topic deserves a more thorough investigation, but also that an integration of person- and distance-oriented systems, as proposed in Chapter 4, is desirable on this additional empirical ground, that is: to capture the diachronic relation between (traditionally) typologically distinct systems. The structure proposed in this work allows for this integration in a straightforward way. Moreover, this further instance of semantic change in ternary systems (from person-oriented ternary systems to distance-oriented ones, i.e. speaker-based binary systems with an additional distance contrast) can be reduced to the same complexity factors

[12]Note that Meira (2003) did not put forward a formal analysis for these facts.

reviewed in Chapter 5, although the solution of the computational complexity level is left to a different mechanism.

6.5 Deriving the indexical asymmetry

So far, I have argued that (qua)ternary demonstrative systems undergo a reduction to binary ones through feature loss. In Chapter 5, I proposed that feature loss is triggered by featural complexity conditions (description length, and, concurrently, monotonicity bias); in the foregoing, I further argued that feature loss is constrained by a structural factor, such that only the last action-on-lattice feature to enter into the derivation of a given demonstrative form may be lost, deriving the attested semantic and formal variation (LIFO).

The explanation provided so far rests on very general tools whose natural domain of application should be unrestricted: thus, we expect that the same patterns of semantic reduction be attested in other indexical systems derived by analogous primitives which, as such, underlie the same mechanisms. An extension of this account to other indexical categories is thus in principle legitimate; as a matter of fact, it is even desirable, as otherwise some additional stipulations would be needed to ensure that the application of the general mechanisms reviewed so far (featural complexity conditions, structural conditions on feature loss) is ruled out in some contexts only.

Nonetheless, if we try to generalise this rationale to other indexical systems beyond the demonstrative domain, we see that it fails. In this section, I focus on the absence of a similar reduction, all else being substantially equal, in pronominal paradigms, and in particular on the (semantic) stability of 2nd person pronouns. In fact, although their featural characterisation is complex (just like that of DEM.2), they do not fall out of use (unlike DEM.2), contrary to predictions made by the present account.[13] This is illustrated by the review of pronominal paradigms across Romance varieties in diachrony and contact presented in Appendix D.1 and seems to indicate that the application of the relevant mechanisms should be constrained. While this could derive the asymmetry, it would also constitute an *ad hoc* solution, if no principled reasons were adduced in its support.

In what follows, I argue that extrinsic restrictions are not necessary, as the asymmetry between pronominal and demonstrative systems is in fact derived by LIFO, once an independent structural difference across the two series of forms is acknowledged: namely, the fact that only personal pronouns, and not demonstratives, typically include (indexical) action-on-lattice number features in their internal structure. Said otherwise, pronominal paradigms can (and typ-

[13]This account also predicts the same for 1EXCL. This seems to be borne out on formal bases, as, whenever quaternary paradigms lose the clusivity distinction and reduce to ternary ones, they preserve the morphology for 1INCL to the expenses of that for 1EXCL, with but few exceptions (Filimonova 2005: 412). However, given that clusivity-related changes in pronominal paradigms are marginal in the present discussion, I leave this fact aside here.

ically do) contrastively refer to one single referent or to a plurality of referents for each person category: that is (leaving aside the thorny issues of the uniqueness of speaker and, possibly, hearer), pronominal paradigms minimally have a singular and a non-singular form for each person category. On the contrary, demonstrative systems do not typically make number distinctions with respect to the deictic centre, regardless of which person category the demonstrative form is rooted onto. So, while ternary pronominal systems typically encode a difference between *I* and *we*, ternary demonstrative systems do not encode any difference between *near me* and *near us*.

Here, I capitalise on this prominent difference to account for the asymmetry across indexicals. Concretely, I assume that number features, just as person features, denote actions on lattices (again with Harbour, e.g. 2014a) and that they merge above person features (Section 6.5.1). Granting this, the last action-on-lattice feature to enter into the derivation of personal pronouns is a number feature, which "protects" the structurally lower person features from being dropped. Hence, I show that the predictions made by LIFO are equally borne out for demonstrative systems and for pronominal ones (Section 6.5.2): in the former, the non-primary feature is a person feature, which may undergo loss; in the latter, the non primary feature is a number feature, making person features stable. Conversely, I show that pronominal systems may lose person features, too, but only if they are lacking number features: this also naturally falls from LIFO.

6.5.1 Number features

As the key ingredient in the derivation of the indexical asymmetry is the different availability of number features across categories, in this section I swiftly introduce the number-related assumptions on which I will build in the next section, both as regards the structural position of number within indexical categories and with reference to the actual features that derive number contrasts. For a more detailed overview of these assumptions, see Appendix D.2.

With respect to structural matters, I take number features to be dissociated from person features and to be merged above them in the functional sequence internal to person indexicals.

Arguments in favour of the dissociation between person and number features come mainly from semantic and neurolinguistic facts. Among the former, the most notable is the interaction of person and number features in deriving the meaning of *we*, which crucially does not denote a plurality of *I*s: the fact that number adds new meaning to person, rather than simply modifying it, suggests that the two are encoded separately (Panagiotidis 2002: 24). Concerning the latter, different responses to agreement violations in person as opposed to number are generally taken to suggest the separate encoding of the two (see e.g. Carminati 2005; Mancini *et al.* 2011; Mancini *et al.* 2014; Ackema & Neeleman 2019).

Arguments in favour of the specific merge position of number features (above

Table 6.2: Number systems (reduced from Harbour 2014a: 214)

Parameter setting	Number system
{ }	no number
{±atomic}	singular, plural
{±minimal}	minimal, augmented
{±minimal*}	minimal, unit augmented, augmented
{±minimal, ±atomic}	singular, dual, plural
{±minimal*, ±atomic}	singular, dual, trial, plural

* indicates feature recursion.

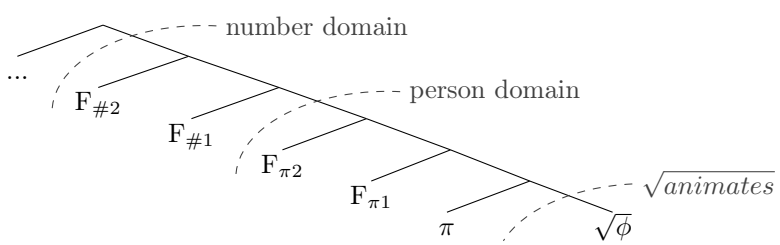
person features), instead, come from morphology and semantics. Assuming that the internal structure of grammatical elements is revealed by the pieces of morphology that constitute them and by their respective ordering (Mirror Principle, Baker 1985), morphological evidence for the high merge position of number is provided by the morphological decomposition of personal pronouns, which is Mirror Principle-compliant. Indeed, whenever personal pronouns can be segmented into a sequence of morphemes, person morphemes consistently precede number morphemes in the surface linear order: thus, it can be concluded that person occupies a lower structural position within their internal syntax (see e.g. Vanden Wyngaerd 2018). Likewise, the semantic interactions between person and number features in deriving pronominal paradigms that encode the clusivity distinction (1EXCL–1INCL) naturally derive the semantic opposition between singular–(dual–)plural and minimal–(unit-augmented–)augmented number systems only if person is merged before number, but not under the opposite ordering (Harbour 2016: section 6.5.1).

As regards the featural side of the issue, I follow Harbour (2008, 2014a, *i.a.*) in assuming that number features, too, denote actions on lattices. The core number features for the present purposes are [±atomic] and [±minimal]. Their exact semantics is immaterial to this discussion and is therefore introduced in detail in Appendix D.2. Here, it suffices to say that [+atomic] selects the atoms within the π lattice (i, u, and o) and [−atomic] selects the remaining elements (non-atoms; e.g. i_o, iu, o_o, *etc.*); instead, [+minimal] selects the elements that belong to the lowest lattice layer (e.g. the atoms and iu, if π is its argument) and [−minimal] selects all other elements. These features may combine to yield non-binary number systems and iterations of number features (with some logics-related restrictions) derive increasingly complex number systems. A sample of how these features derive the typology of number systems is given in Table 6.2.

6.5.2 Number features and Last in–First out

On the basis of the assumptions sketched in Section 6.5.1 (dissociation of person and number features and structurally higher locus for number; action-on-lattice number features), I take the lower internal structure of personal pronouns to be derived as follows:

(22)



That is, personal pronouns minimally consist of a person domain and a number domain, as defined by the distribution of action-on-lattice person and number features along the functional spine. Additionally, but simplifying as the matter is immaterial here, I assume with Harbour (2014a, 2016) that π embeds $\sqrt{\phi}$, the root of the functional sequence. $\sqrt{\phi}$ is understood to denote "the domain of animates (loosely construed to include cats, gods, and other things that, culturally, we regard as our pronominal kin)" (Harbour 2014a: 191). π maps its complement onto the person ontology; person features then interact with the denotation of π, deriving the different person categories as per the overview in Section 3.3.

Further, number features ($F_{\#1}$ and $F_{\#2}$) "count" their complement. Note that these are introduced by a # head in Harbour's (2014a) account. Specifically, # is taken to define whether its complement (i.e. the result of the operations of person features on π) is countable or not. However, this distinction is not directly relevant for person categories, whose lattices have a bottom atomic layer (*i*, *u*, *o*) and are as such count, rather than mass. Therefore, I assume that number features act on the resulting person categories directly.[14] Number features compose with their (count) lattice complement, yielding the different number categories as illustrated in Table 6.2 and, more extensively, in Appendix D.2.

Note that, while person features can be two at most (here: $F_{\pi 1}$ and $F_{\pi 2}$), number features may be more than two, as they can be recursive (for a semantic and syntactic modelling of their recursivity, see again Harbour 2014a): in this respect, the abstract tree in (22) represents a simplification, as only two number slots are represented ($F_{\#1}$ and $F_{\#2}$). Moreover, I assume that this structure composes with a DP layer, at least;[15] however, as the issue of the higher internal

[14]The presence of # may however be assumed for uniformity in the derivation of number across pronominal and nominal categories. The presence or absence of # is ultimately negligible for the present account.

[15]As such, the derivation proposed here is fundamentally not at odds with some of the dom-

structure of pronouns is substantially inconsequential here, it will not be dealt with any further.

In what follows, I represent the structure in (22) in short by referring to the relevant sequence of features, i.e. of functions, indicated by round brackets, as in (23):

(23) $\mathrm{F}_{\#2}\,(\,\mathrm{F}_{\#1}\,(\,\mathrm{F}_{\pi 2}\,(\,\mathrm{F}_{\pi 1}\,(\ldots)))\,)$

In line with the discussion in Chapter 4 and regardless of ontological differences, an analogous structure for the derivation of basic person (and number) contrasts can be posited for all person-related categories: crucially, here, for demonstrative forms, too. Importantly, in demonstrative systems, (indexical) number is only very rarely encoded (see the discussion of Siwi Berber in Section 3.4.2), and as such number features are not typically merged; further, the (relevant part of the) structure in (22) is taken to be embedded under a DemP in demonstratives, rather than under D as in pronouns, deriving the difference between the demonstrative form *this* 'NEAR me' and the PP *near me*, where a P (*near*) embeds a personal pronoun (DP: *you*).

Granting this, I propose that the availability (personal pronouns) or unavailability (demonstratives) of person features in the derivation determines the diachronic asymmetry across indexicals, with person oppositions being stable in personal pronouns but not in demonstratives. This falls from LIFO, whereby the non-primary feature (the last to enter into a given derivation) alone is prone to undergo loss under the relevant featural conditions. Given (22), the last feature to be merged in the derivation of pronominal paradigms is a (possibly: the only) number feature: this ensures that person features are stable, as their application precedes that of number features.[16] The absence of indexical number features in demonstrative systems, instead, makes the second (and last) person feature to enter into the derivation of (qua)ternary demonstratives the non-primary, hence unstable, feature. In this case, as discussed above, the featural complexity conditions are satisfied and no structural factor prevents feature loss.

Ultimately, far from being incompatible with the account proposed in the foregoing, pronominal paradigms provide independent evidence for LIFO. Besides, they indicate that LIFO can be devised as a constraint proceeding along an implicational hierarchy, such that *only* the last action-on-lattice feature to be merged in a given domain may be lost. This is underscored by a wider-ranging generalisation that can be established in relation to person-related systems as

inant approaches to the internal structure of pronouns, and in particular with the proposals advanced by Déchaine & Wiltschko (2002) and Gruber (2013).

[16]Moreover, if only one number feature is merged, that feature does not in and of itself imply computational complexity by any of the metrics discussed in Chapter 5: this predicts that its loss is less common than that of an additional number feature, in line with the synchronic quantitative remarks presented in Appendix D.3, Table D.2 (systems with two or more number features: n=178; systems with one number features: n=466; systems with no number features: n=30). Conversely, see Section 6.5.2.2.3 for preliminary remarks on the instability of more complex number systems.

a whole, namely that, if a system is derived by one person feature alone, it may not encode number oppositions; conversely, if a system encodes number oppositions, it must also display a full set of person oppositions (that is, a tripartition or a quadripartition). In what follows, this is shown in turn for demonstrative (Section 6.5.2.1) and pronominal systems (Section 6.5.2.2).

6.5.2.1 Demonstratives

By LIFO, the last person feature to be merged in the internal structure of a demonstrative form that lacks indexical number features is predicted to be unstable and, as such, may be lost over time. In the foregoing, this was shown to be the case by extensively reviewing the patterns of reduction of (qua)ternary demonstrative systems across Romance languages (Sections 6.2 and 6.3).

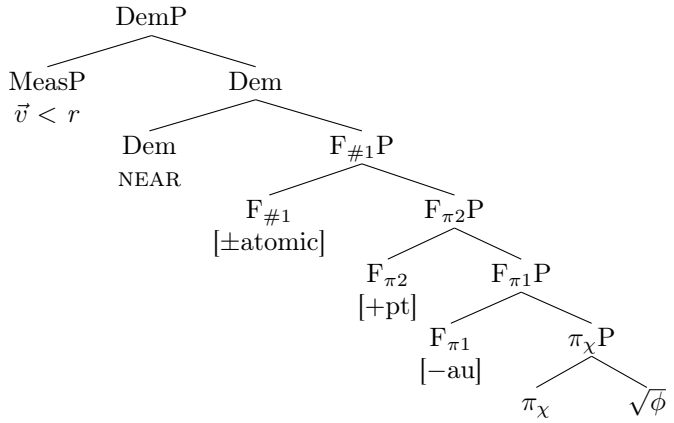
However, and by the same token, we also predict that both person features must be merged whenever a given demonstrative system encodes indexical number, i.e. whenever the last action-on-lattice feature to enter the derivation is a number feature rather than a person one. To the best of my knowledge, this further prediction is borne out as well: demonstrative systems that encode indexical numbers, i.e. that make number-based distinctions with respect to the deictic centre (*this near me–this near us*), show at least a three-way person contrast, as is the case in Siwi Berber, discussed in Section 3.4.2 and for which I repeat the set of demonstrative forms here, for convenience:

(24) *Siwi Berber pronominal demonstratives* (SG.M paradigm; Souag 2014a: 538)

N:DEM-1	N:DEM-2.SG.M	N:DEM-2.SG.F	N:DEM-2.PL	N:DEM-3
w-a 'Near me'	w-ok 'Near you (m)'	w-om 'Near you (f)'	w-erwən 'Near you all'	w-ih 'Far from us'

In Siwi Berber, hearer-oriented demonstrative forms agree in (indexical) number and gender with the hearer. As such, and following the proposal in Chapter 4 for the internal structure of demonstratives and the structure provided in (22), the internal structure of the different hearer-oriented demonstrative forms of Siwi Berber can be derived as follows:

(25)



In (25), the person core of the hearer-oriented demonstrative forms ($F_{\pi 2}P$ and below) is embedded under the indexical number feature [±atomic] which defines whether the hearer is atomic (singular: *wok*, *wom*) or not (plural: *werwən*). In this derivation, I remain agnostic with respect to the locus of gender features, which may be conceived as being encoded either by $\sqrt{\phi}$ or together with the active number feature (both options are taken to be available in the nominal domain and to constitute a point of cross-linguistic parametric variation: number encoded on N *vs* on Num, Ritter 1993; see also discussion in Section 3.4.2).

Nevertheless, for the purpose of the present discussion, the relevant fact is that the second person feature to enter into the derivation, [+participant], is followed by another action-on-lattice features, namely [±atomic], as per the discussion in Section 6.5.1. By LIFO, [+participant] is expected not to be delinked from the functional sequence, as it is not the last feature to enter into the derivation, in spite of feature complexity at person level. Thus, although this prediction has an empirically restricted scope, it is borne out and crucially shows that LIFO holds beyond the exclusively person-related domain and rather offers an insight into the organisation of ϕ features: this issue will be better explored in Section 6.5.2.2 below.

Before doing so, I would like to suggest that the very fact that indexical number features are typically unavailable to demonstrative systems (i.e. demonstrative systems do not commonly encode the difference: *near you–near you all*, unlike in Siwi Berber) could be related to the internal structure of demonstratives, and more precisely to the NEAR function. I speculate that the NEAR function may be constrained by a contiguity requirement, whenever its complement is complex (i.e. not atomic): that is, only contiguous regions occupied by the discourse atoms may be the starting point of a single set of vectors, and not discontinuous ones. I surmise that this might be the case because only contiguous regions, but not non-contiguous ones, can be regarded as convex complexes of regions (that is, simply, as a macro-region), providing a unified (if slightly less punctual) deictic centre. Thus, indexical non-atomicity may be

thought of as severely restricted by independent requirements of the vicinity function.[17]

6.5.2.2 Independent pronominal paradigms

Let us now turn to independent pronominal paradigms. Granting the internal structure for personal pronouns in (22) above and the unrestrained validity of the featural and structural factors which I proposed to account for reductions in demonstratives, we can expect pronominal paradigms to show a single person feature only if they lack number features, by LIFO. Conversely, if at least one number feature is merged in the structure, then we predict that both person features will be merged in the structure.[18] In this section, I quickly show that this is preliminarily borne out, providing further support to the idea that feature stability is constrained by a structural factor. Note that the conclusions to be reached in what follows expand on Greenberg's Universal 42 ("All languages have pronominal categories involving at least three persons and two numbers", Greenberg 1963: 75) and further a principled explanation is provided for it.

The full language sample used to test this prediction includes 674 languages belonging to 234 *genera* and 125 families and is presented in full in Appendix D.3. Note that only independent pronominal paradigms have been considered here: this restriction mainly depends on the fact that dependent, or inflectional, pronouns (i.e., substantially, person agreement markers) tend to show overall higher rates of syncretism than independent personal pronouns (Siewierska 2004: 112–113; Cysouw 2009: 311–315; Vanden Wyngaerd 2018: 278). Thus, only the latter make it possible to fully appreciate the semantic contrasts encoded by a given language, and specifically, in the case at hand, the full extent of the available person oppositions.

6.5.2.2.1 One number feature → two person features Let us first consider paradigms with at least one number feature: by LIFO, these are predicted to be derived by the activation of both person features, i.e. to always instantiate either a tripartition (where [±author] composes with π first, and [±participant]

[17]Likewise, this might explain the scarce diffusion of the clusivity distinction across demonstrative systems: in fact, although the frequency of quadripartitions in pronominal system is roughly equivalent to that of tripartitions (see Appendix D.3 for a quantitative overview), the clusivity distinction in demonstrative systems appears to be significantly rarer (see also Section 3.4.1). This could be due to the independent region contiguity (or, generally, convexity) requirement of the vicinity function with respect to the ground: for the inclusive demonstrative reading to arise, it is not sufficient that (minimally) the speaker and the hearer are singled out with respect to the other person categories by the relevant person features (as is the case for personal pronouns), but the speaker-region and the hearer-region must further be contiguous for the vicinity function to denote a (single) vector that originates from the union of their regions.

[18]Note that these predictions hold in synchrony: their diachronic counterpart is that, in pronominal paradigms, person features may be lost only if no number feature is active; nonetheless, here I will only focus on the synchronic typology of pronominal paradigms, leaving a diachronic approach to pronominal systems to further research.

composes with the result of this composition) or a quadripartition (where instead [±participant] composes with π first, and [±author] composes with the result of this composition). That is, and given the discussion in Section 6.5.1, their internal structure can be summarised as follows, according to whether they display a three-way number opposition (26a) or a two-way number opposition (26b):[19]

(26) a. $F_{\#2}\,(F_{\#1}\,(F_{\pi2}\,(F_{\pi1}\,(\ldots))))$
b. $F_{\#1}\,(F_{\pi2}\,(F_{\pi1}\,(\ldots)))$

Conversely, the prediction made by LIFO can be represented as follows, where $F_{\#2}$ is shaded as its (un)availability is not relevant to the point made here:

(27) * $F_{\#2}\,(F_{\#1}\,(F_{\pi1}\,(\ldots)))$

That is, the presence of at least one number feature blocks the loss of the second person feature to be merged in the derivation. This prediction is largely borne out: out of 644 paradigms that display number features, 324 are tripartitions and 318 are quadripartition, which as such are derived by merging both person features and one (or more) number features (see Table D.2 in Appendix D.3 for a quantitative overview).

Only two paradigms are reported for which a two-way person opposition (i.e. an opposition defined by the activation of one and the same person feature) is attested alongside a two-way number opposition (i.e. an opposition defined by the activation of one and the same number feature). This seems to contradict LIFO, but the matter is less straightforward than is seems.

The two languages in my sample that instantiate (26b), i.e. where one person feature is missing, despite the presence of one number feature merged above them, are Lengua and Sanapaná (Harbour 2014b: 127–128, 2016: 55–56; for the former, a full paradigm is however not given), both Mascoian languages spoken in Paraguay:

(28) *Independent pronouns, Sanapaná* (Harbour 2016: 128)[20]

	singular		plural	
1	ko'o	+at(+au(...))	enenko'o	−at(+au(...))
2/3M	hlejap	+at(−au(...))	hlengap	−at(−au(...))
2/3F	hleja	+at(−au(...))	hlenga	−at(−au(...))

As (28) shows, the Sanapaná system can be described as a speaker-based binary pronominal system, which opposes 1st person and non-1st person forms by means of [±author],[21] and as encoding, on top of this, a two-way number

[19] More complex number systems, with more than two number features, are left aside here; those account for 21 systems in my sample, for which see Appendix D.3.

[20] See also Gomes 2013: 212–222; Adelaar & Muysken 2004: 498.

[21] [−author] forms are further differentiated by gender: masculine *vs* feminine.

distinction (singular *vs* plural), by means of [±atomic]. The person bipartition is not predicted by LIFO, as the availability of a number feature merged after the person component of the paradigm should block the delinking of person features, thus implying a tripartition or a quadripartition (i.e. systems derived by two person features). Moreover, the bipartition seems quite consistent in the system, as both the possessive paradigm and the verbal inflection appear to make a parallel two-way speaker-based distinction.

However, a couple of remarks can be advanced which undermine the solidity of the binary analysis of Mascoian pronominal paradigms. First, as Gomes (2013: 214) notes for Sanapaná, a possible different analysis is one whereby the pronominal paradigm only makes a distinction in terms of 1st *vs* 2nd person and does not instead encode 3rd person by means of a pronominal form.[22] This hypothesis is not too far-fetched, as it is quite common for pronominal paradigms to show (additional) non-pronominal forms in 3rd person function, and typically demonstrative forms (for a comprehensive discussion, see Bhat 2004: chapter 6). Sanapaná demonstratives have in fact a consistent 3rd person semantics, as it clearly emerges from Gomes' discussion of the system (2013: 228–231). This would amount to analysing the pronominal paradigm of (at least) Sanapaná as displaying syncretism (possibly restricted to animate referents in the nominal domain, as inferred from Gomes' examples, and otherwise systematic in the verbal domain), rather than conflation, i.e. the absence of an opposition in the grammar, regardless of the cross-linguistic rarity of syncretism in independent pronominal paradigms.

Furthermore, this is the state of affairs described for another closely-related Maskoy language, namely Enxet Sur (Elliott 2021): in Enxet, the pronominal paradigm is morphologically very close to the Sanapaná one (*ko'o* '1SG', *negko'o* '1PL'; *xeyep/xép/exchep* '2SG.M', *xeye'/xé'/exche'* '2SG.F'; *kéxegke'* '2PL'), and an analogous two-way speaker-based organisation is reported for verbal agreement. Nonetheless, Elliott (2021: 226) underscores that

> instead of having second/third person ambiguous pronouns to match the pronominal prefix system, it [*scil.* Enxet] instead [*sic*] only has masculine and feminine second person singular pronouns. These cannot refer to third persons and only have singular reference. There is also a second person plural pronoun [...].

Thus, while the question cannot be settled without further research, this instance of reduced person semantic co-occurring with number distinctions cannot be regarded as a plain counterexample to the prediction made by the analysis laid out in the foregoing.

[22]"Outra possibilidade de interpretação do referido sistema poderia ser aquela que considera a primeira e a segunda pessoa, em detrimento de uma terceira, possivelmente visível para os actantes do discurso [*Another possible interpretation of the mentioned system could be one which considers 1st and 2nd persons, to the detriment of 3rd person, possibly visible to the discourse participants*]" (Gomes 2013: 214).

6.5.2.2.2 No number features → unstable person features Let us now turn instead to paradigms that do not display number oppositions, i.e. where number features are not merged. The prediction made by LIFO, in this case, is that the last person feature to be merged in the derivation is unstable and might be delinked from the functional sequence, leading to an overall decrease in computational complexity. Thus, the internal structure of the full and reduced paradigms can be respectively summarised as follows:

(29) a. $F_{\pi 2}\,(\,F_{\pi 1}\,(\,...\,))$
b. $F_{\pi 1}\,(\,...\,)$

The prediction is borne out, in that both these systems are attested: the former, in (29a), is instantiated by number-neutral tripartitions (T_0 in Appendix D.3; n=16) or quadripartitions (Q_0 in Appendix D.3; n=10), according to the ordering of feature compositions; the latter, in (29b), is instantiated by the speaker-based and participant-based bipartitions, again according to which feature is active (and thus, vacuously, applies first), respectively found in Damin and Elseng/Morwap on one hand, and Winnebago/Hocąk on the other:

(30) a. *Damin* (Harbour 2016: 55)

1	n!aa	+au(π)
2/3	n!uu	−au(π)

b. *Elseng* (Harbour 2016: 55)

1	ka	+au(π)
2/3	sou/so	−au(π)

c. *Winnebago* (Harbour 2016: 57)[23]

1/2	nee	+pt(π)
3	'ee	−pt(π)

The availability of semantically reduced pronominal paradigms (the speaker-based bipartition in (30a) and (30b), and the participant-based bipartition in (30c)) alongside non-reduced pronominal paradigms (the tripartitions and quadripartitions mentioned above), all of which are number-neutral, neatly mirrors the variation attested by demonstrative systems in this same respect.[24]

[23]However, note that the Winnebago verbal morphology makes a four-way person distinction, reversing the common asymmetry between richer independent pronominal paradigms and poorer inflectional paradigms: syncretism may then be assumed for this pronominal system.

[24]Besides, demonstrative systems can be unary, i.e. not encode any deictic contrasts. A similar, extremely reduced system has been described for Wichita, where nominals are used in pronominal function and pronominal citation forms are provided by the participial form of the verb *be* (see Harbour 2014b: 135).

In this case, too, a language-specific complexity threshold may be invoked to account for the attested variation (see remarks in Section 5.5).

On the whole, and importantly for the present discussion, bipartitions are attested where number is absent (with the marginal exception of, perhaps, the Mascoian languages discussed above). Therefore, we can conclude that in pronominal paradigms, too, person features can be unstable and undergo loss in case number features are unavailable. This parallels the foregoing discussion for demonstratives, and is accounted for by the same principle: only if structural conditions allow may computationally complex featural derivations be simplified through the loss of one feature, resulting in a reduced paradigm. Besides, the fact that only a minority of pronominal systems are number-neutral (offering the suitable structural configuration for one person feature to be unstable, under LIFO) also explains why pronominal paradigms that display fewer person deictic contrasts are less readily available, contrary to demonstratives; however, this difference is not irreconcilable with the present account.

6.5.2.2.3 Unstable number features Let me conclude by mentioning one further issue: assuming the internal structure proposed for personal pronouns in (22) above, number features are typically the last action-on-lattice features to be merged in the derivation of pronominal forms (this is the case for 644 languages in my sample, as opposed to only 30 languages in which number oppositions are not encoded in personal pronoun). Therefore, given LIFO, one prediction can be made with respect to number features, too, and namely: if more than one action-on-lattice number feature is merged, the derivation of at least one category in the full paradigm will necessarily be non-monotonic, meeting the featural complexity conditions for feature loss. Then, the latest number feature to be merged may undergo loss (in the same fashion as the last person feature in number-neutral paradigms); diachronically, this amounts to hypothesising that two-way number systems result from the simplification of three- (or more-)way number systems, through feature loss. Conversely, pronominal systems that only make a two-way number distinction can be predicted to be less prone to reduction, because no featural complexity issues arise, as far as number (the non-primary feature) is concerned.

Again, the diachronic aspect of pronominal paradigms exceeds the scope of this work and is therefore left to future research; however, on a preliminary count, these predictions seem indeed to be borne out. In fact, it is quite common for non-monotonically derived number categories to be lost in diachrony. This is perhaps most famously the case for the dual number, derived by the sequence +minimal(−atomic(...)); see Appendix C.3.1.1 for this featural derivation. Dual pronouns were progressively lost in the evolution of Indo-European languages (with only a handful exceptions), as attested for example by the diachrony of English:

(31) a. *Old English* (e.g. West Saxon; Howe 1996: 131–133)

	Singular	Dual	Plural
1	iċ	wit	we
2	ðu	git	ge

b. *Modern English*

	Singular	Plural
1	I	we
2	you	you

In particular, this state of affair has been extensively investigated for Slavic languages by Slobodchikoff (2019). Although the dual number was widely documented in historical varieties (e.g. in Old East Slavic and in Old Church Slavic; this is reconstructed for Proto-Slavic), dual is now restricted to three present-day Slavic varieties: Slovenian, Upper Sorbian and Lower Sorbian.

A comparable reduction seems to be attested for minimal–unit-augmented–augmented systems: these are likewise derived by the activation of two features, which consist in the reiteration of [±minimal] (see Table 6.2 and Appendix D.2). The unit-augmented number is the non-monotonic category in the system, as it is derived by the sequence +minimal(−minimal(...)). Although these systems are considerably rarer and less well diachronically documented, McConvell (1980: 49) reports that the inclusive unit-augmented number category is undergoing loss in Gurindji (Pama-Nyungan), as it is now mainly restricted to the variety spoken by elderly speakers and is instead substituted by the augmented number by all other speakers.[25] The same is true for closely-related Wanyjirra, as reported by Senge (2015: 218): here, too, the unit-augmented forms (shaded) "could traditionally be used in Wanyjirra but [...] are being lost and only used in a restricted situation" (*ibid.*):

[25]More precisely, McConvell (1980) talks about a 1st person inclusive trial pronominal form, which under the present analysis (based on two [±minimal] features) should instead be defined as a 1st person inclusive unit-augmented form. In fact, 1INCL.TRI amounts to the speaker, the hearer, and one other (both clusivity and ternary cardinality satisfied); but, likewise, 1INCL.U-A denotes the smallest possible increase with respect to the "unit", namely the minimal speaker + hearer (*iu*), which crucially coincides again with speaker, hearer, and one other. See remarks in Appendix D.2 in this regards.

(32) *Wanyjirra pronominal core stems* (Senge (2015: 213))

	Minimal	Unit-augmented	Augmented
1EXCL	ngayu	ngaliyarra	nganimba / ngandiba
1INCL	ngali	ngaliwula	ngaliwa
2	nyundu	nyunbula	nyurrara
3	nyandu	nyanbula	nyarrulu

Furthermore, as already mentioned (see fn. 16) this is compatible with the synchronic picture that emerges from my sample of pronouns: pronominal paradigms that display a two-way number opposition (i.e. one number feature) are the most commonly attested ones (n=466), followed by systems with a three-way (or more) number opposition (two or more number features; n=178). The latter can be factored in by assuming a higher threshold for complexity tolerance. Simpler systems, without any opposition (i.e. without active number features, and which would as such be even less tolerant to complexity), only account for 30 of the sampled paradigms, supporting the idea that paradigms derived by a shorter string of features are overall less likely to undergo reduction and mirroring once again the restricted distribution already observed for unary demonstrative systems.

Typological variation in the featural make-up of pronominal paradigms thus has some limits, as defined by the structural relations among the relevant features: in (33), I organise the different systems discussed so far going from the most featurally complex ones (top) to the least complex ones (bottom) with respect to the number domain. Strikingly, although a comparable complexity "hierarchy" can be defined for person features (more complex paradigms on the left, less complex ones on the right), less complex systems are highly restricted to number-neutral systems (non-number-neutral bipartitions are instead unavailable), as predicted by LIFO and just as discussed for demonstratives so far:

(33)

	$F_{\pi 1}$, $F_{\pi 2}$	$F_{\pi 1}$
$F_{\#1}$, $F_{\#2}$, ...	Q: ...(±min(±at/min(±au(±pt(...))))) T: ...(±min(±at(±pt(±au(...)))))	* *
$F_{\#1}$, $F_{\#2}$	Q: ±min(±at/min(±au(±pt(...)))) T: ±min(±at(±pt(±au(...))))	* *
$F_{\#1}$	Q: ±at/min(±au(±pt(...))) T: ±at(±pt(±au(...)))	* (*)
ø	Q: ±au(±pt(...)) T: ±pt(±au(...))	B_P: ±au/pt(...) B_A: ±au/pt(...)

In conclusion, this preliminary survey of independent pronominal paradigms uncovered a new generalisation:

(34) *Typological generalisation*
If a language consistently makes a two-way person opposition in its pronominal paradigm (i.e. only has one active person feature in its syntax), that language does not encode number in its pronominal paradigm.

This, in turn, provides further evidence for the postulation of a structural condition on feature stability: feature stability is determined by the first-merge position of the relevant action-on-lattice feature, and more precisely only the last action-on-lattice feature to be merged in the derivation of a given form may undergo loss. Thus, LIFO can be consistently defined in implicational terms and is shown to hold beyond the demonstrative domain.

6.6 Conclusions

This chapter introduced a structural constraint on feature loss as triggered by the complexity factors discussed in Chapter 5. Specifically, it capitalised on the following descriptive generalisation for the reduction of demonstrative (qua)ternary systems:

(35) a. Ternary > speaker-based binary: $\cancel{\pm\text{pt}}(\pm\text{au}(\pi_\chi))$
b. Quaternary > participant-based binary: $\cancel{\pm\text{au}}(\pm\text{pt}(\pi_\chi))$

On this basis, Section 6.2 claimed that feature loss cannot target any random feature, but, rather, that it must follow the Last in–First out principle, such that it is restricted to the features that is merged last in the functional sequence and proceeds in an implicational fashion. As such, the merge position of features was proposed as the key determinant of their stability. This structural constraint on feature loss was traced back to the action-on-lattice nature of the person (and number) features adopted in this work. Further, Sections 6.2–6.4 showed how the Last in–First out principle correctly derives the patterns of semantic (given the availability of two orderings of compositions) and formal reduction (assuming residual formal variation) attested, while ruling out the unattested ones (see again Table 6.1).

Finally, Section 6.5, showed that independent pronominal paradigms fall under the Last in–First out principle as well and in fact provide independent evidence for it. This is in spite of the fact that they constitute an apparent counter-example to it, in that they do not undergo reductions similar to the ones documented for demonstrative systems, while being derived by the same features, and, therefore, displaying comparable complexity conditions. It was proposed that, in the case of personal pronouns, a number feature (likewise conceived as denoting actions on a lattice) is the non-primary one in the derivation, predicting that person features may not be lost. Reductions in the person domain are marginally attested in number-neutral pronominal paradigms, for

which the structural conditions for feature loss are met: these were shown to substantially parallel demonstratives, structurally (as far as person features are concerned) and diachronically.

CHAPTER 7

Conclusions

7.1 Summary

This dissertation investigated the patterns of reduction attested by Romance (qua)ternary demonstrative systems and proposed an account for them. This was done firstly by illustrating the relevant patterns of reduction in diachrony and in contact and by identifying the relative empirical generalisations (Chapter 2); secondly, by laying down a featural and structural analysis for demonstrative forms (Chapters 3 and 4, respectively); and, thirdly, by arguing that featural and structural factors interact in the derivation of the attested patterns of reduction (Chapters 5 and 6).

This section reviews the main empirical (Section 7.1.1) and theoretical (Section 7.1.2) findings of this work.

7.1.1 Empirical contributions

Demonstratives First and foremost, this study uncovered specific reduction patterns for Romance (qua)ternary demonstrative systems and showed that, despite the wide-ranging semantic and formal differences attested across the Romance domain, variation does have some clear-cut limits. This finding was described in Chapter 2 with respect to both diachronic change and change in contact, which were shown to follow the same path; eventually, it was accounted for in Chapter 5 and 6. The two main generalisations that emerged and that represented the main *explananda* of this work can be summarised as follows:

(1) *Reduction patterns in demonstrative systems*

a. (Qua)ternary demonstrative systems are unstable in diachrony and contact alike and may undergo a reduction;

b. whenever a reduction occurs, and regardless of the semantic and formal variation in this respect, the contrastive encoding of the hearer-related and, where available, exclusively speaker-related deictic domains is systematically affected, while the other deictic domains are only partially involved, according to the semantics of the new reduced system.

The first generalisation is not completely novel: despite the significant lack of detailed research in this domain, the general instability of (qua)ternary systems had already been identified in the literature for a handful of languages (see Section 2.1 for an overview of the available studies to date). In the present work, I corroborated this conclusion with respect to Romance languages, and did so by widening the empirical coverage to include, besides diachronic change, change in contact: novel first-hand data collected on fieldwork for attrited and heritage Italo-Romance varieties spoken in microcontact and macrocontact, following the methodology devised within the *Microcontact* project; and data from Portuguese-based creoles from the literature. The two have been shown to follow the same path of evolution.

Differently from other available studies which likewise discuss the instability of (qua)ternary demonstrative systems, however, I focused on the various semantic and formal outcomes of this reduction process and used them as a probe into the very mechanisms underlying this change. In this respect, the second generalisation breaks new ground and identifies an underlying commonality between 1EXCL and 2nd person (unstable), on the one hand, and 1(INCL) and 3rd person (stable), on the other; this had not previously emerged in the literature.

Indexical asymmetry Another main generalisation concerning demonstratives was uncovered by comparing unstable (qua)ternary demonstrative systems to other (by hypothesis: similar) person-based indexical systems, and specifically ternary personal pronouns. This was discussed in Section 6.5 and exemplified in Appendix D.1.

This additional line of investigation brought to light a previously unnoticed asymmetry that splits the class of indexical elements in two:

(2) *Indexical asymmetry*
Demonstrative systems are (semantically) unstable both in diachrony and in contact alike; pronominal systems are instead (semantically) stable under the same conditions.

On preliminary counts, it was mentioned that possessive systems pattern with pronominal ones and against demonstrative ones, i.e. are stable, making demonstrative systems exceptional among indexical categories.

Personal pronouns As an aside, in Section 6.5 another noteworthy empirical generalisation was proposed, namely:

(3) *Number features are contingent on person features*
If a pronominal paradigm encodes any number opposition, that paradigm also makes at least a ternary person distinction (1st person *vs* 2nd person *vs* 3rd person).

This was observed on the basis of a typologically varied sample of independent pronominal paradigms (n=674; see Appendix D.3).

Additionally, it was preliminarily noted that the number oppositions encoded by pronominal paradigms may undergo a reduction akin to that explored for demonstrative systems: examples for the loss of the dual number category and of the unit-augmented one were presented in Section 6.5.2.2.3.

7.1.2 Theoretical contributions

The main theoretical findings of this dissertation relate to the following domains: the semantic nature of the deictic oppositions encoded by demonstrative forms; the internal syntax of demonstratives; the proposal of a new third factor principle (the monotonicity bias) and, relatedly, of a complexity metric rooted in featural specifications; and the identification of a structural condition on stability (Last in–First out principle, 'LIFO'), whereby feature stability may be recast as a correlate of merge position. The former two, introduced in Chapters 3 and 4 respectively, ultimately constitute the assumptions upon which the latter two build, in Chapters 5 and 6, to account for the empirical generalisations uncovered in Chapter 2.

Deictic oppositions in demonstrative systems In Chapter 3, I discussed how the deictic oppositions encoded by demonstrative systems can be formalised and concluded, on the basis of novel arguments (namely: participant-based binary systems; and person-oriented ternary systems and, possibly, hearer-oriented forms that encode additional distance oppositions), that the traditional dichotomy between distance-oriented demonstrative systems and person-oriented ones (Anderson & Keenan 1985) is inaccurate. Rather, and regardless of the attested semantic variation, demonstratives were argued to share a basic person-oriented semantics across the board (with minimal reference to the position of the speaker in each given context), and to possibly encode additional distance-oriented contrasts as modification of the core person ones. For similar conclusions, see also Lander & Haegeman (2018a).

Further, I put forth some new arguments in favour of a formalisation of these person-oriented oppositions by means of person features (*contra* Lander & Haegeman 2018a, but in line with accounts by Harbour 2016, Bjorkman *et al.* 2019, Cowper & Hall 2019a), and specifically: demonstrative systems that encode a clusivity contrast; and demonstrative systems that also encode additional indexical features (number and gender). I then illustrated how both these

systems can be naturally captured by person features (concretely, I assumed Harbour's 2016 person system, with minimal modifications), while showing that locative features fall short in both respects.

Finally, in Section 5.2.1, I proposed a new analysis for the seemingly ternary systems of those Romance varieties that only resort to a contrastive expression for the speaker-related (DEM.1) and hearer-related (DEM.2) deictic domains under specific pragmatic conditions and collapse otherwise those domains into a general participant-related domain. Whenever this is the case, the latter domain is expressed by either the speaker-oriented form or the hearer-oriented form (with cross-linguistic variation). I argued that these systems should be analysed as quaternary systems (DEM.1EXCL *vs* DEM.1INCL *vs* DEM.2 *vs* DEM.3) which further display a systematic syncretism either between the exponents for DEM.1EXCL and DEM.1INCL (hence the use of a seeming speaker-oriented form for the participant-related domain) or between the exponents for DEM.2 and DEM.1INCL (hence the use of a seeming hearer-oriented form for the participant-related domain).

In sum, the variation attested across demonstrative systems in Romance varieties can be captured as follows:

(4) *Person-oriented contrasts in demonstrative systems*

System	Partitions/System			
	i_{o_χ}	iu_{o_χ}	u_{o_χ}	o_{o_χ}
1 French	π_χ *ce*			
2/P Catalan	$+\mathrm{P}(\pi_\chi)$ *chisto*			$-\mathrm{P}(\pi_\chi)$ *chillo*
2/A Italian	$+\mathrm{A}(\pi_\chi)$ *questo*		$-\mathrm{A}(\pi_\chi)$ *quello*	
3 Spanish	$+\mathrm{P}(+\mathrm{A}(\pi_\chi))$ *este*		$+\mathrm{P}(-\mathrm{A}(\pi_\chi))$ *ese*	$+\mathrm{P}(-\mathrm{A}(\pi_\chi))$ *aquel*
4 Old Neap.	$+\mathrm{A}(-\mathrm{P}(\pi_\chi))$ *chisto*	$+\mathrm{A}(+\mathrm{P}(\pi_\chi))$ *chisto*	$-\mathrm{A}(+\mathrm{P}(\pi_\chi))$ *chisso*	$-\mathrm{A}(-\mathrm{P}(\pi_\chi))$ *chillo*

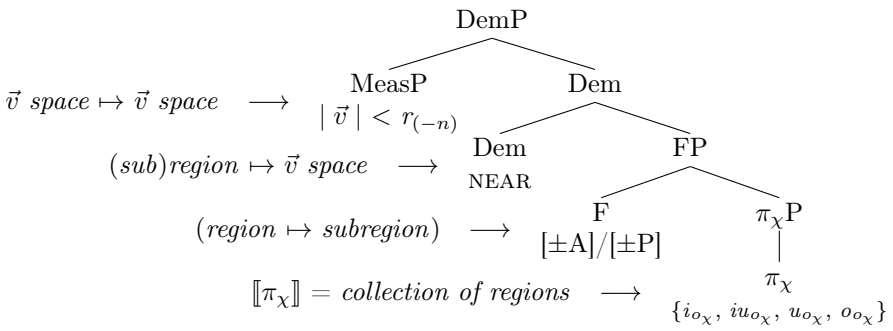
Internal structure of demonstratives In Chapter 4, I proposed that demonstrative forms are internally complex and that their internal make-up consists of a person pronominal-like component and a spatial prepositional-like component, the latter modelled in vectorial terms (see e.g. Zwarts 1997; Svenonius 2010). This proposal is ultimately grounded in the intuitive parallelism between demonstrative forms and spatial (locative) prepositions. The latter locate an entity, the figure, with respect to another entity that acts as a spatial point of reference, the ground. Likewise, demonstratives can be construed as locating

their referent, the (possibly silent) NP that they modify, with respect to one or more of the discourse-related atoms (the speaker, the hearer, and/or the other(s)).

I structurally implemented this observation by regarding the region(s) occupied by the discourse-related atom(s) as the ground of demonstrative forms (the spatial reference point): concretely, this is encoded in a fundamentally pronominal-like way, the only difference being that, rather than involving the discourse atoms themselves ($[\![\pi]\!]$, as in pronouns), the person-based core of demonstratives involves regions associated to the discourse atoms ($[\![\pi_\chi]\!]$). The deictic centre is further specified by the active features (FP), thus determining the ground of the relevant demonstrative form. The ground is then related to the figure by means of a vicinity function (NEAR), which constitutes the prepositional-like component within demonstratives and is, as such, modelled as a vector. That is, the ground (as defined at FP-level and below) is taken to be the starting point of a set of vectors that point to its vicinity. Vicinity is modelled by means of a length constraint (r) on the vectors' length, introduced by a higher MeasP: concretely, for the interpretation to converge on proximity, the vectors that connect the deictic centre (ground) to the demonstrative's referent (figure) must not exceed a contextually determined limit. Finally, I showed how this structure also naturally allows for the distance-oriented oppositions that can arise on top of the basic person-oriented ones (in line with the discussion in Chapter 3): MeasP can introduce different limits on the vectors' length, yielding different classes of vectors which represent different degrees of distance from the given deictic centre.

In short, I proposed that the internal structure of demonstratives should be derived as follows:

(5) *The internal structure of demonstratives*

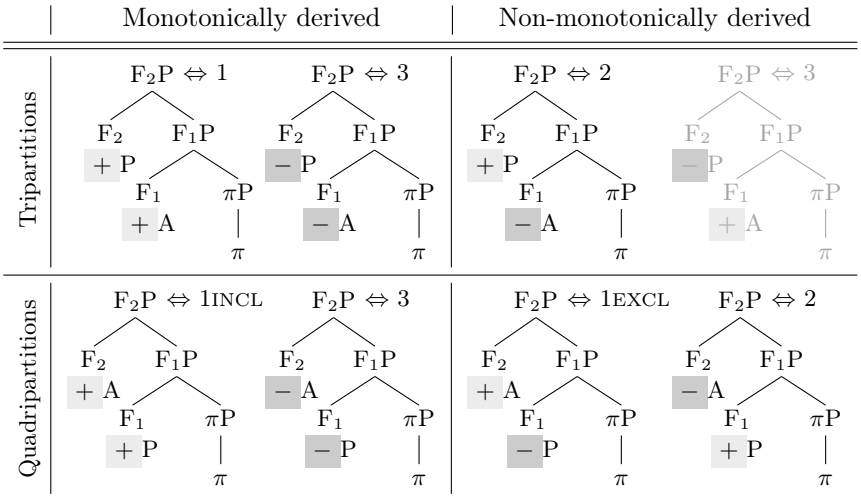


I concluded the discussion by preliminarily addressing syntactic and categorial issues related to this proposal and by providing evidence in its favour. More specifically, I showed that Romance demonstratives can be morphologically decomposed in a series of morphemes that transparently spell out the sequence of heads included in the proposed internal structure, in compliance with the Mirror Principle.

The monotonicity bias In Chapter 5, I argued that (qua)ternary demonstrative systems are featurally complex and that their featural complexity is the ultimate trigger for feature loss. Feature loss, in turn, yields the reduced binary demonstrative systems. More specifically, I proposed that feature loss is determined by a general cognitive bias towards monotonic computations, the monotonicity bias, which I advanced as a new third factor principle to explain the diachronic evolution of demonstrative systems.

This proposal rests on the novel hypothesis that (non-)monotonicity is a trivial property of the person domain: concretely, and expanding on Harbour (2016), I put forth that person categories should be understood as being either monotonically or non-monotonically derived, forming two new natural classes. In (6), I reproduce their "basic" derivations (which ultimately yield personal pronouns) for convenience; for demonstrative forms to be derived, π_χ is needed instead of π and F_2P is further embedded under Dem:[1]

(6)



I argued that the (non-)monotonicity of the derivation is a property inherent to the definition of action-on-lattice person features: as person features are conceived of as performing functions (as determined by feature values) on lattices, sequences of feature values within a single derivation may either denote the reiteration of one and the same operation on the argument lattice (same feature values across the functional sequence: monotonic derivations) or they may require two different operations to be performed (different feature values across the functional sequence: non-monotonic derivations). I further speculated that monotonicity in the person domain might be ultimately related to the preservation (or lack thereof) of the basic subset relations that underlie the feature system, whereby $[\![\text{author}]\!] \subseteq [\![\text{participant}]\!] \subseteq [\![\pi]\!]$.

[1]The derivation of non-monotonic 3rd person in ternary systems is shaded because of its assumed limited availability.

Assuming a general monotonicity bias towards monotonic computation (as found in other (extra-)grammatical domains), I proposed that non-monotonic derivations are dispreferred and may be eliminated to enhance the efficiency of the computation. Crucially, in fact, the non-monotonically derived categories in (qua)ternary systems (the hearer-related deictic domain, DEM.2; and the exclusively speaker-related deictic domain, DEM.1EXCL) are the ones that become unavailable in the reduced demonstrative systems, in line with the discussion in Chapter 2. I hypothesised that these categories are preliminarily collapsed with the monotonically-derived ones (DEM.3 and DEM.1(INCL)) at early stages of acquisition (monotonicity-bias compliant derivation, following an input generalisation mechanism): if the monotonicity bias prevails, non-monotonic sequences are banned (concretely, the second feature value is not allowed to denote an operation that differs from the one denoted by the first feature value). This, in turn, makes one of the two features involved in the derivation of now fully monotonically derived demonstrative systems superfluous: subsequent generations will not posit one of the features originally required to derive the non-monotonic categories, resulting in feature loss.

Incidentally, I showed how this brings about an additional ease in computational complexity, as systems that are derived by two successive function applications, i.e. (qua)ternary systems, can be regarded as more computationally burdensome than systems that are simply yielded by one function application, i.e. binary systems. I related this further complexity metric to the description length of (qua)ternary *vs* binary systems (Kolmogorov complexity).

Last in–First out In Chapter 6, I proposed that feature loss is not indiscriminate, but that it is subject to a structural condition rooted in the nature of action-on-lattice features, under the assumption that they are scattered along the functional sequence (Section 1.3.3):

(7) a. *Last in–First out principle*
A feature can only be lost if it is merged last within a given functional sequence.

b. Formal version
LIFO is a structural condition on feature loss, whereby feature loss is modelled as following the merge position of the relevant action-on-lattice features in an implicational fashion. An action-on-lattice feature can only be lost if it is merged last, and thus composes with the relevant lattice last, in a given derivation.

The proposal that feature stability hinges exclusively on the merge position of the relevant feature is novel and was shown to naturally account both for the semantic variation attested across the reduced demonstrative systems (speaker-based binary systems *vs* participant-based binary systems) and for almost all the patterns of formal variation recorded in the Romance domain (which concretely amounts to which forms from the original non-reduced system are pre-

served in the new reduced system).[2] This was summarised in Table 6.1.

Further, in Section 6.5 I extended LIFO to the domain of personal pronouns. Concretely, assuming that number features are to be analysed as action-on-lattice features and that they are merged above person features (8a), by LIFO no person feature is predicted to be lost from the functional sequence that derives personal pronouns if at least one number feature is merged in it (8b):

(8) a. $\ldots(\mathrm{F}_{\#1}(\mathrm{F}_{\pi 2}(\mathrm{F}_{\pi 1}(\ldots))))$
b. $*\ldots(\mathrm{F}_{\#1}(\mathrm{F}_{\pi 1}(\ldots)))$

This prediction was shown to be borne out, allowing a fully implicational formalisation of LIFO, and the proposal was further preliminarily extended to account for reductions in the encoding of number oppositions, as well.

By this rationale, LIFO was shown to derive the asymmetry between unstable demonstrative systems and stable personal pronouns ones: personal pronouns typically carry (indexical) number features, whereas demonstrative forms typically do not, resulting in only the person features of the latter, but not of the former, to potentially undergo loss. That is, number features "protect" person features from undergoing loss in personal pronouns; as indexical number features are typically not merged in demonstrative forms, instead, there the structural condition that allows for feature loss fully applies.

7.2 Future prospects

Many questions were left to further investigations in the foregoing, both on the empirical and on the theoretical sides of this work. These domains are discussed in turn in Sections 7.2.1 and 7.2.2.

7.2.1 Empirical questions

As regards empirical issues, one aspect that was already raised concerns the investigation of the microcontact domain (and, less substantially, of the creole one): that was concluded to be preliminary, on quantitative and qualitative counts alike. Further data collections are needed to fully validate the hypotheses put forth in Section 2.3.1, in particular, and to gain a better understanding of the patterns of reduction attested in microcontact, more in general. Moreover, given that the microcontact situation can be characterised as change-in-progress (and presents, as such, a great deal of optionality: see data in Appendix A.3), additional investigations in this domain would prove a particularly valid window to test the account put forth in this work. Finally, additional data from comparable situations might be sought to ensure cross-linguistic variation in the sample.

Further, the discussion of the main theoretical proposals, and particularly in relation to the internal structure of demonstrative elements and the account

[2] The remaining reduction patterns were instead brought back to pragmatic factors.

for reduction patterns in demonstratives, would profit from a wider empirical coverage. As concerns the former, a good starting point would be a systematic analysis of the demonstrative data reported by the WALS' Feature 41 (Diessel 2013a). As concerns the latter, besides enlarging the sample considered beyond just Romance languages, more accurate quantitative diachronic investigations might provide additional insights into the variation with respect to the realisation of the patterns of reduction. Under my account, it is (largely) possible to predict which patterns of reduction are possible and which are not, but it is not possible to predict which patterns are (more) likely to actually occur and which are not (or less so). Frequency differences across formal patterns, which are further not entirely captured here, suggest that this domain deserves indeed further research from a diachronic linguistics perspective.

A wider empirical coverage would also be beneficial for the typology of personal pronouns proposed in Section 6.5. The database on which that discussion depends only includes independent personal pronouns: dependent pronominal forms may be included in the sample and their discrepancies with the independent ones should receive a principled account. Likewise, further investigations of the diachronic evolution of personal pronominal paradigms, such as a fully fledged investigation of the reduction in the number domain, are needed to provide additional support for the proposed structural condition on feature loss (Last in–First out principle).

Finally, an empirical domain that should be considered further is that of possessive forms: on preliminary investigations, possessive forms pattern with personal pronouns both in diachrony and in contact (Terenghi 2021d). This is consistent with the hypothesis that possessive forms are (inherently) Case-marked personal pronouns (see e.g. Delsing 1998; Bernstein & Tortora 2005; Dobrovie-Sorin & Giurgea 2011; Holmberg 2021; Terenghi 2022d); however, a large-scale investigation about the diachronic behaviour of the indexical organisation of possessive forms is currently unavailable. This research domain might provide additional evidence for the Last in–First out principle.

7.2.2 Theoretical questions

As regards the open theoretical issues, some were already prominently mentioned as such in the foregoing. Firstly among these, the encoding of (indexical) gender in demonstrative and pronominal forms alike, for which some initial remarks were made in Section 3.4.2, deserves a more extended account, both from a featural and from a structural standpoint.

Secondly, the consequences of the proposed internal structure for demonstratives at DP-internal level, including issues that relate to DemP movement and to DP-internal agreement or concord, were preliminarily sketched in Sections 4.3.2 and 4.3.3. However, those remarks are mostly intended as a starting point for future investigations and no definitive answers were proposed in this work. Likewise, a full implementation of the syntactic account put forth in Chapter 4 for the domain of spatial indexicals is needed, with particular refer-

ence to the case of reinforcers, left substantially open in Section 4.3.3. Further research will additionally assess whether (and, if so, how) this account can be extended to deictic (motion) verbs as well, i.e. verbs that also encode deictic oppositions (e.g. *go* as opposed to *come*, *take* as opposed to *bring*, *etc.*).

Thirdly, I argued that my account for the internal structure of demonstratives is equally well-suited to capture person- and distance-oriented deictic contrasts. In Section 6.4, I capitalised on the availability of a structural position for both contrasts in the internal syntax of demonstrative forms (FP and MeasP in (5), respectively) and tentatively proposed that the two can further be related by means of a person-to-distance reanalysis (and its reverse). This captures known facts which indicate a diachronic and a synchronic relation between the two semantics (see e.g. Meira 2003 for diachronic observations and Jungbluth's 2003 conversational dyad approach for synchronic ones). However, how to exactly model the reanalysis process(es) is unclear. Besides, on the basis of preliminary investigations on the issue, it seems that distance distinctions only apply in speaker-based binary systems, and not in participant-based binary systems: if confirmed, this fact would also await a formal explanation.

Some additional issues that were only briefly mentioned in the foregoing, but for which no dedicated discussion was presented in this work, likewise deserve further investigation. These are highlighted as such in what follows.

Complexity Chapter 5 made use of the notion of complexity to explain the reduction of (qua)ternary demonstrative systems into binary ones. Concretely, two metric for featural complexity were proposed, although it was highlighted that the two are strictly interconnected. On the one hand, featural complexity was conceived of as a correlate of description length, in line with the concept of Kolmogorov complexity: the longer the description of a category in the system (or, given the action-on-lattice nature of the assumed person features: the longer its derivation), the more complex the category. As such, (qua)ternary demonstrative systems were argued to be more complex than binary ones, because the former need two features to be active and successively compose with π_χ for their three- or four-way contrasts to arise, while the latter only need one single function application to π_χ for their two-way deictic oppositions to be yielded. On the other hand, featural complexity was defined as built in the very sequence of features, and, more precisely, of their values: a monotonic sequence of feature values (identical values denoting one and the same operation: $+/+$ or $-/-$) was taken to be less complex than a non-monotonic sequence of feature values (different values denoting two different operations: $+/-$ or $-/+$) because of a general monotonicity bias.

These proposals for featural complexity combined warrant the characterisation of change in demonstrative systems as a process of simplification. Binary systems, resulting from the reduction of (qua)ternary ones, have a shorter description length and are therefore less complex. Besides, the two non-monotonically derived categories in the original (qua)ternary systems become unavailable

under a short description (the activation of one feature prevents mismatches across feature values and, in turn, alterations of the basic set-theoretic relations), eliminating a further source of complexity in the system.

However, the definition of these complexity metrics mainly relies on theory-internal factors: description length and (non-)monotonicity. Experimental evidence should be sought for both, to verify this definition of featural complexity from a theory-neutral perspective. In particular, acquisition was shown to be a good testing ground for the hypothesis of a monotonicity bias (Section 5.4.3), though so far a by no means fully explored one, inviting for further investigations.

Another question that was mentioned in passing relates to the actuation of change. Although the complexity conditions defined in this work are necessarily inherent to all (qua)ternary demonstrative systems, these systems do not automatically undergo change, but can instead be stable or even be created anew from smaller (hence less complex) systems. Both developments were informally related to differences with respect to a non-better defined complexity threshold: if a grammar "tolerates" the level of complexity that underlies the derivation of (qua)ternary systems, those systems may be maintained; likewise, if a change in the complexity threshold takes place, such that a higher amount of complexity can be "tolerated", then new (qua)ternary systems may be introduced in the grammar. With respect to the last issue, I speculated that this change is the result of pragmatic factors; additionally, a general analogical pressure towards (qua)ternary systems may be present as a result of the derivational similarity between demonstrative and pronominal systems. This would not *per se* require a change in the posited complexity threshold; however, even disregarding this, a formalisation of the complexity threshold is missing: as a result, the actuation of change is not accounted for under the present theory. This issue should be addressed in future research, if possible, as it is of paramount importance when it comes to providing a holistic model for change in demonstrative systems.

Demonstratives: Deictic gestures In Chapter 4, I discussed the internal syntax of demonstratives. Despite the pivotal role of the vicinity function (NEAR, encoded under Dem), I concluded that this head is not overtly encoded in the morphology of demonstrative forms. However, I preliminarily proposed that the Dem head of exophoric demonstratives, along with the MeasP that modifies it, is spelled out by a deictic co-speech gesture, i.e. one of the pointing gestures that commonly accompany demonstrative forms. This was suggested as a way to capture various informal observations about the relation between demonstrative and deictic co-speech gestures (co-occurrence, temporal alignment, *etc.*). Further, the hypothesis that gestures spell out the vectorial component of demonstratives (direction: Dem; and length: MeasP), under a multimodal spell-out approach, was proposed as a formalisation of the long-standing intuition whereby deictic gestures can be construed as vectors.

Many issues are left open by this proposal. For instance, there appears to

be some variation with respect to the part of the body that is actually involved in the pointing gesture (hands, head, chin, lips, eyes, elbows, and feet; Kendon 2004: 199). While the choice of one of these pointers over the others is typically regarded as "standardized within a given culture" (McNeill 1992: 12), different guises of deictic co-speech gestures are available even within one and the same language. Overall, it is as yet unclear whether this variation can be construed as simply "formal" variation, or whether different deictic co-speech gestures correlate with (partially) different semantic interpretations, both within a single grammar and cross-linguistically. Another question worthy of investigation in this respect concerns whether the variation in deictic co-speech gestures shows similar patterns (and, if so, whether there is full coincidence of a systematic divergence) with respect to the formal variation as attested in (spoken) demonstratives. Further, while it is generally acknowledged that deictic co-speech gestures are produced alongside uttered exophoric demonstratives, it is unclear whether differences in alignment (roughly, whether and, if so, to what extent the onset of the gesture is temporally aligned with respect to the onset of the uttered demonstrative form) affect the well-formedness of the combination. On more theoretical considerations, the proposal of multi-modal spell-out for demonstrative forms deserves further attention. This hypothesis can be accommodated under the assumption of a modality-blind syntax, meaning that the final product of the derivation can eventually be spelled out verbally and/or manually; however, the issue of the semantic and pragmatic contribution of (co-speech) gestures, and how to formalise it, has been the focus of much research lately (see, among others, Ebert 2014; Schlenker 2015, 2018; Esipova 2019a, 2019b).

The proposal that deictic co-speech gestures spell out part of the internal structure of exophoric demonstratives can be further explored from the perspective of language acquisition, where it is compatible with the notoriously early acquisition of demonstrative forms. This observation has been related by many precisely to the role of deictic co-speech gestures (Diessel 2006; Iverson & Goldin-Meadow 2005; Ozçalişkan & Goldin-Meadow 2005; Clark 1978; *i.a.*); under the present hypothesis, the preliminary use of deictic co-speech gestures as a partial Spell-Out of the internal structure of demonstratives might indeed be regarded as ultimately facilitating the acquisition of the overall internal structure of DemP. Further research in acquisition facts is however needed (as already mentioned); for instance, preliminary findings suggest that the acquisition of different exophoric demonstrative forms shows cross-linguistic differences (Diessel & Coventry 2020); if confirmed, these differences are in need of a theoretical explanation. Moreover, in languages that display a hearer-oriented demonstrative, that form seems to be consistently acquired last: this is compatible with the (non-)monotonicity observations made in this work, but could also be related to the role of deictic co-speech gestures. Crucially, in fact, in hearer-oriented forms the deictic centre is shifted from the speaker to the hearer, making the location of the hearer the starting point for the relevant set of vectors: as a consequence, the accompanying deictic co-speech gesture does not

embody the actual direction and length of the relevant vectors, but can be rather conceived of as the conventionalised realisation of Dem (and its higher MeasP), independently of the actual vectorial component, which might make these forms ultimately less immediate to acquire. Whether the featural or the gestural analysis is the correct one to capture this pattern of acquisition, or an interaction between the two (and how to model it, if so) needs to be further investigated.

Demonstratives: Grammaticalisation As already mentioned in passing in Section 4.4.3, demonstrative forms are the diachronic source of a great variety of grammatical elements, including determiners, personal pronouns, complementisers, copulas, linkers, connectives, *etc.* (see Diessel 1999: chapter 6 for a full overview). This was tentatively related to the null Spell-Out of the vectorial component of endophoric demonstratives, as opposed to the gestural Spell-Out of their exophoric counterparts.[3]

More concretely, the hypothesis that the vectorial component of endophoric demonstratives is null, hence that their underlying syntax might be harder to learn (as also shown by the fact that endophoric demonstratives are generally acquired after exophoric ones: Diessel 1999: 110 and references therein) is compatible with the general observation that endophoric demonstratives constitute the first stage in the grammaticalisation of demonstratives (see again Diessel 1999: chapter 6, *i.a.*). In turn, this acquisition problem directly implies the loss of the demonstrative syntax altogether; crucially, in fact, none of the forms that result from the grammaticalisation of demonstratives has a semantics that may be modelled in vectorial terms. Nonetheless, those forms can be tentatively suggested to still contain traces of the other pieces of the internal structure of demonstratives (for instance, determiners still carry the set of uninterpretable features; personal pronouns still include person features). Thus, the grammaticalisation of demonstrative forms might be analysed as set in motion by the very loss of the null vectorial component in endophoric demonstratives.

A full account for the grammaticalisation patterns of demonstratives as hinging on the complex syntax of demonstratives proposed here seems viable, under the hypothesis that change can be formalised as the loss of part of the internal structure. This would reasonably results in a novel syntax and semantics for the erstwhile demonstrative forms. However, the details and a full implementation of this intuition are left for future research.

[3]Recall that endophoric demonstrative forms are used in non-spatial, pragmatic functions and refer to the (intra)linguistic context (see again Section 1.2.1 and Diessel 1999: chapter 5). Crucially then, endophoric demonstratives (unlike exophoric ones) cannot encode reference to the extralinguistic context: as such, they are not naturally compatible with deictic co-speech gestures, and pointing may be conceived only metaphorically, according to facts. This difference across demonstrative functions was accounted for by suggesting that Dem (and the MeasP that modifies it) is null in endophoric demonstratives; this is consistent with possible formal identity between endophoric and exophoric demonstratives, in spite of their different interpretations (see e.g. English).

Other indexical categories This dissertation focused on how indexical information is encoded in demonstrative and, to a somewhat lesser extent, pronominal forms; in so doing, it built on the assumption that space and person indexicals are ultimately derived by means of the same primitives, namely person features. Whether the same primitives may be extended to other indexical categories, and more specifically to time and discourse deictics, exceeded the scope of this work.[4] Nonetheless, this topic is worthy of further investigations and the identification of the primitives of analysis of indexical forms as a whole has bearings not only for linguistic theory, but more in general for theories about human cognition.

As is well-known, spatial deixis provides at least the linguistic underpinning for some discourse and time deictic expressions. The former is exemplified by the endophoric uses of exophoric demonstratives (according to Diessel 1999: chapter 6, this is the first stage of their grammaticalisation process, as mentioned in the previous paragraph); although there is currently no typology available that quantifies how many languages display a formal identity between exophoric and endophoric demonstratives, languages is which exophoric demonstratives are identical to endophoric ones seem to be widely attested (see for instance Cinque 2020; Diessel 1999: section 5.2). The latter is most commonly represented by demonstrative forms grammaticalised as temporal adverbial expressions (see Diessel 1999: section 6.5.1 for an overview; Haspelmath 1997), although tense morphology may also result from spatial expressions (such as motion verbs: English *going to*, among many others; see for instance Traugott 1975; Bybee & Dahl 1989).

Whether a deeper relation between space indexicals (and, particularly, demonstrative forms) on the one hand and discourse and time indexicals can be established, that is: beyond the linguistic links just mentioned, is an open question. Nonetheless, research is available that supports the cognitive unification of these indexical domains: for the proposal that space and discourse indexicals hinge on the same cognitive system, see most recently Talmy (2020); for the suggestion that space and time indexicals are cognitively related, instead, see most famously the "time-as-space" metaphor (Lakoff & Johnson 1980; Lakoff 1987; for discussion, see Fauconnier & Turner 2008; Evans 2015; contributions in Dancygier 2017: part VI (*Concepts and Approaches: Space and Time*)). Against the background provided in this dissertation, the linguistic and cognitive unification of spatial indexicals and discourse and time indexicals would substantially amount to predicting that the latter two classes of deictics could be formalised in terms of person features, too.

A person-based account for discourse and time indexicals is not inconceivable, although an extension of the account given in the foregoing is not immediately feasible either. The main issues that are not straightforwardly captured under an account such as the one proposed here for space and person indexicals

[4] I disregard social indexicals here; while these are in part related to grammatical person features, they have been shown to strongly rely on the notion of speech act roles and to be thus formalisable in more pragmatic-oriented terms (Ritter & Wiltschko 2018, 2019).

include: the different organisation of systems of discourse and time indexicals; the definition of the deictic centre with respect to which these systems are articulated; and the formalisation of the relation between the deictic centre and the referent introduced by the discourse and time indexicals.

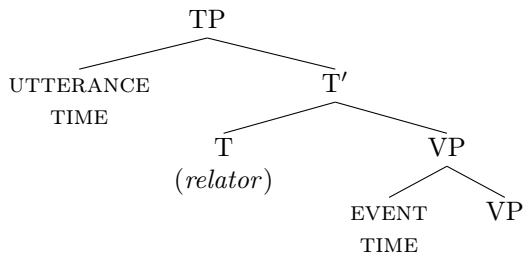
The structure of discourse and time indexicals is rather controversial. Discourse indexicals are organised into at most binary systems, in that they convey the discourse-pragmatic status or their referent, and primarily whether their referent constitutes old or new information (topic or focus; see e.g. Diessel 1999: chapter 5). A binary system neatly captures the use of recognitional demonstratives (for which see also notes in Section 1.2.1 and Colasanti & Wiltschko 2019). However, in the anaphoric function, the discourse properties of the referent are expressed by demonstratives alongside (among others) personal pronouns and other types of full DPs (the latter typically introduce new referent, while demonstratives are restricted to old referents); how to model this is not clear. Time indexicals, instead, are organised in a ternary system (past, present, future), but of a different ilk than that provided by demonstrative and personal systems: in fact, the definition of the three deictic domains is determined by relating the utterance time (which can be identified as the deictic centre) to the event time in terms of precedence (see below). Moreover, while a ternary organisation can be safely assumed for time adverbials (see series such as *yesterday*, *today*, *tomorrow*, cross-linguistically available), the issue becomes more complex once the category of tense is considered: in this domain, some have argued that the basic opposition that languages encode is binary and revolves around the two-way opposition "past–non-past", while future is to be construed as ultimately akin to modality (see e.g. discussion in Lyons 1977: section 15.4 and Comrie 1985: section 2.3; the latter however finally argues in favour of regarding future as a proper tense). This difference between time adverbials and tense, if accurate, may perhaps suggest that the grammar of time is binary (tense encodes time in the grammar), and that richer systems may only be conveyed lexically (but note that simpler systems are available for time adverbials, too: e.g. the present–non-present opposition in *now–then*); but this needs further investigations. Note that, if discourse and time indexicals were proven to be binary systems and, under no circumstance, to be able to grammaticalise a three-way deictic opposition, this would require a principled account to motivate the reduction of the generative capacity of the person-based system.

With respect to the definition of the deictic centre for discourse and time indexicals, additional complications arise. To some extent, discourse indexicals can be analysed as making reference to the hearer as a deictic centre, and crucially as opposed to the speaker: this is the case for recognitional uses of demonstratives particularly, where referents that belong to the common ground and referents that do not (but, crucially, are known to the speaker) are contrastively encoded. Under the present account, the differential encoding of speaker and hearer as deictic centres immediately predicts a ternary system, which is at odds with the robust empirical generalisations uncovered by Colasanti & Wiltschko (2019), who showed that recognitional demonstratives are organised in binary

systems, at most. The coordinates of the hearer seem instead to be irrelevant in time indexicals (Comrie 1985: 15–16). However, time indexicals present a different challenge with respect to the formalisation of the deictic centre, in that truly deictic time systems ("absolute" tenses and adverbs) are attested beside "relative" tenses and adverbs (for the distinction, see Comrie 1985: chapter 2 and 3, respectively). The former establish relations between the utterance time (*hic et nunc*, the deictic centre) and the event time: their coincidence yields the present, if the event time precedes the utterance time the past is yielded, and if the event time follows the utterance time the future is yielded. The latter, instead, establish relations between the event time and an arbitrary reference time: for instance, if the event time precedes the reference time, which, itself, precedes the utterance time, we have a future-in-the-past. In relative tenses, the coordinates of both the utterance time and the reference time have to be encoded and, crucially, they cannot coincide: the modelling of the availability of two coordinate systems does not seem possible under a simple person-based account.

Finally, the relation between the deictic centre of discourse and time indexicals and their referent can intuitively be modelled syntactically along the lines of the account proposed in Chapter 4, but how to exactly formalise that relation is not entirely clear. Discourse indexicals may perhaps be conceived as denoting metaphorical proximity (e.g. psychological proximity) between their referent and their deictic centre, but this does not capture, among others, the difference between cataphors and anaphors. Various accounts have been instead proposed for time indexicals, and particularly for tense, in which the T head is analysed as a relator that establishes a temporal relation between the utterance time (in Spec,T) and the event time (in Spec,V). The content of T is taken to be PAST, and more precisely "after" (the utterance time is after the event time), by Stowell (1995); or to be AFTER, WITHIN, and BEFORE for, respectively, past (the utterance time is after the event time), present (the utterance time coincides with the event time), and future (the utterance time is before the event time), by Demirdache & Uribe-Etxebarria (2000, 2007); or to be a [±coin(idence)] feature ([+coin] for present: the utterance time coincides with the event time; [−coin] for past: the utterance time does not coincide with the event time). Barring these differences, the main insights shared by these accounts can be represented as follows:

(9)



Despite the reversal of the ordering between the deictic centre and the referent

that needs to be located with respect to it (the deictic centre, or the utterance time, is higher in (9); this may be captured by referring to the Mirror Principle), (9) is fully compatible with the account proposed in this work. Moreover, the use of a fundamentally prepositional relator may allow for the definition of different degrees of remoteness (in the past or in the future; see Comrie 1985: chapter 4) in vectorial terms. However, issues that arise when comparing the syntax of tense and the syntax of person include, for instance, the need for yet another ontology for the discourse atoms (not individuals, as in pronouns; not regions associate to individuals, as in demonstratives).

Pending further research, the hypothesis that discourse and time indexicals are derived by the same primitives as space ones allows for predictions with respect to their diachronic (in)stability, too. Importantly, the speculation that discourse and time indexicals may be construed as binary systems would in essence predict their stability in both diachrony and in contact, under the present account. While, to my knowledge, this matter has not been investigated with respect to discourse indexicals, some reflections on the time indexicals, and in particular on grammatical tense, have been made both for diachrony and for contact. In diachrony, it has been observed that tense and aspect systems are tightly linked to one another and original tense morphology may shift towards an aspectual use, and *vice versa* (see e.g. Deo 2012 for an overview of such cases). How to account for this diachronic tendency is not entirely clear at present, but the tendency itself is not incompatible with the diachronic stability of tense systems. In contact, tense has been shown to be stable (Aikhenvald 2006; Polinsky 2018: 62–65, 174–175, who however attributes the stability of tense systems to their structural salience, for which see again Section 6.2). Some cases of borrowing of temporal morphology are reported, but they do not seem to give rise to changes in the temporal system of the receiving language (Nicolle 2012: section 8; Friedman 2012). Further investigations are of course needed in these respects, too.

Diachronic and contact research has been dominated by the investigation of linguistic phenomena that undergo change and by the explanation of the attested patterns of change. This dissertation tried to show that both the investigation of linguistic phenomena that instead are not prone to change and their comparison with phenomena that do change in diachrony and/or contact can grant new insights into the architecture of grammar as well.

APPENDIX A

Demonstratives in *Microcontact*

This Appendix provides the full questionnaire that was used for the data collection of ternary demonstrative systems in microcontact (Section A.1), sociolinguistic details about our informants (Section A.2), and the complete results (Section A.3). Sociolinguistic information was collected without the aid of a sociolinguistic questionnaire. Note that the items in the questionnaire and the stimuli for each item were presented to the informants in random order, which is not reflected by the citation order provided here. In what follows, both the dialectal instructions to the tasks and the dialectal stimuli are informally transcribed.

A.1 Materials

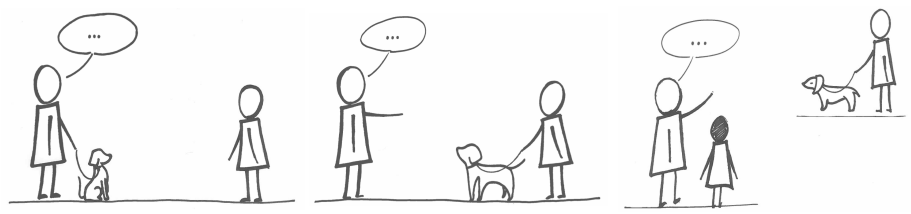
Picture-sentence matching task (Items I1–J6): Instructions. *We will now show you some images. The character with a balloon is the one that is speaking. Please, choose the sentence that, according to you, the speaker is uttering./ Which sentences can they utter?*

- Sicilian: "ora ve facimu a vvedere na pucu de disegni. U pupu cu na nuvoletta jè chiddu ca parla. Vi facimu a ssentere tre frasi e vu andate a ddire quali jè a frasi che secunnu vuauntri dici u pupu ca parla, c'a nuvuletta";
- Abruzzese: "mo ve facce a vvedé quacche ddisegne. La perzona ng'lla nuvoletta jè quelle che té pparlà. Pe ppiacere, capete la frase ca seconde vu dice la perzona che té pparlà";

- Calabrian: "ora ve fazzu vedere certi disegni. A cristiana ca nuvoletta est chidda ca parla. Quali e ste frasi pote diri?".
- The pictures are repeated in Figure A.1 below for convenience.

Semi-guided production task (Items J7–J8): Instructions. *I will now ask you where these three cats are. (Please, respond by saying where the cats are now.)/Can you tell me where the three cats are?*

- Sicilian: "ora ci addumannu nnu so sti tre gatti";
- Abruzzese: "mo v'addumanne a donne se truove šti tre jitte. Pe ppiacere, arrespunnete e diceteme a donne se truove li jitte a štu mumente que";
- Calabrian: "me po diri a ndu sunnu i tri ghiatti?".



(a) Speaker-related domain (DEM.1) (b) Hearer-related domain (DEM.2) (c) Non-participant-related domain (DEM.3)

Figure A.1: Picture-sentence matching task: Graphic stimuli

The following table reports the items used in our questionnaire. Items differ with respect to their syntactic condition (column: "Cond[ition]"): pronominal (*this/that is...*); adnominal (*this/that N is...*); demonstrative-reinforcer construction (*this here/that there is...*); nominal (either pronominal or adnominal); adverbial (*here/there*). Each syntactic condition was tested for all three possible semantics (column: "Sem[antics]"): speaker-oriented (DEM.1), hearer-oriented (DEM.2), and non-participant-oriented (DEM.3). In the column "Stimulus", each stimulus is presented in its Sicilian, Abruzzese, and Calabrian versions: each demonstrative form is glossed as being formally speaker-oriented (⇒1), hearer-oriented (⇒2), or non-participant-oriented (⇒3) and as being nominal ($_n$) or adverbial ($_a$); the stimuli are then translated into English. Finally, the column "Target" reports the target form for each item.

Item	Cond	Sem	Stimuli	Target
I1	Pronominal	N:DEM.1	Graphic: A.1a; audio: Sicilian {'chistu [⇒1_n] jè u ma cane', 'chissu [⇒2_n] jè u ma cane', 'chiddu [⇒3_n] jè u ma cane'}; Abruzzese {'queštə [⇒1_n] jè lu cane mé', 'quessə [⇒2_n] jè lu cane mé', 'quellə [⇒3_n] jè lu cane mé'}; Calabrian {'chistu [⇒1_n] est u me' cani', 'chissu [⇒2_n] est u me' cani', 'chiddu [⇒3_n] est u me' cani'}; translation: N:DEM *is my dog.*	⇒1
I2	Pronominal	N:DEM.2	Graphic: A.1b; audio: Sicilian {'chistu [⇒1_n] jè u ta cane', 'chissu [⇒2_n] jè u ta cane', 'chiddu [⇒3_n] jè u ta cane'}; Abruzzese {'queštə [⇒1_n] jè lu cane té', 'quessə [⇒2_n] jè lu cane té', 'quellə [⇒3_n] jè lu cane té'}; Calabrian {'chistu [⇒1_n] est u to cani', 'chissu [⇒2_n] est u to cani', 'chiddu [⇒3_n] est u to cani'}; translation: N:DEM *is your dog.*	⇒2
I3	Pronominal	N:DEM.3	Graphic: A.1c; audio: Sicilian {'chistu [⇒1_n] jè u ta cane', 'chissu [⇒2_n] jè u ta cane', 'chiddu [⇒3_n] jè u ta cane'}; Abruzzese {'queštə [⇒1_n] jè lu cane sé', 'quessə [⇒2_n] jè lu cane sé', 'quellə [⇒3_n] jè lu cane sé'}; Calabrian {'chistu [⇒1_n] est u so cani', 'chissu [⇒2_n] est u so cani', 'chiddu [⇒3_n] est u so cani'}; translation: N:DEM *is their dog.*	⇒3
I4	Adnominal	N:DEM.1	Graphic: A.1a; audio: Sicilian {'štu [⇒1_n] cani jè mia', 'ssu [⇒2_n] cane jè mia', 'ddhu [⇒3_n] cani jè mia'}; Abruzzese {'štu [⇒1_n] canə jè lu mé', 'ssu [⇒2_n] canə jè lu mé', 'chillu [⇒3_n] canə jè lu mé'}; Calabrian {'chistu [⇒1_n] cani est u meu', 'chissu [⇒2_n] cani est u meu', 'ddu [⇒3_n] cani est u meu'}; translation: N:DEM *dog is mine.*	⇒1
I5	Adnominal	N:DEM.2	Graphic: A.1b; audio: Sicilian {'štu [⇒1_n] cani jè tua', 'ssu [⇒2_n] cane jè tua', 'ddhu [⇒3_n] cani jè tua'}; Abruzzese {'štu [⇒1_n] canə jè lu té', 'ssu [⇒2_n] canə jè lu té', 'chillu [⇒3_n] canə jè lu té'}; Calabrian {'chistu [⇒1_n] cani est u toj', 'chissu [⇒2_n] cani est u toj', 'ddu [⇒3_n] cani est u toj'}; translation: N:DEM *dog is yours.*	⇒2
I6	Adnominal	N:DEM.3	Graphic: A.1c; audio: Sicilian {'štu [⇒1_n] cane jè sua', 'ssu [⇒2_n] cane jè sua', 'ddhu [⇒3_n] cane jè sua'}; Abruzzese {'štu [⇒1_n] canə jè lu sé', 'ssu [⇒2_n] canə jè lu sé', 'chillu [⇒3_n] canə jè lu sé'}; Calabrian {'chistu [⇒1_n] cani est u soj', 'chissu [⇒2_n] cani est u soj', 'ddu [⇒3_n] cani est u soj'}; translation: N:DEM *dog is theirs.*	⇒3

continued on next page

Item	Cond	Sem	Stimuli	Target
J4	Reinforcer	N:DEM.1	Graphic: A.1a; audio: Sicilian {'chistu [⇒1_n] ccà [⇒1_a] jè u ma cane', 'chissu [⇒2_n] ccà [⇒1_a] jè u ma cane', 'chiddu [⇒3_n] ccà [⇒1_a] jè u ma cane'}; Abruzzese {'queštə [⇒1_n] aecchə [⇒1_a] è lu cane mé', 'quessə [⇒2_n] aecchə [⇒1_a] è lu cane mé', 'quellə [⇒3_n] aecchə [⇒1_a] è lu cane mé'}; Calabrian {'chistu [⇒1_n] ccà [⇒1_a] est u me' cani', 'chissu [⇒2_n] ccá [⇒1_a] est u me' cani', 'chiddu [⇒3_n] ccà [⇒1_a] est u me' cani'}; N:DEM A:DEM.1 *is my dog.*	⇒1
J5	Reinforcer	N:DEM.2	Graphic: A.1b; audio: Sicilian {'chistu [⇒1_n] ddhuocu [⇒2_a] jè u ta cane', 'chissu [⇒2_n] ddhuocu [⇒2_a] jè u ta cane', 'chiddu [⇒3_n] ddhuocu [⇒2_a] jè u ta cane'}; Abruzzese {'queštə [⇒1_n] aessə [⇒2_a] è lu cane té', 'quessə [⇒2_n] aessə [⇒2_a] è lu cane té', 'quellə [⇒3_n] aessə [⇒2_a] è lu cane té'}; Calabrian {'chissu [⇒2_n] ddà [⇒3_a] est u to cani', 'chiddu [⇒3_n] ccà [⇒1_a] est u to cani'}; translation: N:DEM A:DEM.2 *is your dog.*	⇒2
J6	Reinforcer	N:DEM.3	Graphic: A.1c; audio: Sicilian {'chistu [⇒1_n] ddhà [⇒3_a] jè u ta cane', 'chissu [⇒2_n] ddhà [⇒3_a] jè u ta cane', 'chiddu [⇒3_n] ddhà [⇒3_a] jè u ta cane'}; Abruzzese {'queštə [⇒1_n] aellə [⇒3_a] è lu cane té', 'quessə [⇒2_n] aellə [⇒3_a] è lu cane té', 'quellə [⇒3_n] aellə [⇒3_a] è lu cane té'}; Calabrian {'chistu [⇒1_n] ddhà [⇒3_a] est u so cani', 'chissu [⇒2_n] ddhà [⇒3_a] est u so cani', 'chiddu [⇒3_n] ddhà [⇒3_a] est u so cani'}; transl.: N:DEM A:DEM.3 *is their dog.*	⇒3
J7	Nominal	*Context-dependent*	Graphic: three cats in the room; audio: Sicilian {'Quali è u gattu neuru/arancione/biancu?'}; Abruzzese {'Qualə jè la gattə nerə/arangionə/bbiangə?'}; Calabrian {'Qual esti u jiattu niuru/aranciuni/iancu?'}; translation: *Which one is the black/orange/white cat?*	—
J8	Adverbial	*Context-dependent*	Graphic: three cats in the room; audio: Sicilian {'Unni è u gattu neuru/arancione/biancu?'}; Abruzzese {'A donnə šta la gattə nerə/arangionə/bbiangə?'}; Calabrian {'A und'esti u jiattu niuru/aranciuni/iancu?'}; translation: *Where is the black/orange/white cat?*	—

A.2 Participants

The following table reports (socio)linguistic information concerning the informants involved in this study. Each informant is univocally identified by a code (column: "Informant") and information about their country of emigration (column: "Country"), their age at the time of the interview (given in a 5-year range; column: "Age"), and their generation (column: "Gen[eration]": "E[migré]" speakers emigrated to the relevant country in the year reported in brackets; "H[eritage]" speakers were instead born in the relevant country) is provided. Further, the column "Hometown" indicates the Italian hometown for the *émigré* speakers and for the parents of the heritage speakers, while the last column ("Home dialect: Demonstratives") records the dialect spoken by our informants and the demonstrative systems which are attested for it, as reported in the sources listed there.

A note is in order regarding this last matter: the elicited demonstrative systems (see Table A.2 for a full picture of the data) are evaluated for change against the information reported in the column "Home dialect: Demonstratives". However, two major issues arise, which deserve further attention but cannot be addressed in this work. Firstly, information is only available for some of the cities and towns listed in the "Hometown" column, but by no means for all of them: given the level of microvariation attested across Italo-Romance varieties, the demonstrative systems indicated for the homeland varieties of each informant are in many cases educated guesses based on the demonstrative systems attested for the (geographically) closest variety of the same dialectal group and for which information is available. However, these guesses may not be accurate, and the actual demonstrative system may be different: ideally, this work should be complemented by a full-scale fieldwork aimed at collecting data for each locality under investigation. Further, such data should be collected from older speakers, possibly age-matched with respect to our informants, and with a limited exposure to Italian, to ensure full comparability. Unfortunately, these conditions make it very difficult for these data to be collected at all.

Secondly, the demonstrative systems reported in "Home dialect: Demonstratives" could optimistically be a good baseline for comparison for the data elicited from *émigré* speakers, who left Italy after being exposed to the relevant varieties. However, they do not by default constitute a good baseline for comparison for the data elicited from heritage speakers: these speakers were born in the country of emigration, where they were only exposed to the dialect as spoken by (attrited) members of their families or of the wider dialectal community. As such, the demonstrative systems elicited from heritage speakers should be compared to the demonstrative systems in their input, to rightfully assess whether any difference is attested. Though originally planned within the *Microcontact* project, this task could not be carried out because of the Covid-19 outbreak.

Informant	Country	Age	Gen	Hometown	Home dialect: Demonstratives
A_cal_BA_001	Arg	66–70	H	Serra Castagna/Case Caria (CZ)	Central Calabrian: ternary (LS16: 884)
A_sic_LP_006	Arg	76–80	E (?)	Merì (ME)	Messinese Sicilian: ternary (Leone 1995: 29)
A_sic_LP_007	Arg	76–80	E (1955)	Ragusa (RG)	South-eastern Sicilian: ternary (Leone 1995: 29)
A_sic_LP_008	Arg	81–85	E (?)	Riesi (CL)	Central Sicilian: ternary (Leone 1995: 29)
A_sic_LP_009	Arg	71–75	E (1950)	Leonforte (EN)	Central Sicilian: ternary (Leone 1995: 29)
A_abr_LP_011	Arg	86–90	E (1949)	Carpineto Sinello (CH)	East. Abruzzese: ternary (Giammarco 1960: 90)
A_abr_LP_012	Arg	76–80	E (1949)	Carpineto Sinello (CH)	East. Abruzzese: ternary (Giammarco 1960: 90)
A_sic_CO_025	Arg	71–75	H	Acireale (CT)	Eastern Sicilian: ternary (Leone 1995: 29)
A_sic_CO_029	Arg	71–75	H	Motta d'Affermo (ME)	Eastern Sicilian: ternary (Leone 1995: 29)
A_abr_RO_034	Arg	91–95	E (1952)	Rapino (CH)	East. Abruzzese: ternary (Giammarco 1960: 90)
A_sic_RO_036	Arg	86–90	E (1953)	Alcara li Fusi (ME)	Messinese Sicilian: ternary (Leone 1995: 29)
A_sic_RO_037	Arg	56–60	H	Alcara li Fusi (ME)	Messinese Sicilian: ternary (Leone 1995: 29)
A_abr_RO_039	Arg	56–60	H	Pietraferrazzana (CH)	East. Abruzzese: ternary (Giammarco 1960: 90)
A_abr_RO_040	Arg	66–70	H	Lentella (CH)	East. Abruzzese: ternary (Giammarco 1960: 90)
A_cal_RO_041	Arg	76–80	E (1954)	Ferruzzano (RC)	Southern Calabrian: ternary (Falcone 1976: 69)
A_sic_SF_054	Arg	81–85	E (1949)	Rosolini (SR)	Eastern Sicilian: ternary (Leone 1995: 29)
A_abr_BA_057	Arg	76–80	E (1953)	Guilmi (CH)	East. Abruzzese: ternary (Giammarco 1960: 90)
A_abr_BA_058	Arg	71–75	E (1953)	Guilmi (CH)	East. Abruzzese: ternary (Giammarco 1960: 90)
A_cal_BA_059	Arg	66–70	E (1953)	Bagnara C./Pellegrina (RC)	Southern Calabrian: ternary (Falcone 1976: 69)
A_cal_BA_061	Arg	81–85	E (1953)	Bagnara C./Pellegrina (RC)	Southern Calabrian: ternary (Falcone 1976: 69)
A_cal_BA_062	Arg	81–85	E (1948)	Bagnara Calabra (RC)	Southern Calabrian: ternary (Falcone 1976: 69)
A_cal_SJ_072	Arg	76–80	E (1953)	Ionadi (VV)	Southern Calabrian: ternary (Falcone 1976: 69)
Be_abr_Br_001	Bel	71–75	E (1952)	Pineto (PE)	Teram. Abruzzese: ternary (Savini 1881: 62; LS16: 885)

LS16 = Ledgeway & Smith 2016.

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Informant	Country	Age	Gen	Hometown	Home dialect: Demonstratives
Be_sic_LL_001	Bel	61–65	E (1974)	Casteltermini (AG)	Central Sicilian: ternary (Leone 1995: 29)
Be_sic_Br_002	Bel	81–85	E (1964)	Assoro (EN)	Central Sicilian: ternary (Leone 1995: 29)
Be_sic_Br_003	Bel	71–75	H	Mazzarino (CL)	Central Sicilian: ternary (Leone 1995: 29)
Be_sic_Br_004	Bel	81–85	E (1962)	Villapriolo (EN)	Central Sicilian: ternary (Leone 1995: 29)
B_sic_PA_001	Bra	86–90	E (1955)	Leonforte (EN)	Central Sicilian: ternary (Leone 1995: 29)
B_sic_PA_002	Bra	96–100	E (1948)	Palermo (PA)	Western Sicilian: ternary (Pitrè 1979: 60)
C_abr_Mo_001	Can	71–75	E (1967)	Cermignano (TE)	Teram. Abruzzese: ternary (Savini 1881: 62; LS16: 885)
C_cal_Mo_001	Can	76–80	E (1967)	Ardore (RC)	Southern Calabrian: ternary (Falcone 1976: 69)
C_cal_Mo_002	Can	76–80	E (1964)	Montebello (RC)	Southern Calabrian: ternary (Falcone 1976: 69)
C_mol_Mo_001	Can	76–80	E (1962)	Ururi (CB)	Molisano: ternary (Giammarco 1960: 90)
C_sic_Mo_001	Can	66–70	E (1959)	Villarosa (EN)	Central Sicilian: ternary (Leone 1995: 29)
C_sic_Mo_002	Can	56–60	H	Villarosa (EN)	Central Sicilian: ternary (Leone 1995: 29)
C_sic_Mo_003	Can	71–80	E (1958)	Cattolica Eraclea (AG)	Western Sicilian: ternary (Leone 1995: 29)
C_sic_Mo_004	Can	61–65	E (1973/4)	Santa Lucia del Mela (ME)	Messinese Sicilian: ternary (Leone 1995: 29)
C_sic_Mo_005	Can	76–80	E (1969)	Canicattini Bagni (SR)	South-eastern Sicilian: ternary (Leone 1995: 29)
U_abr_B_002	USA	46–50	H	Introdacqua/Sulmona (AQ)	West. Abruzzese: ternary (Giammarco 1960: 89)
U_abr_Q_003	USA	76–80	E (1964)	Lanciano (CH)	East. Abruzzese: ternary (Giammarco 1960: 90)
U_abr_Q_004	USA	56–60	H	Orsogna (CH)	East. Abruzzese: ternary (Giammarco 1960: 90)
U_sic_M_001	USA	61–65	E (1962)	Marineo (PA)	Western Sicilian: ternary (Pitrè 1979: 60)
U_sic_B_002	USA	66–70	E (1966)	Castellammare del Golfo (TP)	Western Sicilian: ternary (Leone 1995: 29)
U_sic_B_003	USA	66–70	E (1966)	Castelbuono (PA)	Central Sicilian: ternary (Leone 1995: 29)
U_sic_B_004	USA	71–75	E (1970)	Francofonte (SR)	Eastern Sicilian: ternary (Leone 1995: 29)
U_sic_B_005	USA	71–75	E (?)	Castellammare del Golfo (TP)	Western Sicilian: ternary (Leone 1995: 29)
U_sic_B_006	USA	71–75	E (?)	Paceco (TP)	Western Sicilian: ternary (Leone 1995: 29)

LS16 = Ledgeway & Smith 2016.

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Informant	Country	Age	Gen	Hometown	Home dialect: Demonstratives
U_sic_B_008	USA	76–80	E (1971)	Villabate (PA)	Western Sicilian: ternary (Pitrè 1979: 60)
U_sic_B_009	USA	51–55	H	Castelbuono (PA)	Central Sicilian: ternary (Leone 1995: 29)
U_sic_B_010	USA	56–60	E (1970)	Torretta (PA)	Western Sicilian: ternary (Pitrè 1979: 60)
U_sic_B_011	USA	36–40	H	Carini (PA)	Western Sicilian: ternary (Pitrè 1979: 60)

A.3 Results

The elicited answers were coded as follows:

- ⇒1 (target form for DEM.1 semantics) coded as ST for N:DEM, Q for A:DEM, and ST Q for demonstrative-reinforcer constructions;
- ⇒2 (target form for DEM.2 semantics) coded as SS for N:DEM, D for A:DEM, and SS D demonstrative-reinforcer constructions;
- ⇒3 (target form for DEM.3 semantics) coded as LL for N:DEM, L for A:DEM, and LL L for demonstrative-reinforcer constructions;
- different combinations of these forms were attested: they have been coded as such, by recurring to the combination of the N:DEM codes with the A:DEM ones;
- optionality (i.e. multiple answers) was attested: the competing forms have all been recorded;
- non-available answers (non elicited answers or irrelevant ones) coded as NA.

Table A.2 report the complete results.

Figure A.2: Results

	A_abr_LP_011	A_abr_LP_012	A_abr_RO_034	A_abr_RO_039	A_abr_RO_040	A_abr_BA_057	A_abr_BA_058	C_abr_Mo_001	C_mol_Mo_001	Be_abr_Br_001	U_abr_B_002	U_abr_Q_003	U_abr_Q_004	A_cal_BA_001	A_cal_RO_041	A_cal_BA_059	A_cal_BA_061	A_cal_BA_062	A_cal_SJ_072	C_cal_Mo_001	C_cal_Mo_002
N:DEM.1/Pronominal																					
N:DEM.1/Adnominal																					
N:DEM.1/Reinforcer										[1]											
N:DEM.1/Nominal																					
A:DEM.1/Adverbial																					
N:DEM.2/Pronominal					[2]	3			1	1				13	1		1	3	1	[2]	
N:DEM.2/Adnominal	[2]	1		1	[2]	3			1	1	3				1		1	1	1	1	[2]
N:DEM.2/Reinforcer	[2]	[2]		[2]	[2]	3			1	3	1		[2]	13	13	[2]	1	[2]	1	[2]	
N:DEM.2/Nominal	1	1		[2]	1			1	3	3	1				1			[2]			
A:DEM.2/Adverbial	1	1							3	13	1			3	1		1	1	[2]	[2]	
N:DEM.3/Pronominal	[3]	[3]									2		2		1		1		1		
N:DEM.3/Adnominal											1			1	1		1	1	1		
N:DEM.3/Reinforcer	[3]	[3]		[3]	[3]						1				[3]		[3]				
N:DEM.3/Nominal																					
A:DEM.3/Adverbial														1							

	A_sic_LP_006	A_sic_LP_007	A_sic_LP_008	A_sic_LP_009	A_sic_CO_025	A_sic_CO_029	A_sic_RO_036	A_sic_RO_037	A_sic_SF_054	B_sic_PA_001	B_sic_PA_002	C_sic_Mo_001	C_sic_Mo_002	C_sic_Mo_003	C_sic_Mo_004	C_sic_Mo_005	Be_sic_LL_001	Be_sic_Br_002	Be_sic_Br_003	Be_sic_Br_004	U_sic_M_001	U_sic_B_002	U_sic_B_003	U_sic_B_004	U_sic_B_005	U_sic_B_006	U_sic_B_008	U_sic_B_009	U_sic_B_010	U_sic_B_011
N:DEM.1/Pronominal										[1]							2													
N:DEM.1/Adnominal																														
N:DEM.1/Reinforcer																	[1]													
N:DEM.1/Nominal																												[1]		
A:DEM.1/Adverbial																														
N:DEM.2/Pronominal	1	1	1	1	1		1	3			1			3										[2]		[2]	1	13	13	1
N:DEM.2/Adnominal	1	1	1	1	1			1	[2]		3	1	1	1	1								[2]				3	[2]	1	3
N:DEM.2/Reinforcer	[2]	[2]	[2]	[2]	[2]			[2]	3	[2]	3												1	3		1	[2]	[2]	1	1
N:DEM.2/Nominal					3	3					3			3			3					[2]	13			[2]	3	1	[2]	3
A:DEM.2/Adverbial					3	3	[2]			3	3	1	1	1	1		[2]						1				1	3	1	13
N:DEM.3/Pronominal									1								2								[3]					
N:DEM.3/Adnominal	2	2	2	2	1		1		12								1								[3]					
N:DEM.3/Reinforcer	[3]	[3]	[3]	[3]	[3]					[3]															[3]					
N:DEM.3/Nominal									[3]																					
A:DEM.3/Adverbial																														

Target-like [n=517/765] NA [n=65/765] [1][2][3] Semi-target-like ⇒1/2/3 [n=58/765] 1 Non-target-like ⇒1 [n=78/765]

3 Non-target-like ⇒3 [n=30/765] 2 Non-target-like ⇒2 [n=8/765] 12 13 Non-target-like DEM.3|DEM.2 w/ optionality [n=9/765]

APPENDIX B

Portuguese-based creoles

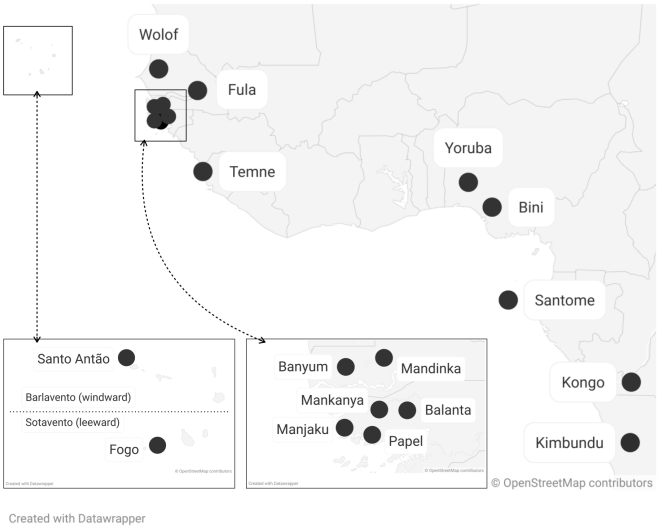
This Appendix provides additional details about the Portuguese-based creoles considered in this work. Section B.1 introduces the main general information about them, as retrieved from the APiCS. Additionally, it provides some basic geographical information and lists the other languages that contributed to the creolisation process. Section B.2 illustrates the demonstrative systems of each of the other contributing languages (organised by family and *genus*, as defined by the WALS); the creoles to which these languages contributed are indicated by their identification number in the APiCS (column: "Creole #"; the identification numbers are indicated in the table in Section B.1). In case of inconsistencies between the APiCS and WALS nomenclatures, the latter is preferred and the former is recorded in square brackets. Finally, Section B.3 collects the demonstrative systems for the Portuguese-based creoles along with a shorthand for the systems attested in Portuguese and in the other contributing varieties (column: "Input systems"), for ease of comparability.

B.1 Overview

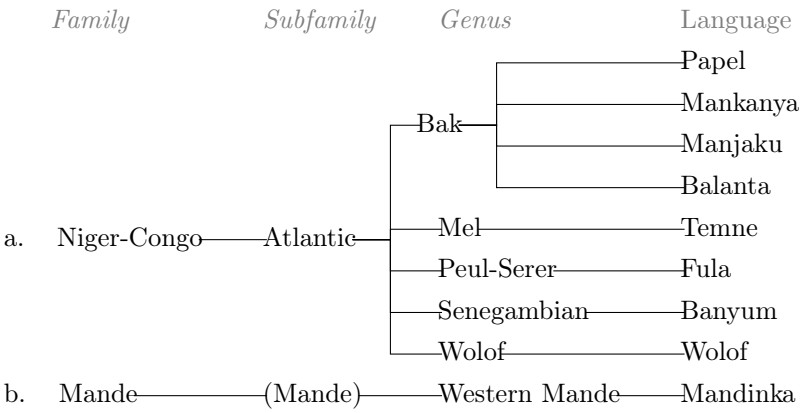
Language	Region	Other contributing languages	Sources
Cape Verdean Creole of Santiago (30)	West Africa	Atlantic (Wolof, Temne) and Mande (Mandinka) languages	Lang 2013a,b
Cape Verdean Creole of Brava (31)	West Africa	Atlantic (Wolof, Temne) and Mande (Mandinka) languages	Baptista 2013a,b
Cape Verdean Creole of São Vicente (32)	West Africa	Sotavento varieties of Cape Verdean Creole (esp.: Fogo, 18th c.); Barlavento varieties of Cape Verdean Creole (esp.: Santo Antão); (English)	Swolkien 2013a,b
Guinea-Bissau Kriyol (33)	West Africa	Balanta, Fula, Mandinga, Manjaku, Mankanya, Pepel	Intumbo *et al.* 2013a,b
Casamancese Creole (34)	West Africa	Mandinka (Manding, both substrate and adstrate), Wolof (substrate), Nyun (adstrate)	Biagui & Quint 2013a,b
Santome (35)	West Africa	mainly Edo and Kikongo	Hagemeijer 2013a,b
Angolar (36)	West Africa	Kimbundu, Santome	Maurer 2013a,b
Principense (37)	West Africa	Edo, Yoruba, Kikongo	Maurer 2013f,g
Fa d'Ambô (38)	West Africa	Edo, Yoruba, Kikongo	Post 2013a,b
Diu Indo-Portuguese (39)	South Asia	Gujarati (dominant), English, Hindi, Konkani	Cardoso 2013a,b
Korlai (40)	South Asia	Marathi	Clements 2013a,b
Sri Lanka Portuguese (41)	South Asia	Tamil, Sinhala, Dutch, English	Smith 2013a,b
Papiá Kristang (42)	SE Asia	Malay, Hokkien Chinese	Baxter 2013a,b
Batavia Creole (43)	SE Asia	Malay, Javanese, Dutch, Indo-Portuguese, South Asian Ls	Maurer 2013c,d

Other contributing languages, African Portuguese-based creoles

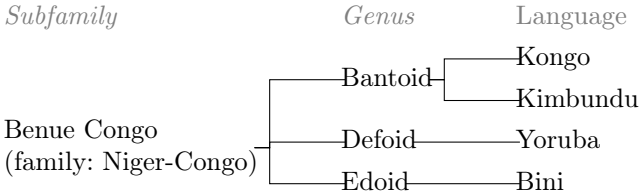
Figure B.1: Other contributing languages / Africa; coordinates from WALS/Glottolog.



(1) Other contributing languages / Upper Guinea Creoles (genetic classification: Dryer 2013):

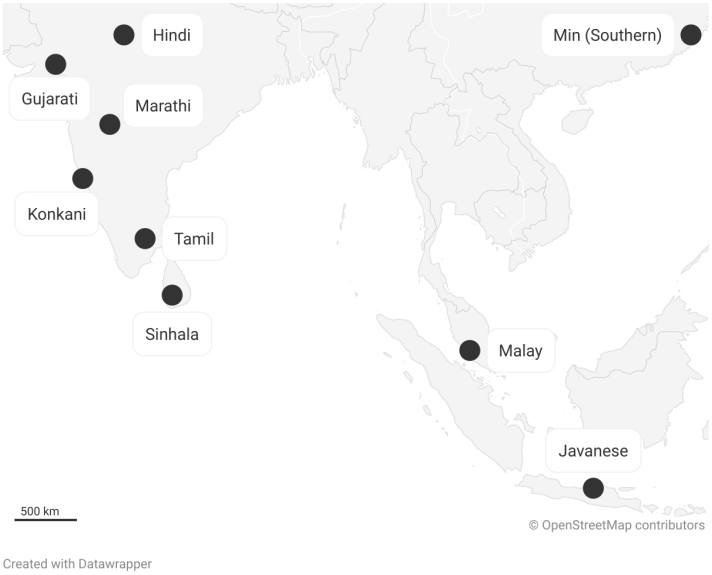


(2) Other contributing languages / Gulf of Guinea Creoles (genetic classification: Dryer 2013):



Other contributing languages, Asian Portuguese-based creoles

Figure B.2: Other contributing languages / Asia; coordinates from WALS/Glottolog.



(3) Other contributing languages / Asia (genetic classification: Dryer 2013)

	Family	*Genus*	Language
a.	Austronesian	Javanese	Javanese
		Malayo-Sumbawan	Malay
b.	Dravidian	Southern Dravidian	Tamil
c.	Indo-European	Germanic	English
			Dutch
		Indic	Sinhala
			Marathi
			Konkani
			Hindi
			Gujarati
d.	Sino-Tibetan	Chinese	Southern Min

B.2 Demonstrative systems: Other contributing languages

Language	Genus	Deictic contrasts in demonstratives*	Creole #
AUSTRONESIAN			
Javanese	Javanese	**3-way contrast**: *iki* 'this (in the vicinity of speaker)' & *kene* 'here by the speaker' ∼ *iku* 'that (connected with the hearer)' & *kono* 'there by the hearer' ∼ *kae* 'that (far)' & *kana* 'there far' (Uhlenbeck 1978: 222–243)	43
Malay	Malayo-Sumbawan	**2-way contrast**: *ini* 'this near' ∼ *itu* 'that distant' (Winstedt 1913: 116) & **3-way contrast**: *di-sini* 'here' ∼ *di-situ* 'there (near you)' ∼ *di-sana* 'there'	42, 43
DRAVIDIAN			
Tamil	Southern Dravidian	**2-way contrast**: *inta/itu* 'this' & *inkee* 'here' ∼ *anta/atu* 'that' & *anku* 'there' (Lehmann 1993: 92, 101, 104; cf. also Herring 1994: 247)	41
INDO-EUROPEAN			
Dutch	Germanic	**2-way contrast**: *deze* & *hier* ∼ *die* & *daar*	41, 43
English	Germanic	**2-way contrast**: *this* & *here* ∼ *that* & *there* (∼ *yon* & *yonder*?)	32, 39, 41
Gujarati	Indic	**2-way contrast**: *a* 'this' & *əhiN/əhyyaN* 'here' ∼ *peluN* 'that' & tyaN 'there' [& neutral: *(t)e* = anaphoric] (Cardona 1965: 108–110, 222–225; cf. also Tisdall 1892: 43, 78)	39
Hindi	Indic	**2-way contrast**: *yah* 'proximate' & *yaha* 'here' ∼ *vah* 'remote' (Shapiro 2003: 292; cf. also McGregor 1995: 12 (WALS))	5, 39

*Citation forms: SG.M, default case morphology; Bantu languages: class I. Genealogical classification: Dryer 2013. cont'd: next p.

Language	**Genus**	**Deictic contrasts in demonstratives***	**Creole #**
Konkani	Indic	**2-way contrast**: *yhɔ̄/yɔ̄* 'proximate/near speaker' & *angā* 'here' ∼ *tɔ̄* 'remote, at a distance from the speaker' & *thangā* 'there' (Rajathi 1976: 64, 115; cf. also Almeida 1985: 150, 162–163)	39
Marathi	Indic	**2-way contrast**: *hā* 'this, proximal' & *yethe* 'here' ∼ *to* 'that, distal' & *tethe* 'there' (Dhongde & Wali 2009: 51, 105; cf. also Pandharipande 1997: 370, 376 (WALS))	40
Sinhala	Indic	**3-way contrast**: *mee* 'proximal to the speaker' & *mehee* 'here' ∼ *oyə* 'proximal to the hearer' & *ohee* 'there' ∼ *arə* 'distal' *arəhe* 'there' [& neutral: *ee* 'anaphoric', *ehee* 'there, anaphoric' (Gair & Paolillo 1997: 19)	41
Mande			
Mandinka/ *Manding(a)*	Western Mande	**2-way contrast**: *nying* (*ñiŋ*) 'this' & *jang* (*jaŋ*) 'here' ∼ *wo* (*woo*) 'that' & *jee* (*woto*) 'there' (Gamble 1987: 2, 38; cf. also MacBrair 1837: 13, 27)	30, 31, 33, 34
Niger-Congo, *Atlantic*			
*	*Atlantic*	——	(30, 31)
Balanta	Bak	**4-way contrast**: *-ɔ́* '(this) close to the speaker' & *hámb-ɔ́* '(here [i.e. this place]) close to the speaker' ∼ *-ɛ́* '(that) close to the addressee' & *hámb-ɛ́* '(there) close to the addressee' ∼ *-é-lè* '(that) far from the speech act participants' & *hámb-é-lè* '(there) far from the speech act participants' ∼ *é-léen* '(that) far from the speech act participants' & *hámb-é-léen* '(there) far from the speech act participants' [& *-a* 'non visible'] (*Ganja dialect*; Creissels, to appear: 15; cf. also Creissels & Biaye 2016: §3.6, 231–232)	33

*Citation forms: SG.M, default case morphology; Bantu languages: class I. Genealogical classification: Dryer 2013.

cont'd: next p.

Language	Genus	Deictic contrasts in demonstratives*	Creole #
Mandjak/ *Manjaku*	Bak	**2-way contrast**: *-i* 'this' *sim -ôn* 'that' ∼ *-an* 'that (out of sight)' (demonstrative roots; Karlik 1972: 242). See also Sapir (1971: 81, fn. 4): *bik-i* 'these' ∼ *buk-un* 'those'	33
Mankanya	Bak	**2-way contrast**: (CL-)*i* 'this' & *(d-ko) d-i* 'here' (lit. 'place this') ∼ (CL-)*uŋ* 'that' & *(d-ko) d-uŋ* 'there' (lit. 'place that') (Trifkovič 1969: 81–85); but see Gaved (2020: 96) for a distance opposition in the nominal domain only: *i* 'near (proximal)' ∼ *uŋ* 'far (distal)' ∼ *undu*/*undi* 'very far (distal)'	33
Papel/*Pepel*	Bak	**2-way contrast**: *(b)ɔk-i* 'these' ∼ *(b)ɔk-un* 'those' (Sapir 1971: 81 fn. 4)	33
Temne	Mel	**2-way contrast**: *ɔw-e* 'this (close to the speaker)' & *nɔ* 'here (no specific place)' / *rɛ* 'here (specific place)' ∼ *ɔw-ʌŋ* 'that (farther away from the speaker)' & *ro* 'there (no specific place)' / *ri* 'there (specific place)' [ɔ-class (SG); same suffixes *-e* ∼ *-ʌŋ* for all other classes] (Kamarah 2007: 81–83, 88–89, 139)	30, 31
Fula	Peul-Serer	**3-way contrast [D]**: class root 'this' (e.g. *o*) & *do* 'here' ∼ class root-*n* 'that (at some distance)' (e.g. *on*) & *don* 'there (at some distance)' ∼ class root-*o* 'that (far away)' (e.g. *oo*) & *doo*/*ton* 'there (far away)' (Westermann 1909: 220–223, 245); *or* **2-way contrast**: *ngee*/*ngeeɗoo*/*ngeɗɗon* 'this (near-deictic)' & *ɗoo* 'here' ∼ *ngeya*/*ngetton* 'that (far-deictic)' & *ton* 'there' (McIntosh 1982: 65)	33
Banyum/ *Nyun*	Senegambian	**3-way contrast [D]**: AGR-(N)-AGR 'proximal' (e.g. *ba-m-ba*, *si-si*) ∼ AGR-(N)-AGR-*V:ŋ* 'distal' (e.g. *ba-m-ba-aŋ*, *si-se-eŋ*) ∼ AGR-*ŋ V:n* 'distal' (e.g. *ba-ŋaan*, *si-ŋeen*) [& anaphoric: AGR-*mër* (e.g. *bë-mër*, *si-mër*; short form: AGR-*m*, e.g. *ba-m*, *si-m*)] (Cobbinah, to appear: 22)	34

*Citation forms: SG.M, default case morphology; Bantu languages: class I. Genealogical classification: Dryer 2013.

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Language	Genus	Deictic contrasts in demonstratives*	Creole #
Wolof	Wolof	**3-way contrast**: *-ii/-ile* 'this (close to the speaker)' & *fii* 'here' ∼ *-uu/-ule* 'this (close to the addressee?)' & *fuu* 'here (close to the addressee? cf. complex forms *foofuu/fule* 'there (close to you)') ∼ *-ee/-ale* 'that (far)' & *fee* 'there' (Diagne 1971: 79–85, 136)	30, 31, 34
Niger-Congo, *Benue-Congo*			
Kimbundu	Bantoid	**3-way contrast [D]**: *iú/ió* 'this' & *-u-/-a-* 'here' (e.g. *mumu*) ∼ & *ó* 'that (not far)' & *-o-* 'there (not far)' (e.g. *momo*) ∼ *uná/iuná* 'that (yonder)' & *-ná* 'there (yonder)' (e.g. *muná*) (Chatelain 1889: 27, 66–67; Batalha 1891: 36–37; but cf. also Augusto 2016: 169 for a person-based description)	36
Kongo/ *Kikongo*	Bantoid	**3-way contrast**: *eki* 'this' & *oku* 'here' ∼ *ekio* 'that (where you are)' & *oko* 'there (where you are)' ∼ *ekina* 'that (remote from both)' & *kuna* 'there (remote from both)' (Bentley 1895: 585; cf. also de Clercq 1921: 28, 62 for Kiyombe (N:DEM: *au* ∼ *ou* ∼ *uina*; A:DEM: *aku* ∼ *oku* ∼ *kuna*); Tavares 1915: 41, 75 for Kisolongo (N:DEM: *oiu* ∼ *oie* ∼ *ona/oiuna*; A:DEM: *ku* ∼ *okue* ∼ *kuna*), who both describe distance-based demonstrative systems)	35, 37, 38
Yoruba	Defoid	**2-way contrast**: *ìyí/èyí* 'this' & *nihiyi* 'here' ∼ *ìyẹn/eyinì/(e)nì/nâ* 'that' & *nibẹ̀* 'there' (Awobuluyi 1978: 34 (*via* WALS) and Crowther 1852: 16, 31); *or* **3-way contrast [D]**: *yí* 'this' ∼ *yẹn* 'that' ∼ *nì* 'that (remote)' (Bamgboṣe 1966: 112)	37, 38
Bini/*Edo*	Edoid	**2-way contrast**:*(ɔ)na/ọ́nàn* 'this' & *emwan* 'here' ∼ *(ɔ)ni/ónin* 'that' & *eʊa/odɔ* '(over) there' (Wescott 1962: 31; cf. also: Ero 2003: 19, 39; Agheyisi 1986, *s.v.*)	35, 37, 38

*Citation forms: SG.M, default case morphology; Bantu languages: class I. Genealogical classification: Dryer 2013. cont'd: next p.

Language	Genus	Deictic contrasts in demonstratives*	Creole #
Sino-Tibetan			
Southern Min/*Hokkien*	Chinese	**2-way contrast**: *tsi*^{2} 'this' ∼ *hur*^{2} 'that' (*16/17th c.*: Lien 2014; cf. also Klöter 2011: 194–197, 240–241 for another 17th c. variety and Chen 2020 (ch. 5) for a modern variety)	42
Other			
Barlavento CVC	Pg.-based creoles	**2-way contrast**: *es* 'this' & *eki* 'here' ∼ *kel*/*ekel* 'that' & *la* 'there' (*Santo Antão*: Veiga 1982: 77, 79, 92)	32
Indo-Portuguese	Pg.-based cr., #39-41	**2-way contrast**: 39 = Diu Indo-Portuguese (*es* & *aki* ∼ *ikəl* & *ali*), 40 = Korlai (*ye* & *aki* ∼ *əkə(l)*/*akə(l)* & *ali*), 41 = Sri Lanka Portuguese (*isti* & *akii* ∼ *aka* & *alaa*) ∼ *aké* & *nalí*); see Appendix B.3	43
Santome	Pg.-based creole (35)	**2-way contrast**: *sɛ* ((*ku sa* (*a*)*i*)/*isɛ*/*isaki* & *(n)ai* ∼ *sɛ* (*ku sa* (*a*)*la*)/*isala* & *(n)ala* (& *-xi*/*ixi* 'out of sight'); see Appendix B.3	36
Sotavento CVC	Pg.-based creoles	**2-way contrast**: *es* (... *li*)/*kel* (... *li*) 'this' & *li* 'here' ∼ *kel* (... *la*) 'that' & *la* 'there' (Baptista 2002: 57–59; cf. also Tavares Lopes 2014: 58; Veiga 1982: 108, 111, 129 for the Fogo variety; and Tavares Moreira 2014: 155 for the Maio variety; and cf. #30-31: Cape Verdean Creole of Santiago and Brava (see Appendix B.3))	32

B.3 Portuguese-based creoles: Demonstrative systems

Creole	Deictic contrasts in demonstratives*	Input systems
CVC of Santiago (30)	**Binary**: *es* (... *li*)/*kel li* 'N:DEM (... here)/that here' & *li* 'here' ∼ *kel* (... *la*) 'N:DEM (... there)' & *la* 'there'	**Ternary**: Portuguese, Wolof; **binary**: Mandinka, Temne
CVC of Brava (31)	**Binary**: *es* (... *li*)/*kel* (... *li*) 'this/the (... here)' & *li* 'here' ∼ *kel* (... *la*) 'that/the (... there)' & *la*/*lago* 'there'	**Ternary**: Portuguese, Wolof; **binary**: Mandinka, Temne
CVC of São Vicente (32)	**Binary**: *es* (... *li*) 'this (... here)'/PROX & *li* 'here' ∼ *kel* (... *lá*) 'that (... there)'/DIST & *lá* 'there'; cf. also Swolkien 2015: 116–118	**Ternary**: Portuguese; **binary**: Barlavento/Sotavento CVCs, (English)
Guinea-Bissau Kriyol (33)	**Binary**: *e(s)* (... *li*) 'this (... here)' & *li* 'here' ∼ *ki(l)* (... *la*) 'that (... there)' & *la* 'there' (Kihm 1994: 75, 140–141)	**Ternary**: Portuguese; **binary**: Mandinka, Mandjak, Mankanya, Papel; **quaternary**: Balanta
Casamancese Creole (34)	**Binary**: *e(s)* (... *li*) 'this (... here)' = nearby & *(a)li* 'here' ∼ *e(s)*/*ke(l)* (... *la*) 'that (... there)' = over there & *la* 'there'	**Ternary**: Portuguese, Banyum, Wolof; **binary**: Mandinka
Santome (35)	**Binary**: *sɛ* (*ku sa* (*a*)*i*)/*isɛ*/*isaki* 'N:DEM (... here) → this (near the speaker and/or the hearer)' & *(n)ai* 'here' ∼ *sɛ* (*ku sa* (*a*)*la*)/*isala* 'N:DEM (... there) → that (far from speaker/hearer' & *(n)ala* 'there' (& *-xi*/*ixi* 'that/those out of sight') (Ferraz 1979: 73–74; but cf. Hagemeijer 2013a: sect. 5: *se ai* 'this' ∼ *se ala* 'that')	**Ternary**: Portuguese, Kongo; **binary**: Bini
Angolar (36)	**Ternary/Binary?**: *e*/*dhe*/*dhe-dhe*/*the*/*isi-e*/*isi-dhe* 'this (proximal)' & *nge*/*aki*/*ai* 'here' {*nge(e)* < *ngaa e* 'this place'} ∼ *si*/*si-e*/*si-dhe*/*isi-dha* 'that (distal, not far away)' & *nha* 'there (distal, not far away)'; *dha*/*dha-dha*/*si-dha*/*isi-dha-dha* 'that (distal, far away)' & *nha*/*nhala*/*nhara*/*laya* 'there (distal, far away)' (Maurer 1995: 41–44, 63, 121; Lorenzino 1998: 139–141, 201)	**Ternary**: Portuguese, Kimbundu; **binary**: *Santome*

*Citation forms: SG.M, default case morphology. Source = APiCS (see B.1/reff.), unless otherwise specified.

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Creole	Deictic contrasts in demonstratives*	Input systems
Principense (37)	**Binary**: *(i)sê* 'this' & *na/ni* 'here' ∼ *(i)xila* 'that' & *lala* 'there'; *(i)xi* 'anaphoric/out of sight'	**Ternary**: Portuguese, Kongo; **binary**: Bini, Yoruba (?)
Fa d'Ambô (38)	**Binary**: *(i)sai/se* 'this (near speaker and hearer)' & *yay* 'here (near speaker and hearer)' (allomorphs: *ya*, *ay*, *i*, *ye*, *e*) ∼ *(i)sala/sa* 'that (far from both)' & *ala* 'there (far from both)'; *xi* 'not in sight' (or head of relative clause), *x(i)ki* 'that not in sight' (Hagemeijer *et al.* 2020: 43–45, 165; but cf. Post 2013a: sect. 5: *sai* 'proximal' ∼ *sala* 'distal')	**Ternary**: Portuguese, Kongo; **binary**: Bini, Yoruba (?)
Diu Indo-Portuguese (39)	**Binary**: *es* 'this'/proximal & *aki* 'here' ∼ *ikəl* 'that'/distal & *ali* 'there' (Cardoso 2009)	**Ternary**: Portuguese; **binary**: English, Gujarati, Hindi, Konkani
Korlai (40)	**Binary**: *ye* 'this'/proximal & *aki* 'here' ∼ *əkə(l)/akə(l)* 'that'/distal & *ali* 'there' (Clements 1996: 101, 250–251, 254)	**Ternary**: Portuguese; **binary**: Marathi
Sri Lanka Portuguese (41)	**Binary**: *isti* 'this' & *akii* 'here' ∼ *aka* 'that' & *alaa* 'there'	**Ternary**: Portuguese, Sinhala; **binary**: Tamil, Dutch, English
Papiá Kristang (42)	**Binary**: *isti/isi* 'this' & *akí* 'here' ∼ *aké* 'that' & *nalí* 'there'	**Ternary**: Portuguese, Malay (A:DEM); **binary**: Malay (N:DEM), Southern Min
Batavia Creole (43)	**Binary**: *iste* 'this' & *aki* 'here' ∼ *akel* 'that'	**Ternary**: Portuguese, Javanese, Malay (A:DEM); **binary**: Dutch, Malay (N:DEM), *Indo-Portuguese*

APPENDIX C

Alternative accounts

C.1 Person *vs* locative features

Section 3.4 showed that a person-based account for the semantic contrasts encoded by demonstrative forms is empirically superior to one based on locative features, such as the one most prominently proposed by Lander & Haegeman (2018a), because only the former seamlessly captures both demonstrative systems that encode a clusivity distinction and demonstrative systems that make additional indexical oppositions (number, gender). Nonetheless, Lander & Haegeman (2018a) present a thorough critique of person-based accounts for demonstrative systems: none of their remarks was addressed in the main discussion. For the sake of completeness, this section reviews each of their counterarguments to show that a person-based approach, besides granting a better empirical coverage, does not meet any significant difficulties.

C.1.1 Argument 1: Reversed containment relations

The first argument that Lander & Haegeman adopt to reject person features in the derivation of demonstrative forms is purely theory-internal: the nanosyntactic containment relations for person can be shown to be [1[2[3]]] (for a discussion, see Vanden Wyngaerd 2018), while those for spatial deixis, as argued by the authors on the basis of morphological evidence, are [Distal[Medial[Proximal]]], which would translate to [3[2[1]]], in person terms. The two containment relations are clearly opposite to one another, thus spatial deixis cannot be accounted for by person features.

However, this point can be disregarded outside the nanosyntactic framework, as is the one in which the present work is embedded. The containment generalisations spotted by the nanosyntactic approach to person and spatial deixis can be described in other models by positing (accidental) syncretisms. Besides, note that the approach adopted in the present work is incompatible with features standing in containment relations to each other: in fact, the variation in the ordering of compositions is pivotal in deriving the attested semantic variation across demonstrative systems. Preliminary morphological evidence for the featural make-up and the internal structure of demonstratives advocated for in this dissertation is discussed in Chapter 4.

C.1.2 Argument 2: Different person oppositions

Secondly, Lander & Haegeman argue that a person-rooted account for spatial deixis predicts that, person and spatial deixis being derived by the same features, there should be clear analogies between person and deictic contrasts. Specifically, Lander & Haegeman (2018a) focus on the prediction according to which "rich" pronominal systems (i.e. systems that encode many contrasts) should correlate with "rich" demonstrative systems, while "poor" pronominal systems (i.e. systems that encode few, if any, contrasts) should correlate with "poor" demonstrative systems. This is clearly not the case, as can be seen very easily by considering English. In contemporary standard English, the pronominal system includes three forms, i.e. 1st persons (*I* and *we*), 2nd persons (*you*), and 3rd persons (*he*, *she*, *it*, *they*), whereas the demonstrative one only includes two forms, i.e. proximal *this* and distal *that*.

More specifically, Lander & Haegeman consider the absence of clusivity distinctions in demonstrative systems, as opposed to its presence in pronominal systems, as a crucial piece of evidence against person features. They report clusivity differences for 21 languages which are described as displaying the clusivity distinction ("rich" systems) in personal pronouns in the WALS (Dryer & Haspelmath 2013: see feature 39A, Cysouw 2013), but which only display a binary contrast ("poor" systems) in demonstrative systems (see WALS feature 41A, Diessel 2013a). Moreover, they mention one case (Kera, Afro-Asiatic) in which the pronominal system makes a four-way distinction and the demonstrative one encodes no deictic contrast at all; and two cases (Navajo, Na-Dene; Koasati, Muskogean) that are reported by the WALS as displaying a "five-way or more" partition in their demonstrative systems, whereas their pronominal systems are simply ternary.

While this fact is cross-linguistically quite solid, it is partially at odds with the treatment of possible clusivity oppositions in demonstratives made by the authors (see Section 3.4.1 for further discussion). Further, different partitions in demonstratives and in personal pronouns (and, precisely, poorer demonstrative systems attested alongside richer personal pronouns systems) are not incompatible with the account proposed here, where person and spatial deixis are substantially parallel, rather than identical, despite being derived by the same

machinery (see discussion in Section 3.3). As such, different person-based categories can be included in the different systems. Besides, the difference between poorer demonstrative systems and richer pronominal systems can be reduced to structural differences, as proposed in Chapter 6.[1]

Finally, more complex demonstrative systems that do not present clusivity distinctions (such as the Navajo and Koasati cases mentioned by Lander & Haegeman) can be derived by means of distance modification of the person core. Note, incidentally, that this is the only way for Lander & Haegeman's strictly ternary feature system to derive systems that, at face value, show more than three contrasts. This means that, in Navajo and Koasati, the presence of richer demonstrative systems as opposed to poorer pronominal ones is only apparent, as the former systems can be derived by the same person oppositions as those present in the latter, plus modification (by a MeasP/degree modifier): as such, they do not truly constitute a counterargument to the application of a full person-based feature system to demonstrative forms. Ultimately, Lander & Haegeman's approach to Navajo and Koasati would be substantially alike to the one proposed in this work, barring differences relative to the featural inventory of the relevant forms and the structural implementation of distance modification.

C.1.3 Argument 3: Extra number/gender distinctions

The third point made by Lander & Haegeman is that spatial deictic systems make rougher distinctions than person systems, lacking indexical number and gender (i.e. information about the number and gender categories of the deictic centre). Consider English: while pronominal systems encode (indexical) number and, partially so, gender (with contrastive reference to singular *vs* plural, and masculine *vs* feminine *vs* neuter referents), demonstrative systems only encode person (granting the person-oriented nature of the system and its description in terms of person features). Therefore, their argument goes, demonstratives cannot truly be person-based, otherwise they would display the other features associated with person in English, too.

This argument is empirically refuted in Section 3.4.2, where the (admittedly rare) case of Siwi Berber is discussed, which encodes indexical number and gender distinctions in its hearer-oriented demonstrative forms (Souag 2014a,b). Besides, a speculation with respect to how these differences across person-based systems come about is provided in Section 6.5.2.1: there, I relate the typical absence of indexical number oppositions in demonstrative systems to a

[1] Note that this only applies to binary demonstrative systems attested alongside ternary (or bigger) pronominal ones; instead, in the case of ternary demonstrative systems attested alongside quaternary pronominal ones, or the other way round, the two systems are derived by the same inventory of features and simply stand in parametric variation to each other (different orderings of compositions of those features with $\pi_{(\chi)}$). Thus, cases of four-way pronouns/demonstratives and of three-way demonstratives/pronouns do not constitute a featural asymmetry, in and of themselves.

contiguity requirement imposed by the vicinity function encoded in the internal structure of demonstratives (see analysis in Chapter 4).

C.1.4 Argument 4: The others

The last argument that Lander & Haegeman adduce for the superiority of locative features with respect to person features in the derivation of demonstrative systems is that distal does not actually refer to the location of the other(s). Said otherwise, *that* 'DEM.2/3' does not refer to an entity or an area that is close to the other(s), but simply to an entity or an area that is far from the speaker. This makes the (locative-based) negative definition as "far from speaker (and hearer)" more accurate than (the person-based one) "close to 3".

However, this point crucially depends on the features adopted to account for person: as discussed in Section 3.3, the feature system that I adopt makes reference to 3rd person indirectly, while still being of course a person system. In fact, there is no person feature that exclusively denotes the other(s) discourse atom, unlike [3] in Lander & Haegeman's discussion: its definition is always dependent on the specific interactions that the two available features ([±author] and [±participant]) have with the π_χ lattice.

C.1.5 Conclusions

In sum, the arguments that Lander & Haegeman (2018a) put forth to reject the use of person features in the definition of demonstrative systems are not waterproof. Some of them depend on specific assumptions for person features (C.1.1 and C.1.4) and do not hold for different assumptions, such as those that underlie the person feature system adopted in this dissertation. One of them (C.1.3) is not substantiated by empirical evidence, and one of them (C.1.2) is not incompatible with the adoption of person features.

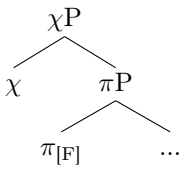
C.2 The internal structure of demonstratives

As shown in Chapter 4, the internal structure for demonstrative forms proposed in this work captures the entire semantic variation (both person- and distance-oriented oppositions) attested across demonstrative systems. This is empirically desirable, given the discussion in Section 3.2.3: nonetheless, the main other accounts for demonstratives that are rooted in person features do not integrate distance oppositions in the internal syntax of demonstratives. This section swiftly discusses those accounts, and namely: Harbour 2016: chapter 7 (general account); Bjorkman *et al.* 2019 (language-specific account: Heiltsuk); and Cowper & Hall 2019a (language-specific account: Marshallese).

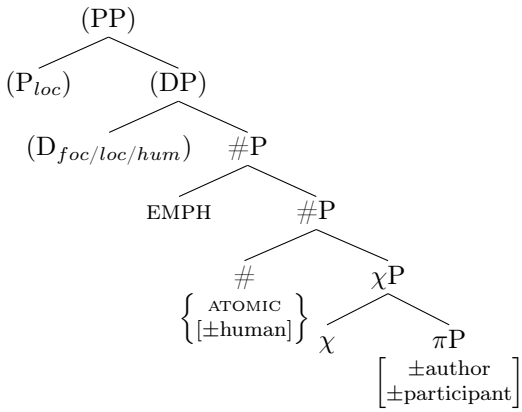
The person features on which these accounts are built are action-on-lattice features (for the former; see Harbour 2016) and traditional predicative features arranged in phonological-like contrastive hierarchies (for the latter two; see

Cowper & Hall 2019b). At any rate, these accounts all assume a χ element which encodes spatial deixis: this is implemented as a head (Harbour 2016, who originally proposed it; Cowper & Hall 2019a) or as a feature (Bjorkman *et al.* 2019):

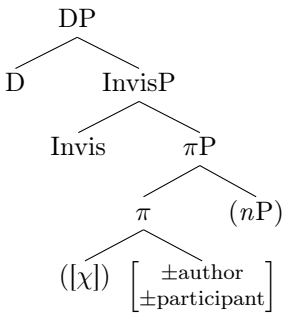
(1) a. Harbour 2016: 179 (adapted)



b. Cowper & Hall 2019a: 8–11 (adapted)



c. Bjorkman *et al.* 2019: 12



Barring some differences, the authors all assume that χ takes as its argument the result of the composition of person features with π to yield the space occupied by the atoms denoted by it. In so doing, they all allow for the full coverage of the person-based deictic oppositions encoded in demonstrative systems.

On top of this, they derive some additional syntactic and semantic oppositions, too. Harbour and Cowper & Hall account for categorial differences, i.e. nominal *vs* adverbial demonstratives. Specifically, Harbour (2016: 180–181)

derives different classes of space deictics by manipulating χ: bare χ derives nominal demonstratives, χ_{space} denotes adverbial demonstratives, and $\chi_{\text{space}_{\pm\text{source}}}$ denotes motion from or to (somewhere), i.e. [+source] *vs* [−source], respectively. Building on their Marshallese data, instead, Cowper & Hall (2019a) propose that categorical differences be derived by embedding the (nominal) demonstrative form under a locative preposition. Further, Bjorkman *et al.* (2019) derive visibility oppositions in Heiltsuk demonstratives by means of an additional InvisP that intersectively modifies (one of) the proximity areas as defined by the application of χ to the individual denoted by π and its person features. Finally, Harbour (2016) and Cowper & Hall (2019a) derive number contrasts relative to the demonstrative's referent (respectively by a ωP and by a #P merged above χP): this captures DP-internal agreement (e.g. *this–these*).[2]

However, distance-oriented contrasts are not addressed in any of the three accounts and seem hardly implementable without any significant modification of those analyses. Moreover, accounts that derive pronominal and demonstrative systems from the same ontology make a prediction relative to the morphology of those systems: one would in fact expect the same person morphology across personal and spatial systems, with personal pronouns serving as basis for demonstrative forms which, in turn, display additional morphology to spell out the (structurally higher) χ component.[3] This is indeed the case for a handful of languages: morphological similarity between personal pronouns or possessive forms on the one hand and demonstrative forms on the other has been shown to hold for Armenian, Japanese, Turkish and Wambule:[4]

(2) a. *Armenian* (Gruber 2013: 192)[5]

Person	Pronouns	Demonstratives
1	es	ays
2	du	ayd
3	na	ayn

[2]Note that, as it is, this fails to account for indexical number distinctions, i.e. those relevant to the deictic centre (the ground), such as those attested in Siwi Berber (see Section 3.4.2), which are fully independent of the number distinctions relative to the referent (the figure), and can be modelled as encoded by a dedicated set of features.

[3]This is not strictly necessary under Bjorkman *et al.* 2019, as there χ is an additional feature hosted on π (see (1c)).

[4]The middle terms of current Japanese and Turkish demonstrative systems are variably analysed as person-oriented (DEM.2) or as distance-oriented (DEM.MED); I leave this issue aside here, but note that the semantics for DEM.2 and DEM.MED seem to be to some extent fluid (both in synchrony and in diachrony), as discussed in Section 3.2.2 (see Jungbluth's 2003 conversational dyad approach) and as preliminarily formalised in Section 6.4.

[5]Besides, Harbour (2016: 174) notes that Old Armenian (enclitic) demonstrative forms: -*s* 'N:DEM.1', -*d* 'N:DEM.2', -*n* 'N:DEM.3', developed into modern Armenian (enclitic) possessives.

b. *Medieval Japanese* (Harbour 2016: 174; Martin 1988: 1067–1068)

Person	Pronouns	Demonstratives
1	konata	kore, ko
2	sonata	sore, so
3	anata	are, ka

c. *Turkish* (Leu 2015: 37–38; Harbour 2016: 176)

Person	Pronouns	Demonstratives
1	ben	bu(n)
2	sen	şu(n)
3	o	o(n)

d. *Wambule* (Nepalese Kiranti, Harbour 2016: 175)

Person	Possessives	Demonstratives
1EXCL	a	ame
2	i	ime
3	aŋ	

Note, however, that the prediction that personal pronouns serve as the morphological base for demonstratives is strictly borne out only for Wambule (*-me* $\Leftrightarrow \chi$; *a-*/*i-* $\Leftrightarrow \pi_{[F]}$, abstracting away from the mismatch in partition attested across the two person and the spatial domain). Instead, Armenian, Turkish, and Japanese do not fully support this prediction, as one and the same morpheme is included in both structures (e.g. Armenian *-s* in both *es* and *ays*), but the full pronominal form is crucially *not* contained in the demonstrative one.

On a more general note, this prediction does not seem to be borne out on an extensive scale, as these cases are rather recorded as rarities: this raises the question as to why this pattern would be so restricted, given the compositional account proposed for demonstratives as (syntactic, thus morphological) extensions of pronouns. The account proposed here, instead, plainly captures the differences between pronominal and demonstrative systems by positing two different ontologies, which allows for the rare instances of syncretism between the two systems (by virtue of the otherwise completely parallel structures), but without predicting them.

C.3 Alternative accounts for change

Chapters 5 and 6 laid out my account for the reduction of (qua)ternary demonstrative systems: I suggested that the process can be modelled in terms of feature loss and argued that feature loss is driven by third factor principles (ultimately bringing about a more efficient computation) and further constrained by a structural factor (Last in, First out: only non-primary features may be lost).

In this section, I discuss some other (actual or conceivable) accounts for the reduction patterns and show that they fair overall less well; more specifically, I focus on: markedness-based accounts (C.3.1), frequency-based explanations (C.3.2), and accounts based on different person feature systems (C.3.3).

Instead, I leave out of this discussion accounts that reduce (some instances of) change in demonstrative systems to the effects of contact (see, most recently, Vulchanova *et al.* 2020; but cf. Vulchanova *et al.* 2022 for partly different conclusions). This issue is reviewed in Section 2.3, where I concluded that the patterns of reorganisation of (qua)ternary demonstrative systems to binary ones do not (unambiguously) reflect the structure of demonstrative systems in the contact languages and cannot, as such, be solely characterised as being contact-induced. Besides, the very availability of the same patterns of reduction in contact and in diachrony alike requires a unitary account, that is one which cannot be limited to the purported effects of contact.

Also note that the reorganisation of demonstrative systems cannot be the mere effect of some post-syntactic mechanism, such as impoverishment (the deletion of a feature in a given context at the morphological level, under Distributed Morphology accounts; see Bonet 1991 and, in general, Halle & Marantz 1993, 1994), because the reductions discussed so far clearly have semantic bearings: therefore, any change must take place before Spell-Out, to ensure that the relevant readings arise. In fact, as discussed in Section 1.2.3, the reduced systems (i.e. the two resulting binary systems) should be conceived as conflating two or three of the semantic oppositions originally encoded in, respectively, ternary and quaternary systems, rather than as being impoverished. This amounts to analysing those oppositions, and thus the features that derive them, as absent in the syntax, rather than as undergoing morphological impoverishment or as simply being syncretically realised.

C.3.1 Reduction patterns and markedness

A fairly common assumption is that diachronic change tends to bring about an overall decrease in markedness (see e.g. Stein 1989 and references therein). Here, I review this assumption, and specifically I discuss whether the systems that undergo diachronic simplification should be regarded as marked. Such a hypothesis has been put forth for (qua)ternary demonstrative systems: for instance, while discussing the reduction of the original ternary Portuguese system

to a binary one in Korlai (see Section 2.3.3.2.3), Clements (1996: 101) notes that "a two-degree demonstrative paradigm is considered more unmarked than one of three degrees".

Concretely, I take issues with two distinct notions of markedness, which seem to be easily applicable to demonstrative systems: Greenbergian markedness (C.3.1.1) and parametric markedness (C.3.1.2). Both discussions conclude that (qua)ternary systems cannot be straightforwardly formalised as marked, under either interpretation of the term.[6]

Further, even granting that (qua)ternary systems are indeed marked, that does not in and of itself provide a principled account for why those systems tend to reduce to binary ones, nor for why the hearer-related deictic domain (and the exclusively speaker-oriented one, in quaternary systems) is systematically lost in the reduction process. In fact, in spite of its wide use, markedness is a very poorly defined concept. Haspelmath (2006) showed that it is indeed used in different senses across research fields and proposed that, in each of those senses, it can (and should) be reduced to more primitive factors, such as frequency of use, economy and pragmatic principles, and/or category-specific factors. Besides, exactly because of the difficulty to precisely pinpoint it to a concrete definition, "markedness" can be regarded as widely descriptive, rather than explanatory.

C.3.1.1 Greenbergian markedness

In one of the foundational works on markedness, Greenberg (1966) enumerates a series of properties that systematically correlate with marked categories on the one hand and with unmarked categories on the other. Importantly, he shows that these properties are the same, *mutatis mutandis*, across phonology, morphosyntax, and the lexicon: this suggests that they all hinge on some more primitive difference across the unmarked-marked pair. Greenberg identifies this difference in the implicational relation which stands between marked and unmarked forms: namely, the marked term always logically implies the unmarked one. This is formalised into (absolute) implicational universals of the type: "If a language has X, then it also has Y"; a famous series of such universals is

[6]Other possibly relevant notions are: morphological difficulty and semantic markedness. The former relates to the degree of transparency of a system (the more homonymy the system includes, the more marked it is). Under this respect, binary systems can be regarded as less transparent than (qua)ternary ones and, as such, as more marked.

The latter refers to the specificity of a member within a semantic opposition (the more constrained a member is in its occurrence, the more marked it is): for instance, given the opposition between singular and plural, plural can be regarded as semantically unmarked as it can refer to both singular and plural entities (*do you have children?*), whereas singular may only be used for singular ones (see, for instance, Alexiadou 2019 and references therein). In this sense, one could view DEM.2 as being more "marked" than DEM.1(INCL) in quaternary systems of the Old Neapolitan type discussed in Section 5.2.1: in those systems, the hearer-oriented term is used to make reference to the hearer-related deictic domain only under specific pragmatic conditions. This is however neither the case for genuine ternary systems nor, possibly, for quaternary systems which are not undergoing change.

proposed by Greenberg (1963).

In this sense, thus, markedness amounts to the possibility of defining implicational universals across a series of categories, which are then in turn expected to display some specific properties. Here, following this rationale, I consider the (absolute) implicational universals that can be defined for (qua)ternary demonstrative systems and discuss their properties. Let me start by enunciating the relevant universals which, to the best of my knowledge, can be formulated in the Greenbergian fashion:

(3) a. *Implicational universal 1*
If a language has a hearer-oriented demonstrative (DEM.2), then that language also (at least) has speaker-oriented and non-participant-oriented demonstratives (DEM.1 and DEM.3).

b. *Implicational universal 2*
If a language has an exclusively speaker-oriented demonstrative (DEM.1EXCL), then that language also has hearer-oriented, non-participant-oriented, and inclusively speaker-oriented demonstratives (DEM.2, DEM.3, and DEM.1INCL, respectively).

Granting that the *implicans* is more marked than the *implicatum*, DEM.2 and DEM.1EXCL are to be conceived as more marked than the other demonstrative categories in (qua)ternary systems. This is intuitively convergent with the second main generalisation that emerged from the featural revision of Chapter 2 laid out in Section 5.2.2: namely, that DEM.2 and DEM.1EXCL are the deictic domains that undergo loss whenever (qua)ternary systems are reduced. However, the implicational universals in (3) only partially correlate with the other properties which tend to be associated with (un)marked terms. Here I restrict the discussion to three such properties that can be best explored with respect to demonstrative systems.

Firstly, marked terms may be neutralised in favour of unmarked ones, in the suitable environments. This is in part true in quaternary systems: as discussed in Section 5.2.1, whenever a fine-grained distinction within the general participant-related domain can be avoided, either ⇒2 (the exponent for DEM.2, "marked") is substituted by $\Rightarrow 1_I$ (the exponent for DEM.1INCL in that system, "unmarked") or ⇒1 (the exponent for DEM.1EXCL, "marked") is substituted by $\Rightarrow 2_I$ (the exponent for DEM.1INCL in that system, "unmarked"). In either case, a marked term is substituted by an unmarked one. However, this is not true for ternary systems, where ⇒2 (the exponent for DEM.2, marked) is systematically employed, regardless of the pragmatic context.

Secondly, unmarked categories are typically more frequent than marked categories. Again, this is overall true for quaternary systems (see again the discussion in Section 5.2.1), but not so for ternary ones. Beyond word frequency considerations, this point can also be explored in terms of cross-linguistic rarity, too, as is commonly done in typological research. Saying that DEM.2 and DEM.1EXCL are marked and, as such, less frequent, amounts to saying that demonstrative systems that include those terms ((qua)ternary) are less frequent

than demonstrative systems that lack them (binary, unary). Let us assess this prediction against WALS' Feature 41A (Diessel 2013a), the most extensive collection of demonstrative systems to date. The systems reported there can be quantitatively summarised as follows:

(4) *Feature 41A: Quantitative overview* (Diessel 2013a)[7]

Demonstrative system	$n/234$	%
Quaternary (and bigger)	13	5.55
Ternary	88	37.61
Binary	126	53.85
Unary	7	2.99

Thus, quaternary systems are definitely rare (as already highlighted in Section 3.4.1), but crucially ternary systems more common (hence, less typologically marked) than unary ones, and rather similar, in terms of frequency, to binary ones.

Thirdly and finally, marked terms tend to display fewer (orthogonal) grammatical contrasts than unmarked ones: this is not the case for demonstrative systems, which display instead the same grammatical contrasts (number and gender information, as available in the relevant languages) across the whole system and regardless of the purported markedness of one (or more) of its terms. Said otherwise, it is not the case that ⇒2 shows a different (smaller) set of uninterpretable features than ⇒1 and ⇒3 in ternary systems.

More importantly, the implicational universals in (3) can be shown to receive a principled explanation in terms of the featural derivation of the relevant systems: this makes the notion of markedness derivative and its use as an explanatory tool insubstantial. A feature-based derivation of implicational universals was originally proposed by Harbour (2011) for number categories; here, I swiftly illustrate this rationale and show it can be applied to the deictic oppositions encoded in demonstrative systems, i.e. to the person features that derive them, as well.

Harbour (2011) considers for instance the implication that holds between the dual category and the singular and plural ones:

(5) *Greenberg's Universal 34* (Greenberg 1963: 74)
No language has a dual unless it has a plural.

The supposed markedness of the dual category (*implicans*) is then shown to be the result of the featural derivation of the relevant number categories. Consider

[7]These figures are not in line with the analysis proposed in Chapter 4, whereby some (qua)ternary systems are construed as being, in fact, binary systems with additional distance-oriented modifications. Following a preliminary implementation of that idea in the WALS sample, that might apply to 47 of the 101 (qua)ternary systems, lowering the overall percentage of (qua)ternary person-oriented oppositions. This issue requires however further investigation.

the following number systems (the features are based on Harbour 2014a and further illustrated in Appendix D.2):[8]

(6) a. *Ternary system: singular* vs *dual* vs *plural*

i.	singular	+minimal(+atomic(P))
ii.	dual	+minimal(−atomic(P))
iii.	plural	−minimal(−atomic(P))

b. *Binary system: singular* vs *plural*

i.	singular	+atomic(P)
ii.	plural	−atomic(P)

Ternary number systems (singular–dual–plural, (6a)) are derived by two active features, [±atomic] and [±minimal]; instead, binary number systems (singular–plural, in (6b)) only require the activity of one feature, [±atomic]. Crucially, then, singular and plural are derived by one feature alone when they stand in a two-way opposition with each other, as in (6b), and do not of necessity need a second feature, as in (6a); dual, instead, cannot be derived under such a small feature inventory and needs one further feature, i.e. [±minimal]. The addition of [±minimal] to the inventory, however, is immaterial to the derivation of singular and plural and still naturally allows for them both, though with a larger feature inventory. That is, the features necessary to derive the dual are sufficient to also derive the singular and the plural, which come into the system for free. The opposite is instead not true (as attested by the binary system in (6b), which can only derive up to two contrastive categories). This is how the featural derivation of number categories captures the implicational universal "dual → singular/plural".

A similar rationale can be followed to capture the implicational universals uncovered for demonstrative systems. This is shown in full in Section 5.3; here, I only swiftly reproduce the arguments to show that the universals in (3), too, immediately fall out of the adopted person feature system.

Implicational universal 1 in (3a) concerns ternary demonstrative systems and speaker-based binary systems. (7) shows that the feature inventory necessary to the derivation of DEM.2 is also naturally sufficient to derive DEM.1 and DEM.3, while the opposite is not true:

(7) *Ternary systems (a) → speaker-based binary systems (b)*

a.	i.	DEM.1	$+P(+A(\pi_\chi))$	b.	i.	DEM.1	$+A(\pi_\chi)$
	ii.	DEM.2	$+P(-A(\pi_\chi))$		ii.	DEM.2/3	$-A(\pi_\chi)$
	iii.	DEM.3	$-P(\pm A(\pi_\chi))$				

Similar conclusions hold for implicational universal 2 in (3b), which instead is centred on quaternary and participant-based binary demonstrative systems,

[8]Simplifying for the present purposes, [±atomic] denotes all the atomic subsets of P (i.e. those that are constituted by only one element: +atomic, or singular), or their complement set (i.e. all the non-atomic subsets of P: −atomic). Of the [−atomic] subsets, [+minimal] denotes the lowest lattice layer (here, that which only includes two elements: dual), while [−minimal] denotes all higher layers (i.e. those which include more than two elements: plural).

as shown by (8). Here as well, the implications that can be defined between the different person categories plainly derive from the featural definition of the available forms, as the feature inventory necessary for the derivation of the DEM.1EXCL makes the system sufficient to also derive DEM.1INCL, DEM.3 (and DEM.2), while the opposite does not hold:

(8) *Quaternary systems (a) → participant-based binary systems (b)*

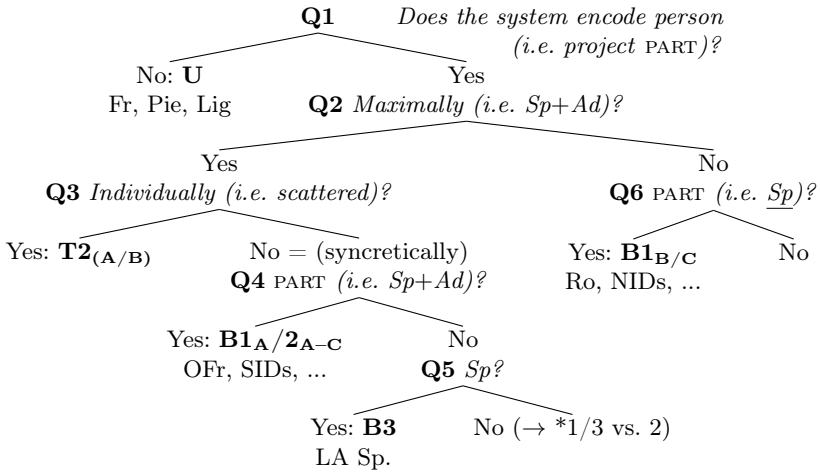
a.	i.	DEM.1EXCL	$+\mathrm{A}(-\mathrm{P}(\pi_\chi))$	b.	i.	DEM.1/2	$+\mathrm{P}(\pi_\chi)$
	ii.	DEM.1INCL	$+\mathrm{A}(+\mathrm{P}(\pi_\chi))$		ii.	DEM.3	$-\mathrm{P}(\pi_\chi)$
	iii.	DEM.2	$-\mathrm{A}(+\mathrm{P}(\pi_\chi))$				
	iv.	DEM.3	$-\mathrm{A}(-\mathrm{P}(\pi_\chi))$				

Thus, implicational universals are a by-product of featural definitions, rather than primitives within a given system: as a result, purported markedness relations between members of the set of demonstrative forms cannot be invoked in their own right to explain the instability of (qua)ternary systems.

C.3.1.2 Parametric markedness

Recently, Ledgeway (2020) proposed that variation across Romance demonstrative systems can be captured by a parameter hierarchy organised as follows:[9]

(9) *Romance demonstratives: Parameter hierarchy* (Ledgeway 2020: 477)



[9]Abbreviations: 'U' = unary, '$\mathrm{B1_A}$' = non-innovative participant-based systems (Section 2.2.2.2), '$\mathrm{B1_{B/C}}$' = (non-)innovative speaker-based binary systems (Sections 2.2.2.1 and 2.2.3.1),'$\mathrm{B2_{A–C}}$' = innovative participant-based systems (Section 2.2.3.2), 'B3' = innovative speaker-based systems (Section 2.2.3.1), '$\mathrm{T2_{(A/B)}}$' = ternary systems (Section 2.2.3); 'Sp' = speaker, 'Ad' = addressee, 'PART' = participant; Languages: 'Fr' = French, 'LA Sp.' = Latin American Spanish, 'Lig' = Ligurian, 'NIDs' = northern Italian dialects, 'OFr' = Old French, 'Pie' = Piedmontese, 'Ro' = Romanian, 'SIDs' = southern Italian dialects.

Assuming this, a different notion of markedness that can be explored in this context relates to whether the given system results from "marked" parameter settings.

The definition of parameter hierarchies such as that in (9) is rooted in the Cambridge-based ReCoS team's research that stretched over the past decade (for a comprehensive overview, see Roberts 2019). The core idea is that the parameters that govern cross-linguistic variation are not independent of one another; rather, single parameters should be combined, so as to capture the consequences that one parameter setting has on other parameter settings and, ultimately, limit the amount of grammars that can be generated and the acquisition space with it. Related parameters are thus modelled into parameter hierarchies.

Importantly for the present discussion, parameter hierarchies capture the "markedness" of parametric choices. They do so by replicating the different range of application for a given parameter: on the top of the hierarchy, the most general domain is specified (i.e. a given feature does not apply at all, or applies to all relevant heads), which makes the option less marked; going downwards in the hierarchy, the domain of application of a parameter is progressively restricted, yielding more marked options (and in need of longer descriptions; see Section 5.3). In the parameter hierarchy in (9), for instance, the first parameter (Q1) defines the most wide-ranging option, as it applies to systems as a whole; instead, lower parameters have progressively restricted domains of application. Concretely, then, markedness is read off the hierarchy as a function of how embedded a given parameter is in the overall hierarchy: the more embedded the parameter, the more marked the phenomenon that results from it. In (9), the first question (Q1) defines the least marked (and most general) option, whereby person is not encoded in the demonstrative system; if instead person is encoded in the demonstrative system, Q2–Q6 further determine its actual featural content (in line with the feature geometry proposed by Harley & Ritter 2002), making the parameter settings more marked as we move down the tree.

Granting the hierarchy in (9) and, at the same time, the premises on which it is built (that parametric markedness hinges on how embedded a given parametric option is), we should conclude that some speaker-based binary systems ($B1_{B/C}$) are as marked as ternary ones, by virtue of being equally embedded; further, some binary demonstrative systems (B3) are even more deeply embedded than ternary ones, making them more marked.

Thus, the purported markedness which would derive the reduction of (qua)-ternary systems cannot be regarded as a consequence of parameter setting. Moreover, the derivation of the evolution of ternary systems into binary ones does not seem to be trivially derivable by making different parameter choices within the hierarchy in (9).

C.3.2 Reduction patterns and frequency

As reported in Section 5.2.1, Ledgeway (2004) shows that old Neapolitan nominal demonstratives (and other old southern Italo-Romance demonstrative systems) should be more accurately characterised as a fundamentally binary participant-based system that can use an extra hearer-oriented form to refer to the hearer-related deictic domain when pragmatically necessary. In fact, across different stages of evolution of old Neapolitan, Ledgeway (2004: 86–87) found an average percentage of 6.4% of hearer-oriented nominal demonstratives (n=155/2419), out of which only slightly less than half (n=72/155, i.e. 2.98% of the overall total) are used in the exophoric function. Besides, Ledgeway (2004: 88) shows that hearer-oriented forms were not systematically used to mark the hearer-related deictic domain (this only happens in 33.6% of the cases; n=72/214), which was instead more commonly expressed by means of "inclusive" speaker-oriented terms. Comparable figures result from a preliminary investigation of a wider sample of southern Italo-Romance varieties (Ledgeway 2004: 90; 4.3% of hearer-oriented forms, n=83/1242) and from a sample of modern Neapolitan texts with respect to hearer-oriented adverbial demonstratives (Ledgeway 2004: 100; 5.2% of hearer-oriented forms, n=35/670). On these grounds, Ledgeway concludes that the use of the hearer-oriented form should be regarded as "marked" and "emphatic" (2004: 89).

However, these frequency (and, concurrently, pragmatic) considerations do not seem to be valid as an outright explanation for the reduction of (qua)ternary systems to binary ones. In fact, while the nominal demonstrative system of Neapolitan underwent a reduction (quaternary > binary), the adverbial one did not, despite showing comparable rates of use of the hearer-oriented term (*lloco* 'A:DEM.2'). A similar mismatch between the nominal and the adverbial domains has been already highlighted for Brazilian Portuguese (see e.g. Section 3.2.1), but is reported for several other Romance varieties by Ledgeway & Smith (2016: see 54.1.4.1, in particular). It should nonetheless be noted that not many studies are currently available which investigate the comparative frequencies of demonstrative forms in diachrony. Pending this, it can be tentatively concluded that frequency explanations fall short when it comes to explaining why only some infrequent forms in a given language fall out of use, and not others.

As an aside, note that my account (as laid out in Chapters 5 and 6) does not make predictions on which specific form(s) will fall out of use, nor does it presently explain the actuation of a given reduction pattern, but it only provides a reason for the different possible patterns of (semantic and formal) reduction. Frequency considerations, instead, do not account for the domain of the possible (and impossible) reduction patterns; however, they may provide some insight on their actuation. Therefore, the issue is worth investigating further, despite being substantially orthogonal to that investigated here.

C.3.3 Other featural accounts

Outside of the feature system assumed here, it is not possible to capture in a principled way the monotonicity-related considerations on which the account proposed above rests: those are in fact inherent to action-on-lattice features, as already emphasised in Section 5.4). In this section, I additionally focus on the descriptive shortcomings of other feature systems, which do not seem to provide a straightforward handle on the attested reduction and variation patterns. Concretely, I quickly evaluate some alternative person primitives against the demonstrative systems under investigation.

Binary features Traditional binary features predicate a property of their argument, rather than performing set operations on it. The two features adopted so far, [author] and [participant], cannot be straightforwardly used to capture the quadripartition: in fact, only three out of four combinations of person features are valid, as the "fourth" combination [+author, −participant] is logically excluded (the speaker cannot be a non-discourse participant). Thus, only three of the four person categories can be derived. A solution is the addition of a third person feature dedicated to the hearer in the system, be it a binary [±hearer] (see Watanabe 2013: section 5) or a privative [hearer] (see Harbour 2006; Nevins 2007; *i.a.*). The former option, without extrinsic constraints, leads to overgeneration of the inventory of person categories (8 categories are generated, but only 4 are attested; see Watanabe's impoverishment rule for a solution: Watanabe 2013: 485). The latter option requires similar extrinsic mechanisms, both to limit the application of the [hearer] feature to some feature combinations only and, possibly, to avoid the logical clash of the [+author, −participant] combination.

The derivation of the clusivity distinction is more obvious if the feature inventory consists of [±speaker] and [±hearer] (see Bobaljik 2008 *i.a.*). However, this alternative inventory is suboptimal in deriving the participant-based bipartition, differently from the previous one: instead of a single [±participant] feature, two active features are required, namely:

(10) a. [+speaker, −hearer] or [−speaker, +hearer] or [+speaker, +hearer] cf. [+participant]

b. [−speaker, −hearer] cf. [−participant]

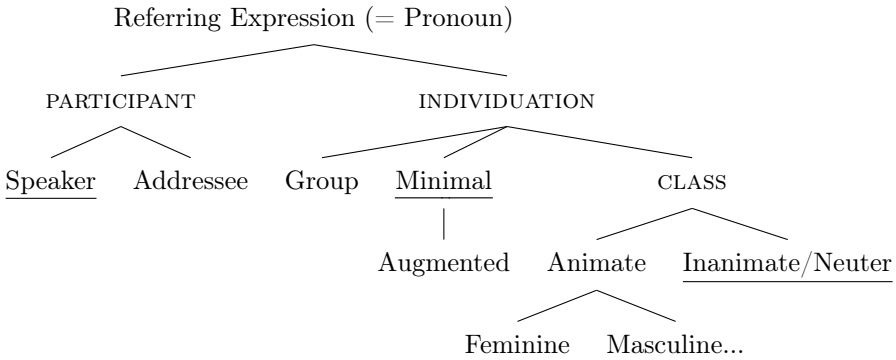
The three feature combinations in (10a) converge in the derivation of the logical disjunction of the participant(s), but do so using one feature more than the system assumed here. Likewise, but without optionality, the derivation of the non-participants is ensured by the activation of two features. Under the hypothesis that longer strings are more complex (see Section 5.3), this system is less economical in the derivation of participant-based binary systems. Besides, the reduction of (qua)ternary systems to participant-based binary ones cannot be accounted for in terms of feature loss (as both systems are characterised by the activity of both features). Finally, assuming that ternary demonstrative

systems reduce to speaker-based binary ones by losing [±hearer], an account based on these binary features would require two different explanations for the reduction of (qua)ternary demonstratives into the two binary systems.

Privative features Privative features may be conceived as organised in a geometry (Harley & Ritter 2002) or as instantiating a containment hierarchy (Vanden Wyngaerd 2018); either way, they fail to capture some of the formal patterns of (semantic) reduction attested in demonstrative systems.[10]

Let us consider first the feature geometry proposed by Harley & Ritter (2002), which underlies most privative approaches to ϕ features (most notably within the Distributed Morphology framework). The feature geometry has the following shape:

(11) *Feature geometry* (Harley & Ritter 2002: 486)



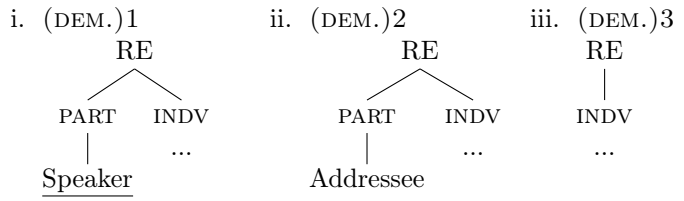
The geometry, as represented here, captures relations among features: features in a lower position logically imply the nodes/features that contain them. The basic features within this system are those typed in small caps: PARTICIPANT, INDIVIDUATION, and CLASS; the activity (i.e. the presence, in a monovalent or privative feature system) of their dependent nodes defines person, number, and gender, respectively. Among the dependent nodes, one is underlined: that represents the default value for the relevant main node (speaker for PARTICIPANT, minimal for INDIVIDUATION, and inanimate/neuter for CLASS), i.e. its default interpretation, in the absence of active dependent features.

Assuming this geometry, ternary systems can be derived by the activation of PARTICIPANT—[speaker] for DEM.1, PARTICIPANT—[addressee] for DEM.2, and by the non-activation of the PARTICIPANT node for DEM.3; see (12a). Quaternary systems display the additional inclusive value (DEM.1INCL) derived by PARTICIPANT—[speaker, addressee], where inclusive is plainly construed as the combination of 1st and 2nd person features. Importantly, this makes [speaker]

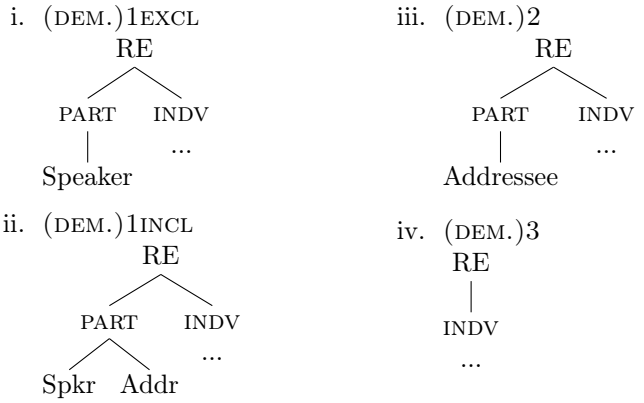
[10] I leave aside the [1], [2], and [3] features here, which are taken to constitute syntactic primitives themselves and, as such, do not allow to establish relations between the features, either in terms of shared primitives or as regards (non-stipulative) complexity relations. These features may ultimately be regarded as an essentially descriptive tool.

fully contrastive in this system, and as such 1st person exclusive is derived as PARTICIPANT—[speaker], with the latter not representing the default, in contrast to the derivation of 1st person in ternary systems, as in (12b):

(12) a. *Ternary systems*



b. *Quaternary systems*



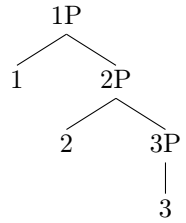
As such, 2nd person (and for the present purposes: DEM.2) may be regarded as more complex in ternary systems, as it is not derived by the "default" value for the PARTICIPANT node; 1st person (DEM.1) and 3rd person (DEM.3) may instead be regarded as less complex, as the former is the default interpretation of the PARTICIPANT node, and the latter does not even involve its activation. In quaternary systems, instead, 1st person exclusive (DEM.1EXCL) and 2nd person (DEM.2) are derived by means of two fully contrastive features, making them substantially equal in this respect; the inclusive form (DEM.1INCL) is instead the complex category, as it involves the activation of both dependent features ("[t]he 1st person inclusive forms [...] have a maximally complex Participant node", Harley & Ritter 2002: 490).

Thus, while the derivation of ternary systems under privative features makes the same prediction as the feature system adopted in this work (2nd person is more complex), that of quaternary systems makes different predictions, and concretely: 1st and 2nd person have an equal level of complexity, which is higher than that for 3rd person, while 1st person inclusive shows increased complexity with respect to all other categories. As such, the reduction of quaternary demonstrative systems could not be explained in terms of a general reduction of computational complexity.

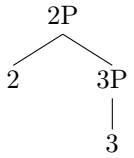
Further, the patterns of reduction of demonstrative systems discussed in Chapter 6 do not naturally fall out of the geometry as illustrated in (11). An impoverishment mechanism, whereby one of the active features becomes inactive in a given context/form, could be conceived as underlying the eventual loss of semantic contrasts: failure to activate the [addressee] feature in ternary systems would result in a system where the only two available person categories are the (default) speaker one, and the non-participant one;[11] failure to activate both the [speaker] and [addressee] features in quaternary systems (and under the additional assumption that, in these cases, [speaker] is not a default feature) would result in a system where the only two available person categories are the participant one and the non-participant one. However, formal variation seems to partly eschew an account in these terms. Specifically, in case of reduction to a speaker-based binary system (Pattern B: e.g. Latin American Spanish *este–ese* 'N:DEM.1–N:DEM.2/3') the preservation of the hearer-oriented term in the non-speaker-oriented function and the concomitant loss of the (less "marked") non-participant-oriented one are difficult to implement in terms of competition between the two forms.

Let us now turn to structurally nested privative features (and as posited in the nanosyntactic framework; but see also, for the original proposal in this direction, Béjar 2003): that is, features regarded as privative and, additionally, as instantiating a containment relationship such that more embedded features contribute to the definition of features that embed them (cumulative features). Following Vanden Wyngaerd's (2018) proposal for person, the three features are [speaker], or [1]; [participant], or [2]; and [person], or [3]. Cumulativity can be straightforwardly illustrated with respect to 1st person: 1st person is characterised by all three features, at once, as the speaker is also a participant and, more in general, a "person"; 2nd person, instead, is simply a participant and a "person", and therefore has a smaller structure; 3rd person, finally, is simply a "person", yielding the smallest structure. The containment hypothesis for the cumulative privative person features yields thus the following internal structures for pronouns (from Vanden Wyngaerd 2018: 279):

(13) a.



b.



c.

[11] This is not fully equivalent to the speaker–non-speaker opposition of speaker-based binary systems. With respect to this point, it should be noted that Harley & Ritter (2002: 513) openly predict that "languages that use the same pronoun [...] for [...] both 2nd or 3rd persons" should not exist: this essentially rules out a reduced speaker-based binary system, where the very distinction between 2nd and 3rd person can be conceived as absent.

The first glaring gap of an account in terms of nested privative features consists in the derivation of quaternary systems, i.e. systems that encode the inclusive-exclusive opposition: Vanden Wyngaerd (2018: 278) leaves this case for further research. This issue was raised in Section 3.4.1 with respect to Lander & Haegeman's (2018a) account for demonstrative systems, and those remarks can be substantially (but not immediately) extended to the derivation of personal pronouns. Concretely, the assumption that embedded features are integral subparts of the features that embed them presents a challenge to the modelling of the clusivity distinction: the inclusive meaning can be construed as denoting both the speaker (here: [1], which includes also [2] and [3]) and the hearer (here: [2], which also includes [3]). As such, we might be willing to assume that the inclusive sits at the very top of the nested structure, including all other categories. However, [1] (i.e. 1st person exclusive) already oddly contains [2], according to the structure in (13a): therefore, the containment relations between [1] and [2] (and a possible, additional category) cannot be modelled in a straightforward way consistently with the interpretation of the clusivity contrast.[12]

Leaving aside quadripartitions altogether and focusing exclusively on tripartitions, a system of cumulative privative person features does not make it possible to single out 2nd person, as opposed to 1st and 3rd persons, to derive its idiosyncratic behaviour as attested by the patterns of reduction of demonstrative systems. In fact, systems as (13) and their ilk consistently rule out the possibility to single out 2nd person in a principled way (i.e., ultimately, they rule out ABA-like patterns). More importantly, they also rule out conflation and only allow for syncretism, contrary to the actual semantics of binary demonstrative systems (see Section 1.2.3): this is due to the assumption that the containment hierarchy is universally present in language (and only possibly made opaque by morphology, with syncretisms), which makes it impossible to derive the semantic reduction that binary systems clearly attest, as opposed to ternary systems.

To conclude, this short review of other feature systems suggests that they are not as descriptively adequate as the one adopted here. Binary features systems need additional extrinsic assumptions, or are outright challenged by participant-based binary systems; geometrically organised privative features face questions with respect to the different formal patterns of reduction; and nested privative features do not provide a satisfactory treatment of quadripartitions and of binary systems.

[12]Moskal (2018) proposes a containment relation which accounts for the attested/unattested patterns of suppletion in personal pronouns with respect to 1, 1EXCL, and 1INCL, whereby 1INCL includes 1EXCL which in turn includes 1 ("[t]he inclusive always properly contains the exclusive", Moskal 2018: 10). However, this containment hypothesis is only relative to 1st person and may not be straightforwardly extended to other person categories.

APPENDIX D

Indexical asymmetry: Background and data

Chapter 6 proposed that (qua)ternary demonstrative systems undergo reduction to binary ones because of feature loss, as triggered by featural complexity and as constrained by the Last in–First out principle. Further, it showed that these same featural and structural conditions are (counterintuitively) fully compatible with the stability of pronominal paradigms by virtue of a key structural difference across the two paradigms: namely, person features are embedded under number features in pronominal paradigms, but not in demonstrative systems, making the person features of the former, but not of the latter, stable.

This Appendix describes the diachronic and contact behaviour of 2nd person in Romance pronominal paradigms, to better illustrate the indexical asymmetry (Section D.1). It then provides further details about the number-related assumptions put forth in Section 6.5.1 (Section D.2). It concludes by listing the languages whose pronominal systems underlie the generalisations drawn in Section 6.5.2.2 (Section D.3).

D.1 Illustrating the asymmetry

In Romance languages, personal pronouns are most commonly found to encode a three-way opposition between the speaker of a given utterance (i.e. the 1st person), the hearer of a given utterance (i.e. the 2nd person), and the other(s), those who are not involved as discourse participants in a given utterance (i.e. the 3rd person). This organisation can be shown to be consistent both in diachrony and, by and large, in contact: that is, pronominal ternary systems do not lose their 2nd person, in spite of its featural complexity, and unlike

demonstrative systems in the same varieties. The discussion is partly based on Terenghi (2021d).[1]

Romance personal pronouns in diachrony When observed in its diachrony, the organisation of personal pronoun paradigms is remarkably stable. In present-day Romance varieties, personal pronouns systematically display the ternary partition of the deictic space that was attested in Latin. This is the case for all 32 (major and minor) Romance languages for which the entire pronominal paradigm is reported in at least one case morphology in contributions included in Jungbluth & Da Milano (2015) and/or in Ledgeway & Maiden (2016) (for a full list and references, see D.1.1). Consider for instance the pronominal paradigm of Corsican:

(1) *Corsican* (Ledgeway 2016b: 217)

	1SG	2SG	3SG.M	1PL	2PL	3PL.M
Latin	ego	tu	ille	nos	vos	illi
Corsican	eio	tu	ellu	no	voi	elli

Corsican contrastively encodes three persons, i.e. it fully preserves the ternary deictic systems of Latin. Note that Latin's 3rd person semantics was expressed by demonstrative forms (from the non-participant-oriented ILLE paradigm): for the present purpose, such categorial considerations are irrelevant. What is relevant, instead, is the very availability of the 3rd person semantics (i.e. the fact that 3rd person is not conflated with a different person). The same is true for the remaining 31 varieties in the sample, barring number-, gender-, and case-driven morphological variation (for an overview thereof, see Cappellaro 2016), as well as the introduction of new lexical items within the system (e.g. in Brazilian Portuguese: see *você*(*s*) '2SG(/PL)' and *a gente* '1PL').

Romance-based creoles personal pronouns Similarly, pronominal paradigms in the 29 Romance-based varieties reported by the APiCS (28 Romance-based creoles, 1 mixed language: Media Lengua; see Appendix B.1 for the Portuguese-based varieties and D.1.1 for the Spanish- and French-based ones) retain the partitions attested in their lexifiers:[2]

[1] There, the same conclusions are drawn with respect to possessive paradigms in Romance, too. However, as the discussion of possessives would not provide additional arguments at this juncture and as the sampled paradigms discussed in Section D.3 are restricted to free pronouns, I leave possessive forms out of the picture here.

[2] In the following paradigms, politeness forms are left aside.

(2) *Pronominal paradigms in contact varieties*

a. *Ternary*

	1SG	SG	3SG	1PL	2PL	3PL
French (oblique series)	moi	toi	lui	nous	vous	eux
Louisiana Creole	mwa	twa	li	nou	vouzòt	ye

b. *Quaternary* (1EXCL *vs* 1INCL)

	1SG	2SG	3SG	1EXCL	1INCL	2PL	3PL
Spanish/Hilig.	yo	tú	él	kamí	kitá	kamó	silá
Zamboanga Ch.	(i)yo	etu	(é)le	kamé	kitá	kamó	silá

As the examples above show, if the lexifier displays a ternary paradigm, the resulting contact variety shows a tripartition too (as in (2a)). This is the case of 28 ternary varieties in the sample.[3] Likewise, if the lexifier has a four-way deictic opposition, i.e. if it displays the clusivity distinction (1EXCL *vs* 1INCL), the resulting contact variety does so, too: this is the case for Zamboanga Chabacano in (2b) (and despite the number split for the lexifier: Spanish provides pronominal forms in the singular, while Hiligaynon is the source for the plural).

General remarks Overall, despite multiple sources of formal variation, the semantic values encoded in pronominal paradigms remain unaffected: with the exception of Zamboanga Chabacano, personal pronoun paradigms in Romance varieties clearly display a ternary opposition between the speaker, the hearer, and the other(s) across time and space; this suggests that the semantics of person categories is very stable in personal pronouns. Besides, and crucially, no Romance(-based) language has a pronominal system that only systematically distinguishes two persons, that is: no reduction akin to that attested by demonstrative systems is instantiated in pronominal paradigms.

The stability of pronominal tripartitions and quadripartitions ranges well beyond the Romance family. In a typologically-oriented investigation, Nichols (1992) concluded that the inclusive/exclusive opposition is very stable genetically (and only slightly less so areally): "pronouns and pronoun categories tend to be conservative in families" (*ibid.*, 123–124). This also emerges from D.3 below, where languages are grouped by family and classified according to the person and number distinctions that their free pronominal paradigms encode. For each linguistic family, I report how many languages, among those considered in the dataset, display each type of pronominal system: while variation in

[3]Batavia Creole (Portuguese-based) and Tayo (French-based) optionally display a seeming exclusive–inclusive distinction, but I follow Maurer (2013d: feature 15) and Haspelmath *et al.* (2013) in disregarding the genuineness of those contrasts.

terms of number systems attested within each family is quite consistent, variation in terms of person systems (ternary *vs* quaternary) is considerably more reduced, and even more so across *genera*, with but few outliers. Changes from ternary pronominal paradigms to quaternary ones, or from quaternary pronominal paradigms to ternary ones, are rare and typically regarded as contact-induced. For instance, Siewierska (2004: chapter 7.3) discusses some cases in which the clusivity distinction was acquired by means of lexical or structural borrowings (p. 276), or in which the distinction was lost (pp. 280–281).

Importantly, under the feature system adopted here, these cases can be derived as a parametric change in the ordering of compositions with π ([±author] composes with π first in tripartitions, [±participant] composes with π first in quadripartitions). Importantly, both systems are derived by the activation of both person features: the difference in the number of paradigm cells between ternary *vs* quaternary systems is thus epiphenomenal. As such, it substantially diverges from the difference in the number of person oppositions encoded across (qua)ternary and binary/unary systems, as only the latter are derived by a reduced number of active features.

D.1.1 Datasets

Romance personal pronouns: Dataset

Language [n=32]	**Source**
Aragonese	Tuten *et al.* 2016: 397
Asturian	Tuten *et al.* 2016: 397
Braz. Portuguese (form.)	Jungbluth & Vallentin 2015: 321
Braz. Portuguese (inf.)	Jungbluth & Vallentin 2015: 321
Bresciano	Benincà *et al.* 2016: 195
Campidanese	Mensching & Remberger 2016: 278
Corsican	Ledgeway 2016b: 217
Cosentino	Ledgeway 2015: 103–104; Ledgeway 2016a: 257–258
Dalmatian	Maiden 2016a: 129
Emilian/Romagnol	Ledgeway 2015: 103–104
French	Smith 2016: 311
Friulian	Benincà & Vanelli 2016: 145
Galician	Dubert & Galves 2016: 420
Italian/Tuscan	Ledgeway 2016b: 217; *own knowledge*
Jesino	Loporcaro & Paciaroni 2016: 243
Judaeo-Spanish	Tuten *et al.* 2016: 397
Ladin (Badia-Abtei)	Irsara 2015: 160
Ladin	Salvi 2016: 158–159
Laziale (Colonna)	Ledgeway 2015: 103–104
Logudorese/Nuorese	Mensching & Remberger 2016: 278
Murese	Ledgeway 2015: 104; Ledgeway 2016a: 257

continued on next page

Language [n=32]	**Source**
Neapolitan	Ledgeway 2015: 103–104; Ledgeway 2016a: 257–258
Northern Gallo-Romance	Smith 2016: 316–317
Occitan	Oliviéri & Sauzet 2016: 331, 340
Perugino	Loporcaro & Paciaroni 2016: 243
Portuguese	Dubert & Galves 2016: 420; Valentim 2015: 300
Romanian	Maiden 2016b: 103–105; Stavinschi 2015: 24–25
Romansh/Rumantsch	Anderson 2016: 178
Salentino	Ledgeway 2015: 103–104; Ledgeway 2016a: 257–258
Spanish (standard)	Tuten *et al.* 2016: 397; Gómez Sánchez & Jungbluth 2015: 244
Spoletino	Loporcaro & Paciaroni 2016: 235
Venetan	Ledgeway 2015: 103–104

Spanish- and French-based creoles

Language	**Region**	**Sources**
Spanish-based creoles		
Ternate Chabacano (44)	Southeast Asia	Sippola 2013c,d
Cavite Chabacano (45)	Southeast Asia	Sippola 2013a,b
Zamboanga Chabacano (46)	Southeast Asia	Steinkrüger 2013a,b
Papiamentu (47)	Caribbean	Maurer 2013e; Kouwenberg 2013
Palenquero (48)	Caribbean	Schwegler 2013a,b
Media Lengua (73)	South America	Muysken 2013a,b
French-based creoles		
Haitian Creole (49)	Caribbean	Fattier 2013a,b
Guadeloupean Creole (50)	Caribbean	Colot & Ludwig 2013a,b
Martinican Creole (51)	Caribbean	Colot & Ludwig 2013c
Guyanais (52)	Caribbean	Pfänder 2013a,b
Louisiana Creole (53)	North America	Klingler & Neumann-Holzschuh 2013; Neumann-Holzschuh & Klingler 2013
Reunion Creole (54)	Indian Ocean	Bollée 2013a,b
Mauritian Creole (55)	Indian Ocean	Baker & Kriegel 2013a,b
Seychelles Creole (56)	Indian Ocean	Michaelis & Rosalie 2013a,b
Tayo (57)	Pacific	Ehrhart & Revis 2013a,b
Michif (75)[a]	North America	Bakker 2013a,b

[a] Note that I excluded Michif (mixed language, French and Cree) from the actual sample because its pronominal and possessive systems consist quite systematically of Cree forms

(Bakker 2013a: Section 8; Bakker 2013b: Features 15, 37). The only exception is provided by possessives when used in combination with French NPs: in this case, a French possessive is used and clusivity distinctions might (but need not) be yielded by additional Cree suffixation:

(3) a. POSS.1INCL, sentence 75-104

ta laang-inaan
2.POSS language-1PL

'Our language, inclusive'

b. POSS.1EXCL/1PL, sentence 75-105

not laang-inaan
1PL.POSS language-1PL

'Our language (exclusive)'

D.2 Number features

The key ingredient in the derivation of the indexical asymmetry is the different availability of number features across indexical categories (Section 6.5). In this section, I provide more background about the number-related assumptions upon which my proposal rests.

D.2.1 Number is higher than person

Under the assumed 1 Feature–1 Head architecture for syntax, here I by hypothesis leave aside (perhaps: mainstream) accounts that take person and number features to be encoded as an unordered bundle hosted on a single head.[4] The dissociation of person and number features is supported by observations that relate to the peculiar interactions between the two classes of features, such as the well-known fact that *we* does not mean "multiple *I*s", i.e. multiple speakers (see remarks e.g. by Boas 1911: 35; Benveniste 1966: 232 ff.; Bobaljik 2008: section 2.1): this strongly suggests that

> Person and Number are not indistinguishably tied together through the computation. Number [plural] features just add meaning to that of person and do not modify it. Crucially, this is a natural consequence of number and person being located on distinct heads.
> (Panagiotidis 2002: 24)

The dissociation between person and number seems to be further confirmed by neurolinguistic research, which uncovered different responses to agreement violations in person as opposed to number, and different repair strategies therefor. Specifically, person violations have been shown to be detected faster than number ones, to be processed in different areas of the brain, and to be more costly to repair (Carminati 2005; Mancini *et al.* 2011; Mancini *et al.* 2014; Ackema & Neeleman 2019; and references therein). This is generally taken to support the

[4] Likewise, I do not discuss accounts that take the ϕ bundle to be encoded on a single head but to be (extrinsically) ordered (see e.g. Georgi 2014).

person and number dissociation hypothesis. As a full exploration of this issue, on both its theoretical and experimental sides, exceeds the scope of the present study, the dissociation of person and number in the syntax is simply assumed here.

Accounts that regard number and person features as structurally dissociated have been most typically proposed in connection to agreement phenomena; only more rarely have they been put forth with respect to the derivation of the internal structure of personal pronouns. Nonetheless, if person and number features are taken to be encoded on separate heads, two options are possible as to their relative configuration: either π (the person head) is structurally higher than # (the number head), or # is structurally higher than π. The former is maintained for the internal structure of pronouns most prominently by van Koppen (2012), but is also widely held in relation to the ordering of the person and number probes that enter into agreement (Shlonsky 1989; Ritter 1995; Sigurðsson 1996, 2004; Haeberli 2002: 294 ff.; Sigurðsson & Holmberg 2008; *i.a.*); the latter, instead, is most prominently advocated for by Harbour (2016), Vanden Wyngaerd (2018), and Ackema & Neeleman (2018).

Two main lines of reasoning underlie the former position: firstly, it is generally assumed that person and definiteness (and, more concretely, the D layer within a DP) are in fact unified; therefore, person is taken to be encoded at the top of the DP. This proposal goes back at least to Lyons (1999: 313) and is supported by the exclusively definite nature of person and, under some respects, a seemingly complementary distribution between definiteness and person. Secondly, the hypothesis that person is higher than number has been taken to be substantiated by the hierarchy person > number > gender, which is widely assumed as the basic organisation for ϕ-features (see Noyer 1992: 44 ff. for a first formalisation of this idea as the Universal Feature Hierarchy, built on empirical generalisations uncovered by Greenberg 1963: 74–76). A basic structural implementation for this intuition is due to Harley & Ritter (2002) (see Appendix C.3.3); however, the transposition of Harley & Ritter's feature geometry into the internal structure of pronouns is not straightforward: see van Koppen (2012) for a full implementation in this sense.

Instead, I follow the second position in taking that number is encoded above person. Although a full discussion of this theoretical choice, too, goes beyond the scope of this work, here I swiftly introduce the main arguments on which this decision hinges.

Firstly, granting that distinct syntactic positions (and their relative ordering(s)) are evidenced by their realisation by means of distinct pieces of morphology (with Mirror Principle-compliant linearisation), the morphological decomposition of pronominal categories in person and number morphemes and the ordering of those morphemes should provide support for only one of the two linearisation options (person above number *vs* number above person). While cross-linguistically independent personal pronouns tend not to be analysable in distinct morphemes (the "unanalysable person-number stem" option in Daniel 2013 is found in almost half of the languages in the WALS sample for feature

35: n=114/261), whenever a clear-cut segmentation is possible, then person can be shown to morphologically precede number, as in the following Suena example:

(4) *Suena* (Wilson 1974: 15)

	SG	DU	PL
1	na	nato / nage (INCL)	nakare / nakai (INCL)
2	ni	nito	nikare
3	nu	nuto	nukare

This suggests that person is indeed structurally lower than number, as per the Mirror Principle (options "person stem with a pronominal plural affix", n=23/261; and "person stem with a nominal plural affix", n=19/261; see Daniel 2013).[5]

Linear precedence of person over number is identified also in the verbal inflection, again on a rich cross-linguistic basis and for both head-initial and head-final languages, e.g. by Trommer (2002) and Harbour (2008); see also, for discussion, Harbour 2016: sections 6.5.2, 6.5.3.

Secondly, Harbour (2016: section 6.5.1) points out syntax-semantic interface issues that only arise under the assumption that person is structurally higher than number. The most straightforward problem for this structural hypothesis concerns person systems that encode the clusivity distinction. In this case, two semantically different types of paradigm are attested, which crucially diverge with respect to number: quaternary paradigms with a singular–(dual–)plural number contrast; and quaternary paradigms with a minimal–(unit-augmented–)augmented number contrast:

(5) a. *Potawatomi* (based on Smith 2011)

	singular	plural
1EXCL	nin (i)	ninan (i_o)
1INCL	—	kinan ($iu_{(o)}$)
2	kin (u)	kinwa (u_o)
3	win (o)	winwa (o_o)

[5]The remaining 105 languages in that sample show either an unanalysable person-number stem additionally followed by a dedicated pronominal or nominal plural affix (respectively n=47/261 and n=22/261); or an unanalysable person-number affix on top of an undifferentiated stem (n=25/261); or number indifferent pronouns (n=9/261). Two languages are reported as not having independent pronouns altogether. Note that the first type (additional plural marker) is also substantially consistent with the hypothesis that number is structurally higher than person.

b. *Ilocano* (based on Corbett 2000: 168)

	minimal	augmented
1EXCL	-ko (i)	-mi (i_o)
1INCL	-ta (iu)	-tayo (iu_o)
2	-mo (u)	-yo (u_o)
3	-na (o)	-da (o_o)

In (5a), the 1INCL pronoun may only be analysed as a non-singular form ("you and me (and possibly others)"); this is in contrast to (5b), where two 1INCL forms are present, one restricted to the interpretation "you and me" (*-ta*) and the other one used to refer to "you, me, and (at least) one other" (*-tayo*). The former pronominal affix can be described as denoting a minimal number, in that it refers to the "minimal" amount of individuals to which an inclusive form may refer (namely: two; in fact, under older analyses, this form was construed as an exceptional dual inside a paradigm that does not make dual distinctions otherwise; see Corbett 2000: 166–169 for a discussion); the latter pronominal affix, instead, conveys the augmented reading, whereby a set of referents which is bigger than the smallest possible set of referents is denoted.

As Harbour highlights, only if number is interpreted on top of person can the semantic contrast between (5a) and (5b) be captured. To see this, let us assume that singular–plural systems are derived by [±atomic], while minimal–augmented are derived by [±minimal] (their semantics will be illustrated in more detail below in this section). Granting this, if we posit that the number features act on the power set of the ontology (i.e. of i, u, o) before that is structured by the action of π, [+atomic] will pick out the atoms in the ontology; likewise, [+minimal] will pick out the elements that cannot be broken down further, that is (again) the atoms. If instead $[\![\pi]\!] = \{i_o,\ iu_o,\ u_o,\ o_o\}$ (which structures the ontology to also include iu_o) precedes number features, [+atomic] will pick out the atoms (i, u, o, only, as in (5a)), while [+minimal] will pick out the minimal elements, including iu, thus yielding minimal–augmented paradigms (as in (5b)).[6]

Thus, on morphological and semantic grounds, I assume that number features are merged on top of person features: number features are consistently realised after person features (whenever the two are segmentable; morphology) and "depend on" the presence of person features in yielding semantically different number systems in the derivation of pronominal paradigms (semantics). As such, number must be structurally higher than person.

[6]Note that, to the best of my knowledge, minimal–(unit-augmented–)augmented number systems are not attested either in ternary pronominal systems or outside the pronominal domain, further supporting this point.

D.2.2 Action-on-lattice number features

The assumptions related to number features are once again embedded in Harbour's action-on-lattice approach (2008, 2014a). In short, Harbour's theory of number rests on the assumption of three features, which are hosted by a dedicated number head (Number, as in Harbour 2014a, or ω, as in Harbour 2016; here I will refer to it as #), and of a parameter which determines the (im)possibility for different values of one given feature to co-occur on a single head.[7] Concretely, the three features in the number system adopted here are:

(6) a. $[\pm\text{atomic}] = \lambda x\ (\neg)\text{atom}(x)$

b. $[\pm\text{minimal}] = \lambda \text{P}\ \lambda x\ (\neg)\neg\exists y\ (\text{P}(y) \wedge y \sqsubset x)$
[Presupposition: $\text{P}(x)$]

c. $[\pm\text{additive}] = \lambda \text{P}\ \lambda x\ (\neg)\forall y\ (\text{Q}(y) \rightarrow \text{Q}(x \sqcup y)$
[Presuppositions: $\text{Q}(x)$; $\text{Q} \sqsubset \text{P}$]

(Harbour 2014a: 195, 202)

In these formulae, P is a lattice region and Q is a subregion of that region; x and y are elements within the lattice region; the formula is only true if the presuppositions (where available) are true, while it is otherwise undefined. Intuitively, [±atomic] discriminates between atoms (+) and non-atoms (−); [±minimal], in the person domain, differentiates between minimal elements, i.e. elements that do not have further subelements (+; i.e. *i*, *u*, *iu*, and *o*), and non-minimal elements (−; i_o, u_o, iu_o, o_o, *etc.*); [±additive] specifies "a set of elements that is closed under addition" (+; Harbour 2016), i.e. a lattice subregion such that, if any two points of that subregion were added to each other, the result of this operation would still be included in that subregion ("join-complete region"), as opposed to the case in which the result of that operation is not (necessarily) included in that subregion (−; "join-incomplete").[8] As such, the three features (may) combine, and possibly recursively so (with some provisos), to yield the different number systems presented in Table D.1; as a full exploration of the individual derivations is orthogonal to the present discussion, I refer the interested reader to Harbour (2014a).

D.3 Pronouns

In Section 6.5.2.2, I showed i) that, contrary to demonstrative systems, pronominal systems cannot lose any person feature unless they are lacking number features; and ii) that, conversely, if person pronouns encode number features, they

[7] Here, in line with the architectural assumptions already laid out (1F1H; see e.g. Section 1.3.3), I take the number features to be distributed along the functional spine, rather than to be bundled together.

[8] [±atomic] and [±minimal] define the so-called exact numbers: singular, dual, trial, minimal, unit augmented; [±additive] defines the so-called approximative numbers: (greater) paucal, greater plural, greatest plural, and global plural. Plural and augmented may instead be referred to as catch-all numbers. For a discussion, see Harbour 2014a and Corbett 2000.

Table D.1: Number systems (reduced from Harbour 2014a: 214)

Parameter setting	Number system
{ }	no number
{±atomic}	singular, plural
{±minimal}	minimal, augmented
{±minimal*}	minimal, unit augmented, augmented
{±minimal, ±atomic}	singular, dual, plural
{±additive, ±atomic}$_1$	singular, paucal, plural
{±additive, ±atomic}$_2$	singular, plural, greater plural
{±additive, ±minimal}	minimal, paucal, plural
{±minimal*, ±atomic}	singular, dual, trial, plural
{±additive, ±minimal*}	minimal, unit augm., paucal, augmented
{±additive*, ±atomic}	singular, plural, greater pl., greatest pl.
{±additive*, ±minimal}	minimal, paucal, greater paucal, plural
{±additive*, ±minimal*}	min., unit augm., paucal, greater pau., pl.
{±additive, ±minimal, ±atomic}$_1$	singular, dual, paucal, plural
{±additive, ±minimal, ±atomic}$_2$	singular, dual, plural, greater plural
{±additive, ±minimal*, ±atomic}	singular, dual, trial, paucal, plural
{±additive*, ±minimal, ±atomic}$_1$	singular, dual, paucal, greater pau., plural
{±additive*, ±minimal, ±atomic}$_2$	singular, dual, paucal, plural, greater pl.
{±additive*, ±minimal*, ±atomic}	sg, dual, trial, paucal, greater pau., plural

* indicates feature recursion; different subscript numbers represent different cut-off points for the additive feature, resulting in different approximative number systems.

must also encode both person features (thus instantiating a tripartition or a quadripartition). This provided further evidence for the Last in–First out principle, allowed for an implicational formalisation of it, and derived the indexical asymmetry.

This conclusion was based on the investigation of independent personal pronouns from a typologically diverse sample of languages (n=674). In this section, I introduce that sample, which was collected through the following sources: Forchheimer 1953, Noyer 1992, Corbett 2000, Harley & Ritter 2002, Bhat 2004, Siewierska 2004, Cysouw 2009, the *Free Personal Pronoun System* database (Smith 2011), Harbour 2014b, Harbour 2016. Languages are arranged by **family** (n=125) and GENUS (n=234).[9] They are accompanied (in square brackets) by an indication of the pronominal paradigm that they display (for which, see Table D.2) and by the respective references.[10]

[9]Creoles and pidgins (#90) and Mixed languages (#91) are excluded from the totals for families/*genera*. Subfamilies, when available, are <u>underlined</u>. The source for the genealogical classification is Dryer 2013.

[10]The relevant references are shortened as follows: B04 = Bhat 2004; C00 = Corbett 2000; C09 = Cysouw 2009; F53 = Forchheimer 1953; HR02 = Harley & Ritter 2002; H14 = Harbour 2014b; H16 = Harbour 2016; N92 = Noyer 1992; S04 = Siewierska 2004; S11 = Smith 2011. For the sake of brevity, I only reported one source for each language, but several languages

Table D.2: Keys for the typology of personal pronoun systems

	System (features)	System (categories)	n/674
Q_+	...(±min(±at(±au(±pt(...)))))	1EXCL–1INCL–2–3; SG–DU–...–...–PL	19
Q_{3a}	±min(±at(±au(±pt(...))))	1EXCL–1INCL–2–3; SG–DU–PL	87
Q_{3m}	±min(±min(±au(±pt(...))))	1EXCL–1INCL–2–3; MIN–U/A–AUGM	15
Q_{2a}	±at(±au(±pt(...)))	1EXCL–1INCL–2–3; SG–PL	163
Q_{2m}	±min(±au(±pt(...)))	1EXCL–1INCL–2–3; MIN–AUGM	34
Q_0	±au(±pt(...))	1EXCL–1INCL–2–3	10
T_+	...(±min(±at(±pt(±au(...)))))	1–2–3; SG–DU–TRI/PAU–PL	2
T_3	±min(±at(±pt(±au(...))))	1–2–3; SG–DU–PL	55
T_2	±at(±pt(±au(...)))	1–2–3; SG–PL	267
T_0	±pt(±au(...))	1–2–3	16
B_P	±pt(...)	1/2–3	1
B_A	±au(...)	1–2/3	2
B*	±at(±au(...))	1–2/3; SG–PL	2
U	ϕ	—	1

1. **Afro-Asiatic** (GENERA n=6; languages n=43 / T_2=30, Q_{2a}=8, Q_{2m}=3, T_3=2)

   (a) BERBER (n=4) ♦ Kabyle Berber [T_2, S04: 109]; Tashlhiyt [T_2, F53: 50]; Tagoi [T_2, S11]; Tamahaq Berber [T_2, S04: 109].

   (b) CHADIC (n=12) ♦ Biu-Mandara (n=6): Gidar [T_2, S11]; Hdi [Q_{2m}, S11]; Kamwe [Q_{2a}, S11]; Margi [Q_{2m}, C09: 261]; Mina [Q_{2m}, S11]; Wandala [Q_{2a}, C09: 141, 261]. East Chadic (n=1): Kera [Q_{2a}, S11]. Masa (n=1): Musey [Q_{2a}, S11]. West Chadic (n=4): Hausa [T_2, S11]; Ngizim [Q_{2a}, C09: 145, 261]; Pero [T_2, B04: 110]; Zari [T_2, S11].

   (c) CUSHITIC (n=9) ♦ East Cushitic (n=8): Afar [T_2, S11]; Arbore [T_2, S11]; Aweer [T_2, S11]; Borana-Arsi-Guji Oromo [T_2, S11]; Daasanach [Q_{2a}, S11]; Rendille [Q_{2a}, S11]; Somali [Q_{2a}, S11]; Tunni [T_2, S11]. Southern Cushitic (n=1): Iraqw [T_2, HR02: 519].

   (d) EGYPTIAN-COPTIC (n=1) ♦ Coptic [T_2, S11].

   (e) OMOTIC (n=10) ♦ Dizoid (n=1): Dizi [T_3, C09: 214]. North Omotic (n=6): Basketo [T_2, S04: 257]; Hozo [T_2, S04: 256]; Koré [T_2, S04: 257]; Male/Maale [T_2, S11]; Seze [T_2, S04: 256]; Wolaytta [T_2, HR02: 519]. South Omotic (n=3): Aari [T_2, S04: 256, 275]; Gayil [T_2, S04: 256]; Hamer [T_2, S04: 275].

in the sample were described in more than one of the sources that were used. Moreover, I did not yet systematically cross-check the original sources from which some of the data have been collected by my sources, nor did I double-check with additional (and, possibly, more recent) sources. I leave a more accurate investigation of the matter to further research.

(f) SEMITIC (n=7) ♦ Akkadian [T_2, F53: 68–70]; Arabic [T_3, F53: 70–71]; Arabic (Chadian) [T_2, S11]; Arabic (South Levantine) [T_2, S11]; Geez [T_2, S11]; Hebrew (Ancient) [T_2, S11]; Maltese [T_2, HR02: 488].

2. **Algic** (GENERA n=2; languages n=7 / Q_{2a}=5, T_2=2)

(a) ALGONQUIAN (n=6) ♦ Cree (Plains) [Q_{2a}, B04: 101]; Menominee [Q_{2a}, S11]; Mi'kmaq [T_2, S11]; Ojibwa [Q_{2a}, F53: 103–104]; Passamaquoddy-Maliseet [Q_{2a}, S11]; Potawatomi [Q_{2a}, S11].

(b) WIYOT (n=1) ♦ Wiyot [T_2, F53: 105].

3. **Altaic** (GENERA n=3; languages n=13 / T_2=7, Q_{2a}=6)

(a) MONGOLIC (n=6) ♦ Daur [Q_{2a}, S11]; Dongxiang [Q_{2a}, S11]; Kalmyk [T_2, S11]; Mongolian (Halh) [Q_{2a}, S11]; Ordos [Q_{2a}, F53: 103]; Tu [T_2, S11].

(b) TUNGUSIC (n=3) ♦ Evenki [T_2, S11]; Manchu [Q_{2a}, S11]; Udihe [Q_{2a}, S11].

(c) TURKIC (n=4) ♦ Karachay-Balkar [T_2, S11]; Kazakh [T_2, S11]; Khakas [T_2, S11]; Turkish [T_2, S11].

4. **Anim**, MARIND (n=1 / T_2)
Marind [T_2, C09: 120].

5. **Arauan**, ARAUAN (n=1 / T_2)
Paumarí [T_2, S11].

6. **Arawakan** (GENERA n=5; languages n=6 / T_2=5, Q_0=1)

(a) ALTO-ORINOCO (n=1) ♦ Warekena [T_2, C09: 130].

(b) BOLIVIA-PARANA (n=1) ♦ Baure [T_2, S11].

(c) CARIBBEAN (n=2) ♦ Arawak [T_2, S11]; Wayuu [T_2, S11].

(d) INLAND NORTHERN ARAWAKAN (n=1) ♦ Baré [T_2, S11].

(e) PRE-ANDINE ARAWAKAN (n=1) ♦ Campa/Perené Asheninca [Q_0, HR02: 522].

7. **Austro-Asiatic** (GENERA n=2; languages n=9 / Q_{3a}=5, Q_{2m}=1, Q_0=1, T_2=1, T_3=1)

(a) MON-KHMER (n=6) ♦ <u>Aslian</u> (n=2): Jehai [Q_{3a}, S11]; Semelai [Q_{2m}, S11]. <u>Bahnaric</u> (n=1): Chrau [Q_0, C09: 151]. <u>Katuic</u> (n=1): Katu [Q_{3a}, HR02: 516]. <u>Khasian</u> (n=1): Khasi [T_2, F53: 61]. <u>Khmuic</u> (n=1): Mlabri [T_3, S11].

(b) MUNDA (n=3) ♦ Ho [Q_{3a}, HR02: 521]; Mundari [Q_{3a}, F53: 120–121]; Santali [Q_{3a}, S11].

8. **Austronesian** (GENERA n=20; languages n=94 / Q_{2a}=42, Q_{3a}=23, Q_+=14, Q_{2m}=10, Q_{3m}=1, T_2=1, T_0=3)

(a) ATAYALIC (n=1) ♦ Taroko/Seediq [Q_{2a}, S11].

(b) BARITO (n=2) ♦ Malagasy (Plateau) [Q_{2a}, S11]; Ngaju [Q_{2m}, S11].

(c) BILIC (n=1) ♦ Tboli [Q_{2m}, S11].

(d) CELEBIC (n=2) ♦ Mori Bawah [Q_{2a}, S11]; Tukang Besi North [Q_{2a}, S11].

(e) CENTRAL MALAYO-POLYNESIAN (n=5) ♦ Kambera [Q_{2a}, S11]; Kisar [Q_{2a}, S04: 271]; Larike [Q_+, S04: 90, 113]; Leti [Q_{2a}, S11]; Tetum [Q_{2a}, S11].

(f) Eastern Malayo-Polynesian (n=52) ♦ Oceanic (n=47): Ayiwo [Q_{3m}, S11]; Dehu [Q_{3a}, S11]; Efate (South) [Q_{2a}, S11]; Fijian (Boouma) [Q_+, S11]; Hawaiian [Q_{3a}, S11]; Iaai [Q_{2a}, S04: 39]; Kabana [Q_{2a}, S04: 255]; Kakabai [Q_{2a}, S11]; Kilivila [Q_{3a}, S11]; Kove [Q_{2a}, S04: 255]; Kwamera [Q_+, S11]; Lihir [Q_+, C00: 25]; Lonwolwol [Q_+, C09: 198]; Lovono [Q_{3a}, H16: 240]; Lusi [Q_{2a}, S04: 255]; Mafea [Q_{2a}, S11]; Maori [Q_{3a}, S11]; Mapia [Q_{2a}, S11]; Marshallese [Q_{2a}, HR02: 520]; Maskelines [Q_{2m}, H16: 148]; Mokilese [Q_+, H16: 226]; Mussau [Q_+, H16: 143]; Nambas, Big [Q_{2a}, S11]; Nengone [Q_{3a}, S04: 233]; Nogogu [Q_+, F53: 81]; Ouma [Q_{2a}, S11]; Paamese [Q_+, C09: 200]; Pileni [Q_{3a}, S11]; Pohnpeian [Q_{3a}, S04: 89]; Rapanui [Q_{3a}, S11]; Rotuman [Q_{3a}, S11]; Samoan [Q_{3a}, S11]; Saliba [Q_{2a}, S11]; Sursurunga [Q_+, C09: 201]; Tanema [Q_{3a}, H16: 240]; Tangga [Q_+, S11]; Tanimbili [Q_{3a}, S04: 253]; Teanu [Q_{3a}, H16: 240]; Tigak [Q_+, S04: 254]; Tinrin [Q_{3a}, B04: 20]; Tiri [Q_{3a}, S11]; Tokelau [Q_{3a}, S11]; Tongan [Q_{3a}, H16: 247]; Tuvalu [Q_{3a}, S11]; Ura [Q_{2a}, S11]; Vinmavis [Q_{2a}, S04: 5]; Woleaian [Q_{2a}, S04: 35]. South Halmahera-West New Guinea (n=5): Ambai [Q_+, S11]; Biak [Q_+, S11]; Pom [Q_{2a}, S11]; Warembori [Q_{3a}, S11]; Windesi [Q_{3a}, HR02: 516].

(g) Greater Central Philippine (n=6) ♦ Batak Karo [Q_{2a}, S11]; Cebuano [Q_{2a}, C09: 261]; Hanunóo [Q_{2m}, C09: 139]; Maranao [Q_{2m}, S11]; Tagalog [Q_{2m}, S11]; Waray [Q_{2m}, S11].

(h) Javanese (n=4) ♦ Javanese [Q_{2a}, S11]; Javanese (Central) [Yogyakarta, Surakarta] [T_0, H14: 133]; Javanese (Cirebon) [T_0, H14: 133]; Kawi [T_0, H14: 126].

(i) Lampungic (n=1) ♦ Lampung Api [Q_{2a}, S11].

(j) Malayo-Sumbawan (n=6) ♦ Acehnese [Q_{2a}, S11]; Cham (Eastern) [Q_{2a}, S11]; Indonesian [Q_{2a}, S11]; Kodi [Q_{2a}, S11]; Malay [Q_{2a}, S11]; Madurese [T_2, S11].

(k) Moken-Moklen (n=2) ♦ Moken [Q_{2a}, S11]; Moklen [Q_{2a}, S11].

(l) North Borneo (n=2) ♦ Belait [Q_{3a}, S11]; Kimaragang (Sa'ban) [Q_{2m}, S11].

(m) Northern Luzon (n=1) ♦ Ilocano [Q_{2m}, S11].

(n) Northwest Sumatra-Barrier Islands (n=2) ♦ Gayo [Q_{2a}, S11]; Nias [Q_{2a}, S11].

(o) Palauan (n=1) ♦ Palauan [Q_{2a}, HR02: 521].

(p) Sama-Bajaw (n=1) ♦ Sama (Southern) [Q_{2m}, S11].

(q) Sangiric (n=1) ♦ Ratahan [Q_{2a}, S11].

(r) South Sulawesi (n=2) ♦ Buol [Q_{2a}, S11]; Makasar [Q_{2a}, S11].

(s) Tsou (n=1) ♦ Tsou [Q_{2a}, S11].

(t) Yapese (n=1) ♦ Yapese [Q_{3a}, S04: 118–119].

9. **Aymaran**, Aymaran (n=3 / Q_0)
Aymara [Q_0, H16: 148]; Aymara (Central) [Q_0, H16: 138]; Jaqaru [Q_0, S11].

10. **Barbacoan**, Barbacoan (n=3 / T_2)
Awa Pit [T_2, S04: 48]; Awa-Cuaiquer [T_2, S11]; Chachi [T_2, S11].

11. **Border**, Border (n=4 / Q_0=3, T_0=1)
Amanab [Q_0, C09: 254]; Imonda [Q_0, C09: 254]; Manem [T_0, C09: 254]; Waris [Q_0, H14: 127].

12. **Bunuban**, Bunuban (n=2 / Q_{3a}=1, Q_{2a}=1)
    Bunaba/Bunuba [Q_{3a}, S11]; Gooniyandi [Q_{2a}, S11].
13. **Caddoan**, Caddoan (n=1 / U)
    Wichita [U, H14: 135].
14. **Cariban**, Cariban (n=3 / Q_{2m}=2, Q_{3a}=1)
    Carib/Kalihna [Q_{2m}, HR02: 489, 521]; Macushi [Q_{3a}, S11]; Trió [Q_{2m}, S11].
15. **Central Sudanic** (genera n=2; languages n=2 / T_2)
    (a) Bongo-Bagirmi (n=1) ♦ Bagirmi [T_2, C09: 135].
    (b) Moru-Ma'di (n=1) ♦ Lugbara [T_2, HR02: 520].
16. **Chibchan** (genera n=6; languages n=8 / T_3=4, T_2=2, Q_{2a}=2)
    (a) Arhuacic (n=2) ♦ Damana [T_3, C09: 195]; Ika [T_3, C09: 196].
    (b) Chibcha-Duit (n=1) ♦ Chibcha [T_2, S11].
    (c) Kuna (n=1) ♦ Border Kuna [T_3, S11].
    (d) Paya (n=1) ♦ Pech [T_3, S11].
    (e) Talamanca (n=2) ♦ Bribri [Q_{2a}, S11]; Teribe [Q_{2a}, S11].
    (f) Tunebo (n=1) ♦ Tunebo (Central) [T_2, S11].
17. **Chukotko-Kamchatkan**, Northern Chukotko-Kamchatkan (n=1 / T_2)
    Chukchi [T_2, F53: 56–57].
18. **Dogon**, Dogon (n=1 / T_2)
    Donno So Dogon [T_2, S11].
19. **Dravidian** (genera n=4; languages n=17 / Q_{2a}=10, T_2=7)
    (a) Central Dravidian (n=3) ♦ Kolami (Northwestern) [Q_{2a}, S11]; Kolami (Southeastern) [Q_{2a}, S11]; Pottangi Ollar Gadaba [T_2, S11].
    (b) Northern Dravidian (n=4) ♦ Brahui [T_2, HR02: 519]; Kumarbhag Paharia [Q_{2a}, S11]; Kurukh [Q_{2a}, S11]; Sauria Paharia [Q_{2a}, S11].
    (c) South-Central Dravidian (n=3) ♦ Kui [T_2, S11]; Pengo [T_2, S11]; Telugu [Q_{2a}, S11].
    (d) Southern Dravidian (n=7) ♦ Kannada [T_2, HR02: 520]; Kodava [T_2, S11]; Kota [T_2, S11]; Malayalam [Q_{2a}, S11]; Tamil [Q_{2a}, S11]; Toda [Q_{2a}, S11]; Tulu [Q_{2a}, S11].
20. **East Bougainville**, East Bougainville (n=1 / Q_{2a})
    Terei/Buin [Q_{2a}, S11].
21. **Eastern Sudanic** (genera n=4; languages n=14 / Q_{2a}=9, T_2=5)
    (a) Daju (n=3) ♦ Dar Sila Daju [Q_{2a}, S11]; Logorik [Q_{2a}, S11]; Shatt [Q_{2a}, S11].
    (b) Kuliak (n=1) ♦ So [Q_{2a}, S11].
    (c) Nilotic (n=8) ♦ Acholi [T_2, HR02: 519]; Lango [T_2, S11]; Luo [T_2, S11]; Maasai [T_2, F53: 67]; Nuer [T_2, S04: 275]; Päri [Q_{2a}, C09: 264]; Shilluk [Q_{2a}, S11]; Teso [Q_{2a}, S04: 275].
    (d) Nubian (n=2) ♦ Midob [Q_{2a}, S11]; Old Nubian [Q_{2a}, S11].

22. **Eleman**, Eleman Proper (n=1 / Q_{3a})
    Toaripi [Q_{3a}, C09: 219].
23. **Eskimo-Aleut** (genera n=2; languages n=4 / T_3=3, T_2=1)
    (a) Aleut (n=1) ♦ Aleut [T_3, C09: 214].
    (b) Eskimo (n=3) ♦ Inuktitut [T_3, F53: 50–51]; Kalaallisut [T_2, S11]; Yupik (Central) [T_3, HR02: 521].
24. **Gogodala-Suki**, Suki (n=1 / T_2)
    Suki [T_2, C09: 121].
25. **Guaicuruan**, Kadiwéu (n=1 / T_3)
    Kadiwéu [T_3, C09: 211].
26. **Gunwinyguan**, Gunwinyguan (n=5 / Q_{3m}=4, Q_{3a}=1)
    Bininj Gun-Wok [Gunwinygic; Q_{3a}, S11]; Ngalakan [Ngalakan; Q_{3m}, C09: 281]; Ngandi [Ngandi; Q_{3m}, S11]; Nunggubuyu [Nunggubuyu; Q_{3m}, N92: 191–193]; Rembarrnga [Rembarnga; Q_{3m}, C09: 233, 281].
27. **Hmong-Mien**, Hmong-Mien (n=1 / T_3)
    Hmong Njua [T_3, HR02: 521].
28. **Hokan** (genera n=2; languages n=7 / T_2=6, Q_{3m}=1)
    (a) Pomoan (n=2) ♦ Pomo (Central) [T_2, C00: 106]; Pomo (Eastern) [T_2, HR02: 520].
    (b) Yuman (n=5) ♦ Jamul Tiipay [T_2, S04: 115]; Kumiai [T_2, S11]; Paipai [T_2, HR02: 520]; Walapai/Hualapai [Q_{3m}, S04: 90]; Yuma/Quechan [T_2, F53: 46–47].
29. **Huitotoan**, Boran (n=1 / Q_{3a})
    Bora [Q_{3a}, S11].
30. **Indo-European** (genera n=10; languages n=64 / T_2=57, T_3=5, Q_{2a}=2)
    (a) Albanian (n=1) ♦ Albanian [T_2, HR02: 519].
    (b) Armenian (n=1) ♦ Armenian (Modern Eastern) [T_2, S04: 94].
    (c) Baltic (n=2) ♦ Latvian [T_2, S11]; Lithuanian [T_3, HR02: 506, 521].
    (d) Celtic (n=6) ♦ Breton [T_2, S11]; Cornish [T_2, S11]; Irish [T_2, S11]; Manx [T_2, S11]; Scottish Gaelic [T_2, S11]; Welsh [T_2, S11].
    (e) Germanic (n=6) ♦ Danish [T_2, S11]; Dutch [T_2, S11]; English [T_2, S11]; German [T_2, HR02: 519]; Gothic [T_3, S11]; Swedish [T_2, HR02: 519].
    (f) Greek (n=1) ♦ Greek [T_2, HR02: 519].
    (g) Indic (n=26) ♦ Assamese [T_2, S11]; Bhojpuri [T_2, S11]; Brokskat [T_2, S11]; Dameli [T_2, S11]; Dhivehi [T_2, S11]; Gawar-Bati [T_2, S11]; Gujarati [Q_{2a}, S11]; Hindi [T_2, S11]; Kalami [T_2, S11]; Kalasha [T_2, S11]; Kashmiri [T_2, S11]; Khowar [T_2, S11]; Konkani [T_2, S11]; Magahi [T_2, S11]; Marathi [Q_{2a}, S11]; Nepali [T_2, S11]; Panjabi [T_2, S11]; Phalura [T_2, S11]; Romani (Baltic) [T_2, S11]; Romani (Sinte) [T_2, S11]; Romani (Vlax) [T_2, S11]; Sanskrit [T_3, F53: 77–78]; Shina [T_2, S11]; Sinhala [T_2, S11]; Suketi (Eastern) [T_2, F53: 55–56]; Urdu [T_2, S11].
    (h) Iranian (n=3) ♦ Baluchi [T_2, HR02: 519]; Persian (Iranian) [T_2, S11]; Tajik [T_2, S11].

(i) Romance & Latin [T_2, S11] (n=13) ♦ Brazilian Portuguese [T_2, H16: 50]; Cajun French [T_2, S11]; Catalan [T_2, S11]; French [T_2, S11]; Galician [T_2, S11]; Italian [T_2, S11]; Logudorese Sardinian [T_2, S11]; Portuguese [T_2, S11]; Provençal [T_2, S11]; Romanian [T_2, S11]; Sicilian [T_2, S11]; Spanish [T_2, S11].

(j) Slavic (n=5) ♦ Bulgarian [T_2, S11]; Polish [T_2, S11]; Serbian [T_2, S11]; Sorbian (Lower) [T_3, C09: 206]; Sorbian (Upper) [T_3, C00: 20].

31. **Iroquoian**, Northern Iroquoian (n=1 / T_0)
Oneida [T_0, S11].

32. **Iwaidjan**, Iwaidjan (n=2 / Q_{2a})
Iwaidja [Q_{2a}, S11]; Margu [Q_{2a}, S11].

33. **Japanese**, Japanese (n=1 / T_2)
Japanese [T_2, F53: 43–44].

34. **Jivaroan**, Jivaroan (n=1 / T_2)
Shuar [T_2, S11].

35. **Kadu**, Kadugli (n=1 / Q_{2a})
Katcha-Kadugli-Miri [Q_{2a}, S11].

36. **Kartvelian**, Kartvelian (n=2 / T_2=1, Q_{2a}=1)
Georgian [T_2, S11]; Svan [Q_{2a}, S11].

37. **Khoe-Kwadi**, Khoe-Kwadi (n=2 / Q_{3a})
!Ora/Korana [Q_{3a}, H16: 106]; Nama [Q_{3a}, HR02: 504, 521].

38. **Kiowa-Tanoan**, Kiowa-Tanoan (n=2 / T_0)
Kiowa [T_0, H14: 132]; Tiwa, Northern [T_0, S11].

39. **Kunza**, Kunza (n=1 / T_2)
Kunza [T_2, S11].

40. **Lower Sepik-Ramu**, Lower Sepik (n=1 / T_+)
Yimas [T_+, HR02: 522].

41. **Maban**, Maban (n=1 / T_2)
Masalit [T_2, S11].

42. **Macro-Ge** (genera n=5; languages n=7 / T_2=3, T_0=1, Q_{2a}=2, Q_{2m}=1)

(a) Bororan (n=1) ♦ Borôro [Q_{2a}, S11].

(b) Ge-Kaingang (n=3) ♦ Kaingang [T_2, HR02: 520]; Timbira [Krahô, Canela] [Q_{2m}, H16: 138]; Xokleng [T_2, HR02: 520].

(c) Karajá (n=1) ♦ Karajá [T_0, S04: 106].

(d) Maxakalí (n=1) ♦ Maxakalí [Q_{2a}, HR02: 502, 520].

(e) Rikbaktsa (n=1) ♦ Rikbaktsa [T_2, HR02: 520].

43. **Mande**, Eastern Mande (n=4 / T_2=2, Q_{2m}=1, Q_{2a}=1)
Boko [T_2, S04: 38]; Bokobaru/Busa [T_2, S04: 256]; Dan [Q_{2m}, C09: 93, fn. 27]; Yaure [Q_{2a}, HR02: 521].

44. **Mangarrayi-Maran** (genera n=3; languages n=3 / Q_{3m}=2, Q_{3a}=1)

(a) Alawa (n=1) ♦ Alawa [Q_{3a}, C09: 227].

(b) Mangarrayi (n=1) ♦ Mangarayi [Q_{3m}, S11].

(c) Ndjébbana (n=1) ♦ Ndjébbana [Q_{3m}, S11].

45. **Mangrida**, Burarran (n=1 / Q_{3a})
Burarra [Q_{3a}, C09: 222, 288].

46. **Mascoian**, Mascoian (n=2 / B*)
Lengua [B*, H14: 127]; Sanapaná [B*, H16: 55–56].

47. **Mayan**, Mayan (n=2 / Q_{2a}=1, T_2=1)
Tzeltal [Q_{2a}, S11]; Tzutujil [T_2, HR02: 520].

48. **Mirndi** (genera n=3; languages n=3 / Q_{3a})

(a) Djamindjungan (n=1) ♦ Djamindjung [Q_{3a}, S11].

(b) Djingili (n=1) ♦ Djingili [Q_{3a}, HR02: 521].

(c) Wambayan (n=1) ♦ Wambaya [Q_{3a}, S11].

49. **Misumalpan**, Misumalpan (n=2 / Q_{2a})
Mískito [Q_{2a}, S11]; Sumo-Mayangna [Q_{2a}, S11].

50. **Mixe-Zoque**, Mixe-Zoque (n=1 / Q_{2a})
Language Popoluca (Sierra) [Q_{2a}, F53: 92–94].

51. **Muskogean**, Muskogean (n=1 / T_2)
Koasati [T_2, HR02: 510, 520].

52. **Na-Dene** (genera n=2; languages n=8 / T_2=6, T_3=2)

(a) Athapaskan (n=7) ♦ Apache [T_2, C09: 124, fn. 23]; Carrier [T_3, F53: 78–79]; Hupa [T_2, C09: 124, fn. 23]; Kato [T_2, C09: 124, fn. 23]; Navajo [T_3, S11]; Slave [T_2, C09: 124]; Slavey (North) [T_2, S11].

(b) Tlingit (n=1) ♦ Tlingit [T_2, F53: 78].

53. **Nadahup**, Nadahup (n=1 / T_2)
Hup [T_2, S11].

54. **Nakh-Daghestanian** (genera n=2; languages n=8 / T_2=5, Q_{2a}=3)

(a) Daghestanian (n=6) ♦ Avar-Andic-Tsezic (n=2): Andi [Q_{2a}, S11]; Hunzib [T_2, S11]. Lak-Dargwa (n=2): Dargwa [T_2, S11]; Lak [T_2, B04: 132]. Lezgic (n=2): Lezghian [T_2, S11]; Tsakhur [T_2, S11].

(b) Nakh (n=2) ♦ Bats [Q_{2a}, S11]; Ingush [Q_{2a}, S11].

55. **Niger-Congo** (genera n=8; languages n=59 / T_2=43, Q_{2a}=9, T_3=1, Q_{2m}=6)

(a) Adamawa-Ubangi (n=1) ♦ Koh Lakka [Mbumic; Q_{2a}, S04: 49].

(b) Atlantic (n=5) ♦ Bak (n=1): Bidyogo [T_2, S11]. Mel (n=1): Kissi (Northern) [T_2, S11]. Peul-Serer (n=2): Adamawa Fulfulde [Q_{2a}, S11]; Maasina Fulfulde [Q_{2a}, S11]. Wolof (n=1): Wolof [T_2, C09: 130].

(c) Benue-Congo (n=43) ♦ Bantoid (n=38): Aghem [Q_{2a}, C09: 168, 178]; Akoose [Q_{2m}, C09: 174]; Babungo [Q_{2m}, C09: 175]; Bafia [T_2, S11]; Bamileke [Q_{2a}, C09: 178]; Basa [T_2, S11]; Bila [T_2, S11]; Diriku [T_2, S11]; Duala [T_2, F53: 135]; Fang [T_2, S11]; Ghomala' [Q_{2m}, C09: 179]; Herero [T_2, S11]; Kele [T_2, F53: 133–134]; Kongo [T_2, HR02: 520]; Kwangali [T_2, S11]; Lega-Shabunda [T_3, S11]; Limbum

[Q_{2m}, S11]; Luvale [T_2, S11]; Luyana [T_2, S11]; Makaa [Q_{2m}, S11]; Mbalanhu [T_2, S11]; Mbili [T_2, C09: 173]; Mbukushu [T_2, S11]; Mundani [T_2, C09: 173]; Ndebele (South) [T_2, S11]; Ndonga [T_2, S11]; Ngemba [T_2, S11]; Ngiemboon [Q_{2m}, C09: 174]; Nkosi [T_2, F53: 134–135]; Noni [Q_{2a}, C09: 177]; Nyamwezi [T_2, S11]; Pedi [T_2, S11]; Sotho (Southern) [T_2, HR02: 520]; Swahili [T_2, HR02: 520]; Tunen [T_2, S11]; Umbundu [T_2, S11]; Venda [T_2, S11]; Yeyi [T_2, S11]. Cross River (n=2): Abua [Q_{2a}, S11]; Odual [Q_{2a}, S11]. Edoid (n=1): Degema [T_2, S11]. Igboid (n=1): Igbo [T_2, C00: 63]. Platoid (n=1): Fyam [T_2, S11].

(d) Gur (n=5) ♦ Northern-Central Gur (n=4): Dagaare [T_2, S04: 109]; Dagbani [T_2, S04: 104]; Koromfé [T_2, S11]; Nateni [T_2, S11]. Southern-Central Gur (n=1): Lyele [T_2, HR02: 488].

(e) Kordofanian (n=1) ♦ Ngile [Q_{2a}, S11].

(f) Kru (n=1) ♦ Godié [T_2, HR02: 520].

(g) Kwa (n=2) ♦ Ewe [T_2, F53: 132–133]; Fon [T_2, S11].

(h) Senufo (n=1) ♦ Supyire [T_2, B04: 88].

56. **Nimboran**, Nimboran (n=1 / Q_0)
Nimboran [Q_0, H16: 138].

57. **Northwest Caucasian**, Northwest Caucasian (n=1 / T_2)
Kabardian [T_2, HR02: 520].

58. **Nyulnyulan**, Nyulnyulan (n=5 / Q_{3m}=2, Q_{2m}=2, Q_{3a}=1)
Bardi [Q_{2m}, S11]; Nyikina/Nyigina [Q_{3m}, S11]; Nyulnyul [Q_{2m}, S11]; Warrwa [Q_{3a}, S11]; Yawuru [Q_{3m}, S11].

59. **Oregon Coast**, Coosan (n=1 / Q_{3a})
Coos [Q_{3a}, F53: 107–109].

60. **Oto-Manguean** (genera n=6; languages n=7 / Q_{2a}=5, Q_0=1, T_3=1)

(a) Manguean (n=1) ♦ Chiapanec [Q_{2a}, S11].

(b) Mixtecan (n=2) ♦ Mixtec (Chalcatongo) [Q_0, HR02: 522]; Mixtec (San Miguel El Grande) [Q_{2a}, S11].

(c) Otomian (n=1) ♦ Otomí (Ixtenco) [Q_{2a}, S11].

(d) Popolocan (n=1) ♦ Popoloca (San Marcos Tlalcoyalco) [Q_{2a}, S11].

(e) Subtiaba-Tlapanec (n=1) ♦ Tlapanec [T_3, S04: 95].

(f) Zapotecan (n=1) ♦ Zapotec (Yatzachi) [Q_{2a}, HR02: 521].

61. **Pama-Nyungan** (genera n=4; languages n=31 / Q_{3a}=20, Q_{3m}=2, Q_{2m}=1, T_3=7, T_2=1)

(a) Central Pama-Nyungan (n=2) ♦ Darling [T_3, S11]; Dieri [Q_{3a}, HR02: 521].

(b) Northern Pama-Nyungan (n=14) ♦ Biri [T_3, S11]; Dyirbal [T_3, S11]; Flinders Island [Q_{3a}, S11]; Gunya [T_3, S04: 277]; Guugu Yimidhirr [T_3, C09: 286]; Kalaw Lagaw Ya/Saibalgal [Q_{3a}, F53: 127–128]; Kuku-Yalanji [Q_{3a}, S11]; Nyawaygi [Q_{3a}, S11]; Umpila [Q_{3m}, C09: 191, 226–227, 290]; Uradhi [Q_{2m}, C09: 290]; Warrgamay [T_3, C09: 273]; Wik Munkan [Q_{3a}, C09: 223, 289–290]; Wikngenchera [Q_{3a}, S11]; Yidiny [T_3, C09: 211].

(c) Southeastern Pama-Nyungan (n=4) ♦ Bandjalang [T_2, S11]; Dyirringan [Q_{3a}, F53: 124–125]; Gumbaynggir [Q_{3a}, H16: 107]; Kamilaroi [Q_{3a}, F53: 125–126].

(d) Western Pama-Nyungan (n=11) ♦ Dhuwal (Dätiwuy) [Q_{3a}, C09: 229]; Gurinji [Q_{3m}, S11]; Jaru [Q_{3a}, S11]; Karadjeri [Q_{3a}, S11]; Mangala [Q_{3a}, S11]; Ngarla [Q_{3a}, S11]; Nyamal [Q_{3a}, S11]; Panytyima [Q_{3a}, S11]; Wajarri [Q_{3a}, S11]; Walmajarri [Q_{3a}, S11]; Yan-nhangu [Q_{3a}, S11].

62. **Penutian** (genera n=6; languages n=11 / Q_{2a}=4, Q_{2m}=1, Q_{3a}=2, T_3=2, T_2=2)

(a) Chinookan (n=1) ♦ Chinook (Lower) [Q_{3a}, F53: 90–92].

(b) Maiduan (n=1) ♦ Maidu [T_3, F53: 44–46].

(c) Sahaptian (n=1) ♦ Nez Perce [T_2, C09: 130].

(d) Tsimshianic (n=1) ♦ Tshimshian [T_2, F53: 75].

(e) Utian (n=6) ♦ Costanoan (n=1): Ohlone (Southern) [Q_{2a}, S11]. Miwok (n=5): Bodega Miwok [T_3, C09: 277]; Miwok (Plains) [Q_{2a}, C09: 277]; Sierra Miwok (Central) [Q_{2a}, HR02: 520]; Sierra Miwok (Northern) [Q_{2a}, S11]; Sierra Miwok (Southern) [Q_{2m}, C09: 276].

(f) Yokuts (n=1) ♦ Yokuts (Yawelmani dialect) [Q_{3a}, F53: 130–131].

63. **Quechua**, Quechua (n=2 / Q_{2a})
Quechua (North Junín) [Q_{2a}, S11]; Quechua (Ayacucho) [Q_{2a}, S11].

64. **Salishan** (genera n=2; languages n=4 / T_2)

(a) Central Salish (n=2) ♦ Halkomelem [T_2, HR02: 520]; Salish (North Straits) [T_2, S04: 20].

(b) Interior Salish (n=2) ♦ Lillooet [T_2, HR02: 520]; Thompson [T_2, S11].

65. **Sentani**, Sentani (n=2 / T_2=1, Q_{2a}=1)
Sentani [T_2, S04: 93, 113]; Tabla [Q_{2a}, S11].

66. **Sepik** (genera n=2; languages n=2 / T_3)

(a) Middle (n=1) ♦ Ngala [T_3, S04: 106].

(b) Ram (n=1) ♦ Awtuw [T_3, S11].

67. **Sino-Tibetan** (genera n=2; languages n=34 / Q_{2a}=12, T_2=9, Q_{3a}=7, T_3=4, T_0=2)

(a) Chinese (n=8) ♦ Chinese (Classical) [T_0, C09: 258]; Chinese (Hakka) [Q_{2a}, S11]; Chinese (Mandarin) [Q_{2a}, S11]; Chinese (Min Nan) [Q_{2a}, S11]; Chinese (Modern) [T_2, C09: 258]; Chinese (Xiang) [T_2, S11]; Chinese (Yue) [T_2, S11]; Taiwanese (Min Nan) [Q_{2a}, H16: 138].

(b) Tibeto-Burman (n=26) ♦ Bodic (n=7): Balti [Q_{2a}, S11]; Bumthangkha [T_2, S11]; Dzongkha [T_2, S11]; Kinnauri [Q_{3a}, F53: 114–117]; Purik [Q_{2a}, S11]; Tibetan [T_2, S11]; Tibetan (Classical) [T_2, S04: 231]. Bodo-Garo (n=1): Gârô [Q_{2a}, F53: 112–113]. Burmese-Lolo (n=1): Burmese [T_2, F53: 42–43]. Kuki-Chin (n=4): Angami [Q_{3a}, B04: 133]; Karbi [Q_{2a}, S11]; Mikir [Q_{2a}, F53: 95]; Mizo [T_2, S04: 80]. Kuki-Chin-Naga (n=1): Ao Naga [Q_{3a}, S11]. Mahakiranti (n=10): Bahing [Q_{3a}, C09: 275]; Camling [T_3, S11]; Chepang [T_3, S11]; Dumi [Q_{3a}, S11]; Kham, Gamale [T_3, S11]; Limbu [Q_{3a}, S11]; Nachering [Q_{2a}, S11]; Newari [Q_{2a}, S11]; Thulung [Q_{2a}, C09: 275]; Wambule [T_0, S11]. Qiangic (n=1): Qiang (Northern) [T_3, S11]. rGyalrong (n=1): Jiarong [Q_{3a}, C09: 218].

68. **Siouan**, Core Siouan (n=3 / Q_{2a}=1, T_2=1, B_P=1)
Biloxi [T_2, S11]; Dakota [Q_{2a}, HR02: 521]; Winnebago/Hocak [B_P, H16: 51].
69. **Solomons East Papuan** (genera n=2; languages n=2 / Q_{3a})
    (a) Lavukaleve (n=1) ♦ Lavukaleve [Q_{3a}, S11].
    (b) Savosavo (n=1) ♦ Savosavo [Q_{3a}, S11].
70. **Songhai**, Songhai (n=1 / T_2)
Koyra Chiini [T_2, S11].
71. **South Andamanese**, South Andamanese (n=1 / T_0)
Jarawa [T_0, H16: 51].
72. **Southern Daly**, Ngankikurungkurr (n=1 / Q_{3a})
Ngankikurungkurr [Q_{3a}, C09: 221, 287].
73. **Tai-Kadai** (genera n=2; languages n=8 / Q_{2a}=5, T_2=2, T_0=1)
    (a) Kadai (n=2) ♦ Gelaon [T_2, S11]; Lachi [T_2, S11].
    (b) Kam-Tai (n=6) ♦ Chadong [Q_{2a}, S11]; Sui [Q_{2a}, S11]; Tai Do [Q_{2a}, S11]; Thai [T_0, S11]; Zhuang, Northern [Q_{2a}, S11]; Zhuang, Southern [Q_{2a}, S11].
74. **Tangkic**, Tangkic (n=2 / B_A=1, Q_{3a}=1)
Damin [ceremonial register of Lardil] [B_A, H16: 51]; Kayardild [Q_{3a}, S11].
75. **Tor-Orya**, Tor (n=1 / T_2)
Berik [T_2, HR02: 519].
76. **Torricelli**, Kombio-Arapesh (n=1 / T_3)
Bukiyip [T_3, S11].
77. **Trans-New Guinea** (genera n=13; languages n=29 / T_2=11, T_3=7, Q_{3a}=4, Q_{2a}=2, T_0=2, Q_{3m}=2, Q_{2m}=1)
    (a) Angan (n=1) ♦ Kapau [T_3, S04: 114].
    (b) Asmat-Kamoro (n=2) ♦ Asmat [T_2, C09: 110]; Karas [Q_{2a}, S11].
    (c) Awju-Dumut (n=3) ♦ Kombai [T_2, S11]; Korowai [T_2, S11]; Wambon [T_2, S11].
    (d) Binanderean (n=2) ♦ Guhu-Samane [Q_{3a}, C09: 219]; Korafe [Q_{3a}, C09: 220].
    (e) Chimbu (n=3) ♦ Golin [T_0, C09: 253]; Kuman [T_2, C09: 112]; Salt-Yui [T_0, C09: 116].
    (f) Dani (n=1) ♦ Dani (Lower Grand Valley) [T_2, S11].
    (g) Eastern Highlands (n=5) ♦ Awa [T_2, C09: 125]; Kamanugu [T_2, F53: 66–67]; Tairora [T_2, C09: 119]; Usarufa [T_2, C09: 129]; Yagaria [T_3, H16: 119].
    (h) Engan (n=1) ♦ Kewa [T_3, C09: 212].
    (i) Finisterre-Huon (n=3) ♦ Kâte [Q_{3a}, F53: 128]; Nabak [T_3, C09: 273]; Wantoat [T_3, C09: 272].
    (j) Goilalan (n=2) ♦ Kunimaipa [Q_{3m}, C09: 235]; Weri [Q_{3m}, C09: 235].
    (k) Koiarian (n=1) ♦ Grass Koiari [Q_{2m}, S11].
    (l) Madang (n=4) ♦ Amele [T_3, S04: 76]; Bongu [Q_{3a}, F53: 128–129]; Kalam [T_3, C09: 208]; Tauya [T_2, S11].

(m) Mairasi-Tanahmerah (n=1) ♦ Mairasi [Q_{2a}, S11].

78. **Tucanoan**, Tucanoan (n=3 / Q_{2a})
Barasano [Q_{2a}, S04: 114]; Cubeo [Q_{2a}, HR02: 521]; Macuna [Q_{2a}, C09: 144].

79. **Tupian**, Tupi-Guaraní (n=3 / Q_{2a})
Cocama-Cocamilla [Q_{2a}, S11]; Guaraní [Q_{2a}, S11]; Sirionó [Q_{2a}, HR02: 521].

80. **Uralic** (genera n=2; languages n=10 / T_2=6, T_3=4)

(a) Finno-Ugric (n=7) ♦ Finnic (n=2): Liv [T_2, S11]; Suomi/Finnish [T_2, F53: 53–54]. Mordvin (n=1): Mordwinish/Mordvin [T_2, F53: 53]. Permic (n=1): Udmurt [T_2, C09: 274]. Saami (n=1): Lapponian/Saami [T_2, F53: 53]. Ugric (n=2): Hungarian [T_2, C00: 103]; Ostyak/Khanty [T_3, F53: 52].

(b) Samoyedic (n=3) ♦ Enets, Forest [T_3, S11]; Kamas [T_3, S11]; Nganasan [T_3, C09: 195, 274].

81. **Uto-Aztecan** (genera n=5; languages n=10 / T_2=5, Q_{2m}=3, Q_{3a}=2)

(a) Aztecan (n=1) ♦ Nahuatl (Classical) [T_2, S11].

(b) California Uto-Aztecan (n=2) ♦ Cahuilla [T_2, HR02: 519]; Luiseño [T_2, HR02: 519].

(c) Hopi (n=1) ♦ Hopi [T_2, F53: 73–74].

(d) Numic (n=5) ♦ Comanche [Q_{3a}, S11]; Paiute (Northern) [Q_{2m}, C09: 159]; Paiute (Southern) [Q_{2m}, F53: 88–89]; Paiute (Ute-Southern) [Q_{2m}, S11]; Shoshone [Q_{3a}, F53: 89–90].

(e) Tepiman (n=1) ♦ Pima Bajo [T_2, S11].

82. **Wakashan** (genera n=2; languages n=2 / Q_{2a}=1, T_2=1)

(a) Northern Wakashan (n=1) ♦ Kwakiutl/Kwakw'ala [Q_{2a}, HR02: 503, 521].

(b) Southern Wakashan (n=1) ♦ Nootka/Nuuchahnulth [T_2, F53: 120].

83. **Wappo-Yukian**, Wappo (n=1 / T_3)
Wappo [T_3, HR02: 521].

84. **West Papuan** (genera n=2; languages n=5 / Q_{2a}=5)

(a) North Halmaheran (n=4) ♦ Makian (West) [Q_{2a}, HR02: 520]; Makian, East [Q_{2a}, S11]; Tidore [Q_{2a}, S11]; Tobelo [Q_{2a}, S11].

(b) West Bird's Head (n=1) ♦ Moraid [Q_{2a}, S11].

85. **Western Daly**, Wagaydy (n=1 / Q_{3m})
Maranungku [Q_{3m}, C09: 288].

86. **Worrorran**, Worrorran (n=4 / Q_{2a}=1, Q_+=3)
Kwini [Q_{2a}, S11]; Ungarinjin [Q_+, N92: 190]; Worora [Q_+, F53: 126]; Wunambal [Q_+, S11].

87. **Yanomam**, Yanomam (n=1 / Q_{3a})
Sanumá [Q_{3a}, S11].

88. **Yeniseian**, Yeniseian (n=2 / T_2)
Ket [T_2, S11]; Kottish/Kott [T_2, F53: 48–49].

89. **Zaparoan**, Zaparoan (n=1 / Q_{2a})
Iquito [Q_{2a}, S11].

90. **Creoles and Pidgins** (n=6 / T_2=4, Q_+=2)
Dutch-based: Afrikaans [T_2, H16: 119]. *English-based*: Bislama [Q_+, H16: 104]; Nigerian Pidgin [T_2, HR02: 520]; Tok Pisin [Q_+, HR02: 522]. *French-based*: Haitian Creole [T_2, HR02: 520]; Mauritius Creole [T_2, C09: 131].

91. **Mixed languages** (n=3 / T_2)
Bantu-Cushitic: Mbugu [T_2, S11]; *Chinese-Tibetan-Mongolian*: Wutunhua [T_2, S11]; *Quechua-Puquina*: Callawalla [T_2, S11].

92. **Isolate** (n=36 / —)[11]
Ainu: Ainu [Q_{2a}, S11]; **Araucanian**: Mapudungun [T_3, S11]; **Basque**: Basque [T_2, HR02: 519]; **Chapacura-Wanham**: Pakaásnovos [Q_{2a}, S11]; **Chimúan**: Mochica [T_2, S11]; **Chiquito**: Chiquitano [Q_{2a}, S11]; **Chitimacha**: Chitimacha [T_2, S11]; **Cholon**: Cholón [T_2, S11]; **Chumash**: Chumash [T_3, S04: 118]; **Dagan**: Daga [T_2, S11]; **East Strickland**: Samo [Q_{3a}, C09: 196, 220]; **Gaagudju**: Gagadu/Gaagudju [Q_{3a}, S11]; **Hadza**: Hadza [Q_{2a}, S11]; **Harakmbet**: Amarakaeri [T_2, S11]; **Itonama**: Itonama [Q_{2a}, S04: 111]; **Kiwaian**: Kiwai [T_+, C09: 198]; **Korean**: Korean [T_2, S11]; **Kunama**: Kunama [Q_{3a}, S04: 88]; **Kutenai**: Kutenai [T_2, HR02: 522]; **Morwap**: Elseng [B_A, H16: 55]; **Movima**: Movima [Q_{2a}, S11]; **Mura**: Pirahã [T_0, H16: 133]; **Nivkh**: Gilyak/Nivkh [Q_{2m}, S11]; **Páezan**: Páez [T_2, S11]; **Peba-Yaguan**: Yagua [Q_{3a}, S11]; **Puquina**: Puquina [T_2, S11]; **Sumerian**: Sumerian [T_0, S11]; **Tiwian**: Tiwi [Q_{2m}, S11]; **Tol**: Tol [T_2, S11]; **Tonkawa**: Tonkawa [T_3, F53: 58–59]; **Tunica**: Tunica [T_3, F53: 59–60]; **Urarina**: Urarina [Q_{2a}, S11]; **Washo**: Washo [Q_{3a}, S04: 79]; **Yareban**: Yareba [T_3, C09: 215]; **Yawa**: Yawa [Q_{2a}, S11]; **Zuni**: Zuni [T_3, HR02: 521].

[11] Isolates are families that only include one language (and its varieties; e.g. Basque is considered a language isolate, in spite of dialectal variation); see again Dryer (2013) for further notes and for the present classification.

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Samenvatting in het Nederlands

Talen coderen allemaal deiktische informatie in hun aanwijzend voornaamwoordsystemen (voortaan: 'AVSen'), maar welke informatie precies wordt gecodeerd, is een kwestie van cross-linguïstische variatie. Dit proefschrift onderzoekt deze variatie, specifiek met betrekking tot hoe het deiktische centrum is gecodeerd in de syntaxis van (meestal) Romaanse AVSen, en doet dit vanuit zowel een synchroon als een diachroon perspectief.

Vanuit het eerste perspectief ligt de nadruk op hoe de geattesteerde cross-linguïstische verschillen kunnen worden geformaliseerd in de syntaxis van aanwijzende voornaamwoorden (voortaan: 'AVen'). Deze onderzoekslijn culmineert in het voorstel van een nieuwe interne structuur voor AVen die persoon en ruimte met elkaar verbindt. Dit overwint de klassieke dichotomie tussen persoonsgericht en afstandsgericht analyses van AVen en geeft het systeem een grotere empirische dekking. Vanuit het laatste perspectief ligt de nadruk op de reductie van AVSen in de verschillende (micro-)diachrone stadia van een bepaalde taal, inclusief in contactsituaties. Dit is het onderzoeken waard, aangezien soortgelijke veranderingen alleen AVSen betreffen, in tegenstelling tot andere deiktische categorieën (persoonlijke voornaamwoorden, bezittelijke vormen, tijdsystemen, enz.). Verder vormt deze onderzoekslijn de belangrijkste nieuwe bijdrage van dit werk, want dit onderwerp niet eerder was onderzocht in formele studies.

Hoofdstuk 1 zet de toon voor de rest van het werk door de belangrijkste vragen te introduceren die moeten worden beantwoord, namelijk: hoe deixis synchroon wordt gecodeerd in de syntaxis van AVen, hoe (op basis daarvan) men het proces van reductie dat van invloed is op AVen kan modelleren in diachronie, en hoe men de diachrone asymmetrie tussen stabiele (bv. pronominale paradigma's) en instabiele (AVSen) deiktische systemen kan verklaren. Daarnaast biedt het een basisoverzicht van de belangrijkste terminologie en bespreekt het theoretische kader waartegen deze studie wordt uitgevoerd (niet-lexicalistisch minimalistisch model voor syntactische afleidingen, gecombineerd met een algemene 1 Feature–1 Head-architectuur voor syntaxis en een span-

ningsmechanisme voor het invoegen van woorden bij Spell-Out).

Hoofdstuk 2 is de empirische ruggengraat van deze studie en bestaat uit een gedetailleerd overzicht van de reorganisatie van Romaanse (soms: schijnbare) ternaire AVSen in diachronie en in contact, op basis van gegevens verzameld uit literatuuronderzoek (diachronie en Portugese creolen) en veldwerk (verloren – door taalverlies – en erfgoed Italo-Romaanse talen in micro- en macrocontact). Gezien het typologische belang van deze gegevens, geeft hoofdstuk 2 de beschrijving ervan slechts zo veel mogelijk theorie-neutraal. De twee belangrijkste generalisaties die uit Hoofdstuk 2 naar voren komen kunnen als volgt worden samengevat:

(1) *Reductiepatronen in AVSen*:

a. (qua)ternaire AVSen zijn instabiel zowel in diachronie als in contact en kunnen een reductie ondergaan;

b. wanneer een reductie optreedt, en ongeacht de geattesteerde semantische en formele variatie, wordt de contrastieve codering van de deiktische domein van de hoorder en, indien beschikbaar, die uitsluitend van de spreker systematisch verloren, terwijl de andere deiktische domeinen slechts gedeeltelijk betrokken zijn, volgens de semantiek van het nieuwe gereduceerde systeem.

De eerste generalisatie is niet geheel nieuw: ondanks het aanzienlijke gebrek aan gedetailleerd onderzoek op dit gebied, was de algemene instabiliteit van (qua)ternaire systemen al in de literatuur vastgesteld voor een handvol talen. Dit proefschrift bevestigt deze conclusie met betrekking tot Romaanse talen, en doet dit door de empirische dekking uit te breiden naar, naast diachrone verandering, verandering in contact (Italo-Romaanse talen gesproken in (micro)contact; Portugese creolen). Van AVSen in beide scenario's wordt aangetoond dat ze consequent hetzelfde veranderingpad volgen.

In tegenstelling tot andere studies die eveneens de instabiliteit van (qua)ternaire AVSen bespreken, richt dit werk zich echter op de verschillende semantische en formele uitkomsten van het reductieproces ter discussie en gebruikt ze om de mechanismen te onderzoeken die aan deze verandering ten grondslag liggen. In dit opzicht is de tweede generalisatie baanbrekend omdat het een onderliggende overeenkomst identificeert tussen 1(INCL) en 3e persoon (stabiel) enerzijds en 2e en 1EXCL persoon (instabiel) anderzijds; dit was nog niet eerder in de literatuur naar voren gekomen.

De rest van dit proefschrift biedt een analyse van de gegevens in Hoofdstuk 2 en een verklaring voor de generalisaties in (1). Concreet presenteren de Hoofdstukken 3 en 4 de kenmerken betrokken in en de syntactische analyse van AVen, die samen verklaren hoe deixis wordt gecodeerd in AVSen. Hierop voortbouwend, geven de Hoofdstukken 5 en 6 een principiële verklaring voor de reductie van AVSen; daarin wordt besproken wat hun instabiliteit bepaalt, hoe dit kan worden beperkt om alleen maar de geattesteerde reductiepatronen af te leiden, en waarom integendeel andere deiktische systemen stabiel zijn.

Meer specifiek gaat **Hoofdstuk 3** verder dan de traditionele dichotomie tussen persoonsgericht en afstandsgericht analyses van AVen (Anderson & Keenan 1985) om te beweren dat, ongeacht de semantische variatie, Romaanse AVSen een fundamentele persoonsgericht semantiek hebben (tenminste met verwijzing naar de positie van de spreker in elke context); toch kunnen ze ook extra afstandsgericht contrasten coderen, door het persoonscomponent te modificeren. Soortgelijke conclusies worden getrokken door Lander & Haegeman (2018a). De argumenten ter ondersteuning hiervan zijn echter deels nieuw en berusten op het zorgvuldig onderzoek van minder geattesteerde AVSen, namelijk: deelnemers-gebaseerde binaire AVSen, persoonsgericht ternaire AVSen, en hun interacties; en AVSen die hoordergericht vormen bevatten die extra afstandsopposities coderen.

Verder stelt Hoofdstuk 3 dat persoonsgericht AVen moeten worden afgeleid door persoonskenmerken, d.w.z. door dezelfde tools die ook o.a. persoonlijke voornaamwoorden afleiden. Er worden enkele nieuwe argumenten voor deze hypothese naar voren gebracht (in tegenstelling tot locatieve kenmerken, zie Lander & Haegeman 2018a; maar in lijn met Harbour 2016, Bjorkman *et al.* 2019, Cowper & Hall 2019a), en specifiek: AVSen die het onderscheid "exclusief–inclusief" hebben; en AVSen die ook coderen voor aanvullende deiktische kenmerken (getal en geslacht). Geen van beide kan worden afgeleid door locatieve kenmerken. Bovendien introduceert Hoofdstuk 3 het persoonskenmerkensysteem die in dit proefschrift wordt aangenomen (gebaseerd op Harbour 2016, met enkele aanpassingen) en toont het hoe de geattesteerde (synchrone) variatie binnen de Romaanse talen (en verder) eronder wordt afgeleid:

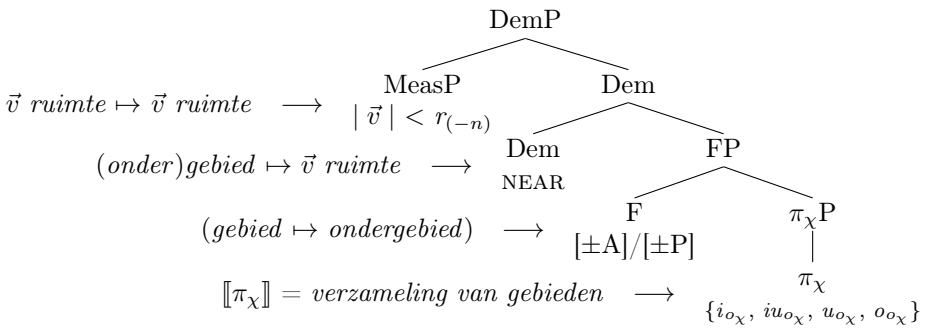
(2) *Persoonsgericht contrasten in AVSen*

Systeem	Partities/Systeem			
	i_{o_χ}	iu_{o_χ}	u_{o_χ}	o_{o_χ}
1 Frans	π_χ *ce*			
2/P Catalaans	$+\mathrm{P}(\pi_\chi)$ *chisto*			$-\mathrm{P}(\pi_\chi)$ *chillo*
2/A Italiaans	$+\mathrm{A}(\pi_\chi)$ *questo*		$-\mathrm{A}(\pi_\chi)$ *quello*	
3 Spaans	$+\mathrm{P}(+\mathrm{A}(\pi_\chi))$ *este*		$+\mathrm{P}(-\mathrm{A}(\pi_\chi))$ *ese*	$-\mathrm{P}(\pm\mathrm{A}(\pi_\chi))$ *aquel*
4 Oud Napol.	$+\mathrm{A}(-\mathrm{P}(\pi_\chi))$ *chisto*	$+\mathrm{A}(+\mathrm{P}(\pi_\chi))$ *chisto*	$-\mathrm{A}(+\mathrm{P}(\pi_\chi))$ *chisso*	$-\mathrm{A}(-\mathrm{P}(\pi_\chi))$ *chillo*

Hoofdstuk 4 presenteert een nieuw voorstel voor de interne structuur van AVen, waarvan wordt beweerd dat het intern complex is. Specifiek bevatten

AVen een voornaamwoordelijk-achtige component (afgeleid door de machinerie beschreven in Hoofdstuk 3) ingebed onder een voorzetselachtige component, die gemodelleerd is door vectoren (zie bv. Zwarts 1997; Svenonius 2010). Dit voorstel is gebaseerd op het parallellisme tussen AVen en ruimtelijke voorzetsels: deze laatste plaatsen een onderwerp, de figuur, ten opzichte van een andere onderwerp, de grond, die als ruimtelijk referentiepunt dient; evenzo kunnen AVen worden opgevat als vormen die hun referent (de – mogelijk stille – NP die ze wijzigen) lokaliseren met betrekking tot een of meer van de gespreksdeelnemers (de spreker en/of de hoorder). Meer concreet definieert de voornaamwoordelijk-achtige component van de AVen het deiktische centrum met betrekking tot welke elke AV wordt geïnterpreteerd; daarna denoteert de voorzetselachtige component een ruimtelijke relatie van nabijheid tussen dat deiktische centrum en de AVs referent. Daarnaast zorgt dit voor de afleiding van extra afstandsgericht contrasten in AVen (door een modificeerder, zoals in de discussie in Hoofdstuk 3). Kort gezegd, volgens dit voorstel wordt *dit boek* geanalyseerd als "(het) boek bij mij (in de buurt)" en zou de interne structuur van AVen als volgt worden afgeleid:

(3) *De interne structuur van AVen*



Hoofdstuk 4 wordt afgesloten met een inleidende bespreking van syntactische en categoriale kwesties die verband houden met dit voorstel. Bovendien levert het snel bewijs ervoor door aan te tonen dat Romaanse AVen morfologisch kunnen worden ontleed in een reeks morfemen die op transparante wijze de volgorde van hoofden uitspellen die betrokken zijn bij de voorgestelde interne structuur, in overeenstemming met het spiegelprincipe.

Voortbouwend op de belangrijkste conclusies uit de Hoofdstukken 3 en 4, keren de Hoofdstukken 5 en 6 terug naar de gegevens die in Hoofdstuk 2 worden gepresenteerd om de veranderingen in de codering van deixis in AVen te formaliseren en te verklaren. Om te beginnen stelt **Hoofdstuk 5** voor dat sommige op het eerste gezicht ternaire AVSen die in Hoofdstuk 2 zijn besproken feitelijk een viervoudig deiktisch contrast coderen (met de extra "exclusief–inclusief" onderscheid). Dit toestaan wordt verder waargenomen dat alle reductiepatronen, ongeacht hun variatie, beschrijvend kunnen worden gemodelleerd als het resultaat van het verlies van het laatste persoonskenmerk dat in de afleiding

van een bepaald (qua)ternair AVS komt:

(4) **Beschrijvende generalisatie**

a. Ternair > spreker-gebaseerd binair AVS: $\cancel{\pm}\cancel{\mathrm{P}}(\pm\mathrm{A}(\pi))$

b. Quaternair > deelnemers-gebaseerd binair AVS: $\cancel{\pm}\cancel{\mathrm{A}}(\pm\mathrm{P}(\pi))$

Verder wordt een principiële verklaring voor deze intuïtie gegeven, die de generalisaties in (1) vangt: in een notendop wordt bewezen dat (qua)ternaire AVSen kenmerkend complex zijn en dat hun kenmerkend complexiteit de ultieme trigger is voor het verlies van kenmerken. Kenmerkverlies levert op zijn beurt de gereduceerde binaire AVSen op (zie (4)).

Meer concreet worden twee met elkaar verweven complexiteitsmetrieken besproken: minimale beschrijvingslengte (Kolmogorov-complexiteit) en niet-monotoniciteit van de afleiding. Volgens het eerste zijn systemen die worden afgeleid door twee opeenvolgende functie-applicaties, d.w.z. (qua)ternaire AVSen, computationeel zwaarder dan systemen die eenvoudig worden afgeleid door één functie-applicatie, d.w.z. binaire AVSen. Volgens de laatste zijn er binnen de complexe (qua)ternaire AVSen sommige vormen complexer vanwege het niet-monotone profiel van de operaties (kenmerken en hun waarden) die bij hun afleiding betrokken zijn:

(5)

	Monotoon	Niet-monotoon
Tripartitie	$+\mathrm{P}(+\mathrm{A}(\pi)) = 1$ $-\mathrm{P}(-\mathrm{A}(\pi)) = 3$	$+\mathrm{P}(-\mathrm{A}(\pi)) = 2$ $-\mathrm{P}(+\mathrm{A}(\pi)) = 3$
Quadripartitie	$+\mathrm{A}(+\mathrm{P}(\pi)) = 1_{\mathrm{INCL}}$ $-\mathrm{A}(-\mathrm{P}(\pi)) = 3$	$+\mathrm{A}(-\mathrm{P}(\pi)) = 1_{\mathrm{EXCL}}$ $-\mathrm{A}(+\mathrm{P}(\pi)) = 2$

Persoonscategorieën die zijn afgeleid door een niet-monotone reeks operaties (verschillende kenmerkwaarden de reeks langs, waardoor twee verschillende operaties moeten worden uitgevoerd) worden als complexer beschouwd dan persoonscategorieën die zijn afgeleid door een monotone reeks operaties (dezelfde kenmerkwaarden de reeks langs: herhaling van één en dezelfde operatie) vanwege een algemene, d.w.z. cognitieve, voorkeur voor monotone computatie (derde-factor principe). Deze vooringenomenheid zorgt voor de eliminatie, door kenmerkverlies, van de (niet-geprefereerde) niet-monotone categorieën (mogelijk bij taalverwerving) om de computationele efficiëntie te verbeteren. Dit verlicht overigens ook de complexiteit van het systeem als geheel, omdat de afleiding daardoor korter is. Cruciaal is dat de niet-monotoon afgeleide categorieën in (qua)ternaire systemen (het deiktische domein van de hoorder, DEM.2; het deiktische domein uitsluitend van de spreker, DEM.1EXCL) degene zijn die niet meer beschikbaar zijn in de gereduceerde AVSen, volgens de discussie in Hoofdstuk 2.

In **Hoofdstuk 6** wordt ten slot een structurele beperking op kenmerkverlies geïntroduceerd: kenmerkverlies is beperkt tot het tweede en laatste persoons-

kenmerk dat in de afleiding komt (zie nogmaals (4)). Daardoor wordt kenmerkstabiliteit een functie van *Merge*, zoals vastgelegd door de Last in–First out principe:

(6) *Last in–First out principe* ('LIFO')
Een kenmerk kan alleen verloren gaan als het als laatste wordt gemerged in een bepaalde functionele reeks.

Het LIFO principe is geworteld in het belang van de volgorde van composities voor actie-op-tralie kenmerken. Vervolgens wordt aangetoond dat dit nieuwe voorstel op natuurlijke wijze verklaart zowel de geattesteerde semantische variatie (binaire AVSen zijn ofwel spreker-gebaseerd of deelnemers-gebaseerd) als de meeste patronen van formele variatie die zijn gevonden in het Romaanse domein (de resterende reductiepatronen kunnen worden herleid tot pragmatische factoren).

Bovendien betoogde Hoofdstuk 6 dat het LIFO principe het verlies van persoonskenmerken in persoonlijke voornaamwoorden voorkomt, wat de uitzonderlijkheid van AVSen afleidt met betrekking tot andere persoonsdeiktische categorieën. Concreet, aangenomen dat getalkenmerken moeten worden geanalyseerd als actie-op-tralie kenmerken en dat ze boven persoonskenmerken worden gemerged (7a), wordt door LIFO voorspeld dat er geen persoonskenmerk verloren gaat uit de functionele reeks die persoonlijke voornaamwoorden afleidt indien ten minste één getalkenmerk is erin gemerged (7b):

(7) a. $\ldots(\mathrm{F}_{\#1}(\mathrm{F}_{\pi 2}(\mathrm{F}_{\pi 1}(\ldots))))$
b. $*\ldots(\mathrm{F}_{\#1}(\mathrm{F}_{\pi 1}(\ldots)))$

Op deze manier afleidt het LIFO principe de asymmetrie tussen instabiele AVen en stabiele persoonlijke voornaamwoorden: de eerste dragen typisch (deiktische) getalkenmerken, terwijl de laatste dat meestal niet doen. Dit resulteert in alleen de persoonskenmerken van de laatste, maar niet van de eerste, om mogelijk verloren te gaan, omdat de structurele voorwaarde die kenmerkverlies mogelijk maakt is in AVen volledig van toepassing. Overigens leidt het onderzoek van persoonlijke voornaamwoorden de weg naar een empirische generalisatie, waargenomen op basis van een typologisch gevarieerde steekproef van onafhankelijke persoonlijke voornaamwoorden paradigma's (n=674):

(8) *Getalkenmerken zijn afhankelijk van persoonskenmerken*
Als een persoonlijke voornaamwoorden paradigma een getaloppositie codeert, maakt dat paradigma ook op zijn minst een ternair persoonsonderscheid (1e persoon versus 2e persoon versus 3e persoon).

Hoofdstuk 7 besluit met een samenvatting van de belangrijkste empirische en theoretische bevindingen van dit werk en biedt vooruitzichten voor verder onderzoek.

Curriculum Vitae

Silvia Terenghi was born in Milan, Italy, in 1993. In 2012, she won a scholarship to attend the Scuola Normale Superiore of Pisa, Italy, where she studied until 2017. At the same time, Silvia studied at the University of Pisa and graduated *cum laude* from both her BA in Italian Linguistics (2015) and MA in Linguistics (2017); moreover, in 2015 she spent six months as an exchange student at the Romanisches Seminar of the University of Zurich, Switzerland. In 2017, Silvia was offered a PhD position in the ERC-funded *Microcontact* project hosted by Utrecht University (PI: Prof. dr. Roberta D'Alessandro): the results of her PhD research are collected in this dissertation and were previously presented at over 20 conferences in 10 different countries (although, sadly, some of these she could only attend from her living room) and published as peer-reviewed journal and proceedings articles. Thanks to the *Microcontact* project, Silvia was also able to collect fieldwork data in Quebec, Canada (spring 2019), and in the south of Belgium (autumn 2019). On top of this, she has held numerous teaching positions within the Linguistics programme of Utrecht University and the Italian programme of Leiden University and she continues to work as a lecturer at both institutions.