Less form - more meaning:

Why bare singular nouns are special[1]

Henriëtte de Swart and Joost Zwarts

Abstract

In languages like English, bare nominals are only used in special constructions, and they come with special meaning effects. This paper applies bidirectional Optimality Theory to explain why unmarked (articleless) forms have unmarked (stereotypical) meanings. The syntactic unmarkedness of bare nominals is embedded in a constraint-based typology of number, article use and referentiality. The semantic unmarkedness of the stereotypical interpretation falls out of the strongest meaning hypothesis.

Keywords: bare nouns, Optimality Theory, stereotypicality, markedness

1 Introduction

Bare nominals are noun phrases that lack an article or determiner. If we set proper names aside, they come in two types: bare plurals and bare singulars. Bare plurals have been intensively studied for a long time, but bare singulars, like those in (1), have only recently gained the interest of linguists.[2]

[1] This paper was presented at 'A Bare Workshop' in Utrecht and 'Nominal Incorporation and its Kind' in Ottawa. We thank the audiences as well as two anonymous reviewers for useful questions and comments. We gratefully acknowledge the Netherlands Organization for Scientific Research (NWO) for financial support (grant 051-02-070 for the Cognition project *Conflicts in Interpretation*). The first author is grateful for the hospitality of the Netherlands Institute for Advanced Study in the Humanities and Social Sciences (NIAS) during the academic year 2005-2006, and thanks NWO (grant 365-70-015) for financial support of her sabbatical.

[2] A selection of relevant recent references: Stvan (1998), Pérez-Leroux and Roeper (1999), Travis (2001), Heycock & Zamparelli (2003), Borthen (2003), Déprez (2005), Munn and Schmitt (2005), Matushansky and Spector (2005), Baldwin et al. (2006).

(1) a. John is *in hospital*. (Bare location)

b. the way to use *knife and fork*. (Bare coordination)

c. Mary *is chair* of the department. (Bare predication)

d. He found *door after door* closed. (Bare reduplication)

e. She is *playing piano* for the choir. (Bare incorporation)

In these constructions a singular count noun, which would usually have to occur with a determiner of some sort, can occur without one. Such constructions are not only found in English, but also in other languages that usually require singular count nouns like *hospital*, *knife*, *fork*, *chair*, *door*, *sergeant* and *piano* to have a determiner.

When we compare these bare constructions with their non-bare counterparts, which we will do in section 2, we see that bare nominals often have a variety of richer, 'stereotypical' interpretations. In this paper, we will derive this effect from bidirectional optimization (Blutner 2000), which aligns formal and semantic markedness. This approach incorporates the Gricean insight of the 'division of pragmatic labor', that unmarked forms go with unmarked meanings and marked forms with marked meanings (Horn 1984). The bare constructions in (1) have a richer interpretation because the competition with a non-bare counterpart leads to an optimal outcome in which the more economical forms take on the more stereotypical meanings and the less economical forms the less stereotypical meanings. In this way, bidirectional Optimality Theory helps us to understand why formally less is semantically more.

After a brief overview of the relevant data in section 2, we will sketch in general terms how bidirectional OT applies to bare singulars in section 3. Working out the general idea requires us to take a closer look at the syntactic and semantic markedness constraints that

underlie the optimization process (in section 4 and 5, respectively). Section 6 concludes the paper.

2 Bare singular constructions

The bare nominals that we are interested in are very much tied to particular constructions (a term that we use here in a descriptive sense). We will use conveniently simple terms to refer to them:

(2) Bare location = [P N], bare coordination = [N Coord N], bare predication = [Copula N], bare reduplication = [N P N], bare incorporation = [V N]

For the sake of accessibility, most of the examples will come from English, unless other languages exemplify the construction in a clearer way.

Omission of articles in prepositional phrases is a cross-linguistically widespread phenomenon, especially with locative prepositions (Himmelmann 1998, Stvan 1998, Baldwin et al. 2006). Here are some examples (see Stvan 1998 for extensive lists):

(3) in town, at sea, in church, to school, out of bed, on television, on tape, off stage, in view, at lunch, on vacation

The bare location construction occurs with nouns that refer to spaces (in a wide sense): geographical (*town*, *sea*), 'social' (*church*, *school* or *bed*), media (*television*, *tape*), 'frames' (*stage*, *view*), and time periods (*lunch*, *vacation*). Although languages target more or less the same locative concepts for bare location, there are minor differences from language to

language. Dutch doesn't use *kerk* 'church' in bare locations (*in *(de) kerk* 'in church'), but it does use the word for office in this way (*op kantoor* 'in the office').

That the bareness in this construction has special meaning effects has often be noted and been described more systematically in Stvan (1998), Pérez-Leroux and Roeper (1999) and McIntyre (2001). There are two important effects that we can see by contrasting the bare locations with their full counterparts. With social spaces, bare location usually has, what Stvan (1998) calls, an activity sense, illustrated in (4a):

(4) a. to be in prison 'to be a prisoner'

b. to be in the prison 'to be in the location designated by "prison"'

(5) a. John is at school. 'at *his* school'

b. John is at a/the school.

To be in prison does not just refer to a physical location in a building, but to the most typical way to participate in the defining state of the social institution that corresponds to that location (detention). This is not necessary with the 'full' PP in (5b). We get the same activity sense with *in church* (religious service), *to school* (education), *in hospital* (medical care). Another effect is that the bare construction has a possessive interpretation that is lacking in the normal construction, as shown in (5).[3] Often these two effects will go together.

In a bare coordination two bare nouns are conjoined:

(6) a. Mother and daughter weren't at home.

b. The costs of monitor, keyboard and mouse were included.

c. He bought table and chairs for $182.

[3] Which is particularly clear with the bare expression *home*, as Jackendoff, Maling and Zaenen (1993) have shown. Mithun (1986) points to possessive interpretations for incorporation constructions like 'hand washing.'

There are many others like these, most of them idiomatic (*needle and thread*, *husband and wife*, *bow and arrow(s)*, *knife and fork*). Lambrecht (1984) calls these constructions *bare binomials* and observes that the nouns in a bare binomial are part of the same conceptual frame. Bare coordination is an instance of what the typological literature calls *natural coordination* (when the conjuncts go together conventionally or conceptually) as opposed to *accidental coordination* (when this is not the case), a distinction that languages tend to iconically mark in one way or another (Haspelmath to appear, Dalrymple and Nikolaeva 2006). Other syntactic and semantic properties are noted in Heycock and Zamparelli (2003) and Roodenburg (2004).

The bare predication construction has recently received a lot of attention, being the most productive of the bare constructions. Extensive discussion about the syntax and semantics of this construction can be found in Munn and Schmitt (2005), Matushansky and Spector (2005), de Swart, Winter and Zwarts (2005, 2007), and Zamparelli (2005). In English the construction is restricted to unique roles, typically with a PP complement:

(7) a. Anne is head of the department.

b. Bill is employee of the week.

All other Germanic languages and the Romance languages do not have this restriction. They typically use bare predication for professions, nationalities, and religions:

(8) a. Ndongo is Malinees. [Dutch]

'Ndongo is a Malian.'

b. Er ist praktizierender Katholik. [German]

'He is a practicing Catholic.'

c. Jeanne était espionne. [French]

'Jeanne was a spy.'

Predication with bare nominals is always literal and official. (9c) cannot mean that Jeanne was a linguist who spied on her colleagues (then the indefinite article would have to be used), but only that she was officially working for the secret service.

We use the term bare reduplication for a construction that Jackendoff (n.d.) calls the NPN construction and Travis (2001) *syntactic reduplication*, while Beck and von Stechow (2005) treat it as a pluractional.

(9) cheek to cheek, page for page, house by house, volume after volume

One of the intriguing properties of this construction is that it can express quantificational force without there being an overt quantifier (Postma 1995):

(10) Student after student talked about his attitudes.

There is not just a sequence of students that talked about their attitudes, but what (10) intends to express is that many or maybe all students talked about their attitudes.

Incorporated nominals form a particularly tight unit with the predicate they are arguments of. In English, incorporation is confined to the lexicon (compounding as in (11a)). In Dutch, it is syntactically productive with musical instruments (11b):

(11) a. Babysitter, berry picking

b. Ik hoor dat Peter piano speelt. [Dutch]

I hear that Peter piano plays

'I hear that Peter plays/is playing the piano.'

As pointed out by Mithun (1984, 1986), Dayal (1999) and others, incorporation constructions are frequently associated with idiomatic meanings, so that the referent of the bare noun N is involved in the activity of V in a way that is customary or appropriate for N. Notice the following contrast in Dutch:

(12) a. … dat Alex televisie kijkt.

… that Alex television watch

'… that Alex watches television.'

b. … dat Alex naar de/een televisie kijkt.

… that Alex to the/a television watch

'… that Alex watches the television/looks at a television.'

The bare incorporation example (12a) can only be used when Alex is watching programs broadcast by the television. The indefinite counterpart in (12b) only has the literal meaning (Alex looking at the television set as a physical object), while the definite version is ambiguous between these two senses.

These five bare constructions show intriguing lexical restrictions, sometimes quite idiosyncratic, not only within but also across languages. We are at the border here of syntax and lexicon, of rules and lists, of regularities and idioms. Our aim in this paper is *not* to explain why the bare constructions are restricted in this way, or to account for minor cross-

linguistic variations in the lexical pattern, but rather to explain, for the cases where we *do* find bare nominals, how their interpretation contrasts with their non-bare counterparts.

Note that a bare construction is not the only way to obtain a special interpretation. Carlson and Sussman (2005) note very similar semantic effects and lexical restrictions with definite articles: *go to the store* (namely for shopping), *listen to the radio* (to what is broadcast). In a few cases, a noun can be used with and without the definite article, with what seems to be roughly the same effect, e.g. *to (the) hospital* (for healing). Note also the ambiguity of the following example:

(13) His daughter is in some fancy private school

This can refer to pure spatial location, but also to participation in the abstract institution. The important thing for us is that this ambiguity typically disappears when a construction allows the determiner to be dropped with singular nouns, and we get a systematic contrast in meaning between bare and non-bare versions of the same construction. The main aim of the paper is to account for the correlation between form and meaning in those pairs.

Finally, we observe that the five constructions that we introduced above are not the only ones that allow bare nouns. Here are some more contexts in which singular count nouns occur bare in Germanic and Romance languages:

(14) a. *Waiter*, there is a fly in my soup (Bare vocatives)

b. Where is *sergeant* Jones? (Bare functions)

c. I'll come *next week* (Bare adverbial)

d. *Introduction* to stamp collecting (Bare titles)

e. *Way* to go! (Bare exclamatives)

We ignore these and other bare constructions here because they are not as well studied as the bare constructions we discussed so far, but we take it that the analysis developed here extends to the examples in (14).

3 How less can be more

Bare constructions have a special interpretation lacking in their full counterparts. This seems to present an interesting paradox: how can a *reduction* in form lead to an *enrichment* in meaning? Actually, this is not an uncommon phenomenon in language, as observed in the pragmatic literature. It is what Horn (1984) calls the division of pragmatic labor ('unmarked forms tend to be used for unmarked situations and marked forms for marked situations') and Levinson (2000) the M-heuristic ('What is simply described is stereotypically exemplified'). There are many examples that exemplify this kind of non-arbitrary correlation between form and meaning in morphology, historical development, grammaticalization, binding theory, etc. The interpretational effects of bare singular nouns have been mentioned as an example by both Horn and Levinson, and Stvan (1998) has worked out the interpretational effects of bareness in PPs in detail using this line of explanation.

The general pragmatic principle is that hearers and speakers take each other's perspectives into consideration in choosing forms for their meanings and meanings for their forms. Bidirectional Optimality Theory is a formalization of this principle (Blutner 2000, 2004, Jäger 2003, and Dekker and Van Rooij 2000, van Rooij 2004 for game-theoretical versions).[4] It is a framework for modeling the relation between form and meaning that differs from ordinary OT approaches in defining optimality for *pairs* of a form *f* and a meaning *m*.

[4] For a more general discussion about bidirectionality in syntax and semantics, see Beaver and Lee (2004).

OT syntax (e.g. Grimshaw 1997) is only concerned with the derivation of the optimal syntactic form for a given input meaning; OT semantics (e.g. Hendriks and de Hoop 2001) takes the opposite, interpretive perspective, the mapping from a form to an optimal meaning. By evaluating pairs of a form and a meaning, bidirectional OT combines both directions of optimization. There are different ways to do this, but the definition of Blutner (2000) is special because it defines optimality for pairs in a *recursive* way:[5]

(15) ⟨*f*,*m*⟩ is optimal iff

a. there is no optimal pair ⟨*f'*,*m*⟩ that is better than ⟨*f*,*m*⟩ and

b. there is no optimal pair ⟨*f*,*m'*⟩ that is better than ⟨*f*,*m*⟩.

In words, a form-meaning pair <*f*,*m*> is optimal if and only if we cannot find an optimal meaning pair <*f'*,*m*> that has the same meaning *m* but a better form *f'* or an optimal pair <*f*,*m'*> that has the same form *f* but a better meaning *m'*. What makes a form (meaning) better than another form (meaning) is determined by *markedness*. The core idea underlying Optimality Theory (for phonology, syntax, or semantics) is that a pronunciation, structure, or interpretation is marked if it has complexities or unusual features. We illustrate the basic principles with a concrete example involving two forms (*in jail* and *in the jail*) and two meanings ('imprisoned' and 'just visiting the prison').

When we compare the two forms, we can say that *in the jail* is marked vis-à-vis *in jail*, simply because it has an article. In OT formulation: *in the jail* violates a markedness constraint *F that *in jail* does not violate. We will be more specific about the nature of this constraint in section 4. Of the two meanings, 'imprisoned' is the more stereotypical one, the

[5] This definition may look circular, but it is not. There is always a non-recursive way for a pair ⟨*f*,*m*⟩ to be optimal, namely if there is simply no pair ⟨*f'*,*m*⟩ or ⟨*f*,*m'*⟩ that is better than ⟨*f*,*m*⟩.

expected, 'default', and therefore unmarked way of being located in a jail, namely as a prisoner. The other meaning, 'just visiting', is the marked meaning, violating some semantic markedness constraint *M (about which more in section 5). This gives us the following pattern of constraint violations over the four possible pairs, represented in a tableau:

		*F	*M
✌	(a) *in jail*, 'imprisoned'	✓	✓
	(b) *in the jail*, 'imprisoned'	*	✓
	(c) *in jail*, 'just visiting'	✓	*
✌	(d) *in the jail*, 'just visiting'	*	*

Figure 1: Bidirectional optimization

The rows give the candidate form meaning pairs, showing in the columns which constraint they satisfy (✓) or violate (*). According to the definition in (15) pair (a) is optimal, because there is simply no other pair that is better, either in form or meaning. Pair (b) is not optimal because there is an optimal pair with a better form (namely (a)) and (c) is not optimal either, (a) being the pair with a better meaning. In bidirectional OT, the process of optimization is recursive. As a result, (15) rules in (d) as optimal: even though it violates both constraints, there is no *optimal* alternative for (d). (b) and (c) are better alternatives for (d), but they are not optimal, because they have themselves already been 'beaten' by (a). The symbol ✌ (two fingers making a victory sign) indicates the winning pairs.

In this way bidirectional optimization gives us a correspondence between bare forms and stereotypical meanings, but what remains to be worked out are the notions of markedness that underlie the optimization (cf. Haspelmath 2006). The remainder of the paper addresses the question why the bare nominal (rather than the non-bare one) is the unmarked form, and why

the stereotypical interpretation (rather than the non-stereotypical one) is the unmarked meaning. This involves spelling out the markedness constraints on forms and meanings, represented as *F and *M in Figure 1. As far as syntactic markedness is concerned, it seems quite straightforward that the form *in jail* is less marked than the form *in the jail*, being shorter and less complex. But that is actually not good enough. Paradoxically, in most ordinary contexts, the unmarked bare noun *jail* is not possible:

(16) a. *Jail burnt down.

b. *The police stormed jail.

c. *This building is jail.

It is actually the full form, with a definite or indefinite article, that is the normal, grammatical form in most contexts. The bare singular only occurs in particular constructions, so we have to provide a characterization of (un)markedness for noun phrases that is relative to these special syntactic contexts.

On the meaning side there is also a problem, but of a different sort. On what basis can we say that the meaning 'incarcerated' is semantically less marked than the meaning 'just visiting'? Unlike with the form dimension we don't find an obvious visible difference in meaning complexity here. We need an independent way to order the two meanings, and we need a way to do this not just for this example, but ideally in a more general way, in order to account for the range of stereotypicality effects that we find in bare constructions.

Given the OT perspective of this paper, we do not simply want to assume markedness orderings of forms and meanings, but we want to derive these orderings from violation patterns over a system of constraints. Section 4 embeds the unmarkedness of the bare form in

a typology of bare nominals. Section 5 derives the unmarkedness of the stereotypical interpretation from the strongest meaning hypothesis.

4 Less form: The unmarkedness of bare singular nouns

4.1 Projections

The syntactic form of a noun phrase is determined through the interaction of markedness constraints (that prohibit structure) and faithfulness constraints (that require particular meaning elements to be reflected in the form). Let us assume that the following four syntactic structures are possible:[6]

(17) a. $[_{NP}$ N]

b. $[_{NumP}$ Num $[_{NP}$ N]]

c. $[_{DP}$ D $[_{NP}$ N]]

d. $[_{DP}$ D $[_{NumP}$ Num $[_{NP}$ N]]]

A projection is only present when associated with morphological material: articles in D, number inflection in Num. We know that bare nominals do not have an overt D, so we assume that they do not have the structure in (17c) or (d). The observation that bare nominals are number neutral supports the view that they do not have the structure in (17b) either. Incorporated singulars as in (18a) can have singular or plural reference, so Farkas and de Swart (2003) claim that they lack a Num projection.

[6] More elaborate structures may be necessary for hosting indefinite determiners (like *some, several*), numerals (like *four, at least three*), and D-quantifiers (like *every, most*). We ignore these complex structures here, and restrict our attention to simple noun phrases with or without articles.

(18) a. Mari bélyeget gyüjt. [Hungarian]

Mari stamp.Acc collect

'Marie is collecting stamps.'

b. Jan en Sofie zijn leraar. [Dutch]

Jan and Sofie are teacher.

'Jan and Sofie are teachers.'

De Swart, Winter and Zwarts (2005, 2007) claim that bare predicate nominals don't have a Num projection, which explains why they can be used with both singular and plural subjects (18b). We already referred to the semantic plurality underlying reduplication constructions in section 1 (examples 9 and 10). Generalizing over these observations, we assign the bare singulars in the range of constructions exemplified in section 1 the structure in (17a).

4.2 Constraints

In the OT perspective adopted here, the interaction of faithfulness and markedness constraints determined the optimal form of a nominal. We argue that the minimal structure in (17a) emerges as the optimal form if no faithfulness constraints are active that require the presence of Num or D. There is just one simple syntactic markedness constraint:

(19) *FunctN: Avoid functional structure in the nominal domain.

Each functional projection in a noun phrase presents a violation, and adds to the markedness. If *FunctN were the only constraint, we would have a system with $[_{NP}$ N] as the only structure, lacking number and articles, perfectly unmarked.

In reality there are elements in the meaning of a noun phrase that require the presence of Num or D. There is a variable or discourse referent *x* in the semantic representation, which can carry specifications of number and referentiality, and these features have to be reflected in the syntax. In the languages under consideration, plural is marked in the morphology on the noun, i.e. in Num, which is expressed by the constraint FPl (FaithPlurality):

(20) FPl: plural must be expressed in Num.

With FPl ranked higher than *FunctN, we get a structure for plurals that includes Num.

The definite/indefinite contrast involves the referential status of the discourse referent (Farkas 2002, Farkas and de Swart 2007, and references therein). Following Farkas (2002), we assume that definites convey determined reference, i.e. the possibility to pick out a unique individual in the model as the referent of the definite expression, on the basis of uniqueness or anaphoricity. Indefinites lack this property. The faithfulness constraint FDef (FaithDefiniteness) relates this referential status of the discourse referent to the form of the nominal, reflecting the asymmetric treatment of definites and indefinites:

(21) FDef: determined reference must be expressed in D.

With the ranking FDef >> *FunctN we obtain a system with definite articles, projecting a structure with a D.

In addition to definite articles, languages such as English also have indefinite articles. A position commonly adopted in dynamic semantics is that indefinite articles serve to introduce discourse referents (Heim 1992, Kamp 1981, Kamp and Reyle 1993, Higginbotham 1985, Kamp and Van Eijck 1996). Following Farkas and de Swart (2003), we posit a faithfulness

constraint Fdr (FaithDiscourseReferent) that is more general: it also allows number morphology (under certain conditions) to express a discourse referent.

(22) Fdr: Parse a discourse referent by means of a functional layer above NP.

For Farkas and de Swart (2005) this possibility is related to the fact that number morphology is interpreted in terms of a condition on the discourse referent. Since singular nouns are not morphologically marked, but plural nouns are, we end up with an asymmetry between singular and plural nouns. If either plural Num or D is sufficient to introduce a discourse referent, we have a system of definite and indefinite articles in the singular, and an opposition between definite plurals and bare plurals, as in English.

Languages vary in their ranking of the faithfulness constraints FPl, FDef, and Fdr with respect to the markedness constraint *FunctN. Chapter 7 of Hendriks et al. (2007) shows how this leads to a typology of bare nominals. Here, we focus on the ranking relevant for most Germanic and Romance languages, including English. In these grammars, we have all three faithfulness constraints ranking above the markedness constraint *FunctN:

(23) { FPl, FDef, Fdr } >> *FunctN

The faithfulness constraints need not be ranked, because they do not conflict with each other. Given this constraint ranking, we expect a nominal to remain without projections (because of *FunctN) if the application of the higher faithfulness constraints can somehow be circumvented. We claim that this is exactly what happens in the special constructions in which we find bare singulars in Germanic and Romance.

4.3 The emergence of bareness

Section 2 showed that the possibility of omitting the indefinite article is restricted to particular syntactic positions. Bare singular nouns typically do not occur in regular argument positions of verbs, but only as predicates, in the company of 'minor' words like prepositions and conjunctions, or in an incorporated position. It is well known that bare singular nouns often do not have the referentiality that is characteristic of their full counterparts. Stvan (1998:224) gives the following contrast for bare location:

(24) a. Pat is in prison. ?It is a 3-story concrete building.

b. Pat is in a/the prison. It is a 3-story concrete building.

Notice also the contrast between bare and full predication in Dutch:

(25) a. Jan is *(een) leraar en Piet is *er* ook één [Dutch]
Jan is a teacher and Piet is there also one
'Jan is a teacher and Piet is one too'

b. Jan is (een) leraar en Piet is *dat* ook
Jan is a teacher and Piet is that also
'Jan is a teacher and Piet too'

Bare predication allows anaphoric reference to the property (through the definite demonstrative pronoun *dat* in 25b). Unlike full nominal predicates, bare predicates cannot pick out individuals from the set of teachers, with the anaphoric adverb *er*, which Dutch uses (like Italian *ne*) to refer to the nominal complement of numerals (25b).

The view that incorporated objects are non-referential goes back to Mithun (1984). Incorporated nominals are often discourse opaque, that is, anaphoric pronouns in discourse cannot refer back to the incorporated (singular) nominal:

(26) Ik weet dat Peter viool$_i$ speelt. #Kan hij 'm$_i$ meenemen? [Dutch]
I know that Peter violin$_i$ plays. #Can he it$_i$ take along?
I know that Peter plays the violin. Can he take it along?

Farkas and de Swart (2003) interpret incorporated nominals in terms of thematic arguments, not discourse referents. Following standard assumptions in dynamic semantics (cf. Section 4.2), regular argument positions require nominals that introduce a discourse referent. Farkas and de Swart argue that incorporated nominals only show up in special constructions in which the introduction of a discourse referent is not required. We adopt this view here and suggest that it extends to the other constructions involving bare nominals. Our assumption is then that the constructions discussed in Section 2 are special in the sense that they involve nominals that are not necessarily associated with a discourse referent, because they are not in a regular argument position. This is obvious for predicates, of course (cf. de Swart, Winter and Zwarts 2005, 2007), and for incorporation we rely on the argumentation of Mithun (1984) and Farkas and de Swart (2003). As for the remaining three constructions, we believe that a good case can be made that the noun phrase complement of a conjunction or a preposition is not necessarily the argument of that word. Both conjunctions and prepositions are functional categories, which only together with their complements form a complete extended projection (Grimshaw 2005). Semantically, conjunctions are clearly operators, not argument-taking predicates, while the status of prepositions as predicates is notoriously unclear (see Baker 2005 for a recent discussion). All in all, we believe there is enough

support for the claim that the bare nominals in the five constructions under consideration do not occur in a regular argument position.

We formulate the correlation between argument structure and discourse referents as a faithfulness constraint:

(27) Arg: parse a nominal projection in argument position as a discourse referent.

Arg is a *semantic* constraint that relates the presence of some nominal projection (an NP, NumP or DP) in regular argument position to a semantic representation involving a discourse referent. Arg works together with the syntactic faithfulness constraint Fdr: Arg requires a nominal in argument position to introduce a discourse referent and Fdr requires this discourse referent to be parsed by a functional level above NP. This pairing up of syntax and semantics effectively blocks bare singulars in regular argument position in Germanic and Romance languages. However, crucially, bare singulars are still allowed in non-argument positions, where no discourse referent is required, and this includes the special constructions discussed in this paper.

In bare nominal constructions, Arg is vacuously satisfied in the OT semantics, because the nominal does not appear in regular argument position in the syntactic input. In bare nominal constructions, Fdr is vacuously satisfied in the OT syntax, because there is no discourse referent in the semantic input. Given that only discourse referents are specified for number (Farkas and de Swart 2003) and definiteness (Farkas 2002), FPl and FDef are also vacuously satisfied. If Fdr, FPl and FDef are all vacuously satisfied, the lower ranked constraint *FunctN determines that a bare nominal is preferred over a nominal marked with an article, and a bare singular is preferred over a bare plural.

Although *FunctN is ranked so low that it becomes 'invisible' in major parts of the syntax, it emerges as decisive when highly ranked constraints are vacuously satisfied. The use of bare singulars in such constructions can be viewed as an instance of emergence of the unmarked in OT terms. Accordingly, we have established not only the syntactic unmarkedness of bare singulars in the grammar, but also restricted the use of bare singulars in languages like English, Dutch, French to non-argument positions, in which these nominals get a non-referential interpretation. The analysis in this section accounts for the syntactic unmarkedness of bare nominals. Section 5 deals with the other half of the bidirectional pattern detected in section 3, and addresses the question why stereotypicality is the unmarked meaning of bare nominals.

5 More meaning: the stereotypicality of bare singular nouns

In the bidirectional formulation of section 3, a stereotypical meaning *m* was said to be 'less marked' than a non-stereotypical meaning *m'*. Stereotypicality is used in the pragmatic literature as a cover term for the addition of a special meaning effect on top of a normal interpretation, an instance of strengthening or enrichment of meaning (Horn 1984, Levinson 2000). Understanding the enriched meanings of bare constructions provides the key to the insight that stereotypical interpretations are semantically unmarked.

The stereotypical meaning is usually more informative, stronger, richer than the non-stereotypical meaning, and hence we find the following types of entailments. A sentence with a bare predicate typically entails the sentence with the corresponding full predicate, but the reverse is not necessarily true (De Swart, Winter and Zwarts 2005):

(28) a. Peter is advocaat ⇒ Peter is een advocaat

Peter is laywer ⇒ Peter is a lawyer

b. Martha is een manager *⇒ Martha is manager

Martha is a manager *⇒ Martha is manager

The reason that (28b) is not valid is that one can be a university professor with a lot of management tasks, without being literally a professional manager. We see the same with bare coordination and bare location:

(29) Mother and daughter weren't at home ⇒ A mother and a daughter weren't at home

A mother and a daughter weren't at home *⇒ Mother and daughter weren't at home

(30) Bill is in jail ⇒ Bill is in the jail

Bill is in the jail *⇒ Bill is in jail

The bare coordination in (29) makes the stronger claim that we are talking about a mother and *her* daughter and the bare location in (30) refers to the property of being in jail as a prisoner. Notive that the bare ⇒ non-bare entailment may be restricted by properties of the underlying semantic domain. For instance, if Mary is *in school*, then she will only be *in the school* at school hours, when she is not ill or on an excursion, and not involved in long distance education. The entailment is therefore, like often in lexical semantics, *defeasible*, i.e. based on what is typically, usually, normally the case, but not without exceptions.

By having extra semantic features, the stereotypical meaning is a proper subset of a wider meaning that includes both stereotypical and non-stereotypical situations. For example,

for prepositional phrases like *in jail*, *in a jail*, *in the jail* at least two meanings are relevant, with, for the sake of concreteness, the following very simple representations:

(31) a. λx [IN(x,y) & JAIL(y)]

b. λx [IN(x,y) & JAIL(y) & IMPRISONED(y,x)]

The PPs are interpreted as ordinary predicates containing a free variable for the object. The stronger, stereotypical meaning in (31b) contains the information that *y* is imprisoned in *x,* which we take to correspond to Stvan's (1998) activity implicature. (31a) on the other hand is only the set of objects that have the spatial IN relation with the jail *y*.

There are various ways in which the b-meaning can be stronger and more restricted than the a-meaning. In other bare location PPs, the extra clause adds the possession relation between *x* and *y*, e.g. in *at home*. Instead of a very general prepositional relation IN, there is probably also a more specific *functional* instance of containment IN_{FNC} that refers to the way *x* uses *y* in a canonical way (see Carlson and Van der Zee 2005 for articles about functional aspects of location). This might require a shift between different meanings of *jail* or *school*, from a basic meaning to an institutional meaning (maybe along the lines of the qualia theory of Pustejovsky 1991). We remain agnostic here about how enriched meanings are derived from the compositional, lexically based meanings (IN and JAIL) and how this enrichment is driven or constrained by convention, encyclopedic knowledge, cultural models, qualia, frames, scripts and scenarios, etcetera. Somehow these factors determine what is normal, natural, typical, customary, conventional, institutionalized, but they are hidden in the generator, the OT component that generates the set of form-meaning pairs.

There is actually a third meaning here that we will leave out of consideration: the *complement* of the stereotypical meaning (31b) with respect to the general meaning (31a):

(31) c. λx [IN(x,y) & JAIL(y) & ¬IMPRISONED(y,x)]

For a PP like *in the jail* this meaning can be described as: 'being in jail, but not as a prisoner'. In Horn (1984) this complementary meaning arises as a result of Q-implicature. The use of *in the jail* instead of *in jail* signals to the hearer that the opposite of the stereotype is intended. Here we have chosen to work out a variant in which the stereotypical meaning competes only with the general meaning; the incorporation of the 'anti-stereotypical' meaning is worked out in Chapter 7 of Hendriks et al. (2007).

The interpretations available for PPs like *in jail*, *in a jail*, *in the jail* can now be ordered through a constraint Strength that favours informationally stronger, richer meanings (Zwarts 2004, and references cited there) by penalizing the weaker meanings relative to the stronger meanings. It is the constraint version of the R/I implicatures of Horn (1984) and Levinson (2000) and of the strongest meaning hypothesis of Dalrymple et al. (1994). It is this constraint that defines whether one meaning is unmarked relative to another meaning.

(32) Strength: stronger interpretations are better than weaker interpretations

With this constraint in place we are ready to return to the schematic tableau 1 that we gave in section 3 and fill in the two markedness constraints: *FunctN for the forms and STRENGTH for the meanings:

		*FunctN	Strength
✌	*in jail*, λ*x* [IN(*x*,*y*) & JAIL(*y*) & IMPRIS(*y*,*x*)]	✓	✓
	in the jail, λ*x* [IN(*x*,*y*) & JAIL(*y*) & IMPRIS(*y*,*x*)]	*	✓
	in jail, λ*x* [IN(*x*,*y*) & JAIL(*y*)]	✓	*
✌	*in the jail*, λ*x* [IN(*x*,*y*) & JAIL(*y*)]	*	*

Figure 2: Bidirectional optimization (bare location)

As we saw in section 3, the recursive definition of bidirectional optimization provides the association of bare nominals with stereotypical meanings and non-bare forms with non-stereotypical meanings, given the two general markedness constraints.

Our approach extends naturally to the other bare constructions under consideration, provided that the semantic enrichments that are found in these constructions are made explicit. One striking enrichment of the bare coordination *mother and daughter*, for instance, is the reciprocal possessive relation between the two conjuncts. We can therefore distinguish a weaker meaning, in which the second arguments of these relational nouns are existential quantified, and a stronger meaning, in which they are bound to each other. The + sign indicates the sum of the two conjuncts:

(33) a. λ*x*+*y* ∃*u*,*v* [MOTHER(*x*,*u*) & DAUGHTER(*y*,*v*)] (weaker meaning)

b. λ*x*+*y* [MOTHER(*x*,*y*) & DAUGHTER(*y*,*x*)] (stronger meaning)

These meanings will match up with the bare and full coordinations as illustrated in Figure 3.

	*FunctN	Strength
✌ *mother and daughter*, λ*x*+*y* [MOTHER(*x*,*y*) & DAUGHTER(*y*,*x*)]	✓	✓
a mother and a daughter, λ*x*+*y* [MOTHER(*x*,*y*) & DAUGHTER(*y*,*x*)]	*	✓
mother and daughter, λ*x*+*y* ∃*u*,*v* [MOTHER(*x*,*u*) & DAUGHTER(*y*,*v*)]	✓	*
✌ *a mother and a daughter*, λ*x*+*y* ∃*u*,*v* [MOTHER(*x*,*u*) & DAUGHTER(*y*,*v*)]	*	*

Figure 3: Bidirectional optimization (bare conjunction)

Along similar lines, de Swart, Winter, and Zwarts (2007) give an explicit account of the distinctions between bare and non-bare predication that can be incorporated in the bidirectional approach, as shown in Chapter 7 of Hendriks et al. (2007).

6 Conclusions

In this paper, we studied a number of constructions in which languages like English allow nominals to appear without an article. These include bare location, bare coordination, bare predication, bare reduplication, and bare incorporation. These constructions share a variety of special meaning effects that are characterized in terms of stereotypicality. We used bidirectional Optimality Theory to argue that the special meaning of these constructions is the result of the pairing up of unmarked forms with unmarked meanings, and marked forms with marked meanings. The syntactic unmarkedness of bare nominals was derived from a system

of constraints on the use of number and articles in argument and non-argument positions. The semantic unmarkedness of the stereotypical interpretation is the result of strengthening, in line with the strongest meaning hypothesis. Although the use of bare singulars in languages like English seems extremely restricted, their occurrence reveals the operation of general constraints on economical structures and typical interpretations.

Bidirectional optimization has a much broader empirical scope. Hendriks et al. (2007) present a range of linguistic phenomena, involving scrambling, pronouns, negation, discourse relations, and prepositions that can be analyzed in these terms. In each case the mapping between form and meaning is determined by underlying markedness constraints, creating the kind of patterns that we saw in this paper. Bidirectional OT thus leads to richer view on the relation between syntax and semantics, not as a rigid one-way mapping from syntax to semantics, but as a two-way connection in which constraints on form and meaning interact.

References

Baker, Mark (2005). *Lexical Categories*. Cambridge: Cambridge University Press.

Baldwin, Timothy, John Beavers, Leonoor van der Beek, Francis Bond, Dan Flickinger and Ivan A. Sag (2006). In Search of a Systematic Treatment of Determinerless PPs. In Patrick Saint-Dizier ed., *Computational Linguistics Dimensions of Syntax and Semantics of Prepositions*. Springer, 163-180.

Beaver, David and Hanjung Lee (2004). Input-Output Mismatches in OT. In Reinhard Blutner and Henk Zeevat, eds., *Optimality Theory and Pragmatics*. Basingstoke: Palgrave Macmillan, 112-153.

Beck, Sigrid and Arnim von Stechow (2005). Dog after Dog Revisited. In Christian Evert and Cornelia Endriss, eds., *Proceedings of the Sinn und Bedeutung* 10. *ZAS Papers in Linguistics* 44. Berlin, 43-54.

Blutner, Reinhard (2000). Some aspects of optimality in natural language interpretation. *Journal of Semantics* 17.3, 189-216.

Blutner, Reinhard (2004). Pragmatics and the lexicon. In Laurence Horn and Gregory Ward, eds.. *Handbook of Pragmatics*, Oxford: Blackwell, 488-514.

Borthen, Kaja (2003). *Norwegian Bare Singulars*. Doctoral Thesis, Norwegian University of Science and Technology.

Carlson, Greg and Rachel Sussman (2005). Seemingly indefinite definites. In Stephan Kepser and Marga Reis, eds., *Linguistic Evidence: Empirical, Theoretical, and Computational Perspectives*. Berlin: Mouton de Gruyter, 71-86.

Carlson, Laura A. and Emile van der Zee eds. (2005). *Functional features in language and space*. Oxford: Oxford University Press.

Dalrymple, Mary, Makoto Kanazawa, Sam Mchombo and Stanley Peters (1994). What do reciprocals mean? In *Proceedings of SALT* 4. Ithaca: Cornell University, 61-78.

Dalrymple, Mary and Irina Nikolaeva (2006). Syntax of natural and accidental coordination: Evidence from agreement. *Language* 82.4, 824-849.

Dayal, Veneeta (1999). Bare NPs, reference to kinds and incorporation. In *Proceedings of SALT* 9, Ithaca, NY: Cornell University Press.

Dekker, Paul and Robert van Rooij (2000). Bi-Directional Optimality Theory: An Application of Game Theory. *Journal of Semantics* 17.3, 217-242.

Farkas, Donka (2002). Specificity distinctions. *Journal of Semantics* 19, 1-31.

Farkas, Donka and Henriëtte de Swart (2003). *The semantics of incorporation*. Stanford: CSLI Publications.

Farkas, Donka and Henriëtte de Swart (2007). Article choice in plural generics, *Lingua* (in press).

Grimshaw, Jane (1997). Projections, heads, and optimality. *Linguistic Inquiry* 28, 373-422.

Grimshaw, Jane (2005). *Words and Structure*. Stanford: CSLI Publications.

Haspelmath, Martin (2006). Against markedness (and what to replace it with), *Journal of Linguistics* 42, 25-70.

Haspelmath, Martin (to appear). Coordination. In Timothy Shopen, ed., *Language Typology and Linguistic Description*, 2nd edition. Cambridge: Cambridge University Press.

Hendriks, Petra and Helen de Hoop (2001). Optimality Theoretic Semantics. *Linguistics and Philosophy* 24, 1-32.

Higginbotham, James (1985). On semantics, *Linguistic Inquiry* 16, 547-593.

Heim, Irene (1992). *The semantics of definite and indefinite noun phrases in English,* PhD thesis, University of Massachusetts at Amherst.

Hendriks, Petra, Helen de Hoop, Irene Krämer, Henriëtte de Swart, and Joost Zwarts (2007). *Conflicts in Interpretation*. Ms. University of Groningen, University of Nijmegen, Utrecht University.

Heycock, Caroline and Roberto Zamparelli (2003). Coordinated bare definties. *Linguistic Inquiry* 34.3, 443-469.

Himmelmann, Nikolaus P. (1998). Regularity in irregularity: Article use in adpositional phrases. *Linguistic Typology* 2, 315-353.

Horn, Larry (1984). Towards a new taxonomy of pragmatic inference: Q-based and R-based implicature'. In D. Schiffrin (ed.), *Meaning, Form, and Use in Context: Linguistic Applications*, GURT84, 11-42, Washington; Georgetown University Press.

Jackendoff, Ray, Joan Maling and Annie Zaenen (1993). *Home* is subject to Principle A. *Linguistic Inquiry* 24, 173-177.

Jackendoff, Ray (n.d.). Construction after construction. Ms. Brandeis University.

Jäger, Gerhard (2003). Learning constraint hierarchies. The bidirectional gradual learning algorithm. In R. Blutner and H. Zeevat, eds., *Pragmatics in OT*, Palgrave MacMillan, 251-287.

Kamp, Hans (1981). A theory of truth and semantics representation. In J. Groenendijk, T. Janssen & M. Stokhof, eds.. *Truth, representation and information,* Dordrecht: Foris, 277-322.

Kamp, Hans and Uwe Reyle (1993). *From discourse to logic.* Dordrecht: Kluwer Academic Press.

Kamp, Hans and Jan van Eijck (1996). Representing discourse in context. In J. van Benthem and A. ter Meulen, eds.. *Handbook of Logic and Linguistics*, Amsterdam: Elsevier, 179-237.

Lambrecht, Knut (1984). Formulaicity, frame semantics and pragmatics in German binomial expressions. *Language* 60.4, 753-796.

Levinson, Steven (2000). *Presumptive Meanings. The Theory of Generalized Conversational Implicatures*. Cambridge, Massachusetts: MIT Press.

Matushansky, Ora and Benjamin Spector (2005). Tinker, tailor, soldier, spy. In Emar Maier, Corien Bary, and Janneke Huitink, eds., *Proceedings of SuB9*. Nijmegen: NCS, 241-255.

McIntyre, Andrew (2001). Functional interpretations. Ms. University of Leipzig.

Mithun, Marianne (1984). The evolution of noun incorporation, *Language* 60, 847-894.

Mithun, Marianne (1986). On the nature of noun incorporation, *Language* 62, 32-37.

Munn, Alan and Cristina Schmitt (2005). Number and indefinites. *Lingua 115*, 821-855.

Pérez-Leroux, Ana T. and Thomas Roeper (1999). Scope and the structure of bare nominals: evidence from child language. *Linguistics* 37, 927-960.

Postma, Gertjan (1995). Zero-semantics: The syntactic encoding of quantificational meaning. In Marcel den Dikken and Kees Hengeveld, eds., *Linguistics in the Netherlands* 1995, Benjamins, 175-190.

Pustejovsky, J. (1991). The Generative Lexicon. *Computational Linguistics* 17.4, 409-441.

Roodenburg, Jasper (2004). French bare arguments are not extinct: the case of coordinated bare nouns. *Linguistic Inquiry* 35.2, 301-313.

Rooij, Robert van (2004). Signalling games select Horn strategies. *Linguistics and Philosophy* 27: 493-527.

Stvan, Laurel Smith (1998). *The Semantics and Pragmatics of Bare Singular Noun Phrases*. Ph.D. Dissertation. Northwestern University.

Swart, Henriëtte de, Yoad Winter and Joost Zwarts, (2005). Bare predicate nominals in Dutch. In Emar Maier, Corien Bary, and Janneke Huitink, (eds). *Proceedings of SuB* 9, p. 446-460.

Swart, Henriëtte de, Yoad Winter and Joost Zwarts, (2007). Bare nominals and reference to capacities, *Natural Language and Linguistic Theory* (in press).

Travis, Lisa (2001). The syntax of reduplication. In Minjoo Kim and Uri Strauss, eds., *Proceedings of NELS* 31, 455-469.

Zamparelli, Roberto, (2005). Introduction: Some questions about (in)definiteness. *Lingua* 115, pp. 759-766.

Zwarts, Joost (2004). Competition between Word Meanings: The Polysemy of (A)Round. In Cecile Meier and Matthias Weisgerber, eds., *Proceedings of SuB* 8. Konstanz: University of Konstanz Linguistics Working Papers, 349-360.