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NUMERAL CLASSIFIERS AND THE STRUCTURE OF DP

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ABSTRACT

Numeral Classifiers and the Structure of DP

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This dissertation investigates the structure of the Determiner Phrase from a crosslinguistic perspective, with a particular focus on English and Persian. Three main issues are addressed: the syntactic expression of number, the syntactic expression of specificity and the relationship between them.

A numeral classifier is used in numeral+noun constructions, as in Mandarin *yi/liang ge xuesheng* ‘one/two CL student’, where the classifier is insensitive to the singular/plural distinction of the quantifying element. Other languages use number morphology, as in English *table/tables*, where number marking does make a singular/plural distinction. To account for the similarities and differences between classifiers and number morphology, this dissertation proposes that the heads of Number Phrase (NumP) and Classifier Phrase (CLP) house bundles of UG functional features. These features, arranged in a geometry based on Harley and Ritter’s (2002) proposal for pronouns, assure syntactic composition of nP with classifiers and number morphology and of NumPs and CLPs with determiners. A classifier’s feature, [individuation], only “individuates” the nP complement as a count noun; in contrast, plural morphology also has a [group] feature, which entails the presence of [individuation] but which also calls for a more-specific singular/plural

distinction. This feature-based approach leads to the finding that despite descriptive claims that Persian has many “numeral classifiers”, there is only one, *ta*; the others are in fact modifiers.

On top of CLP and NumP, two Quantifier Phrases replace the traditional DP: Weak Quantifier Phrase (WQP) and Strong Quantifier Phrase (SQP). Following from earlier work, I argue that weak quantifying determiners denote a function from CLP/NumP predicates to a WQP generalized quantifier and that strong quantifying determiners denote a function from WQP generalized quantifiers to SQP generalized quantifiers.

Crosslinguistic variation in the expression of number and specificity stems from slight differences in the feature bundles that appear in the functional heads and whether these bundles have overt form. This feature-based analysis permits the cooccurrence of a classifier and number marker, a cooccurrence ruled out in earlier theories but which occurs in a number of languages, including Persian. For determiners, particularly articles, the proposal is that the syntactic features in WQ and SQ are interpreted pragmatically with regard to the speaker’s presuppositions about whether discourse participants know a referent. Necessarily, specificity and definiteness are analyzed into more primitive features.

My working assumption is inspired by Cinque’s (2002) hypothesis that functional syntax is the same across languages. But I diverge from the claim that exactly the same phrases are available in all languages. More precisely, I argue that what is universal are the functional features. These do tend to be associated with certain functional heads, but because the features can be bundled variously, some phrases may “fuse” under certain conditions (Bobaljik 1995, 2001) or may be always fused (Munn and Schmitt 2005, Schmitt and Munn 2002), with no evidence for the language learner that the two phrases are ever projected separately.

Acknowledgments

First, thanks to my wife, Shahrzad Mahootian, for encouraging me to pursue a PhD at this stage in life. It's a big family decision for one spouse to drop a day job and return to graduate school after a long hiatus and yet Shahrzad generously encouraged me to do just that. Her support was crucial, because although linguistics may not be a young man's game in the same sense that baseball is or math is said to be, PhD-level syntax was more challenging than I'd imagined. Without her support I wouldn't have started or finished the Northwestern program. And besides her moral support, her help with the syntax of Persian was essential.

For the successes of this dissertation in particular, the input of my committee was paramount. Brady Clark, Edith Aldridge, Simin Karimi and Stefan Kaufmann provided crucial, even essential, constructive criticism, helping clarify important points of syntactic theory in order to say meaningful things about the syntax and semantics of DP. Clichés sometimes ring very true and I cannot thank them enough for their care in seeing this dissertation through, despite my many missed deadlines and sometimes fuzzy conjectures. To the chair of my committee, Brady Clark, my heartfelt thanks for all the time, and there was a lot of it, that he put into this dissertation and for showing me how rigorous linguistics research is done.

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Abbreviations and typological conventions

Persian transcription

For the Persian data, transcriptions are broad IPA with the following deviations and clarifications.

a	low back vowel
æ	low front vowel (<i>æ</i> in italic)
e	mid front vowel
ey	front diphthong
c	voiceless alveopalatal affricate
j	voiced alveopalatal affricate
y	palatal glide
š	voiceless alveolar fricative
ž	voiced alveolar fricative
x	voiceless uvular fricative
ɣ	voiced uvular fricative

Morphological glosses

1S, 2S, 3S	1 st , 2 nd , 3 rd person singular
1P, 2P, 3P	1 st , 2 nd , 3 rd person plural

-RA	the Persian specific accusative morpheme
-ra/-ro/-o	alternative pronunciations of -RA
-i	a Persian indefinite morpheme
-e	the Persian singular definite morpheme
-ha/-a	the Persian plural specific morpheme
-EZ	the ezafe morpheme linking a head and postmodifier

Categories and heads

$X = X^0$	i.e. X is a phrasal head. X is usually used instead of X^0
DP	i) Determiner Phrase, according to the DP hypothesis ii) an NP with functional projections that give argument status to the nominal; DP in the standard DP hypothesis, and in this dissertation the structures I call WQP and SQP. (Note that arguments are actually Case Phrases, but after the introductory remarks I put aside Case Phrase until section 5.5. Until then I refer to WQP and SQP as the argument phrases.)
SQP	Strong Quantifier Phrase
SQ	the head position of SQP, i.e. SQ^0 ; also, a strong quantifying determiner

WQP	Weak Quantifier Phrase
WQ	head position of WQP, i.e. WQ ⁰ ; also weak quantifying determiners, including numerals
NP	Noun Phrase, the phrase including the root
N	the head of NP, i.e. N ⁰ , also, a noun
nP	the functional projection immediately above NP
n	the head of nP, categorizes nouns and serves to check [u-n]
Number	the singular/plural distinction
NumP	Number Phrase
Num	the head position of NumP, i.e. Num ⁰
Numeral	= cardinal, a weak quantifying determiner for precise cardinality, e.g. 1, 2, 3
CLP	Classifier Phrase
CL	the head of CLP, i.e. CL ⁰ , also, a numeral classifier
KP	Case Phrase

Features

[feature]	a privative feature
[u-feature]	an unchecked feature
[u -feature]	an feature that has been checked (see Copies, below)
[u -feature]	an unchecked feature that has failed to get checked during the derivation

Particular syntactic features and their associated meanings: simplified for easy reference

[n]	the feature in n, the head of nP, which categorizes for nouns and checks [u-n]
[indiv]	[individuation], a basic number feature
[group]	plural, a number feature
[minim]	[minimal], singular, a number feature
[q]	[quantity], a basic quantity feature, interpreted as a choice function
[rel]	[relative], a more-specific quantity feature for <i>many</i> , <i>some</i> , etc.
[abs]	[absolute], a more-specific quantity feature for numerals
[i.know]	associated with speaker's presupposition that speaker knows the referent
[you.know]	associated with speaker's presupposition that addressee knows the referent
[speaker]	feature associated with the speaker
[addressee]	feature associated with the addressee

Copies

DER _{EXT}	(small caps, shaded), in tree structures indicates an unpronounced copy of a moved element
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~~derext~~ in bracketed syntactic structures, indicates an unpronounced copy of a moved element,
 not to be confused with the strikeout convention for checked features, which are within feature brackets:
 i.e. ~~derext~~ is a copy of a moved element while [~~u=feature~~] is a checked feature

Semantic types

e an entity
 $\langle e, t \rangle$ a function from entities to truth values
 $\langle \langle e, t \rangle, t \rangle$ a function from a function from entities to truth values to truth values, i.e. a generalized quantifier
 GQ = $\langle \langle e, t \rangle, t \rangle$, a generalized quantifier
 $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ a function from sets to sets
 $\langle \langle e, t \rangle, \langle \langle e, t \rangle, t \rangle \rangle$ a function from sets to generalized quantifiers
 $\langle \langle e, t \rangle, GQ \rangle$ = $\langle \langle e, t \rangle, \langle \langle e, t \rangle, t \rangle \rangle$, a function from sets to generalized quantifiers
 $\langle GQ, GQ \rangle$ = $\langle \langle \langle e, t \rangle, t \rangle, \langle \langle e, t \rangle, t \rangle \rangle$, a function from GQs to GQs

Judgments

* an ungrammatical string
 # a contextually infelicitous structure

Optional element

() Indicates an element that may but need not appear, as in *We camped (for) two months along the Xingu River*

To my parents,
Evelyn and Lew Gebhardt

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Chapter 1: Introduction

1.1 The phenomena of number

Numeral classifiers are the window into this dissertation's investigation of the syntactic features that reside in the heads of functional phrases in DP. Depending on the analysis (e.g. Borer 2005), numeral classifiers (or just “classifiers”) may be considered a kind of number marking or at least a parallel to number marking in that classifiers typically appear in numeral+noun constructions where singular/plural morphology is not used. For example, in contrast to English, which marks plural (1a), Mandarin uses a numeral classifier, *ge* (1b).

(1a) two student-s

(1b) liang ge xuesheng
two CL student
'two students'

Mandarin

The examples in (1) may suggest that number, i.e. the singular/plural distinction, is indeed a parallel to numeral classifiers. That is, where English has *-s* Mandarin has *ge*. This apparent parallelism is further evidenced by the fact that a number of studies (e.g. Greenberg 1972, Sanches and Slobin 1973, T'sou 1976) have observed a rough complementary distribution of number marking and classifiers: languages tend to use one or the other, or if a language has access to both it avoids using them in the same construction.

On the other hand, there is ample evidence that number and classifiers are not perfect parallels. For example, that the Mandarin numeral classifier *ge* in (1b) is not simply a freestanding number marker completely parallel to English bound *-s* in (1a) is clear in that English number marking is sensitive to the singular/plural distinction (2a) while numeral classifiers are not (2b) since they appear with either the numeral for 'one' or 'two'.

used with determiners like *the*: in fact, Chierchia (1998a) and Gil (1987) argue that since nouns, i.e. NPs, in classifier languages are arguments they don't have DP projections. And indeed classifier languages tend to lack articles. But claiming that classifier languages' nouns don't have DP projections is suspect in that these languages do have demonstratives, ordinary quantifying determiners like *some* and *many*, and pronouns. In these cases we do expect a classifier to be used, at least with a demonstrative or determiner, but, as (3b) shows, such determiners can apparently bar the use of a classifier. A further problem with determiners, independent of the classifier issue, is the difficulty in accounting for their use and meaning, which vary greatly across languages. For example, Chierchia's (1995a, p346) assumption that *the* is a Frege-Russell iota operator whereby ιX is the largest member of X (i.e. ιDOGS = the largest plurality of dogs and ιDOG is the only dog) cannot fully explain the distribution *the* and *a*.

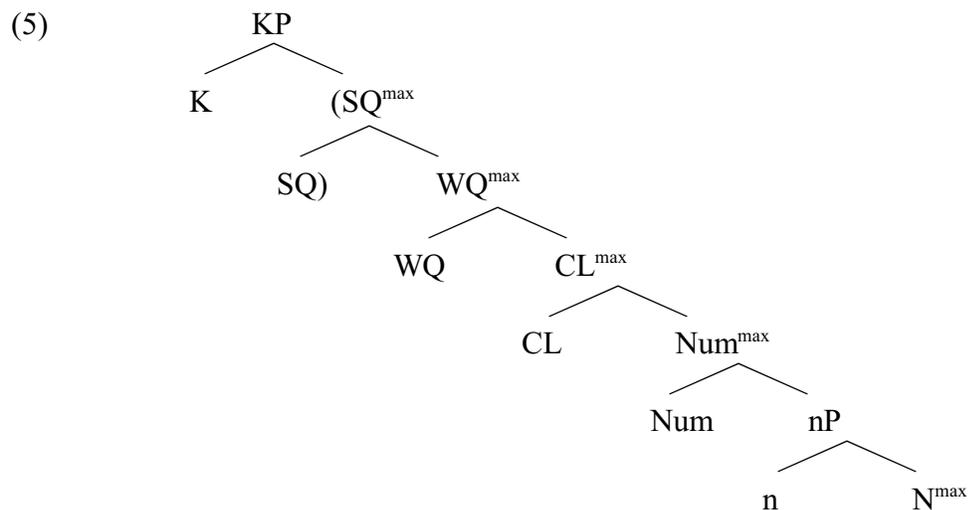
With regard to classifiers and number, I will argue that the analyses sketched above do not hold up and that we must assume nouns are predicates in all languages. My argument has more in common with Borer (2005), who argues for a Classifier Phrase where nouns become count, than with the Chierchia view that languages parameterize the semantics and syntax of their NPs; I show that classifiers and plural have syntactic features, with semantic associations, in common. But I depart also from Borer for both empirical and theoretical reasons. The main empirical argument is based on the details of Borer's proposal that number marking and classifiers are alternative expressions of number and her concomitant prediction that they therefore should not appear in the same construction. But some languages do use classifiers and number together, as the Persian example in (4) shows.

- (4) se ta gorbe-ha
 three CL cat-PL
 ‘the three cats’

Persian

Further, Borer’s system does not tell us why classifiers should ever be sensitive to whether the quantifying element is a numeral (3c) or other determiner such as *many* (3b). As we will see, analogs to (3b) are grammatical in Mandarin and Thai, so what is needed is some non-ad hoc flexibility to permit, require or bar a classifier with numerals or other determiners depending on the language and the particular determiner.

The syntactic framework assumed in this dissertation will be discussed in the next chapter, but I here briefly present the following structure of an argument NP and its projections. (5) shows a fully articulated DP, but as explained below what is important is not that the phrases be considered universal but that the functional features that typically head those phrases are.



As seen in (5) an argument is a Case Phrase (KP), which must include a Weak Quantifier Phrase and also requires a Strong Quantifier Phrase if the expression is specific for the addressee in a

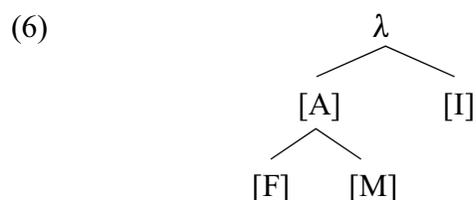
discourse; the heads of SQP and WQP are occupied by determiners. A Classifier Phrase and Number Phrase can in principle be projected separately. At the bottom of the structure are NP and its functional projection, nP. However, (5) is slightly misleading. The actual heads that appear and the phrases that are projected from them may vary by language (e.g. Bobaljik 1995, 2001, Munn and Schmitt 2005, Schmitt and Munn 2002), and not every argument in every language has the structure in (5). For example, we will see that Mandarin, but not Persian, doesn't allow separate projections for CLP and NumP; in Mandarin, therefore, these two phrases are effectively "fused", from the point of view of the language learner. More precisely what is universal is the set of functional features required for the syntactic and semantic composition of arguments. These features tend to be associated with particular heads.

As for the particular features to be adopted, the proposal in this dissertation is to adapt a system from Harley and Ritter (2002) that captures the similarities between classifiers and plural while at the same time accounts for the differences. Classifiers and number share the same fundamental number feature in the syntax, a feature we will call [individuation], but only number is further specified for the singular/plural distinction: [individuation, group]. (Note that in the feature geometry to be presented the presence of [group] entails the presence of [individuation].) The main empirical advantage is that it allows for cases like (4) but it also, I believe, shows a certain economy in the derivation of the more common classifier expressions as in (1b, 2b, 3c) and other classifier phenomena.

Having analyzed number marking in terms of a small set of syntactic features, I further adapt Harley & Ritter's system for the syntactic features of determiners and show that the features of strong quantifying determiners are associated with pragmatic presuppositions on the

part of the speaker. The conclusion is then that languages have the same DP syntax for number and determiners. In fact, the crucial aspect of universality is that the same features appear across languages. Where they differ is in which features are selected from a set of features available from UG and whether certain sets of features, or feature bundles, in the functional heads above NP are pronounced. In brief, despite certain tendencies for, say, features [F] and [G] to appear in head H, neither [F] nor [G] is required to appear in H. For example, Chomsky (1999, p7) assumes that a language assembles features into lexical items, possibly as a one-time mapping; but he also allows that “empirical phenomena might call for ‘distribution’” of a lexical item, i.e. the appearance of the various features in different heads. So, in some languages feature [G] may appear in head K.

The features associated with a lexical item are arranged in a geometry along the lines of Harley and Ritter (2002). Consider the abstract representation of a lexical item λ and its component features [A], [I], [F] and [M].



In Harley and Ritter’s system, features [F] and [M] are “dependent” on feature [A] and “entail that feature [A] is present” (Harley and Ritter 2002, p485). However, [A] says nothing at all about the presence of [F] and [M]. Lower, dependent features are more marked than higher features in that their use is claimed to be typologically rarer than higher features. For example, if λ in (6) is a pronoun, [A] is [animate], [I] is [inanimate], [F] is feminine and [M] is [masculine], the

geometry implies that the lower [feminine]/[masculine] distinction is more typologically marked than [animate]/[inanimate] distinction; that is, a language is more likely to have animate versus inanimate pronouns than it is to have feminine versus masculine pronouns. As an example more relevant to this dissertation, classifiers and number both have the feature [individuation], but only number has dependent features that make the distinction between plural and singular, as in (7a). And simplifying for now, classifiers like Mandarin *ge*, I argue, have only the feature [individuation], as in (7b). English *-s*, in contrast, is further specified for [group], i.e. plurality, as in (7c).

- (7a) [individuation] ← **available in classifier languages**
 / \
 [group] [minimal] ← **available in number-marking languages**
- (7b) Mandarin *ge*: [individuation]
- (7c) English *-s*: [individuation, group]

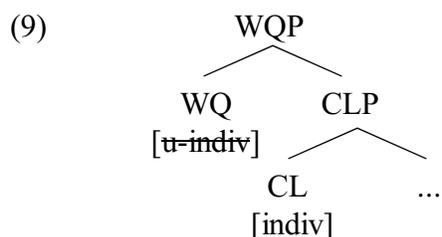
There is some direct carryover from Harley and Ritter's feature geometry to that used in this dissertation, for example [individuation] as a number feature. However, I significantly adapt their system since the aim here is not pronouns but number morphology. I further adopt their geometry by introducing new features for determiners and their relationship to pronouns, in chapter 5. For example, consider (8), where the definite determiner *the* indicates that both the speaker and addressee are presupposed to know what the referent is for an expression like *the cat*. Again simplifying for now, *the* has the features [i.know], meaning the speaker presupposes that the speaker knows the intended referent, and [you.know], indicating that the speaker presupposes

that the addressee also knows the intended referent (8a). In contrast, with the specific indefinite *a* the speaker does not presuppose that the addressee is aware of the referent (8b).

- (8a) definite *the*: [i.know, you.know]
 (8b) indefinite specific *a*: [i.know]

By being able to separate the [i.know] and [you.know] features, we eliminate not only definiteness but also specificity as primitive notions. This in turn makes it easier to show the similarities and differences of determiners across languages. The features such as [individuation] and [i.know], besides having semantic and pragmatic content, are also functional features that assure correct composition of the entire DP.

It turns out that [individuation] is a crucial feature in projection above NP. For one, it assures syntactic composition between CLP and NumP on the one hand and a weak quantifying determiner on the other. I argue that corresponding to [individuation] in number and classifiers is an uninterpretable [~~u-indiv~~], or [u-indiv], in determiners that must be checked by [individuation], or [indiv], in the determiner's complement, as in the simplified tree in (9). Checking of [u-indiv] is indicated by striking out.



One consequence of this approach is that determiners take CLP or NumP complements; the semantic side of the equation is that determiners are functions from $\langle e, t \rangle$ -type objects to generalized quantifiers. Another fallout from this approach is that determiners in some languages may be null, meaning that a particular feature bundle in some language may not map to any morphology. But the features are still present in the functional heads to assure both syntactic and semantic composition. Hence I argue against the position that some languages' nouns are only NPs and that other languages' nouns project to DP. In this dissertation, DP is the same across languages because the set of UG functional features is the same although the association of sets of features with particular heads may vary.

1.2 Theoretical assumptions

An important assumption in much linguistics theory coming out of the Principles & Parameters tradition is that humans are born with a capacity to learn language and that this capacity resides in a so-called faculty of language. Stated another way, Chomsky (1994, p3), supposing that the P&P model might be on the right track, hypothesizes that “there is a single computational system C_{HL} for human language and only limited lexical variety”, i.e. the language faculty. The language faculty is some network of cognitive capacities with a genetically determined initial state, called Universal Grammar, that is assumed to be “uniform for the species” (Chomsky 1995, p14). Such a faculty of language accessible to all humans is purported to explain why children acquire any language so seemingly effortlessly yet so perfectly in five or six years, apparently with surprisingly few errors considering the number of syntactic hypotheses they could conceivably entertain when abstracting a grammar from the linguistic noise that surrounds them.

Hauser, Chomsky and Fitch (2002) suggest a distinction between the faculty of language in a broad sense and the faculty in a narrow sense. The former contains a conceptual-intentional system, a sensory-motor system and the computational capacity for recursion. The faculty of language in the narrow sense, which may have evolved for a reason or reasons other than language, contains only recursion, which, they say, is the only uniquely human component of the faculty of language.

But while UG may constrain the number and kinds of hypotheses children consider, languages vary significantly enough to make the task of identifying the components of UG very difficult. One idea, suggested more than two decades ago by Borer (1983), is that besides having different sound-meaning correspondences for nouns, adjectives and verbs (and prepositions to the degree that they are lexical), languages also vary in their functional items and that the differences in functional items are the source of syntactic variation. As put more recently by Alexiadou (2001), it is functional items that give categorial status to lexical projections and it is functional heads that are responsible for syntactic distinctions. Also see Pollock (1989) and Rohrbacher (1999) for similar approaches and Thráinsson (1996) and Bobaljik (2001) for doubts.

There is certainly intuitive appeal to blaming language variation on the lexicon, which is at least where we expect arbitrariness. Just how much power the lexicon has vis-a-vis the syntax has been a long debate (for discussion see Lasnik and Uriagereka 2005, section 1.2, Newmeyer 1980, section 4.3). And while theories about the precise nature of the lexicon continues to change, that it does have an important effect on syntax is an important assumption behind mainstream generative proposals for what seem to be an ever increasing number of functional heads that are

projected above NP and VP, not to mention the proliferation of possible phrases for modifiers like adjectives.

This dissertation assumes that functional features in phrase heads drive the syntax of Merge. The features are assumed to be universal. That assumption is neither striking nor new. This line of thinking owes traces to, among others, Cinque's (2002) hypothesis that we should start with the assumption that syntax is the same across languages, despite the apparent variation. According to Cinque, the most promising *modus operandi grammaticae* is to assume as much as possible that languages are syntactically uniform modulo their differences in the functional features associated with functional heads and to go about determining what those functional heads and features are (from Cinque 2002, p3):

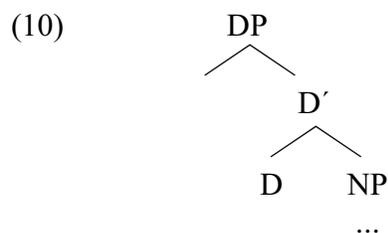
What makes the enterprise all the more interesting is the mounting evidence of the last several years that the distinct hierarchies of functional projections may be universal in the inventory of the heads they involve, in their number, and in their relative order (despite certain appearances). This is, at any rate, the strongest position to take, as it is compatible with only one state of affairs. It is the most exposed to refutation, and, hence, more likely to be correct if unrefuted.

If the projections themselves are, as Cinque suggests, universal, then functional variation must reside in what goes into the heads of those projections.

The assumptions of universality in this dissertation differ from those of Cinque, because of a clarification about what's driving what. Implicit in the Cinque view is that the phrases claimed to be universal are generated by something in their heads. That something is features and those features, in effect, project the phrase. But the phrases are universal only if the features are

associated with the heads in the same way across languages. The contention of this dissertation is that while there is a strong tendency for certain features to be associated with certain heads they need not be. Features can bundle in different ways in the lexicon, since the lexicon is the site of variation. In brief, it is the functional features that are universal, but the way they map to syntax may vary slightly. In this dissertation, the most obvious case of this is in variation of how number is reflected. Number may be lexicalized as a number-marking item such as plural in English or as a classifier in Mandarin or as both in Persian. Persian allows for the maximal case, with a classifier and plural marker allowed to cooccur. English and Mandarin, in contrast, allow for one or the other. But in all three cases the same kind of feature is involved.

In work by Brame (1981, 1982), Horrocks and Stavrou (1987), Szabolcsi (1981, 1984, 1987), Abney (1987) and others, NP has been argued to be dominated by a DP, as in (10).

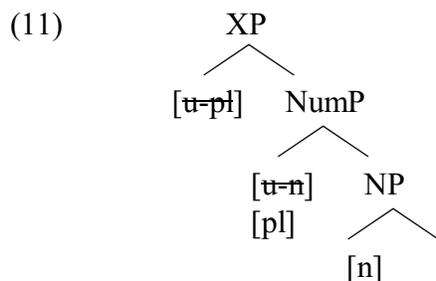


and in the years since their work other intermediate phrases have been suggested and to a large degree accepted, such as Number Phrase (Ritter 1991, 1992, for example).

As Chomsky (1987) commented, cited in Lasnik (2003, p2), “if some phenomenon is observed overtly in certain languages, then it probably applies covertly” somehow in all languages, because the overt expression is likely to follow from UG requirements. The primary extension of this view in this dissertation is that the same functional features in the heads above NP appear in all languages, regardless of whether there is morphological expression for them.

While conclusive evidence has yet to appear, there is much to be gained by working toward the interpretation of a universal feature-based DP syntax.

As an empirical fact, there are generalizations one can make about the mapping of functional features to syntactic heads. In the nominal domain, for example, number morphology indicating singular, plural, dual or something more basic such as “individuation”, tend to be in the head of Number Phrase. This means that some feature for number—let’s call it [pl] for now—must be in Num. But since plurals take noun complements, it is argued that there is also an unchecked noun feature in Num, say [u-n]. The latter feature will be checked by a feature [n] in the functional head n of nP while the former feature will serve to check a [u-pl] feature in a higher head. So the feature bundle for Num must be something like [u-n, pl]. The features presented here for exposition and the checking procedure are exemplified in the simplified tree in (11)..



But as the semantic interpretation of [pl] is too gross to explain the facts in all languages, more- and less-refined features are available, and languages pick and choose among them. So some languages end up with robust use of numeral classifiers and other languages require making a singular/plural distinction on all count nouns.

At the determiner level, which I suggest in chapter 5 includes one head for weak quantifying determiners and a higher one for strong quantifying determiners, languages seem to vary more than in the predicate levels for CLP and NumP. Some languages cleave articles along definite/indefinite lines, other split along specific/nonspecific lines and, of course, many languages lack articles entirely. This begs for an approach that goes deeper than definiteness as a primitive notion and the dissertation suggests features to accommodate variation in what articles are available. In some cases, whatever features that result in *the* in English may have no Spellout in another language. While the feature bundle for *the* has no morphological realization in Mandarin, for example, the features still function syntactically.

Particularly for the analysis numeral classifiers, I gathered data from both published sources and informants for Mandarin and Armenian. But the focus of informant data for classifiers, number morphology and determiners is Persian. Especially for number/classifier morphology, Persian presents itself as an interesting intermediate case between standard number-marking languages and prototypical numeral classifier languages. Persian has numeral classifiers (although I argue there is only one true classifier) and also uses number morphology robustly. Further, plural morphology is bound with specificity. Persian thus shares some characteristics with English and some with Mandarin, thus providing evidence that classifier languages and number languages may not be as parametrically distinct as has been supposed (e.g. Chierchia 1998a, Gil 1987). Further, Persian exhibits a degree of optionality in the use of some morphology that, when we look for commonality among languages, points to an analysis to bring languages like Mandarin, English and Persian together.

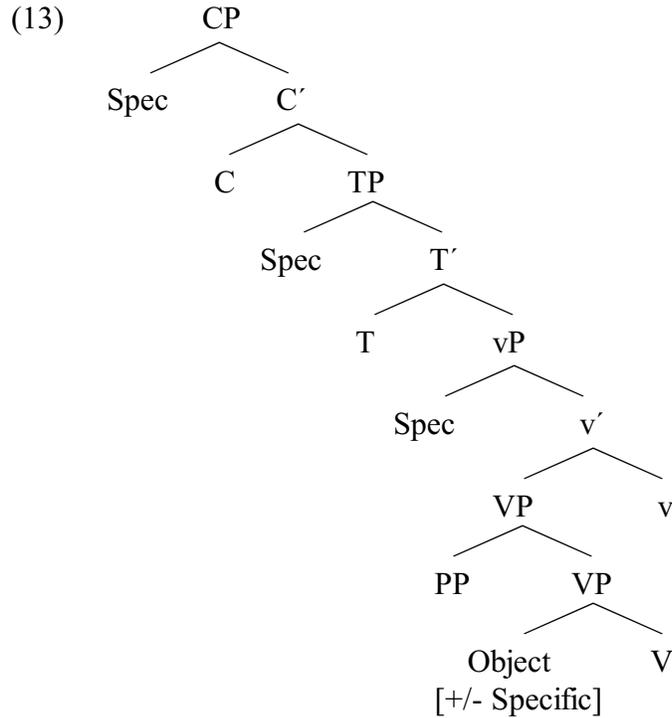
1.3 Sketch of Persian Grammar

Given the importance of Persian data for the development of the theory of this dissertation, following is a brief description of the language. The variety of Modern Persian investigated in this thesis is that of Tehran, what might be called “careful colloquial” speech (Mahootian 1997). My informants are all university-educated Persian-English bilinguals, most of them having lived outside Iran for many years.

Modern Persian, an Indo-European language, is a prodrop language (12a), with canonical constituent order S O_{Definite} PP V (12b) and S PP O_{Indefinite} V (12c). While Persian is typically verb-final, some adverbials and other elements can appear postverbally (12d-f).

- (12a) zud ræft-ænd
 early went-3P
 ‘They went early’
- (12b) baba abjo-ro be dana dad
 Dad beer-RA to Dana gave.3S
 ‘Dad gave the beer to Dana’
- (12c) baba be dana abjo dad
 Dad to Dana beer gave.3S
 ‘Dad gave some beer to Dana’
- (12d) dir ræft-ænd mænzel
 late went-3P house
 ‘They went home late’
- (12e) mi-r-æm bala
 Asp-go-1S up
 ‘I’m going upstairs’
- (12f) be-r-im xærid
 Subjn-go-1P shopping
 ‘Let’s go shopping’

Karimi (2005, p7) suggests the follow structure for the clause.



In (13), both specific and nonspecific objects are generated in the same position, but specific objects move to Spec of vP (Karimi 2005, p108) to get the word order exemplified in (12b), where the specific object precedes the PP.

While sentences are verb-final with the exceptions noted immediately above in (10d-f), the language is generally head-initial. Prepositions precede objects (14a), demonstratives precede nouns (14b), nouns precede relative clauses (14c) and verbs precede clausal complements (14d).

(14a) ruye miz
on table
'on the table'

(14b) in pærænde
this bird
'this bird'

- (14c) pærænde-i ke did-æm
 bird-Ind that saw-1P
 ‘the bird that I saw’
- (14d) mina fekr mi-kon-e (ke) šærab-e emrikai ærzun-e
 Mina think Asp-do-3S (that) wine-EZ American cheap-is
 ‘Mina thinks that American wine is cheap’

Example (14d) also illustrates the ezafe construction, where the noun *šærab* ‘wine’ is postmodified by an adjective *emrikai* ‘American’ with the intervening ezafe particle, *-e*. The ezafe is also used in possessives, where the possessed precedes the possessor.

- (15) gorbe-ye æmber
 cat-EZ Amber
 ‘Amber’s cat’

Subjects agree with verbs in person and number, as in (16).

- (16) mæn / to / u / ma / šoma / unha resid- {æm / -i / -∅ / -im / -id / æn(d)}
 I / you / he/she / we / you / they arrived- {1S / 2S / 3S / 1P / 2P / 3P}

But inanimate subjects need not agree in number.

- (17) sændæli-ha bala hæst(-ænd)
 chair-PL up is/are
 ‘The chairs are upstairs’

While lacking articles, spoken Persian commonly uses the suffix *-e/-ye/-he* to indicate a noun familiar in the discourse to both speaker and hearer (18a); *yek* ‘one’ sometimes functions as an indefinite article (18b), where *-i* is also possible.

- (18a) cai-ye
 tea-the
 ‘the tea’
 (18b) ye ketab-i
 a book-Ind
 ‘a book’

Also, plural *-ha/-a* typically indicates definiteness/specificity.

- (19) ketab-a
 book-PL
 ‘the books’

There is a single marked case, the specific direct-object marker *-ra* ([*-ra / -ro / -o*]), sometimes described as a definite direct object marker. It is not used with indefinite nouns in spoken language, although it can appear with indefinites in written language (Simin Karimi, p.c.). As the plural marker signals definiteness, it requires the *-ra* definite-object marker when the noun is a direct object (20a); *-ha* in object position without *-ra* is ungrammatical (20b).

- (20a) ki gilas-a-ro xord
 who cherry-PL-RA ate
 ‘Who ate the cherries?’
 (20b) *ki gilas-ha xord

For overviews of Persian see Karimi (2005, chapter 1), Boyle (1966), Elwell-Sutton (1963), Mahootian (1997), Faroughy (1944), Forbes (1828), Lambton (1953), Phillott (1919), Rubinchik (1971), Windfuhr (1990).

1.4 Outline of the dissertation

Chapter 2 presents the morphological and syntactic assumptions within which the dissertation proceeds, Distributed Morphology and Minimalist syntax. I also lay out the functional phrases that project above NP. I then present the architecture for functional features based on Harley and Ritter's (2002) features for pronouns. Finally I present the semantics associated with the various phrases of NP and its functional projections and the semantic types of the heads of these phrases. In Chapter 3 I provide the background on the classifier/number literature and problems with earlier theories, focusing on Chierchia (1998a,b) and Borer (2005). Chapter 4 presents a solution for the problems of earlier theories indicated in chapter 3. The chapter starts with derivations for Persian, including the most problematic one for both Chierchia and Borer. To demonstrate crosslinguistic relevance and to cover all the data analyzed in the earlier theories I also provide derivations for data in Mandarin, Armenian and English. As chapter 4 focuses on the syntax of Classifier Phrase and Number Phrase and their associated semantics, the focus of chapter 5 is the determiner projections, Strong Quantifier Phrase and Weak Quantifier Phrase. The syntactic feature system for these phrases is similar to that used for NP and Classifier/Number Phrase, but features are associated with pragmatic presuppositions. So besides showing how the syntactic composition works, I argue for primitive determiner features that underlie notions of (un)definiteness and (non)specificity. These features correspond to pragmatic presuppositions on the part of the speaker about whether the speaker and addressee are aware of the referent. Finally, I argue that a Case Phase is needed to mediate between the Quantifier Phrases and case-assigners, T, v and P.

Chapter 2: The syntax and semantics of DP: theoretical assumptions

2.0 Introduction

Chapter 2 outlines the theoretical assumptions for this dissertation. In section 2.1 I briefly discuss some morphology issues, primarily how in Distributed Morphology (Halle and Marantz 1994, and others cited below) roots enter the derivation. Section 2.2 outlines the Minimalist syntax (Chomsky 1995, and many others cited below) of feature checking and the phrases assumed to be projected, including NP, nP, Number Phrase, Classifier Phrase and Strong and Weak Quantifier Phrases, Case Phrase and the positions that head them. Details on Case Phrase are put off until section 5.5. Until then I refer to WQP and SQP as the highest projections that can be used as arguments. I provide details about the identification of numerals as weak quantifying determiners. I also introduce the process of syntactic Fusion which I adopt to account for the apparent absence of certain functional items in some structures. Section 2.3 identifies the semantic types of the heads of the phrases and the semantic denotation of the various phrases. A conclusion is provided in section 2.4.

2.1 Morphology

I assume that the lexicon is a set of lexical items (LIs) that enter into the computational system of syntax (Chomsky 1995, p168-169). LIs come in two types: roots and functional morphemes. In Distributed Morphology terms, the two types are called “l-morphemes” and “f-morphemes” (e.g. Harley and Noyer 1999, Embick and Marantz 2008). The l-morphemes, i.e. roots, include the open-class lexical items (Embick and Marantz 2008, p5), though they are category-neutral. Roots are defined as nodes manipulated in the syntactic derivation that come

from the open-class lexical items (Embick and Marantz 2008, p5-6). A root is indicated under a radical sign, as in (1) (Embick and Marantz 2008, p4-5).

(1) the roots for *cat* and *destruction*: $\sqrt{\text{CAT}}$, $\sqrt{\text{DESTROY}}$

In Marantz (1997), for example, it was suggested that roots that become, say, nouns are categorized in the syntactic context of a determiner. Similarly, Noyer (2006) characterizes a noun as a root whose nearest c-commanding f-morpheme is a determiner. On this view, $\sqrt{\text{DESTROY}}$ will be spelled out as *destruction* in the presence of a determiner, as in (2b) (from Marantz 1997, p217).

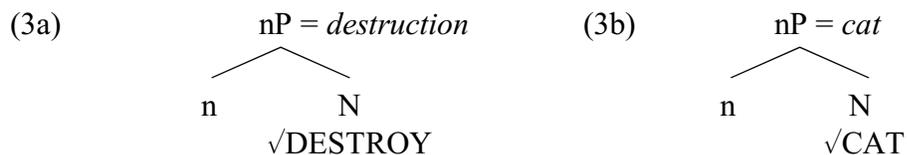
(2a) the destruction of the city

(2b)

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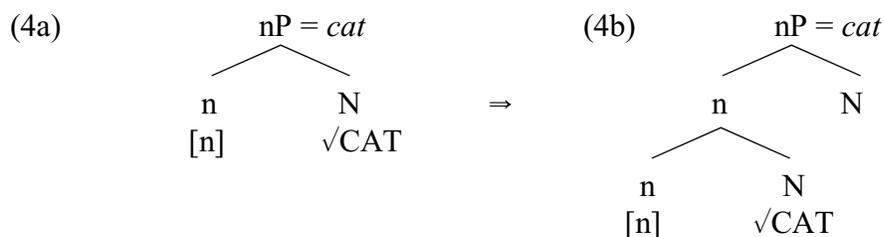
graph TD
    D1[D] --- D2[D]
    D1 --- R["√DESTROY = destruction"]
    D2 --- the1[the]
    R --- R1["√DESTROY"]
    R --- RC["the city"]
  
```

In Embick and Marantz (2008, p5), however, it is explained that all roots combine with a category-defining functional head, such as n for nouns and v for verbs. Such heads are distinguished “by virtue of their feature content” (Embick and Marantz 2008, p5). According to Embick and Marantz, roots can neither be pronounced nor interpreted without being categorized by such a head. So instead of a root being simply the complement of a determiner as in (2b), $\sqrt{\text{DESTROY}}$ and $\sqrt{\text{CAT}}$ are categorized as in (3a,b), via n, the functional head of nP.



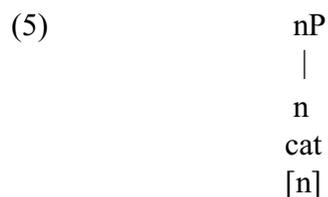
These spell out as *destruction* and *cat* when phonological information is inserted.

As mentioned in the previous paragraph, for Embick and Marantz *n* is a category-defining head with feature content. But, for transparency in showing feature checking I will assume a feature [n] in the head *n* that is responsible for the categorizing and which can check with a higher [u-n] feature, as in (4a) and (4b). Jumping ahead just a bit to syntactic considerations, the nP head will be involved in raising and checking. So N must first raise to *n*, as in (4).

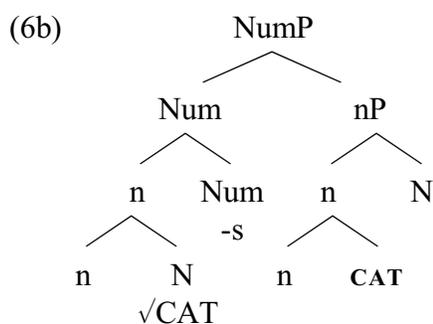
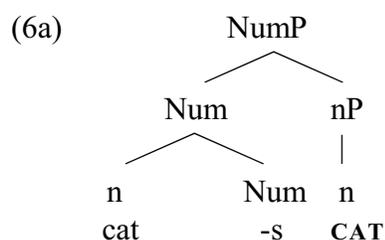


I will assume that the derivation in (4) always takes place. Therefore, to simplify the many tree structures that appear in this dissertation I use (5) as equivalent to (4b). Note that *n* projects to nP. Also note that I leave *n* as a reminder of the category head, although it is often assumed that the word and the category are identical, or that the preterminal *n* and the terminal *cat* are not distinguished (Carnie 2008, p27-28); on that interpretation *cat* IS the head and including *n* is, at best, redundant. One reason I leave a head such as *n* in the syntactic trees along with the morpheme that occupies that head position is typographical, to provide a convenient place for the

indication of semantic types associated with heads; the other reason is an aim for consistency in presenting the tree structures.



When a noun raises to the head of NumP, (6a) based on (5) is a simplified version of (6b) based on (4b), where N has head-raised to n and the [n [n N]] complex then raises to Num.

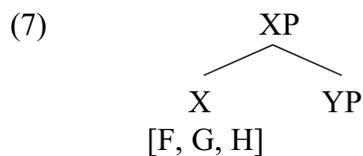


It is important for the current proposal that a plural marker requires a count element headed by n. Though not crucial to the ideas in this dissertation, for clarity I assume a Distributed Morphology view of how features are spelled out at PF, i.e. after Spellout. Noyer (2006, p3) describes a morpheme as a “syntactic (or morphological) terminal node and its content”. In short, the Vocabulary Items (the roots or bundles of functional features) are inserted during Merge. A Vocabulary Item gets the phonological expression that is associated with its set of features or the best match of a subset of features (Harley and Noyer 1999, Halle 1997). By the Subset Principle,

if several items compete for insertion, the Vocabulary Item that matches the greatest number of features is inserted.

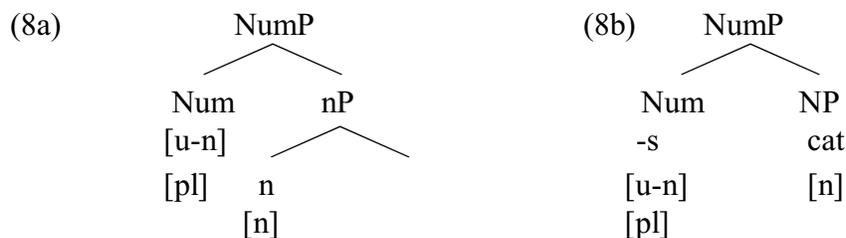
Each functional morpheme enters the syntax as a bundle of one or more features. The features are selected from the set $\{F\}$ of features available from S_0 , the initial state, for all languages (Chomsky 2001, p4). F-morphemes are the content of functional terminal nodes and contain grammatical information such as [past] and [definite]. According to Marantz, “The set of grammatical features are [sic] determined by Universal Grammar and perhaps by language-particular (but language-wide) principles” (Marantz 1997, p3). The functional morphemes of importance in this dissertation are the categorizing head n for nouns and the feature bundles in the heads of NumP, CLP and the Quantifier Phrases. (NumP is discussed in section 2.2.2.1, CLP in section 2.2.2.2 and Quantifier Phrases in 2.2.2.4 and chapter 5.)

A note on notation within trees. According to DM, feature bundles are inserted in heads, with Spellout to come postsyntactically (but also see the phase-based approach in, e.g., Chomsky 1999). So, abstractly, consider the case where X merges with YP . The morpheme to be inserted in X has the features [F], [G] and [H]. So they are inserted as the bundle [F, G, H], as in (7).

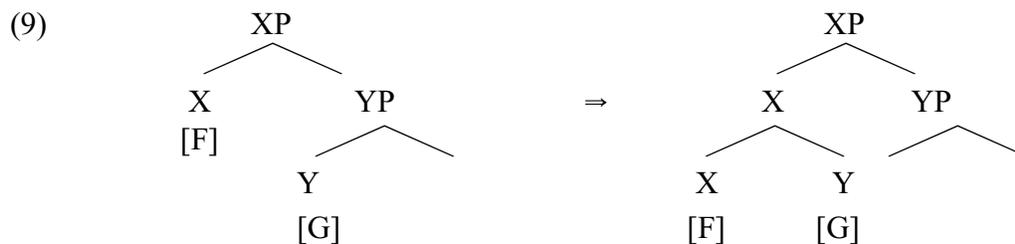


For clarity, when the features under X spell out in X , I will include the morpheme’s phonetic realization, as in (5) above. As an example, let’s say the regular plural $-s$ in English has the feature [pl] and that it subcategorizes for a noun via the unchecked feature [u-n]. Even though the initial

insertion is as in (8a), without a phonetic realization, for clarity I include phonetic realizations of the morpheme as in (8b), for those cases where the feature bundle spells out on the node where the features are inserted.



However, sometimes the features of two heads will spell out as a single morpheme. In these cases I follow the strict DM notation where the features are inserted without phonetic realization, as in the abstract case in (9), where X and Y will fuse to spell out as a single morpheme. Fusion is discussed more fully in section 2.2.4.



2.2 Syntax

2.2.1 Basic syntactic assumptions

This dissertation adopts a Minimalist perspective on syntax (Chomsky 1995 and subsequent work, and many others including Lasnik and Uriagereka 2005, Lasnik 2003, Hornstein et al. 2005, Radford 2004). Minimalism raises questions about some of the assumptions of the GB/P&P framework that led up to it. Among the questions are whether all of the nonderivable

assumptions and mechanisms in GB, such as government, are required and whether some of them can be dispensed with. However, Minimalism is not a theory per se but rather is a program aimed at finding out how well designed the faculty of language is and why it is what it is (Chomsky 1998, p5). Chomsky asks to what extent the formal part of the lexicon is “the repository of departures from virtual conceptual necessity, so that the computational system C_{HL} is not only unique but optimal” (Chomsky 1999, p4). Here economy is a prime consideration in considering a version of Minimalism, which asks whether “language is an optimal solution to legibility conditions” (Chomsky 1998, p9). The study of language within this program assumes that there are only two interfaces between the language system and other cognitive systems: an articulatory-perceptual system interface and a conceptual-intentional one. Language generates pairs (π, λ) , a PF and LF representation respectively, which are interpreted at the two interfaces. There are no levels of structure such as had been supposed in earlier generative models. An optimal solution may be considered to involve less rather than more: less structure, less movement, fewer devices such as government, traces, s-structure and d-structure, unless they have clear and independent status. Minimalism does not mean that notions like government are a priori wrong but it does question whether we need them and asks for clear motivation for their existence (see Hornstein et al. 2005, chapter 1, for an overview).

In line with Minimalism, I assume a lexicon as a collection of roots and bundles, or sets, of functional features (discussed above in section 2.1) and a computational system. Derivations occur through Merge. According to Chomsky (1999, p2), Merge takes two syntactic objects α and β to form a new object Γ , where $\Gamma = \{\alpha, \beta\}$. The new object formed from Merge, Γ , is

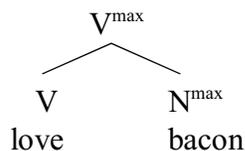
labeled $LB(\Gamma)$, meaning the label of Γ . $LB(\Gamma)$ “in the best case” is either $LB(\alpha)$ or $LB(\beta)$. That is, either α or β will be the head and the other the complement. Merge can be internal or external. External Merge always joins an item from the lexical array, which is the set of morphemes that will enter the computation, with a syntactic object. Simplifying, the derivation of the sentence in (10a) begins with a lexical array, or a numeration if LIs are to be used more than once (Chomsky 1999, p8). In this case the lexical array is in (10b).

(10a) Goldstein loves bacon

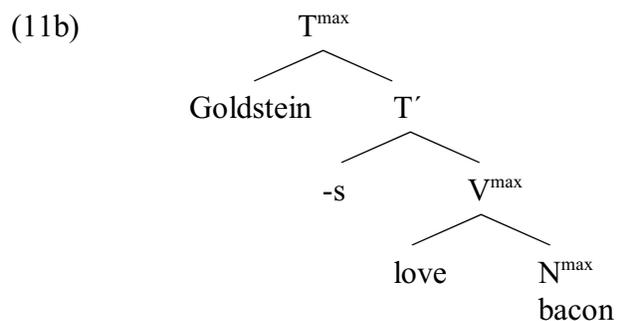
(10b) Lexical array for (10a): $\{Goldstein, love, -s, bacon\}$.

The derivation begins with External Merge of *love* and *bacon* from the lexical array. The new object is labeled by the head of the structure, *love*, as V^{max} (11a).¹ Successive External Merge of the lexical items produces (11b).

(11a)

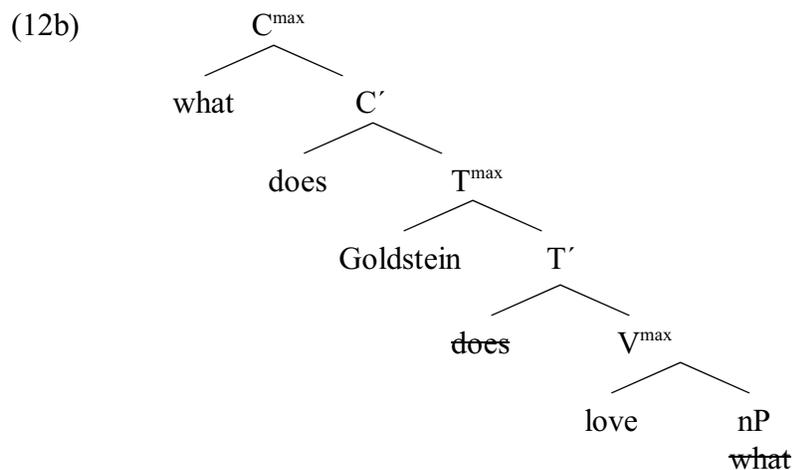


¹This structure and the one below is simplified. For example, I omit some node labels such as V , leave out possible vP , and ignore that *Goldstein* may begin VP -internally and later raise to $SpecTP$. And the structure simply assumes a very basic N^{max} for the object, with no details on functional structure such as Number Phrase and Quantifier Phrases that are assumed and/or developed in this dissertation.



Internal Merge can be defined as an operation “by which an item contained in an existing structure is moved to a new position” (Radford 2004, p199). As an example of Internal Merge, for the sentence in (12a), consider the structure in (12b).

(12a) What does Goldstein love?



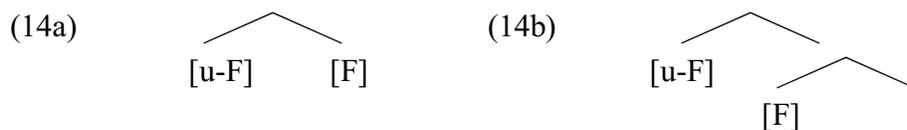
What has happened is that *what* has moved from its position as complement to V to SpecCP, leaving an unpronounced copy in the original position. Also, reflecting subject-aux inversion in English, T moves to C, leaving a copy in T. Again I simplify, for example overlooking the possibility that the subject may be generated inside VP.

I will also assume that core to the syntax are the functional features of f-morphemes (see section 2.1, above). Features may drive movement (Internal Merge) from one position to another (Chomsky 1995, p280) through the need of uninterpretable features to be checked by their interpretable counterparts. Interpretable features contribute to semantic interpretation while uninterpretable features do not (Radford 2004, p287). Interpretable features are also characterized as “legible to the external systems at the interface” (Chomsky 1998, p7). Uninterpretable features activate Agree and are checked under it (Chomsky 1999, p4). If an unchecked, uninterpretable feature is not checked in the course of the derivation the derivation crashes. Technically, the relation Match associates the related features, with Agree being the checking between them. Match is, optimally, identity between the features (Chomsky 1999, p4), i.e. the same feature. So interpretable [F] matches [u-F].

Two lexical items can form an agreement chain with respect to their features, where an agreement chain is defined in (13a) (Adger 2006, p509). The operation Agree takes place according to (13b) (Adger 2003, p168).

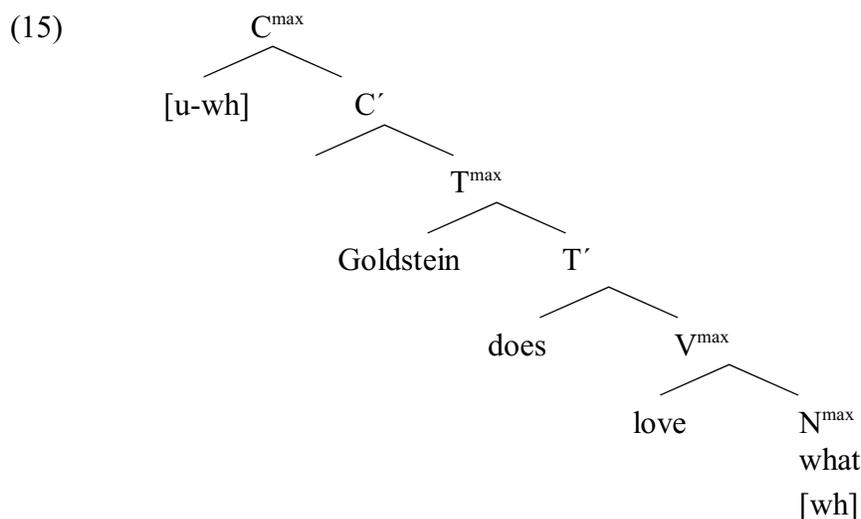
- (13a) An agreement chain is a pair of lexical items (LIs), where the uninterpretable features of one LI are a subset of the interpretable features of the other.
- (13b) An uninterpretable feature F on a syntactic object Y is checked when Y is in a c-command relation with another syntactic object Z which bears a matching feature F.

Given (13), both the structures in (14) involve c-command checking relationships, where (14a) is symmetric c-command and (14b) is asymmetric c-command.



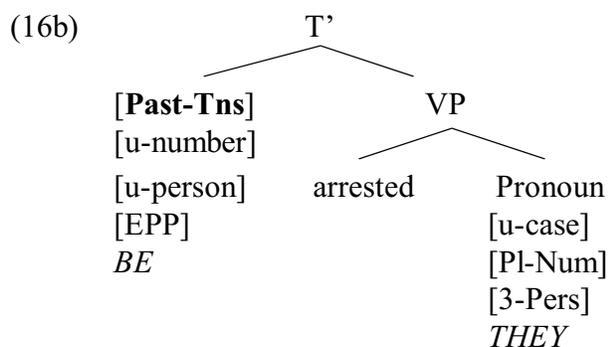
Agree results in the checking of uninterpretable features via a Match relationship.

The feature pair involved in Agree are described as being in a probe-and-goal relation. A probe is an uninterpretable feature [u-F]; a goal is a matching [F] interpretable feature that appears in the probe's c-command domain (Hornstein et al. 2005, p317; Radford 2004, p282), as in (14a,b) above. A probe or goal is active if it has an uninterpretable feature associated with it. Thus uninterpretable features are removed from the narrow syntax in an agreement chain with interpretable features. Match/Agree is local: a probe agrees with the first matching goal it finds. Given wh-movement in (12) where [-wh] finds a goal in *what*, Match must be within the clause. In (15), [u-wh] in the specifier of CP is the probe and its matching goal is the [wh] feature of *what*. In this case, in English, [u-wh] is “strong”, forcing movement of *what* from its VP-internal position to the specifier of CP.



LI_j [u-F] is in an agreement chain with LI_k [F] because it matches with regard to the feature F, and LI_j 's uninterpretable features are a subset of the interpretable features in LI_k . As a concrete example, for the derivation of the sentence *They were arrested* (16a), in (16b) the features in T form an agreement chain with the features in DP (from Radford 2004, p307). (Per Radford, the all-caps italic *BE* and *THEY* here indicate feature bundles that have not yet been spelled out.)

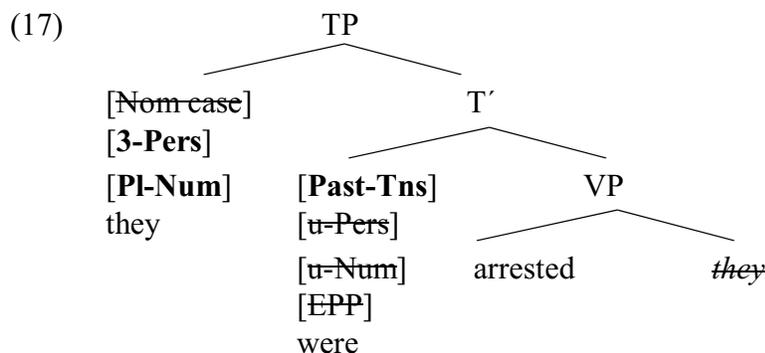
(16a) They were arrested



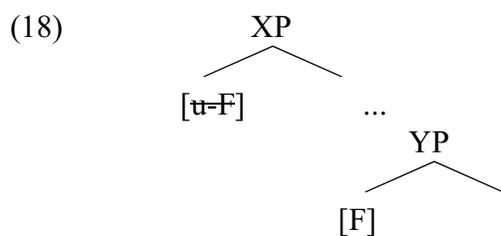
What we have in (16b) is a bundle of features for a caseless third-person plural subject generated in VP in an agreement chain with the auxiliary in T, which itself has tense but has uninterpretable [u-number] and [u-person]. The features [u-number] and [u-person] are a subset of the interpretable features of the DP *they*: [number: PL] and [person: 3rd]. In (17), the pronoun raises to SpecT for case and to satisfy the EPP (the requirement that sentences have subjects), uninterpretable features are checked in an agreement chain and the appropriate forms of the pronoun and auxiliary can be spelled out. According to Radford (2004, p308), the EPP feature is

uninterpretable and seeks an active nominal goal to check and consequently delete its phi-features.

T assigns case to the subject pronoun in SpecTP. Typographically, strikeout of a feature in brackets, as [~~u-Num~~] in the head of TP in (17), indicates that the feature has been checked.

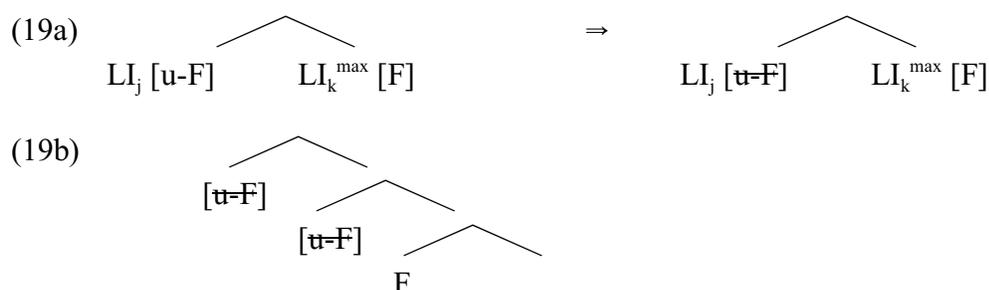


As mentioned above, the features that serve as probes are understood to c-command their goal counterparts. With the exception of case as in (16b) above, where [u-case] is low to be checked in TP above, checking is in the configuration in (18). In (16b), the probes are the uninterpretable person and number features, and EPP; they match with the interpretable features of plural and third person in the goal.



Agree does not necessarily lead to movement as it does in (16-17). As an example, consider LI_j [u-F] and LI_k [F] selected from an array and merged in (19a). The two LIs match by

virtue of the feature F . In this case, the uninterpretable feature $[u-F]$ is an improper subset of the interpretable feature $[F]$ in the goal. The probe, $LI_j [u-F]$ thus Matches the goal $LI_k [F]$ and by Agree the probe's uninterpretable feature gets checked. In this case movement is not required because the probe feature is "weak". Also note that I am assuming that an interpretable feature can check more than one matching uninterpretable feature (Hiraiwa 2001), as in (19b).

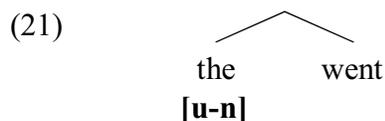


Merge is selectionally restricted (Chomsky 2001, p7) and the relation Agree, based on features, can be considered a way to specify subcategorization restrictions. (Features as subcategorization devices will be more fully developed in section 2.4.4.) We can characterize even simple Merge as agreement via selectional restrictions. Consider (20).

(20) *The went

The ungrammatical (20) fails on at least one count, because the determiner *the* presumably subcategorizes for an NP but does not have an NP complement. In terms of features, this means that *the* carries a feature, say $[u-n]$, which is not checked during the derivation since whatever features may be associated with *went* (or with v or T) do not contain $[n]$. (Bolded expressions

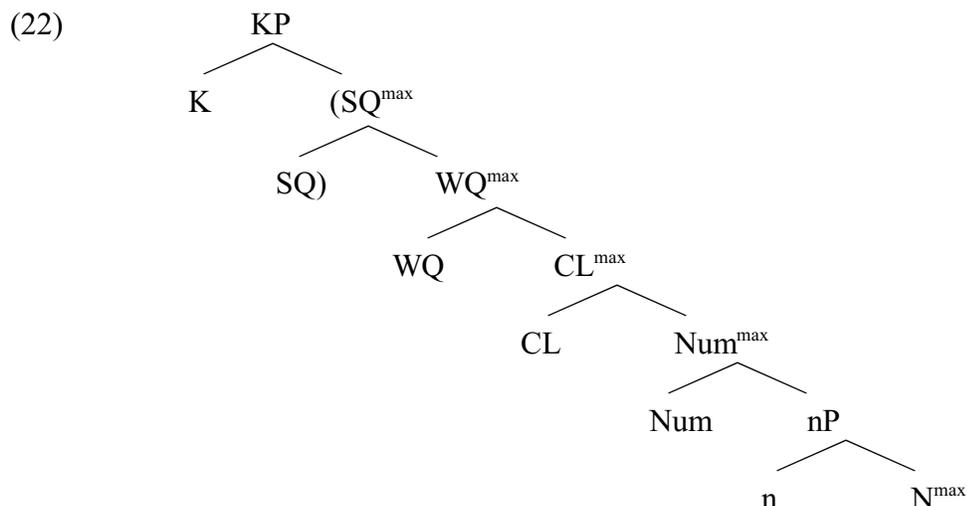
indicate that a feature has not been checked by the end of the derivation, causing the derivation to crash because it contains information that is uninterpretable at an interface.)



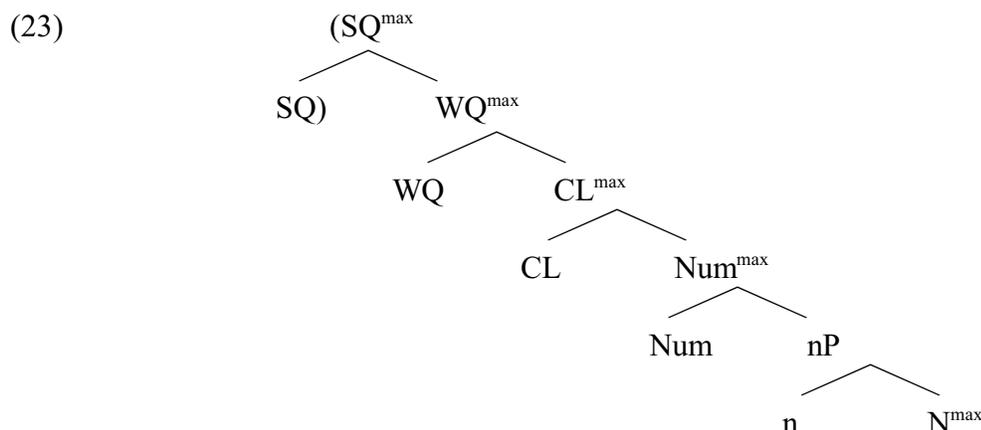
2.2.2 The functional projections in DP

This dissertation argues that the structure of DP is limited to that in (22), meaning that (22) is the maximum case; we see that it is sometimes the case that not all phrases are projected but that the syntactic features that are typically associated with these heads *are* always present. Under the Cinque (2002) hypothesis discussed in chapter 1, (22) would represent a universal DP structure, available in all languages in all DP structures and a theory to account for apparent crosslinguistic variation would have to explain apparent departures from (22). But this dissertation argues that it is more properly the features of functional heads that are universal, the important thing being which bundles of functional features are available in the lexicon and which heads they appear in. Therefore, the actual number of phrases may be fewer than appear in (22).

Since features do not map in precisely the same way with functional heads across languages, any given DP may vary from (22) in several ways. For example, below I explain that SQ^{\max} appears only in expressions that are specific for the addressee. In another departure from (22) it is possible that the heads of CL^{\max} and Num^{\max} may “fuse”, resulting in a single phrase, although a crucial number feature must nonetheless be present.



At the very top of the functional projections above NP is KP, or Case Phrase. Besides independent motivation argued by others (e.g. Löbel 1994, Lamontagne and Travis 1986, 1987, Ogawa 2001, Karimi 1996), a Case Phrase is important in the context of this dissertation for being the only possible complement for a verb (or a verb's subject). The reason for this is that in this dissertation there is no longer a single DP, as is evident in (22). Taking case into the picture, arguments can be understood as Case Phrases, whose head, K, selects a Quantifier Phrase that is either a Strong Quantifier Phrase or a Weak Quantifier Phrase, with the proviso that a Strong Quantifier Phrase requires a Weak Quantifier Phrase as well. Briefly stated, a verb selects a KP, not DP, SQP or WQP. However, I will say nothing more about KP until section 5.5. Until then, the relevant portion of (22) is the complement of K, as in (23). Until section 5.5 I refer to WQP and SQP and the highest projections, which can be arguments.

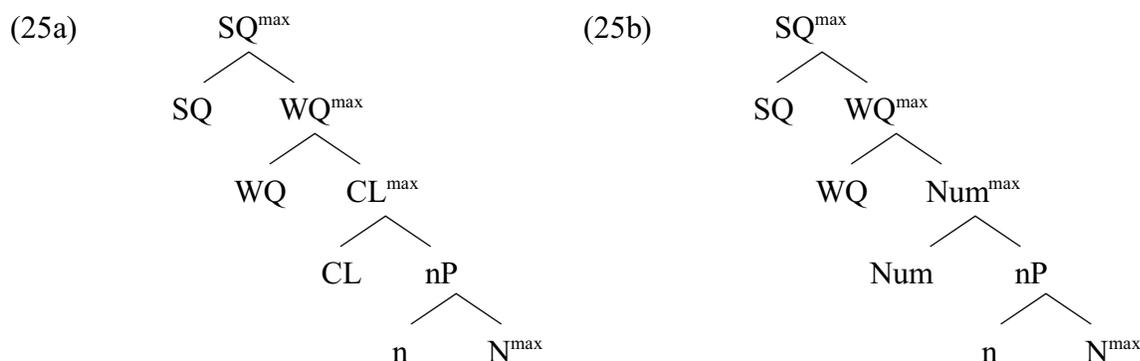


SQ^{\max} , or a Strong Quantifier Phrase, is headed by strong quantifying determiners such as *every* and *each* and *the*. The parentheses around SQ^{\max} in (22-23) indicate that this phrase is syntactically optional; in short, SQ^{\max} appears only in addressee-specific expressions. WQ^{\max} , or Weak Quantifier Phrase, is headed by weak quantifying determiners such as *some*, *a* and numerals. SQ^{\max} and WQ^{\max} replace the DP that has been the most common analysis of NPs (Brame 1981, 1982, Horrocks and Stavrou 1987; Szabolcsi 1981, 1984, 1987; Abney 1987; Stowell 1989, Longobardi 1994, and others). To the extent that DP has been argued to be necessary for a nominal expression to be an argument, in this dissertation I argue that what is required for an argument is either a WQ^{\max} for indefinites or an SQ^{\max} for definites within a KP. In (23), CL^{\max} and Num^{\max} appear separately. CL^{\max} is headed by a numeral classifier. A numeral classifier is a morpheme that appears when a noun is being counted by a numeral, such as *ta* between *do* ‘two’ and *miz* ‘table’ in (24a). Num^{\max} is headed by number morphology such as plural *-s* in English. (23) represents a full-fledged nominal projection in that all functionally headed phrases appear (apart from KP, see above): two Quantifier Phrases and separate projections for

CLP and NumP. (23) is possible only if a language has numeral classifiers, so English will never have this full-fledged DP, but it is possible in Persian, as shown in (24b) for (24a).

- (24a) un do ta miz-ha *Persian*
 Dem two CL table-PL
 ‘those two tables’
- (24b) [_{SQP} un [_{WQP} do [_{CLP} ta [_{NumP} miz-ha [_{nP} **miz**]]]]]]

It therefore is not necessary that all the phrases that appear in (23) project in every case. In fact, given the tendency for mutually exclusive classifiers and number marking (Greenberg 1972, Sanches and Slobin 1973, T’sou 1976), a more typical structure is (25a) or (25b), where *either* CLP or NumP appears.



For English the node dominating nP is a Num^{max}, since English lacks numeral classifiers. In Mandarin, the node dominating nP is a CL^{max}, since Mandarin uses classifiers between numerals and nouns but it rarely uses plural morphology. The structure (26b) for (26a) shows that English lacks a classifier while structure (26d) for (26c) shows that Cantonese lacks number (from Simpson 2005, p824).

- (26a) those two tables
 (26b) [_{SQP} those [_{WQP} two [_{NumP} table-s [_{NP} table]]]]
 (26c) goh saam bo sue *Cantonese*
 Dem three CL book
 ‘those three books’
 (26d) [_{SQP} goh [_{WQP} saam [_{CLP} bo [_{NP} sue]]]]
 Dem three CL book

The absence of CLP in English and the lack of NumP in Mandarin in the examples in (26) weaken the working hypothesis of Cinque (2000) that was mentioned above—that the phrasal projections are the same across languages. But both English *-s* and Cantonese *bo* share an [individuation] feature in the syntax. So notationally, something like “indivP” could replace both NumP in (26b) and CLP in (26d), thereby indicating a universality. Recall that Mandarin classifiers contain [individuation] while English plural has [group], whose presence entails the presence of [individuation]. But since languages like Persian allow both a classifier and plural to appear in the same construction, we want that a CLP and NumP be able to be projected separately. Yet for Persian, we don’t have to introduce any new universal features; it’s just that the [group] of English and [individuation] of Mandarin have projected independently. To clarify, saying that (22/23) is common to all languages is an oversimplification. We will see that sometimes CLP and NumP can “fuse”, as they do sometimes in Persian and obligatorily in Mandarin, although the features involved in merging phrases are still present. This is a refinement of the view of Cinque cited above and represents a middle ground between a view that assumes precisely the same syntactic projections in all constructions in all languages and a view that allows for some phrases not to be projected at all in some languages as long as the requisite features

needed for syntactic composition are present. Such is one view (e.g. Chierchia 1998, Gil 1987) that claims some languages need not project DP.

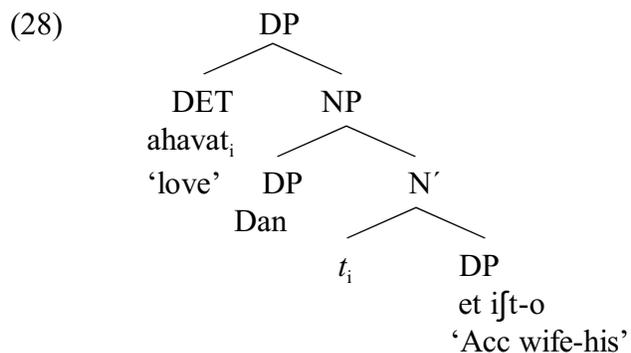
Immediately below I motivate the presence of each of the phrases represented in (23).

2.2.2.1 Number Phrase

The lowest and lexical level is NP, as discussed in section 2.1. NP is functionally dominated by nP. Going one level up, to accommodate a syntactic position for number marking, I will assume the functional projection Number Phrase, per Ritter (1991, 1992, 1995). Ritter adopts the DP hypothesis of Brame (1981, 1982), Abney (1987) and others, where it is argued NPs are complements to the head of a Determiner Phrase, D, which houses determiners. Assuming an underlying subject-noun-object order for DPs, Ritter posits N-movement from the N position to the D position to account for word-order facts of Hebrew construct-state genitives like (27).

- (27) ahavat dan et ift-o *Hebrew*
 love Dan ACC wife-his
 'Dan's love of his wife'

Unlike the assumed underlying SNO order, (27) reflects a phonetic order of NSO. To get the noun *ahavat* 'love' left of the subject *dan* 'Dan', Ritter (1991, p39) argues for N-movement. Movement is also motivated by the need for the N to get case, since D is argued to be a null genitive in the construct state. In (28) the object *ahavat* 'love' moves to D, ahead of the subject of the nominal *dan* 'Dan'.

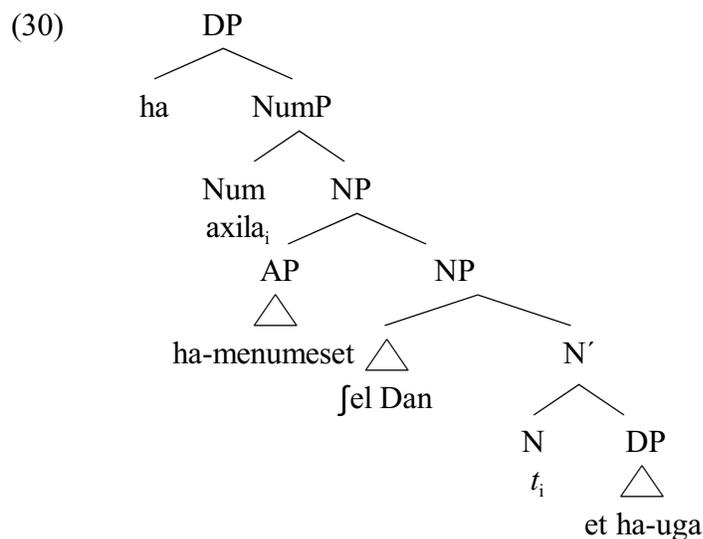


However, Ritter points to a problem for the DP hypothesis as it stands because of data from the Hebrew free genitive construction (29) (from Ritter 1992, example (4a)). The free genitive construction also has phonetic NSO order, but in contrast to the construct state, the free genitive: i) allows a definite determiner in initial position, ii) contains an overt case marker, *ʃel* ‘of’ on the subject of N, and iii) puts event adjectives before the subject.

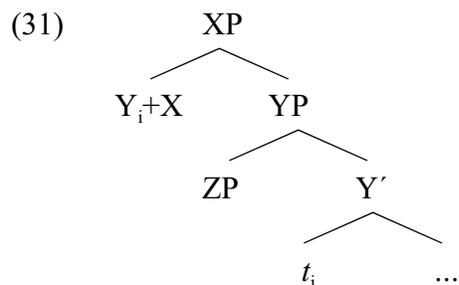
(29) *ha-axila* *ha-menumeset ʃel dan* *et* *ha-uga* *Hebrew*
 the-eating the-polite of Dan ACC the-cake
 ‘Dan’s polite eating of the cake’

In (29) we have an example of the free genitive with the definite determiner *ha-* in initial position, the genitive marker *ʃel* ‘of’ on the subject *dan* ‘Dan’, and the adjective *menumeset* ‘polite’ left of the subject. The problem here is that in the free genitive D does not appear to take NP as its complement, since the genitive case marker *ʃel* appears. But by proposing another projection between DP and NP, Ritter can adduce head-to-head movement to account for not only the construct state in Hebrew but the free genitive as well. Since in (30) the D position is presumably occupied by the definite article *ha-*, the noun *axila* cannot move there. An intermediate projection

provides a landing site for the noun *axila* ‘eating’, left of the adjective. The structure for (29) is (30).



Granted that a functional projection between NP and DP allows for a unified account of both kinds of genitive constructions in Hebrew and gets the pieces in the right surface order, we must still ask why that phrase between DP and NP should be specifically a Number Phrase, whose head, Ritter says, houses the singular/plural distinction, and not some other functional projection. Her argument rests on the assumption that gender marking in Hebrew is derivational on nouns and is thus affixed in the lexicon (Ritter 1991, p50) but that number, i.e. singular vs. plural, is inflectional on nouns, thus requiring head movement as in (31), where Y raises to X.



Ritter (1991) presents a case for gender affixes in Hebrew lacking number, though they may be interpreted as singular by default. That gender affixes are derivational can be seen by their ability to derive new words. For example, the feminine marker *-et* can derive a new word from the masculine noun *magav* ‘wiper’.

(32) magav+et ⇒ magevet ‘towel’ *Hebrew*
 wiper feminine

Plural morphology can then be suffixed to a derived word.

(33) magevet-ot
 towel-PL
 ‘towels’

The fact that number is inflectionally added after the derivation prompts Ritter to identify the functional projection between NP and DP, which is needed for independent reasons, with Number Phrase.²

²Ritter (1992) extends the analysis to Haitian, making correct predictions about the order of elements within DP. Ritter (1995) further plumbs the Number Phrase hypothesis to successfully account for certain agreement facts in Hebrew by putting first- and second-person pronouns in D and third-person pronouns in Num. Related analyses arguing for NumP include those of Delfitto and Schroter (1991), Bernstein (1991) for Romance, and Picallo (1991) for Catalan specifically.

In short, the most direct significance of Number Phrase for us is that in its head is housed the number distinction between singular and plural. (Details on what the features associated with NumP are presented below in section 2.2.4.) The result is that when a noun has number morphology resulting in a Number Phrase, or Num^{max}, this phrase is the complement that merges with quantifying elements of a higher phrase. Within the classifier literature, for example in Borer (2005), numeral classifiers are seen as parallel to number morphology. Borer, discussed in great detail in chapter 3, takes the position that number morphology and classifiers are alternative Spellouts of a divider function that converts mass stuff, nouns, into countable things. While this seems to be the case in some languages where classifiers and number morphology cannot cooccur, this is not the case in all languages, such as Persian. So a Classifier Phrase and Number Phrase are in principle separable projections. I will show in chapter 4 how the independence or syntactic Fusion of these two phrases stems from a very simple feature system.

2.2.2.2 Classifier Phrase

A Classifier Phrase is headed by a numeral classifier. As mentioned in section 1.1 and 3.1, a numeral classifier is an element that appears in numeral+noun constructions as in (1b). A Classifier Phrase headed by numeral classifiers has been argued for by Cheng and Sybesma (1999, 2005), Ishii (2000), Li (1998, 1999), Tang (2004), Simpson (2005) and Borer (2005). Borer considers that a Classifier Phrase instantiates either a classifier or number morphology. Others (e.g. Gil 1994 and Kobuchi-Philip 2005) consider that classifiers are not phrasal heads and may instead be part of a larger unit connected to the numeral. For example, Gil (1994) noted several reasons for thinking that classifiers are part of the numeral. First, Gil points out, classifiers and

numerals often appear sequentially, as in Persian *do ta gorbe* ‘two CL cat’. Second, numerals and classifiers often form a single unit syntactically and sometimes phonetically, as in Japanese *issatusu*, corresponding to *ichi sattsu* ‘one CL’. Third, they sometimes can be moved, or floated, together as in the Japanese pair *ippon no enpitsu* ‘one.CL Particle pencil’ and *enpitsu ippon* ‘pencil one.CL’.

Simpson (2005) points out that none of Gil’s points is a knockdown argument for a classifier being part of a larger phrase rather than a head of its own phrase. That numerals and classifiers are contiguous falls out just as well from assuming that the CLP is a sister to the numeral. That classifiers may be cliticized on numerals, as in Japanese *is-satsu no hon* ‘one-CL Particle book’, could simply mean that classifiers, like plural markers, can be bound or free morphemes. As for being clitics, Simpson suggests that free classifiers can cliticize as they grammaticalize. With regard to [numeral noun] being able to float, this can be explained just as easily as phrasal movement. One example of that is NP movement in Japanese away from the numeral+classifier: *hon nisatsu* ‘book two-CL’, where the NP *hon* ‘book’ can be interpreted to move left of *nisatsu*.

Simpson (2005, p807-810) then presents arguments for preferring the two-head hypothesis. First, classifiers are distinct from numerals in meaning, and typically each is a separate morpheme. Second, classifiers are often if not typically fully phonetic, unreduced elements that appear to be independent words rather than inherently affixal in nature, thus indicating that a classifier is a head of a phrase separate from the numeral. Third, classifiers have an independent function: whereas numerals count, classifiers individuate their NP complements. We will see later

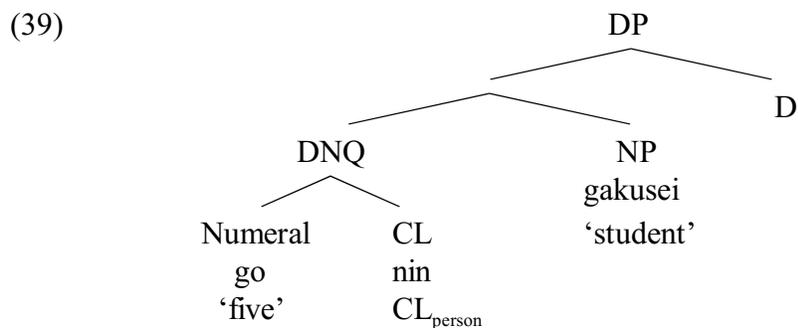
In an analysis similar to Gil's (1994) that argues for numerals and classifiers to form units, Kobuchi-Philip (2005) argues that classifiers combine with numerals to form words that are numeral classifier units, or NQs. When the NQ is internal to the DP we have a "DP-internal NQ", indicated as the bracketed segment in (37) (from Kobuchi-Philip 2005, p273).

- (37) [go nin no gakusei]-ga hashitta Japanese
 five CL No student-Nom ran
 'Five students ran'

But when the NQ stays internal to the predicate, we have a floating NQ construction where the NQ constituent "floats" from its VP-external position to one inside the VP. In (38), *go nin* 'five CL' is predicate-internal, separated from *gakusei-ga*, which is outside VP.

- (38) gakusei-ga [go-nin hashitta]
 student-Nom five-CL ran
 'Five students ran'

The particular structure in (39) (from Kobuchi-Philip 2005, p274) is for Japanese, but in principle it is argued to be universal, modulo word-order facts.

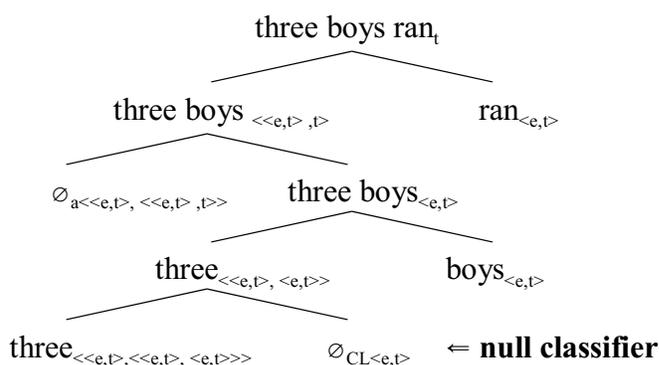


In (39), the numeral is the quantifying element, the CL is the domain of quantification and the NP is the nuclear scope. DNQ is a modifier of type $\langle\langle e,t\rangle, \langle e,t\rangle\rangle$.

There are several reasons not to prefer Kobuchi-Philip's analysis. First, note that she claims the CL itself denotes a set of objects, or, more formally, a function from individuals to truth values. For example, in *go nin* 'five CL', she considers the classifier *nin* itself as having an $\langle e,t\rangle$ denotation that is the domain of quantification of the numeral *go*. Further, arguing the need for classifiers to be universal, she claims that English also has one, albeit null, as in the structure (40b) for (40a), where \emptyset_a is a null indefinite determiner.

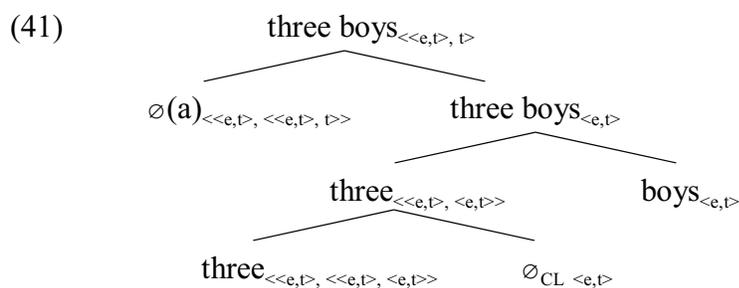
(40a) three boys ran

(40b)



In (40b) Kobuchi-Philip also gives *boys* an $\langle e,t\rangle$ -type interpretation, indicating that she does agree that the constituent *boys*, what we are calling a NumP, corresponds to a set. However, she has *three boys* as two separate constituents: the lower one merges with a null determiner to give a new *three boys* that is a generalized quantifier. In the interpretation being presented here, the null determiner is unnecessary since the numeral is what converts *boys* into the generalized quantifier *three boys*, without the need of the intermediate step. Further, if classifiers and plural are parallel

kinds of number morphology, which most accounts seem to agree on at least implicitly, then it isn't the classifier that denotes a set but rather the entire CLP that is set-denoting, just as it is NumP of the form N-PL and not the plural marker itself that denotes a set of objects. The contribution, if any, of plural morphology is not clear in Kobuchi-Philip's theory, which analyzes semantic types for English only down to a plural noun, rather than for the noun and for the plural marker individually. So *boys* is of type $\langle e, t \rangle$. A numeral like *three* is a modifier of type $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ and the null classifier in English, like the overt one in Japanese, is of type $\langle e, t \rangle$. So her composition of *three boys* is as in (41) (from Kobuchi-Philip 2005, p283).

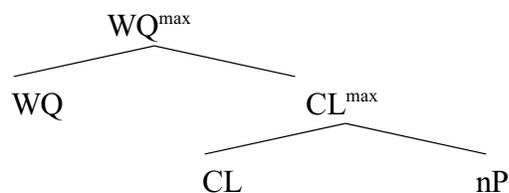


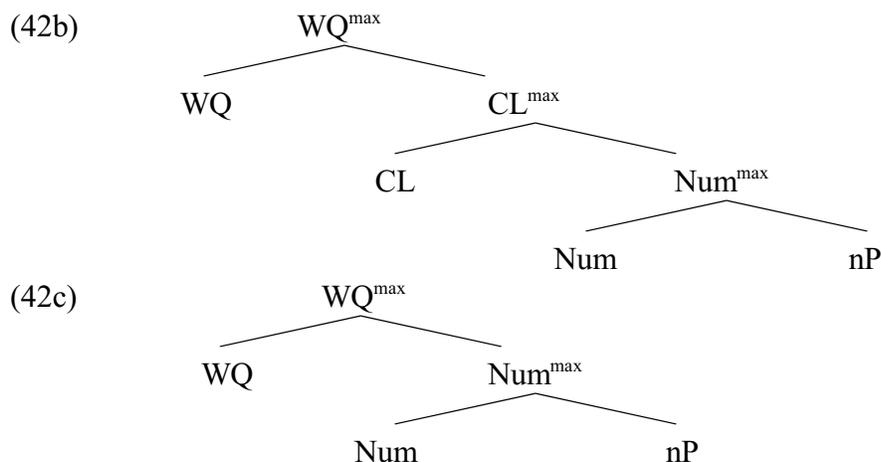
In (41), *three* merges with a null classifier to give the modifier *three*. This modifier then composes with *boys* to give the characteristic function denoted by *three boys*. *Three boys* then composes with a null determiner to yield a generalized quantifier. I will differ from Kobuchi-Philip's semantic analysis in the following ways. Although I agree that *boys* is a predicate, I argue in section 2.3 that the plural *-s*'s semantic contribution is parallel to that of the classifier. Therefore, CL and PL must have similar syntactic status and they must appear in the same or similar positions within DP, as Borer (2005) argues. I will also argue that *three boys* can only be a generalized quantifier and never a set corresponding to the characteristic function as the structure

in (41) suggests. Further, I assume that English does not have a null indefinite determiner as Kobuchi-Philip claims. Rather, I adopt the position of Lyons (1999) that there is no indefinite morphology per se that makes an NP indefinite; rather, indefiniteness is simply the absence of definiteness. The syntax and semantics of this claim will be clarified in chapter 5. I also expand the idea that there is no ontological indefiniteness to the broader claim that there is no definiteness or specificity. Instead, these three notions will be shown to be derivative of more primitive features.

In short, I opt against the analyses of Gil and Kobuchi-Philip and in favor of Simpson's (2005) argument for separate phrases for the more transparent interpretation that classifiers and number morphology, because of their similar syntactic and semantic functions, are heads of phrases. According to Greenberg (1972, 1990), numeral+classifier+noun and noun+numeral+classifier are the most frequent orders of the three elements noun, numeral and classifier. Simpson (2005) argues that noun+numeral+classifier is derived through movement from the more basic order numeral+classifier+noun. In any case, numeral+classifier+noun is the basic order in Persian, and I assume this reflects the relationship between heads and complements: numerals take CLPs and CLs take nPs. The rest of the structure will appear as either (42a), with only a classifier, (42b) with classifier and number morphology, or (42c), with only number morphology.

(42a)





2.2.2.3 CL and Num are functional heads

As presented in section 2.1, Distributed Morphology makes a distinction between l-morphemes and f-morphemes. L-morphemes are of the traditional categories of N, V and A while f-morphemes are those commonly called functional morphemes (Marantz 1995, 1997, Embick and Marantz 2008, Harley and Noyer 1998, 1999). F-morphemes are closed-class items that typically express purely grammatical properties or have their meanings determined only by universal cognitive categories (Harley and Noyer 1999, p4).

I have assumed above that a feature [n] in the functional head n converts a root into a noun. But besides that functional head, the other functional heads in DP are the head of Number Phrase (for the singular/plural distinction), the head of Classifier Phrase (which is argued here to be an underspecified kind of number) and the heads of the quantifier phrases SQP (Strong Quantifier Phrase) and WQP (Weak Quantifier Phrase). SQ^0 and WQ^0 correspond to determiners, which are standardly assumed to be functional heads. (Motivations for having a SQP and WQP replace DP will be discussed below in section 2.2.4.)

Here I devote some space to show that classifiers and number morphology correspond to functional heads. Abney (1987, p64ff) suggests a set of characteristics for identifying functional elements. No criterion is necessary or sufficient and, according to Abney and others (e.g. Corver and van Riemsdijk 2001, on prepositions), there is no sharp category boundary between those LIs that are lexical (“thematic” per Abney) and those that are functional. The five characteristics of functional elements that Abney describes are listed in (43).

- (43)
- i. Functional elements constitute a closed class
 - ii. Functional elements are generally phonologically and morphologically dependent. They are generally stressless, often clitics or affixes, and sometimes phonetically null.
 - iii. Functional elements permit only one complement, which is in general not an argument. The arguments are CP, PP and (Abney claims) DP. Functional elements select IP, VP, NP.
 - iv. Functional elements are usually inseparable from their complement.
 - v. Functional elements lack “descriptive content”. Their semantic contribution is second-order, regulating or contributing to the interpretation of their complement. They mark grammatical or relational features, rather than picking out a class of objects.

I will judge the relevant LIs from Persian and English against Abney’s characteristics, focusing on the LIs for number and quantity.

For number, which I argue in sections 2.2 and 2.3 is instantiated as number morphology, numeral classifiers or null elements, we are clearly dealing with closed classes. English has the productive morpheme *-s* and a small set of irregular plurals such as in *child/children*, *sheep/sheep*, *criterion/criteria*, etc.³ The most common plural in Persian is *-ha*, though *-an* is also available for

³I will focus on *-s*. Persian also has irregular plurals, mostly Arabic borrowings, as in *mæmur/mæmur-in* ‘official’/‘officials’ and so-called broken plurals like *ser/asrar* ‘secret’/ ‘secrets’ (Elwell-Sutton 1963, p24).

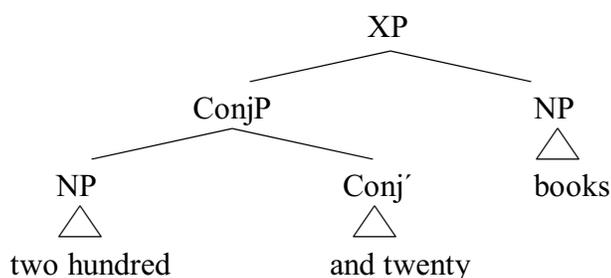
pluralizing nouns that denote living things: *zæn-an* ‘woman-PL’, *gusfænd-an* ‘sheep-PL’, *deræxt-an* ‘tree-PL’. Persian also has numeral classifiers. The default classifier is *ta*, but there are perhaps a score more that are occasionally used (Lambton 1953). While many languages have only a handful of classifiers, for example about ten for Assamese and eight for Yacuna, an Arawak language (Aikhenvald 2000, p100ff), some languages have many classifiers, with several hundred attested in Japanese (Downing 1996) and eighty or more listed for Maya (Tozzer 1977)⁴. But even in those languages with many classifiers, there are many fewer classifiers than there are nouns.

To denote quantity, however, there are considerably more morphemes available. While the single-morpheme quantifying determiners in English are few in number, e.g. *all*, *some*, *few*, *no*, etc., as Keenan (1996) points out, we end up with many more when complex determiners are included, such as *around fifty*, *practically no*, *between five and ten*, *too many*, etc. But minus the complex determiners, whose compositionality is syntactically and semantically transparent, the set of quantifying determiners does seem rather limited and does not approach the thousands of LIs in the content classes of N, A and V. An exception to the generalization that quantifying words are closed classes might be numerals, which constitute at least the infinite set of integers. But if the real numbers and other larger sets are included, and indeed we can count with those as well, the set of cardinal words becomes transfinitely infinite. So on this view the cardinals are hardly a closed class. On the other hand, it is apparent that all but a small set of numerals are complex in

⁴Aikhenvald (2000, p103) cites examples of some languages in Southeast Asia, such as Lao and Thai, where nearly any noun can be used as a numeral classifier, making classifiers a virtually open class. These classifiers, or “repeaters”, simply double the noun as in Thai *pratheet saam pratheet* ‘land three CL:land’ / ‘three countries’.

that they are multimorphemic compounds or more complex structures that are made of the small set of simplex numerals like *one*, *two*, *three*, fractional expressions, nouns like *hundred*, *million* and *billion*⁵ and words like *point* and phrases used for power functions such as *2.2 to the 21*. In English, for example, we can reduce the set of simplex monomorphemic numerals to 0-20 (minus perhaps the teens), 30, 40, 50, 60, 70, 80, 90, and a few more technical words like π , e , i , \aleph_0 . All the other cardinals are complex, like $1\frac{1}{2}$, $1.33333\dots$, 21, 1,000,019, 2^{\aleph_0} and $2^{32,582,657}-1$. By “complex” I mean involving the composition of more than one simplex, or morphologically minimal, numeral. Several authors have argued that numerals are, or can be, phrasal and as such involve the syntactic and semantic composition of simplex numerals (e.g. Li 1999, Selkirk 1977, Hurford 2003, Zabbal 2006). For example, Zabbal uses a Conjunction Phrase for complex numerals, as in (44) for the expression *two hundred and twenty books* (adapted from Zabbal 2006, p13), where the numeral *two hundred and twenty* is complex and phrasally compositional.

(44)



⁵*Hundred*, *thousand*, *million* and *billion* are nouns and do not behave like *one*, *two*, *three*, etc. (Payne and Huddleston 2002, p351). They take the determiner *a*, e.g. *a million cats*/**a three cats*; they are easily pluralized, *millions* and *millions of cats*/**sevens of cats*.

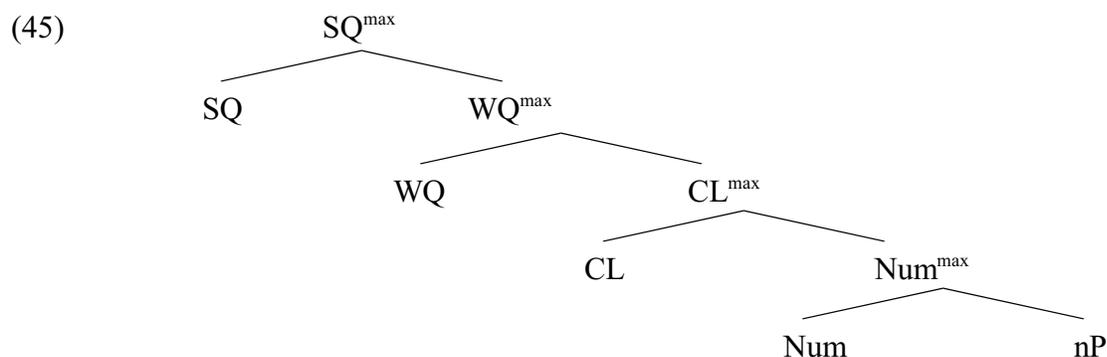
Under the assumption that most numerals are compositional, basic numerals can then be considered a closed class.⁶ So overall, number morphology, numeral classifiers and quantifying determiners, including cardinals, constitute closed classes, consistent with their being considered functional LIs.

Abney's second characteristic is that functional elements are phonetically weak, stressless or null. For example, English *-s*, being a coda or part of a coda, carries no stress. There is no singular marking per se and it can be considered null from the point of view of Abney. But Persian *-ha*, while dependent, is not unstressed (Winfuhr 1990). In fact, just the opposite. Persian words are generally stressed on the final syllable, unless that syllable is inflectional. So *doxtær* 'girl' has the stress on the second syllable, *doxTÆR*, but *doxTÆR-e* 'girl-Def' is stressed on the penultimate syllable. But with plural, stress is once again on the final syllable: *doxtær-HA*. When the accusative marker *-ro* is added, stress remains on *-ha*, e.g. *doxtær-HA-ro*. So plural is hardly a weak phonetic element in Persian. As for classifiers, they are not phonetically reduced, such as *ta*, *jeld* for books and others (see section 4.6.1). Thus for plural morphology and classifiers Abney's second characteristic seems to fail for quantifying determiners in both English e.g. *some*, *all*, and Persian e.g. *ziyad* 'many' and *caend* 'some'. Generally, especially for Persian, quantifying elements and number morphology are not phonetically weak.

Abney's third characteristic, that functional elements allow "only one complement" seems to hold, but this will depend somewhat on assumptions about phrase structure. His point is that C

⁶I take no strong position on this issue since most of my examples will involve low, simplex numerals. Note that other authors have argued that no matter how complex a numeral is it always is a head (e.g. Zamparelli 1995).

takes an IP complement, that I takes a VP complement, etc. In the nominal domain Abney suggests that D takes an NP complement. Many functional projections have been proposed since Abney's 1987 dissertation, but though more recent literature has more functional projections than Abney supposed there were, each functional head seems to take a single kind of complement. Given the structure in (45), SQ takes a WQP, WQ takes a CLP, CL takes a NumP and Num takes an nP.



It becomes harder to tell if a particular head is restricted to a single kind of complement in cases where any one of the heads is not overt. Consider (46a), where there is no overt WQP or NumP/CLP and (46b) where there is.

- (46a) [_{SQP} un [_{NP} mænzel]] *Persian*
 that house
 ‘that house’
- (46b) [_{SQP} un [_{WQP} do [_{CLP} ta [_{NumP} mænzel-ha [_{nP} mænzel]]]]]
 Dem two CL house-PL
 ‘those two houses’

On the surface, we might guess that the demonstrative can take either a WQP complement or an nP complement. However, if morphological heads are allowed to be null or if a lower head can raise to or from a head that appears to be null, then it is easier to maintain that each functional element typically does take a single kind of complement. For example, Borer (2005) argues that DP structure is uniform and that the various functional heads, if an item is not base-generated in them, are filled via raising, as in (47) (simplified from Borer 2005, p97).⁷

(47) [_{DP} the [_{#P} ~~the~~ [_{CLP} ~~the~~ [_{NP} cat]]]]

Borer argues that a Classifier Phrase is needed to make nouns count and that a #P is needed to quantify nouns. In (47), the article *the* serves to make *cat* count; hence *the* is generated in CLP. The article raises to spec of #P to quantify and raises again to its definite determiner position. So under this analysis, classifiers only take NPs, # heads take CLPs and determiners take #Ps. I will assume that classifiers, number morphology, quantifying elements and determiners take unique complements, making them functional elements in Abney's terms at least by this criterion.

The fourth characteristic is that functional elements are typically inseparable from their complements. This seems true as a generalization. Plural *-s* cannot be appear independent of its host, as it is a bound morpheme. Likewise for plural *-ha* in Persian. But the case is not so clear with classifiers. The default classifier *ta* cannot appear independently since it requires a preceding numeral. However, its complement need not follow. In (48b) the complement of *ta* can be elided and in (48c) it can be fronted. The same pattern appears in Mandarin (48d-e). (48d) is a question

⁷I present Borer's theory in detail in section 3.3.3.

with unmarked word order. The answer (48e) elides the complement of *ge*, and under certain conditions of contrasting apples with something else, *ping guo* ‘apple’ can be fronted, stranding the classifier at the end of the sentence.

- | | | | | | | | | | |
|-------|--------------------------------------|-------------|---------------|-----------|-------|----------|--|--|-----------------|
| (48a) | cændta | ænar | xærid-i | | | | | | <i>Persian</i> |
| | how many | pomegranate | bought-2S | | | | | | |
| | ‘How many pomegranates did you buy?’ | | | | | | | | |
| (48b) | do | ta | <ænar> | xærid-æm | | | | | |
| | two | CL | <pomegranate> | bought-1S | | | | | |
| | ‘I bought two’ | | | | | | | | |
| (48c) | ænar | do ta | xærid-æm | | | | | | |
| | pomegranate | two CL | bought-1S | | | | | | |
| | ‘Pomegranates, I bought two’ | | | | | | | | |
| (48d) | ni | chi | le | ji | ge | ping guo | | | <i>Mandarin</i> |
| | you | eat | Asp | how many | CL | apple | | | |
| | ‘How many apples did you eat?’ | | | | | | | | |
| (48e) | wo | chi | le | liang | ge | | | | |
| | I | eat | Asp | two | CL | | | | |
| | ‘I ate two’ | | | | | | | | |
| (48f) | ping guo | wo | chi | le | liang | ge | | | |
| | apple | I | eat | Asp | two | CL | | | |
| | ‘Apples, I ate two’ | | | | | | | | |

So the complement of the classifier is separable from the classifier. The examples in (48) also show that if cardinals are functional, then their complements can be elided or moved in English.⁸

Finally, with regard to the criterion that functional elements lack descriptive content, this seems to be the case for the items under discussion. While plural morphology clearly contributes to the semantic interpretation of a noun (*cats* means something different than *cat*), the contribution of plural is, as Abney describes it, “second-order, regulating or contributing to the

⁸In languages like Japanese, the classifier can be more transparently bound phonologically to its host: *issatsu*, for *ichi satsu* ‘one CL’, showing an even tighter relation between the numeral and the classifier.

interpretation of their complement...rather than picking out a class of objects” (Abney 1987, p65).

Classifiers too lack descriptive content in Abney’s sense, since they are a kind of number

morphology. Occasionally, numeral classifiers can influence whether an NP’s referents should be

interpreted as individuals or groups. Kobuchi-Philip (2006) points out that the choice of classifier

makes a difference in quantification, as in (49) (from Kobuchi-Philip 2006, p273).

- | | | | | | |
|-------|-------------------------------|---------|-------------|---------|-----------------|
| (49a) | go | nin-no | gauksei-ga | hashita | <i>Japanese</i> |
| | five | CL-No | student-Nom | ran | |
| | ‘Five students ran’ | | | | |
| (49b) | go | kumi-no | gauksei-ga | hashita | |
| | five | CL-No | student-Nom | ran | |
| | ‘Five groups of students ran’ | | | | |

But the distinction between the person classifier *nin* in (49a) and the group classifier *kumi* in (49b)

is more of a functional distinction rather than a descriptively contentful one since in both cases we

are talking about students. Also, while numeral classifiers or noun classifiers in general modify a

noun according to its class as in (50a), where *hon* (-*pon*) classifies long things, sometimes the

choice of classifier can reflect a speaker’s attitude or interpretation of the noun, as in (50b) and

(50c) (from Aikhenvald 2000, p103).

- | | | | | |
|-------|-------------------------------|--------------------------------------|--------|-----------------|
| (50a) | enpitsu | ippon | | <i>Japanese</i> |
| | pencil | one.CL _{long} | | |
| | ‘one pencil’ | | | |
| (50b) | tini | zɔn | xɔkhi | <i>Assamese</i> |
| | three | CL _{human/male} | friend | |
| | ‘three friends’ (respectful) | | | |
| (50c) | tini | zɔni | sowali | |
| | three | CL _{feminine/disrespectful} | girl | |
| | ‘three girls’ (disrespectful) | | | |

But still in cases like (50), the classifier is not affecting in any fundamental way what set of objects is being referred to.

Concluding this section, the heads of CLP and NumP projections within DP generally pass Abney's criterial tests and we can consider them functional LIs.

2.2.2.4 The determiner positions above NumP and CLP

Dominating CL^{\max} , I argue, are two more phrases we will call a Weak Quantifier Phrase (WQP) and a Strong Quantifier Phrase (SQP). Weak quantifying determiners such as *some* and numerals appear in the head of WQP, and strong quantifying determiners such as *each* and the definite article are in the head of SQP.

Starting at least with Bowers (1975), Jackendoff (1977) and Milsark (1979), it has been noted that there are distributional differences between strong quantifying determiners and weak quantifying determiners. First, the meaning of strong determiners is like that of standard universal quantifiers in logic. So, minus distributional and agreement differences, the examples in (51a,b,c) with the strong determiners *all*, *every* and *each* all share the meaning of the contribution of the universal quantifier, as suggested in (51d).⁹

- (51a) All the green candidates voted no on the nuclear bailout bill
- (51b) Every green candidate voted no on the nuclear bailout bill
- (51c) Each green candidate voted no on the nuclear bailout bill
- (51d) $\forall x, x \text{ is green} \ \& \ x \text{ is a candidate} \Rightarrow x \text{ voted no on the nuclear bailout bill}$

⁹I am not saying that all universal quantifying determiners have the same meaning, as there are important differences. For example, as pointed out by Gil (1995) and many others, *every* does not allow a collective reading while *all* does: *All men gathered at dawn!* **Every man gathered at dawn.* This is because, Gil says, *every* has a distributive contribution to the semantics on top of the universal contribution that it shares with *all*.

Other quantifying determiners like *many*, *some* and *few*, obviously do not have the semantic import of a universal quantifier.

Second, strong quantifying determiners compete with *the* for the same position.

- (52a) *the each iguana / *each the iguana
 (52b) *the every iguana / *every the iguana

In contrast, weak determiners can cooccur with *the*.

- (53a) the few iguanas
 (53b) the many iguanas

Also, like *the* in (53), at least some strong quantifying determiners can precede some weak quantifying determiners (54).

- (54a) the many senators / the few minimalists
 (54b) the few secular humanists / all three yahoos

But no weak quantifier can take a strong-quantifier complement.¹⁰

- (55a) *few the secular humanists / *many all yahoos
 (55b) *few the secular humanists / *some the yahoos

We might consider that the semantics of the clashing determiners in (55) is responsible more than their order for the judgments in (55). This is no doubt true, but the success of the compositional

¹⁰Roehrs (2007) points to the acceptability of an article preceding *every* in German: *ein jeder gute Student* ‘an every good student’ but the less acceptable *ein jeder guter Student* and *ein jede Stunde* ‘an every hour’. This violates the generalization that weak quantifying determiner do not precede strong ones.

semantics seems to depend on the elements being in the right order. Weak determiners take <e,t>-type complements (i.e. Number Phrases) and produce generalized quantifiers. Strong determiners then take a generalized quantifier and produce another generalized quantifier. This accords with the ordering restrictions in (52-55). Since it is heads that subcategorize for their complements, and since weak quantifying determiners take NumP complements and weak quantifying determiners are in turn selected by strong quantifying determiners, the two types of determiners must be separate heads.¹¹

Further, it appears that weak quantifying determiners are in the same position as numerals but strong quantifiers are not. For example, weak quantifying determiners cannot occur with numerals (56).

(56a) *few three iguanas / *three few iguanas

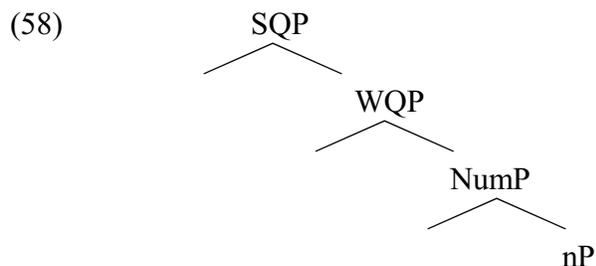
(56b) *many three iguanas / *three many iguanas

This is in contrast to the possible cooccurrence of *the* and numerals, as in (57).

(57) the three tenors

Examples (56a) and (56b) support the idea that cardinals and weak quantifying determiners are in the same position, lower than the position for strong quantifying determiners. So, as a first hypothesis, the functional projections above nP take the following form. Recall that English does not have a Classifier Phrase.

¹¹See section 5.1.2 for similar evidence from Persian.



The elements that appear in this projection are as in (59). Note that besides the arguments presented above, the phrases are the same as those assumed in Lyons (1999) and Borer (2005), though their nomenclature differs somewhat: Lyons splits the traditional DP into a Definiteness Phrase and a Cardinality Phrase while Borer uses a DP and #P.

(59) $[_{SQP} \text{ the/SQ } [_{WQP} \text{ a/\#/WQ } [_{NumP} \text{ sing/pl } [_{nP} \text{ N }]]]]$

In classifier languages the NumP phrase will be replaced by a CLP, where a basic number feature of individuation is indicated although it is not specified for the singular/plural distinction. This will be discussed in more detail below in section 2.2.3. In those cases where both classifier and plural are permitted (59) can be expanded to (60).

(60) $[_{SQP} \text{ the/SQ } [_{WQP} \text{ a/\#/WQ } [_{CLP} \text{ CL } [_{NumP} \text{ sing/pl } [_{nP} \text{ N }]]]]]]$

While determiners divide into two classes based on syntactic position, they bifurcate in a different way with regard to how they quantify. Some determiners, i.e. numerals, provide precise quantification. But the other weak quantifying determiners and the strong quantifying determiners

behave as a class in providing vague or “proportional” quantification (e.g. Partee 1995, p561). By precise quantification I mean that a generalized quantifier like *three boys* refers to a set of sets such that each set contains three boys, as in the literature on generalized quantifiers (e.g. Heim and Kratzer 1998, chapter 6). In contrast, a quantifying determiner such as *many* or *most* forms a generalized quantifier such as *many boys*, where the sets do not have a uniform cardinality. Determiners like *many* involves pragmatic presuppositions that determine whether a dozen is many or several thousand is many; *most* reflects a relative proportion, say more than half. But neither has a fixed cardinality.¹² One apparent exception is the indefinite *a* in English and its correlates in other languages where singularity is implied. However, I will take the position of Lyons (1999), to be discussed below, that *a* is really a cardinal. For Lyons *a* is not indefinite, because there is no indefinite morpheme/feature. Rather, indefiniteness is simply the lack of a [def] feature. A true exception to the claim that nonnumerals do not provide precise quantification is *both*, which entails exactly two.

That there are two classes of determiners in this sense is also demonstrated by entailment relations among elements in the same class and with elements in the other class. Numerals order with respect to each other; so *Four cats are caterwauling* entails that *three cats are caterwauling* and *Most cats are caterwauling* entails that *Some cats are caterwauling*. But *Twenty cats are*

¹²This is technically imprecise, under one interpretation. Numerals are often interpreted such that *four* means “at least four”, since if five girls traveled to London it is true that four girls went to London (e.g. Barwise and Cooper 1981). Others, however, use an exact denotation, as Scha (1981) does. Landman (2000, p238ff) comes down somewhere in the middle, suggesting that *three* means exactly three, but by virtue of a null numeral modifier that means “=”. While I do not ignore this important issue, the distinction between the “exactly” meaning of numerals and the “at least” meaning does not play out in the syntax or semantics being proposed in this dissertation.

caterwauling does not entail that *Most cats are caterwauling* and *Most cats are caterwauling* does not entail that *Twenty cats are caterwauling*. Further, that the numerals are a special class distinct from the other quantifying determiners is evidenced by the fact that certain numeral classifiers in classifier languages are generally restricted to appearing with numerals and not with other quantifying determiners. In Persian, for example, a classifier can be used with a numeral (61a) but not with a word like *xeyli* ‘a lot (of)’ (61b).

- | | | | | |
|-------|--------------|----|-------|----------------|
| (61a) | do | ta | sib | <i>Persian</i> |
| | two | CL | apple | |
| | ‘two apples’ | | | |
| (61b) | *xeyli | ta | sib | |
| | a lot | CL | apple | |

More formally, we can characterize the distinction between proportional and absolute quantifying determiners as follows. From Landman’s characterization of Scha (Landman 2000, p96ff), absolute quantification involves a numeral, n , that is a property of a set X , such that \sqcup makes a sum of X , and

$$(62) \quad \lambda X. |\sqcup X| = n.$$

Further, we know from set theory (e.g. DeLong 1971, p72) that two sets have the same property n (the n in (62)) iff their members can be mapped 1-to-1. So *three* is the property that all sets of three elements have. Defining negatively, proportional quantifying determiners do not indicate any particular n to give cardinality to a set. There is no n such that it characterizes the cardinality of all sets (or sets of sets) denoted by *most x*, *few x*, etc.

Finally, to recap somewhat, the set of numerals is infinite in that languages create as many of them as needed by context. The other quantifying determiners are smallish in number, and while they would seem to be potentially infinite, as in *more than three, more than four, ...*, this is dependent on the infinite set of numerals. Generally, by “numerals” I mean the set of cardinals such as $\{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$.¹³ In contrast, by “quantifying determiner” I mean the smallish set of LIs including *all, some, few, many, ...*.¹⁴

Since this dissertation assumes that functional features account for syntactic variation, I devote some space to justify that the LIs with the features for number, cardinality/quantification and (in)definiteness are indeed functional. Recall from section 2.2.2.3 that among Abney’s (1987) criteria for identifying functional items are the conditions that functional items are few in number and that functional classes resist being added to. We’ve already seen that the set of quantifying determiners, as Keenan (1996) noted, can be quite large and, it seems, can be added to. And of course the cardinals are an infinitely large and thus open set. Abney also mentions that functional items tend to have minimal phonetic heft, such as unstressed articles in English or plural markers. But quantifying determiners and cardinals such as *many* and *seven* are hardly phonetically light. Another characteristic of functional elements is that they tend to be morphologically bound to their complement, which appears to be the case with, say, inflectional features of verbs. But the

¹³This is simplified for exposition. As already mentioned I of course assume that the linguistic set of cardinals includes expressions for all rational numbers and all transfinite numbers. So completely analogous to *There are three females in Jim’s family* is *There are \aleph_0 members of the set of integers* and *There are π diameters in a circumference*.

¹⁴As mentioned just above, the quantifying determiners subdivide into at least two species, weak and strong, as is well known (e.g. Milsark 1979). This distinction will become important in chapter 5.

complements of cardinals and quantifying determiners are free, as in (63) where the complement of *five* is contrastively fronted.

- (63) I bought two Flaming Lips CDs, but Talking Heads CDs, I bought five ~~Talking Heads CDs~~

To the degree that an item is lexical if it can be used to make a copular predication (since they have descriptive content (cf. (43v)), some quantifying determiners are lexical. For example, just as we can use nouns, adjectives and verbs (copular or otherwise) in making predications (64a-c), quantifying determiners can appear in the same position (64d).

- (64a) Teddie is an idiot
 (64b) Teddie rocks
 (64c) Teddie is anorexic
 (64d) The reasons are few/many¹⁵

Despite the potential lexical characteristic inherent in a quantifying determiner exhibited in (64d), a quantifying determiner's basic meaning is still primarily a functional one. Abney's specification is that a functional element's semantic contribution is a "second-order" one that contributes to the interpretation of the complement rather than identifying a class of objects. If nouns are taken to be predicates (or if as I argue in this dissertation that Number Phrases or Classifier Phrases are the relevant predicates) that name classes, then the quantifying determiners do not identify new classes. Indeed, if anything, words like *many*, *some* and *seventeen*, in making

¹⁵Not surprisingly, strong determiners are barred: **The reasons are all*, **The reasons are every*. We expect *all* to be barred in this position since strong quantifying determiners don't appear in this position, as noted by Milsark (1979). More mysteriously, some weak determiners are barred in this position: **The reasons are some*. There are no doubt semantic restrictions involved, which I do not investigate here.

generalized quantifiers out of predicates, generally identify subclasses of their predicates by modifying them. They do not identify first-order predicates. Gamut (1991, p75-79) illustrates the difference between the two orders with (65-66). In (65a) *pink* is a first-order predicate because we can represent the meaning of the predicate *pink elephant* as a conjunction of two first-order predicates, as in (65b).

(65a) Jumbo is a pink elephant

(65b) $E_j \wedge P_j$

In contrast, the relative adjective *small* is second order because a conjunction like the one in (66b) gives us the wrong meaning for (66a).

(66a) Jumbo is a small elephant

(66b) $E_j \wedge S_j$

(66b) is the wrong characterization of (66a) because Jumbo does not belong to the class of small things, as is suggested by the second conjunct, S_j . Similarly, *many creationists* is not correctly characterized as the intersection of the sets denoted by *creationists* and *many*.

This dissertation takes the view that an argument must be a Case Phrase that dominates an SQP or WQP, in (22-23). These are headed by strong quantifying determiners and weak quantifying determiners respectively. NumP and nP are never ordinary arguments.¹⁶ This refines the notion of Longobardi (1994) and others (e.g. Stowell 1991, Matthewson 1998, Progovac

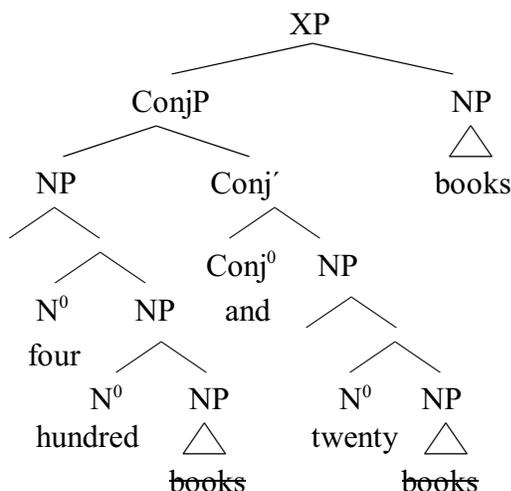
¹⁶Predicates can be subjects of second order predicates: e.g. *Red is a color*. The relationship between phrases and arguments is discussed in 2.2.2.4 and chapter 5.

1998) that a DP is required for argumenthood and that all determiners occur in D. Longobardi, for example, considered that all determiners are in D while in this dissertation it is claimed that determiners can go in two places. Mine is an intermediate position between the Longobardi view and that of others who also say that lower projections such as NumP or NP can be arguments (e.g. Chierchia 1998a for Chinese and other classifier languages, Pereltsvaig 2006 for Russian, Dobrovie-Sorin et al. 2006 for Spanish and Romanian, Li 1998 for Chinese). Importantly, I will follow the distribution of “determiner” elements in DP that is suggested by Karimi (1989), where numerals and weak quantifying determiner are reserved for one position and specific elements are in another. I differ from Karimi in where exactly these two categories of “determiners” go. The bifurcation of determiners contrasts with Jackendoff’s (1977) division of the “determiners” into three categories that go into three separate positions. Also, my analysis takes into account the importance that Karimi places on specificity for Persian and other languages, although I show that specificity should not be bound to the speaker only and that specificity is a derived notion. Specificity is discussed in chapter 5.

2.2.2.5 Numerals

As argued above, I am considering a numeral to be a weak quantifying determiner that heads a WQP. The numerals I am focusing on are simplex (see section 2.3). Such numerals are basic LIs and can be assumed to be simple heads. With more complex compositional numerals, it may be that the numeral is phrasal. For example, Zabbal (2006) suggests a conjunction phrase for numerals that reflect arithmetic operations, as in (67) (from Zabbal (2006, p22)).

(67)



Within the ConjP, the two lowest NPs right-node raise to the NP sister of ConjP.

Such a complex structure does have some attractive points. First is that it provides a way for the numeral to be compositional and allow for any complex numeral to be formed from basic elements such as *two*, *four*, *hundred*, etc. (see section 2.2.2.3 for “basic” numeral elements).

Second, given iterative compositionality, we can generate an infinite set of numerals. Third, using a ConjP seems to reflect that conjunctions are involved in creating large numerals. English may use conjunctions, as in (68a), although it seems to me that conjunctions in large numerals are preferably omitted when too many are involved, as in (68b).

(68a) four hundred (and) twenty books

(68b) two million (*and) two thousand (*and) four hundred (and) twenty books

But the awkwardness of too many *ands* in (68b) could be stylistic and not syntactic. In any case, Zabbal’s proposal has clearer empirical support in Persian, which requires a conjunction particle for each conjunction that Zabbal would predict.

- (69) do hezar-*(o) car sæd-*(o) bist-*(o) do ta ketab *Persian*
 two thousand-and four hundred-and twenty-and two CL book
 ‘2,422 books’

However, a structure like (67) raises questions about the assumption in this dissertation that numerals are ordinary heads of WQP. I do not propose that nonsimplex, compositional numerals cannot involve complex structure but I want to show that they need not involve a structure like that in (67) and that we can maintain that complex numerals act as lexical-numeral heads in basic numeral+CL+noun constructions. First, it is not clear that all numerals are nouns, as Zabbal supposes.¹⁷ Next, in Persian, where the Zabbal proposal otherwise seems to work, the right-node raising analysis in (67) has a technical problem. Note in (69) that the conjunction particle *-o* is repeated but the CLP *ta ketab* appears only once. This suggests that the right node being raised is a CLP rather than an NP. If only the NPs raise we get the structure in (70) for *car sæd-o bist ta ketab* ‘420 books’ with two classifiers, as in the ungrammatical (71).

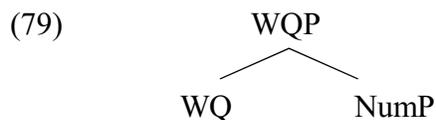
¹⁷As mentioned in footnote 5, some numerals like *hundred* and *million* are nouns. However others are like *two* are quantifying determiners.

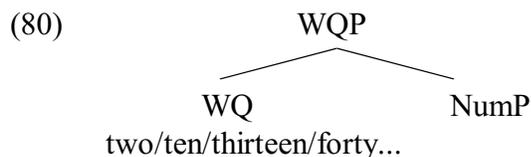
Another problem concerns the nature of the root XP. The XP in (67) must be higher than an NP since we have a quantified phrase. In traditional terms it would be a DP and in the context of this dissertation it must be at least a Weak Quantifier Phrase. In any case, we have the odd situation where Merge of ConjP and NP has not resulted in a phrase labeled by one of its daughters, as (78) indicates.



On the other hand, if we maintain endocentric labeling, then XP in (67) must be either a ConjP or an NP. But in either case, according to Zabbal (example (34), ff.), the result of the composition of the ConjP and NP is a set and not a generalized quantifier as it must be in Zabbal's example, *John bought 220 books*. Specifically, Zabbal (2006, p13) says that the denotation of *220 books* is "the set of individuals x such that each x is the sum of two non-intersecting plural individuals, y and z, where y is the denotation of *two hundred books* and z is in the denotation of *twenty books*".

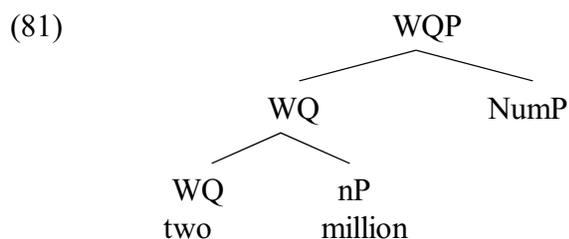
I will assume that numerals are always heads. In the simplest case we have for a numeral like *two* the structure in (79), which accommodates any monomorphemic numeral, as in (80).



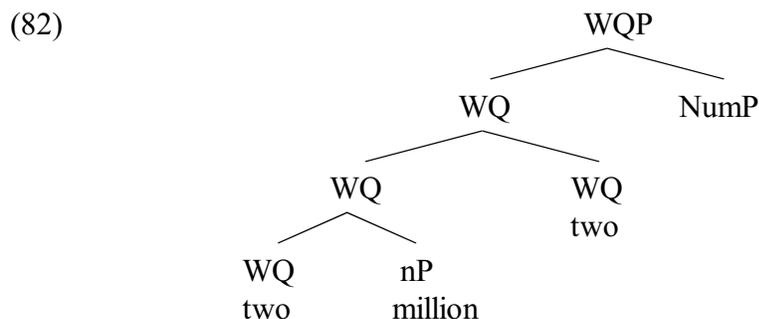


In a larger number that involves a simple numeral and a noun like *million*, the noun adjoins to the numeral, as in (81) for *two million*, where the result is a determiner-noun compound.

Syntactically, [_{WQ} WQ nP] is like a noun-noun compound. Semantically, however, *two million* is different. The semantic relationship between the modifier and head in a noun-noun compound varies, e.g. *bookshelf*, where the shelf is *for* books, and a *wood shelf*, where the shelf is *made of* wood. In contrast, the compound *two million* is unambiguously multiplicative.



And, assuming binary structure, further modification involves further adjunction, as in (82) for *two million two*.



If conjunctions appear in complex structures, as they sometimes do in English and must in Persian, I will assume that a conjunction can appear as a sister to the numeral but without projecting a ConjP: [_{WQ} and two], i.e. another root compound.

The structure in (82) is not without problems. Under the highest WQ there are two syntactically similar modificational structures that are interpreted in semantically different ways. The lower one, [_{WQ} [_{WQ} two] [_{NP} million]] involves a WQ multiplicatively modifying the noun *million* while the higher one, [_{WQ} [_{WQ} two million] [_{WQ} two]] puts *two million* in an additive relation with *two*. However, the two modifications involve different components. Suppose that the [WQ nP] adjunction *two million* is multiplicative in the same sense that *two-car* in *two-car garage* is multiplicative. In the former, *two* tells us how many millions there are and in the latter *two* tells us how many cars there are. Also note that in both cases, in English anyway, the noun is not pluralized: **two millions* (people) / **two-cars garage*. In contrast, as a generalization, the adjunction between two numeral WQs is additive, *two million* plus *two*. This is loosely analogous to the additive qualities in compound color terms like *yellow-green* and *blue-green*.

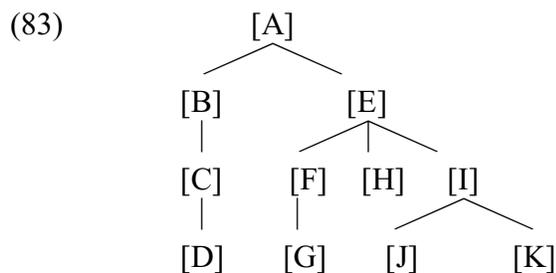
A complete analysis of complex numerals is needed, but the one offered here seems plausible and leads to the intuitively satisfactory result that the head itself, WQ, is the position for a numeral. (For coordination in numerals see the Zabbal (2006) source mentioned above, for information on coordination more generally in the Minimalist tradition see Zoerner (1999) on a ConjunctionP-type analysis, as well as Radford (1993), Johannessen (1993) and Rebuschi (2005).) For an argument against Conjunction Phrase see Borsley (2005).)

2.2.3 Feature architecture

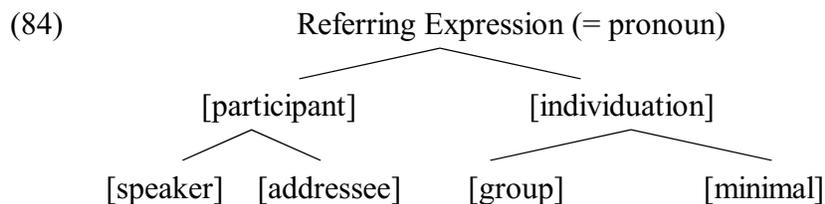
Here I introduce the feature system I will use, a variation of Harley and Ritter's (2002) feature geometry for pronouns. Harley and Ritter argue against the view that pronoun features come in unstructured bundles. A theory based on unstructured bundles, they say, overlooks the fact that there is a lot of structure in pronoun paradigms. Further, if features can combine in any arbitrary way they overgenerate the types and number of pronouns that appear in the world's languages.¹⁸ Also, unstructured features fail to explain certain universal implications. For example, with regard to pronoun number, one such Greenberg implication is that a language with morphology for dual number will also have plural morphology but not the other way around (cited in Harley and Ritter, p483). But without a hierarchically arranged feature geometry the cooccurrence of dual and plural in languages would be completely random, some languages having plural, some dual, some both and some neither, contrary to Greenberg's observation that a language with dual must have plural. That is, we want the feature organization to rule out some nonoccurring paradigms. Both to reduce the number of possible pronouns to those that actually are attested in languages and to recognize the order that apparently exists in pronoun systems, Harley and Ritter argue for an implicational feature geometry.

An abstract feature geometry is in (83) (Harley and Ritter 2002, p485).

¹⁸Harley and Ritter (p481) state that a pronoun inventory based on the person features [1] and [2], the number features [sg] and [pl] and two genders would allow for 2^6 possible pronouns, although no known pronoun paradigm comes anywhere close to that.



In this system, features are considered monovalent, or privative, and only appear with a positive value, for example [F], if [F] is active; [F] corresponds to [F: +] in a bivalent notation, but there is no such [F: -] for Harley and Ritter. According to the feature geometry in (83), the presence of feature [G], for example, entails the presence of [F], which in turn entails the presence of [E]. But the feature implication does not hold top-down: [E] may appear without [F], [H] or [I]. More concretely, for pronouns a partial feature geometry is (84) (adapted from Harley and Ritter 2002, p486).



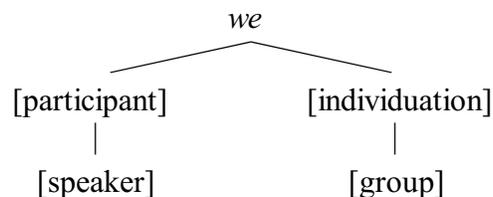
To point to one of the feature implications in the hierarchical geometry, consider that the presence of both [group] and/or [minimal] entails the presence of [indivduation], as in (85).

(85a) [group] \supset [indiv]

(85b) [minim] \supset [indiv]

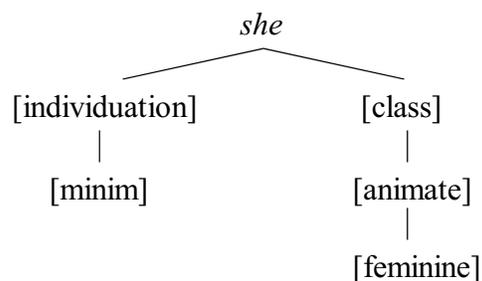
A particular pronoun is represented by some subset of (84). For example, the English pronoun *we* has the features in (86).

(86) Feature geometry for *we*

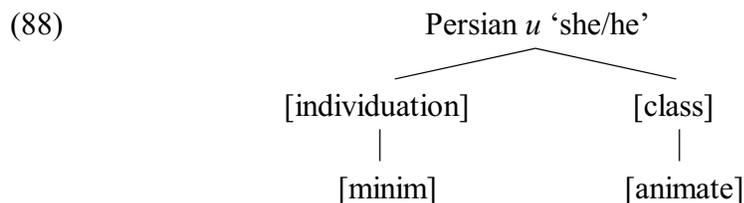


Not indicated in (86) is a sister node to [group] and [minimal], [class], which for Harley and Ritter contains gender information. [Class] bifurcates as [animate] and [inanimate/neuter], and [animate] can be further specified as [feminine] and [masculine]. Also, based on various differences between first and second person on the one hand and third person on the other, as is clear in the absence of a third-person feature under the participant node in (84), third person is a default pronoun indicated by the absence of [participant]. So the geometry for English *she* is (87).

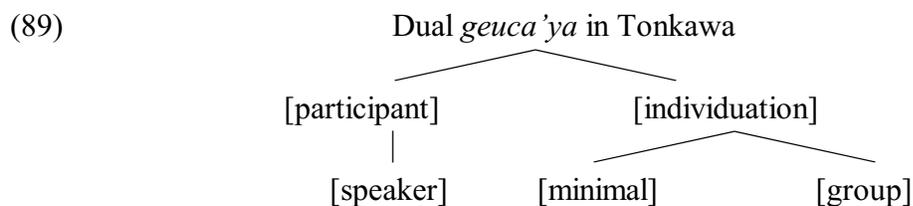
(87)



Persian *u*, meaning either *she* or *he*, specifies for [animate] but has no daughter for masculine or feminine. Since it is third person, the [participant] node is absent.



Any subset of the features is possible, as long as the geometry is maintained. The presence of both [speaker] and [addressee], for example, occurs in inclusive forms. And the presence of [minimal] and [group] is possible, giving us the dual, as in the geometry for the dual pronoun *geuca'ya* in Tonkawa, a Coahuiltecan language (from Harley and Ritter 2002, p491).



While on a first glance [minimal] might appear to be equivalent to [singular], (89) shows this is not the case. According to Harley and Ritter, the cooccurrence of [minimal] and [group] “captures the intuition that the smallest possible nonsingleton set contains two entities” (Harley and Ritter 2002, p492).

In this dissertation I adapt Harley and Ritter’s feature-geometry approach for pronouns and apply it to number and determiners as well as to pronouns. In chapter 4, I present in more detail the specific feature geometry relevant for the languages that appear in this dissertation, none of which has dual, trial or paucal. It will be shown that there are three versions of number:

classifier, singular and plural. All reflect the feature [individuation]. But singular and plural are further specified for [minimal] and [group] respectively. The features are as in (90).

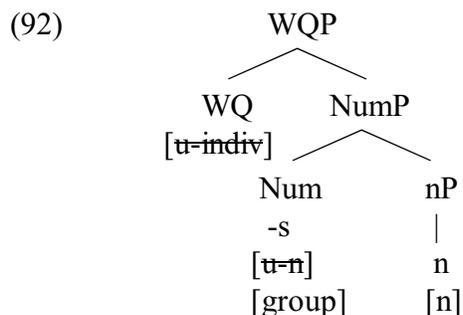
(90) Partial feature geometry for number items

<u>classifiers</u>	<u>plural morphology</u>	<u>singular morphology</u>
[indiv]	[indiv]	[indiv]
	[group]	[minim]

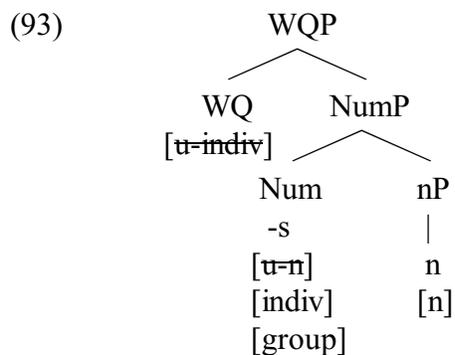
The features for the traditional number morphology of singular and plural should be transparent. Note, however, that a classifier, here considered simply another kind of number morphology, is unspecified for the singular/plural distinction. That classifiers are typically insensitive to whether the noun has a plural or singular interpretation is clear from their use with the numeral for *one* or other numerals. In (91) we see that the classifier *ge* in Mandarin is used with the numeral *one* or *two*.

(91)	yi/liang	ge xuesheng	<i>Mandarin</i>
	one/two	CL student	
	‘one student’ / ‘two students’		

I point to some technical details involved in the checking of the features to be proposed. As a concrete example, we will see that [u-indiv] in a weak quantifying determiner serves as a probe, looking for a goal, [indiv]. While [indiv] is the feature that typically appears on numeral classifiers, English plural is more specific in that it is featured as [group]. So when a determiner merges with NumP, we have the feature specification as in (92).



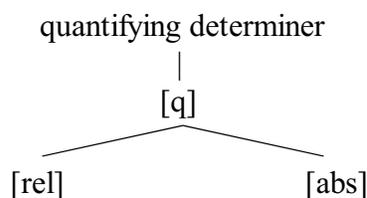
The plural marker's [u-n] is checked by [n]. But the main point here is the checking of [u-indiv]. In (92) it is checked by [group]. More precisely, [u-indiv] is checked by [indiv], whose presence is entailed by the presence of [group]. In general, dependent features can check the uninterpretable versions of the features they are dependent on. So the more fully specified features should be as in (93), with [indiv] added to (92).



With that clarification, I will often abbreviate feature bundles such as [indiv, group], where the presence of one entails the presence of the other as in (93), as single features such as [group] in (92). Note also that the listing of [indiv, group] (along with [u-n]) is more than a notational clarification; I am assuming that the two features are individually available for checking and interpretation.

I introduce additional features that specify the relation between quantifying determiners and CL/NumP when the numeral requires a classifier. Quantification comes in two types. Numerals provide precise or absolute quantification, while other quantifying determiners, including both strong and other weak quantifying determiners, provide proportional quantification, that is, quantification relative to the set assumed in a discourse. So the numeral in *three women* provides an absolute cardinality for each set of the generalized quantifier¹⁹, without telling us whether the set is some or all of some domain; i.e. the generalized quantifier *three women* is a set of sets of three women. In contrast, the quantifying determiner *some* in a phrase like *some women* refers quantifies any set of a set of sets without regard to whether a set contains three women or 10,000 of them. Since both kinds of quantifying determiners quantify but in different ways, I assume that the relationship between quantifying determiners and CLP/NumP involves a basic [quantification] feature, or [q]. When the relationship involves a numeral that requires a classifier the feature involved is a more specific [absolute] feature, or [abs], while nonnumerals may involve a [relative] feature, or [rel]. Thus the feature geometry is as in (94).

¹⁹Note again that for some (e.g. Barwise and Cooper 1981) *three* denotes not ‘three’ but ‘at least three’, to accommodate the truth-conditional fact that *three children played football* is true if four children played football. In this dissertation I consider cases where $|X| = n$ rather than where $|X| \geq n$. See footnote 12.

(94) Partial feature geometry for quantifying determiners

In (94), [rel] is for nonnumeral determiners while [abs] is for numerals. Just as for number features, for the quantifying determiners the lower feature entails the higher feature.

(95a) [rel] \supset [q]

(95b) [abs] \supset [q]

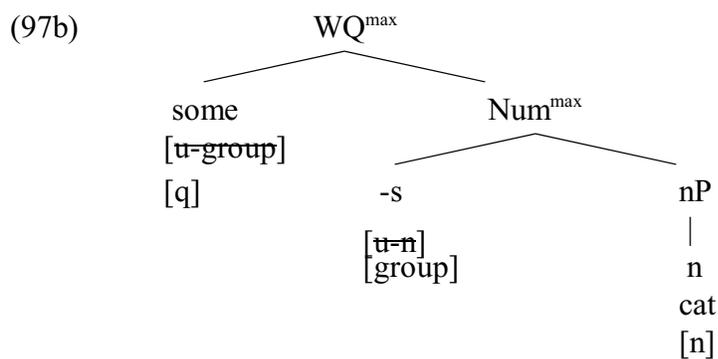
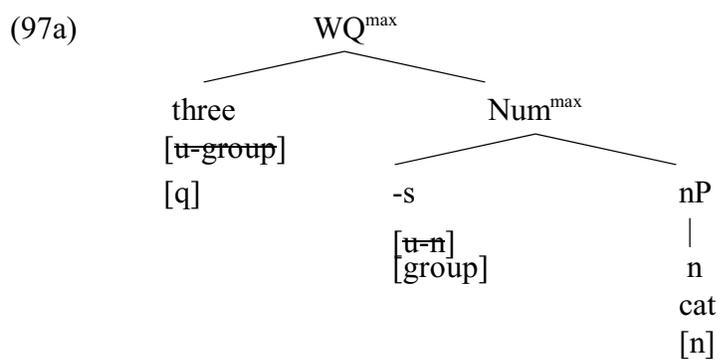
In the syntax being presented here, the feature on the determiner is interpretable [q], although its [rel] and [abs] variants can be [u-rel] and [u-abs]; I assume that the checking status of a lower feature like [abs] is independent of the checking status of a higher feature like [q]. The [u-rel] and [u-abs] versions will be checked by matching features in NumP of CLP. A Number Phrase, in English, is not specific about how it is quantified, meaning that it can be quantified by either a numeral (96a) or nonnumeral quantifying determiner (96b).

(96a) three cats

(96b) some cats

Since English plural is used with both numerals and nonnumerals, as in (96), the relationship between the determiner and the NumP does not depend on [abs] or [rel] but only [q], as for *three* (97a) and *some* (97b). In a language that does not make a distinction in the relationship between

the determiner and the NumP, there is no specification of [abs] or [rel] on the number-marking element.

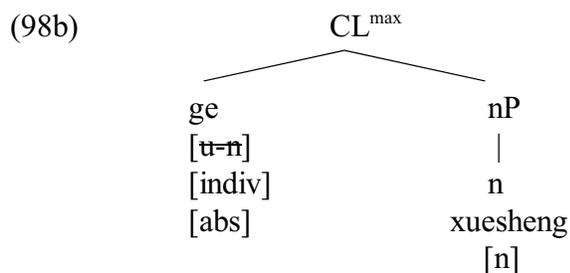


Note that *-s* in (97a,b) is also $[u\text{-n}]$. This basically is a subcategorization feature indicating that it is a noun affix. The feature $[n]$ in the head of nP checks $[u\text{-n}]$ on *-s*.

Numeral classifiers are specified as $[indiv]$, without further detail on plural or singular. So the individuation of a noun in a classifier language is as in (98).

(98a) ge xuesheng
CL student

Mandarin

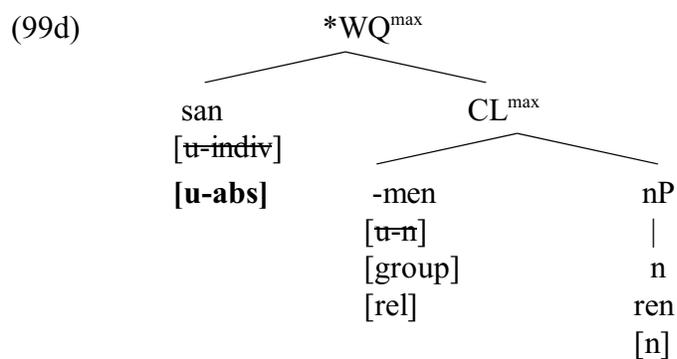
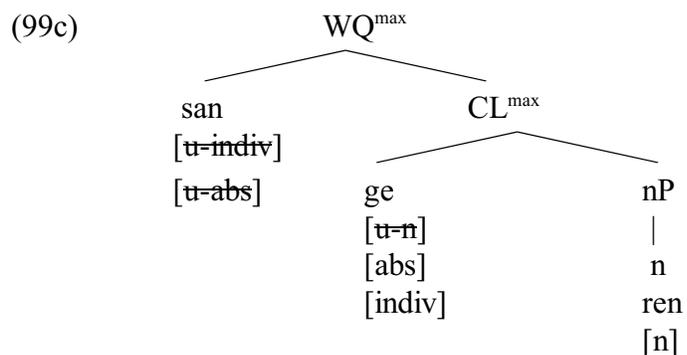


However, classifiers also differ from [group] and [minim] morphology in that, by and large, classifiers specifically require a numeral, not just any quantifying determiner.²⁰ Also, in classifier languages, the numeral requires a CL+noun construction. So we have the problem of deciding whether a feature on the classifier is checking a feature on the numeral or a feature on the numeral is checking a feature on the classifier. The problem is that since numerals require classifiers they are [u-abs] because [u-abs], the uninterpretable probe feature, c-commands the [abs] goal. But if the numeral is [u-abs] and the plural marker is [rel], then feature checking is impossible, as in (99d) for (99b). In (99c) for (99a), however, all features are checked.

- (99a) san ge ren
 three CL person
 'three people'
 (99b) *san ren-men

Mandarin

²⁰There are exceptions in Mandarin and other languages. The exceptions can be explained within the system proposed here by minor alterations of feature specification. See section 4.6.3.



Summarizing, nouns, number morphology, classifier, numerals in Mandarin, which is a prototypical classifier language, are featured as in (100).

(100) Mandarin heads and associated features

	<u>head</u>	<u>feature</u>
(i)	noun:	[n]
(ii)	plural:	[u-n, group, rel]
(iii)	classifier:	[u-n, indiv, abs]
(iv)	numeral WQD:	[q, u-abs, u-indiv]
(v)	nonnumeral WQD:	[q, u-rel, u-indiv]

(100) is useful for outlining the mapping of features to morphology in Mandarin, a stereotypical classifier language in the terms discussed by Chierchia (1998) and Borer (2005) (to be discussed in detail in chapter 3). It is also useful to see what the system claims about English. Despite what look like vast differences in the behavior of nouns, classifiers and plural morphology in Mandarin and English, the feature differences amount to very little. We are assuming that nouns are of a universal type. They are the result of roots being categorized via *n*. As mentioned briefly above, English plural morphology differs from Mandarin plural morphology in that the former is not restricted to being used with nonnumeral quantifying determiners: *many cat-s* / *three cat-s*. Further, English has no numeral classifiers. The functional heads in English and their associated features are as in (101).

(101) English heads and associated features

	<u>head</u>	<u>feature</u>
(i)	noun:	[<i>n</i>]
(ii)	plural:	[<i>u-n</i> , <i>group</i>]
(iii)	classifier:	Not independently available: number feature is [<i>group</i>], not [<i>indiv</i>]
(iv)	numeral WQD:	[<i>q</i> , <i>u-group</i>] for plural, [<i>q</i> , <i>u-minim</i>] for singular
(v)	nonnumeral WQD:	[<i>q</i> , <i>u-group</i>] for plural, [<i>q</i> , <i>u-minim</i>] for singular

That is, a very slight variation in the available morphology and the features associated with them, I will argue, accounts for the apparently significant differences that appear on the surface between Mandarin and English.

As a final note on features, in chapter 5 it is shown how a Harley and Ritter-type feature system can be used for features that underlie specificity. I will explain at that point that my adaptation contains an important difference from Harley and Ritter's feature system. Harley and

Ritter's feature geometry is designed for pronouns and their analysis uses the features to distinguish: i) first person from second person (ignoring number for now), and ii) first/second person from third person. The absence of participant features results in third person. In the system to be developed in chapter 5 for specificity, the main point of the feature geometry is to distinguish specific items from nonspecific items. Pronouns are a subset of the former class.

2.2.4 Phrase Fusion

Certain functional features tend to get mapped to particular heads. For example, in Mandarin, plural is [u-n, group, rel], classifiers are [u-n, indiv, abs], etc. So [abs] gets mapped only to the classifier. As is evident in (100) and (101) for the feature-head associations for Mandarin and English, the set of features is small and, I propose, universal. But it is possible for the universal features to be packaged on different heads, depending on the language. And this different packaging can account for varying kinds of behavior that classifiers and number show crosslinguistically. For example, Persian classifiers are like Mandarin classifiers at least in the sense that both require a numeral, so both are [abs]. Neither Mandarin nor Persian allows a classifier without a numeral, as in (102).²¹

(102a)	*ta	danešju	<i>Persian</i>
	CL	tree	
(102b)	*ge	xuesheng	<i>Mandarin</i>
	CL	student	

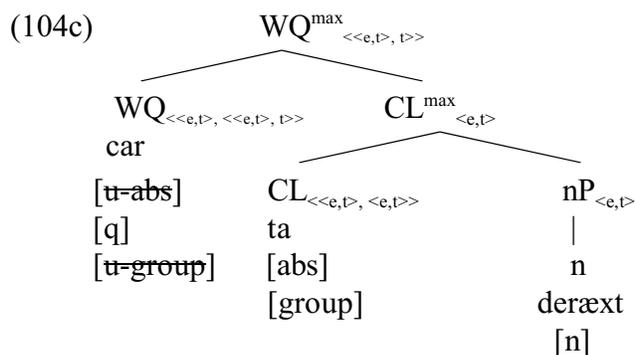
²¹Several exceptions in Mandarin, and Thai, are discussed in section 4.6.3.

In contrast, as we will see, Persian classifiers do not require an NP complement, since they can occur with a NumP (103a), unlike Mandarin classifiers (103b).

(103a)	do	ta	danešju-ha	<i>Persian</i>
	two	CL	student-PL	
			‘the two students’	
(103b)	*liang	ge	xuesheng-men	<i>Mandarin</i>
	two	CL	student-PL	

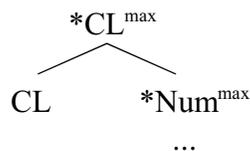
In (103a) the classifier is consistent with *-ha* while in (103b) the classifier’s cooccurrence with the pluralized noun *xuesheng-men* results in ungrammaticality. This means that Persian classifiers, in not requiring NP complements, are not featured as [u-n]. Persian is more flexible on this count in that numerals can take an NP complement or a NumP complement. Persian will be described in great detail in chapter 4, but a list of features in the Persian DP is presented here for convenience (104a). An example of a derivation for (104b) is in (104c).

(104a)	<u>Persian heads and associated features</u>	
	<u>head</u>	<u>syntactic features</u>
(i)	noun:	[n]
(ii)	plural:	[u-n, group, rel, specif]
(iii)	classifier:	[group, abs]
(iv)	null classifier:	[u-n, indiv, abs]
(v)	numeral WQD:	[q, u-group, u-abs] or [q, u-minim, u-abs]
(vi)	nonnumeral WQD:	[q, u-group, u-rel] or [q, u-minim. u-rel]
(104b)	car ta deræxt	
	four CL tree	
	‘four trees’	



In not allowing the cooccurrence of CL and PL in Mandarin but permitting the cooccurrence in Persian, the feature differences between Mandarin and Persian classifiers mean two things. First, the system of feature specification effectively bars CLP and NumP from ever occurring together in Mandarin: the former is [abs] telling us that a numeral is involved while the latter is [rel], indicating a nonnumeral, but the quantifying element is either one or the other. Second, because of the variation in features, Persian CLP and NumP are allowed to project separately. So while classifiers and number morphology are both kinds of number marking, in Mandarin CLP and NumP are necessarily “fused”. Fusion, discussed below, is where the features of two heads are spelled out as a single morpheme. Given that the features may be in the heads of separate phrases, the lower head raises to the higher head, thereby allowing Fusion to take place. Plural is not absent in Mandarin. Although very restricted, the plural marker *-men* can be used for humans when definiteness is implied: *xuesheng-men* ‘the students/#students’. So both CLP and NumP exist in Mandarin; it’s just that they cannot occur together. The barred structure is shown in (105).

(105)



The idea that potentially separate projections might be fused in some languages has been proposed before. Bobaljik's (1995) proposal, in the verbal domain, is that languages vary in whether they project tense and agreement as single or separate heads. In Distributed Morphology, morphological operations are capable of fusing the features of several nodes into a single node (Halle and Marantz 1994, p277). I will assume, as Bobaljik (1995) argues, that Fusion occurs in narrow syntax where sister terminal nodes are collapsed into one and the number of syntactic terminals is reduced by one (Kandybowicz 2007, p85-86). Immediately below I provide some details on the operation Fusion.

Bobaljik points out that whereas Icelandic can simply add a person morpheme onto a tense morpheme (106a), English can only add one or the other, as in (106b) (from Bobaljik 1995, p25).

(106a) Icelandic *kasta* 'to throw'

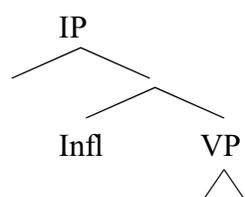
	present	past
1 sg	kasta	kastaði
2 sg	kast-r	kasta-ði-r
3 sg	kast-r	kasta-ði
1 pl	köst-um	köstu-ðu-m
2 pl	kast-ið	köstu-ðu-ð
3 pl	kasta	köst-ðu

(106b) English *tremble*

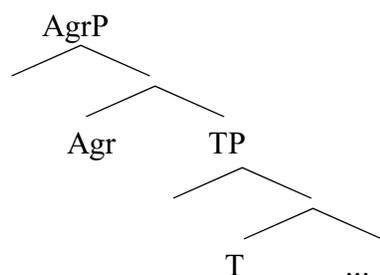
	present	past
1 sg	tremble	tremble-d
2 sg	tremble	tremble-d
3 sg	tremble-s	tremble-d
1 pl	tremble	tremble-d
2 pl	tremble	tremble-d
3 pl	tremble	tremble-d

In Icelandic the second person singular morpheme *-r* can be suffixed to the past morpheme *-ði* to give *kasta-ði-r* ‘you (pl) threw’. But as the English paradigm shows, we can have a person marker or a tense marker but not both: **tremble-ed-s*, **tremble-s-ed*. This suggests that tense and person are competing for the same position in English while they are happily spread out over separate positions in Icelandic. In terms of Distributed Morphology, in Icelandic there are two nodes for the morphemes of agreement and tense to be inserted, whereas in English there is only one. The simplified trees show the contrast between English (107a) and Icelandic (107b) (from Bobaljik 2001, p9).

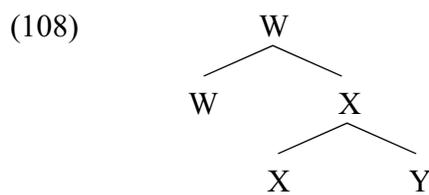
(107a)



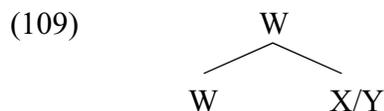
(107b)



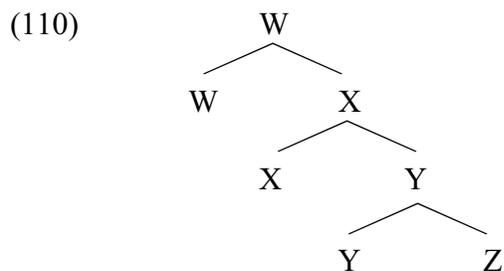
If a language maps its functional morphemes to syntactic heads 1:1, then all morphemes are spelled out separately. But if a vocabulary item has more than one functional feature, then the nodes where the separate features would ordinarily go must fuse. Consider the abstract structure in (108), where X and Y express features of separate nodes (from Bobaljik 1995, p33).



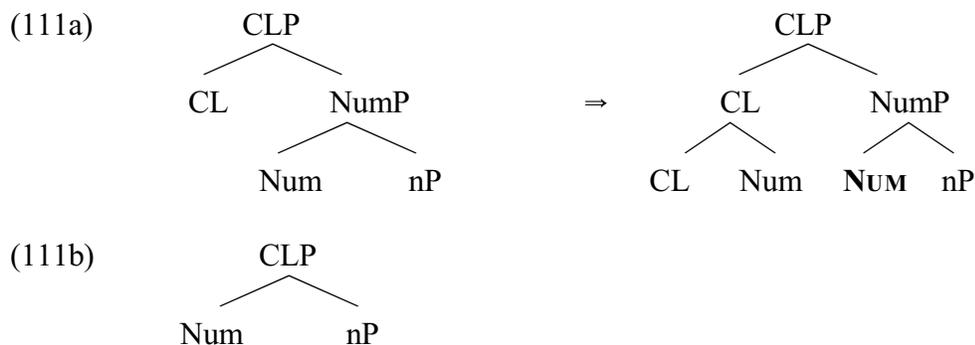
In (108), the relevant morphemes are inserted separately into X and Y. But if there is a morpheme that expresses the features in both X and Y, then the result is (109), (from Bobaljik 1995, p34).



However, if features are in heads then the typical relationship will not be that in (109) where X and Y are sisters, but rather that in (110), where the X head and the Y head are in an asymmetric c-command relation and the Fusion of X and Y is not possible.



However, if Y's features raise and adjoin to X, then we end up with the structure in (109) and Fusion is possible. This situation arises and will be discussed in a number of derivations in chapter 4. So if NumP and CLP fuse, as in English, we have the structure in (111b) via (111a).



In (111) the Num head raises to the head of CLP and is eventually spelled out as a single morpheme. The Fusion of CLP and NumP is not optional in English. There is no feature bundle that projects a separate classifier phrase. Recall that classifiers are characterized only with [indiv] and not with [group] or [minim]. English does not have a functional head with [indiv] to the exclusion of [group/]minim]. Note that in (111b) that the Phrase is designated as a CLP, which the Fusion operation dictates, even though the Num head has merged with it. To some degree, the designation CLP is not as important as the fact that the two phrases have fused. It might be useful to call the result an [indiv]P, since it's a phrase projected by the [indiv] feature in the classifier, but this I think leads to notational confusion. Also, for Bobaljik (1995, 2001) the Fusion takes place in narrow syntax, I indicate the movement before postsyntactic operations.

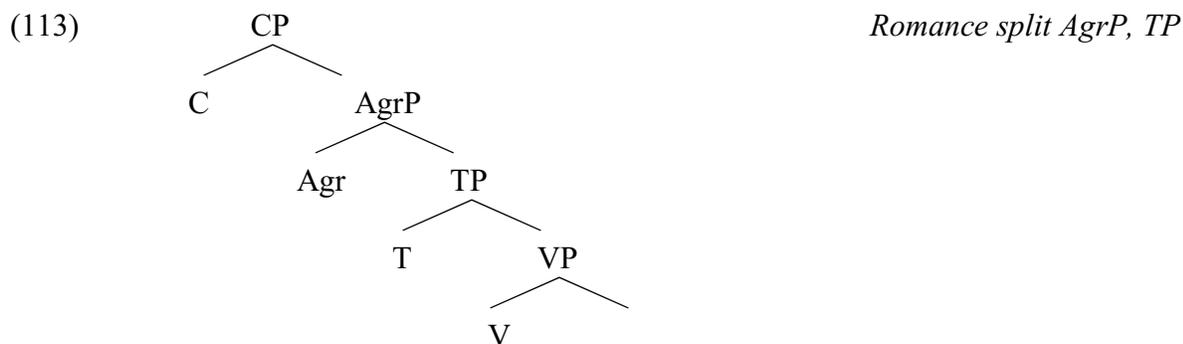
Consider further the difference between English and Romance languages like French. In French the morpheme showing agreement with the subject noun on the verb can appear separate from a tense morpheme.

(112a) nous donn-ons
 we give-1P
 'We give'

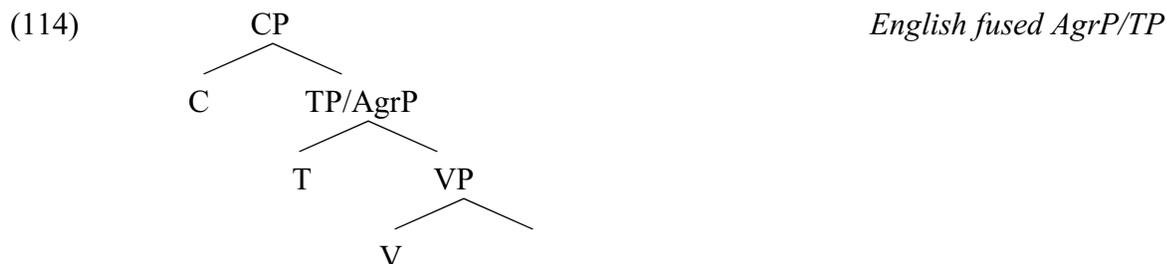
French

(112b) nous donn-er-ons
 we give-Future-1P
 'We will give'

With two morphemes for tense and agreement we need two heads, T and Agr (Bobaljik 1995, p9ff). The suggested structure is in (113).



In (113), there are separate positions for Agr and T, but in English, as suggested in the Icelandic/English contrast above, Agr and T never appear separately and must therefore appear together, fused, here as T in (114).



The difference for Bobaljik between Romance and English is in what he calls the Free Agr Parameter, which says that languages may vary as to whether an agreement morpheme can appear independently of a tense morpheme. Romance has a positive setting for the Free Agr Parameter whereas English does not.

Munn and Schmitt (2005) and Schmitt and Munn (2002) have applied Bobaljik's ideas of fused versus separate phrases to the nominal domain to attempt to account for bare singulars in Brazilian Portuguese. They note that bare singulars are widely available in Brazilian Portuguese, in episodic (115a), generic (115b) and kind (115c) contexts (Schmitt and Munn 2002, p186-187).

- (115a) Ele comprou computadores/computador *Brazilian Portuguese*
 'He bought computers/{a computer/computers}'
- (115b) Criança lê revistinha
 child read.3S comic book
 'Children read comic books'
- (115c) No ano 2030 gavião-real vai estar extinto
 in.the year 2030 royal hawk will be extinct
 'In 2030, royal hawks will be extinct'

They then argue that bare singulars are neither singulars nor disguised plurals. For example, both the bare singular and the bare plural allow durative readings (116a) but not terminative readings (116b) (from Schmitt and Munn 2002, p208).

- (116a) Eu escrevi carta/cartas por duas horas
 I wrote letter/letters for two hours
- (116b) #Eu escrevi carta/cartas em duas horas
 I wrote letter/letters in two hours

The ordinary singular is contrastive because it does allow a terminative reading.

- (117) Eu escrevi uma carta em duas horas
 I wrote a letter in two hours

So a bare singular is not an ordinary singular. Nor is it an unmarked plural, they argue. For example, a bare singular can antecede either a singular or plural pronoun (Schmitt and Munn 2002, p207).

- (118) Eu vi criança na sala
 I saw child in.the room
 E **ela** estava / **elas** estavam ouvindo
 And she was / they were listening
 ‘I saw a child/children in the room. And she was/they were listening.’

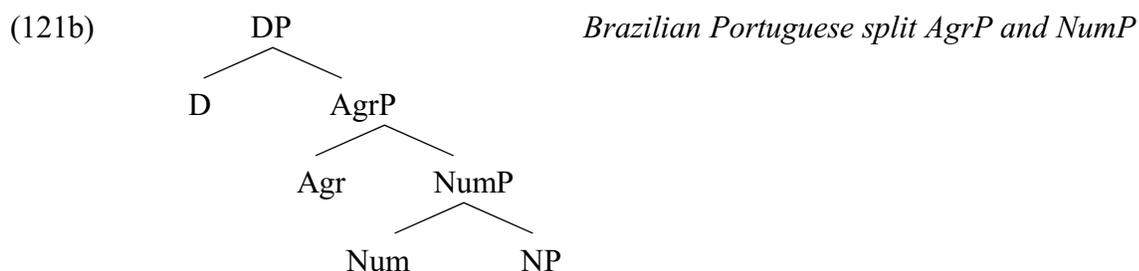
But bare plurals can antecede only plurals.

- (119) Eu vi crianças na sala
 I saw children in.the room
 E ***ela** estava / **elas** estavam ouvindo
 And she was / they were listening

Further, while bare plurals license the adjective *diferente* ‘different’ (120a), bare singulars cannot (120b) (Schmitt and Munn 2002, p207).

- (120a) Eles escreveram livros diferentes / um livro diferente
 they wrote books different / a book different
 ‘They wrote different books / a different book’
- (120b) *Eles escreveram livro diferente
 they wrote book different

Schmitt and Munn’s conclusion is that Brazilian Portuguese bare singulars are neither ordinary singulars nor bare plurals. Schmitt and Munn claim that such bare singulars simply lack number. They do propose some licensing conditions, but their main point is that bare singulars are possible. The reason bare singulars are allowed in Brazilian Portuguese but not English, they say, is because Brazilian Portuguese has split agreement and number projections in DP while English has a fused agreement/number projection. If the agreement/number projection appears, then number must appear along with agreement. But since in Brazilian Portuguese number is separable from agreement, number can appear without agreement. The proposed structures are in (121a) for English and (121b) for Brazilian Portuguese.



I accept in principle the intuition in the argument presented in Munn and Schmitt (2005) and Schmitt and Munn (2002) that phrases may or may not be fused, depending on the morphosyntax of the language. One immediate application of the Fusion analysis is that it captures the classifier/plural distributional differences between Mandarin and Persian. Mandarin classifiers can never appear with plural morphology, suggesting that in Mandarin the projections of CL and Num cannot appear separately and are therefore fused. In Persian, in contrast, plural morphology and a classifier can cooccur, meaning that the CL and Num projections can occur independently. I will argue in chapters 4 and 5 that other phrases within DP may also fuse.

To wrap up, the traditional DP is split into a SQP and a WQP, an approach with roots going back to at least Jackendoff (1977) as discussed in this section and in chapter 5. The appearance of classifiers with NPs is handled by a feature [u-n] on the classifier. If a classifier can take a NumP as well as an NP, this [u-n] feature is not on the classifier. For languages without classifiers, like English, the CLP and NumP are obligatorily fused. Just as English language learners have no evidence for separate Agr and number projections, they have no evidence to posit a position for a classifier in English. The significance of these proposals is that they make more accurate empirical predictions than theories that fail to predict the cooccurrence of classifiers and plural morphology, as discussed in chapter 3.

2.3 Semantics

2.3.0 Introduction

The interpretation of a SQP/WQP proceeds in parallel with its syntactic analysis. Each head and phrase will be of a certain semantic type, and heads will specify the type of complement they can take. In what follows, we discuss the semantics of the various phrases in the DP.

2.3.1 C-selection and s-selection

I am assuming that a functional LI relies on both semantic selection (s-selection) and subcategorization or category selection (c-selection) to determine possible complements. This issue goes back to an important debate about redundancy. The question is, do we need both: c-selection *and* s-selection? Can't subcategorization be predicted from semantic selection, or vice versa? The lexicon, becoming more powerful (for example by Chomsky 1970), came to be seen as containing information that renders PS rules largely redundant (see Lasnik and Uriagereka 2005, p3ff and Hornstein et al. 2005 chapter 6 for brief overviews on this development). X-bar theory addressed many of the redundancy issues but the question remained as to just how much and what kinds of information a lexical item should have.

Pesetsky (1982) argued that subcategorization can be deduced from semantic relations inherent in the meanings of LIs. So if a verb requires a patient (a semantic selection), the requirement of an NP object should follow for free without the need for c-selection. So, for example, since part of *put*'s meaning is that it has a patient and goal, Pesetsky's position is that it is redundant for *put* to also call for a DP and PP. From a language-acquisition perspective, Pesetsky held that theta roles must be epistemologically prior to syntactic categories in that they could be available to a child before linguistic experience.

However, there are questions about the strength of Pesetsky's argument. Lasnik and Uriagereka (2005, p10-16) concede that notions like agenthood may be available to the child but they consider it unlikely that the child will have access to the agent of any particular sentence. And since particular sentences contain subjects and objects, the child is being presented simultaneously with both semantics and c-selection data. Further, c-selection just might provide information about the meanings of verbs, as when a child learns that a particular verb may take a propositional complement. In contrast to the position of Pesetsky, Grimshaw (1979, 1981, 1991) argues that we need both c-selection and s-selection. She notes in Grimshaw (1979, p284) that verbs like *ask* semantically take a question.

(122) Amber asked what time it was

But *ask* can also take a noun as a "concealed question".

(123) Amber asked the time

However another verb, *wonder*, which can also take questions, cannot take concealed-question nouns.

(124a) Amber wondered what time it was

(124b) *Amber wondered the time

For Grimshaw, the way to distinguish *ask* and *wonder* is to note that they both semantically select (s-select) a question but that *ask* but not *wonder* has the option of c-selecting (category-selecting) an NP.

I will not attempt to resolve the c-selection/s-selection debate in this dissertation.

However, there are cases where we need both s-selection and c-selection in the DP parallel to the difference Grimshaw noted between *ask* and *wonder*. As I will show more fully later, both CLPs and NumPs denote sets and are thus of semantic type $\langle e, t \rangle$. Numerals in both Mandarin and Persian take $\langle e, t \rangle$ -type CLP complements.

- | | |
|---|-----------------|
| (125a) liang [ge ren] _{$\langle e, t \rangle$}
two CL person
'two people' | <i>Mandarin</i> |
| (125b) do [ta ketab] _{$\langle e, t \rangle$}
two CL book
'two books' | <i>Persian</i> |

However, Mandarin numerals cannot take a NumP, as illustrated in (126a), despite NumP being of type $\langle e, t \rangle$. But while Mandarin numerals can only take CLP complements (125a/126a), Persian numerals can take either a CLP (125b) or a NumP (126b).

- | | |
|---|-----------------|
| (126a) *[liang ren-men] _{$\langle e, t \rangle$}
two person-PL | <i>Mandarin</i> |
| (126b) do [ketab-ha] _{$\langle e, t \rangle$}
two book-PL
'the two books' | <i>Persian</i> |

So Mandarin numerals must also c-select for an CLP. This corresponds to CLP having the feature [abs], selected by [u-abs] on the numeral.

2.3.2 The semantic type of NP

I make the common assumption that common nouns such as *mongoose* and *carburetor* are predicates, of semantic type $\langle e, t \rangle$ (Heim and Kratzer 1998, Gamut 1991, Chierchia and McConnell-Ginet 2000, Carlson 2003, van Geenhoven 1992, Chung and Ladusaw 2004, to name a few; the modern notion traces back to at least Frege (Heim and Kratzer 1998, chapter 2). On this view, predicates can be considered extensionally as sets that correspond to a function from entities to truth values. So *dog* denotes the set of dogs. Intensionally, nouns can be considered properties, as in (127) (from Krifka 2003, p2).

(127) The dog property
 $[[\text{dog}]] = \text{DOG} = \lambda w \lambda x [\text{DOG}(w)(x)]$

What (129) says is that $[[\text{dog}]]$ is a function that maps worlds w to the set of dogs in w . The dog property is the property(s) that all dogs have which sets them off as dogs. On this view, the set denotation of nouns parallels the denotations of intransitive verbs and adjectives as predicates or sets of individuals. Part of the motivation for attributing the $\langle e, t \rangle$ type to nouns stems from apparent differences between ordinary nouns and proper names. Proper nouns are type- e extensionally individuals while a noun like *petunia*, corresponds to a set of individuals.

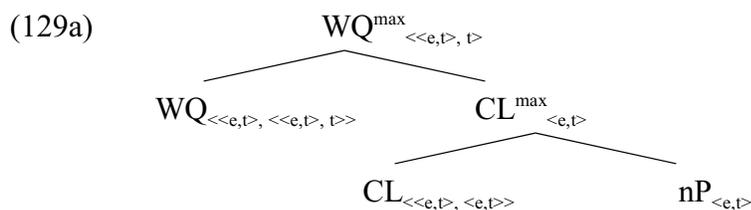
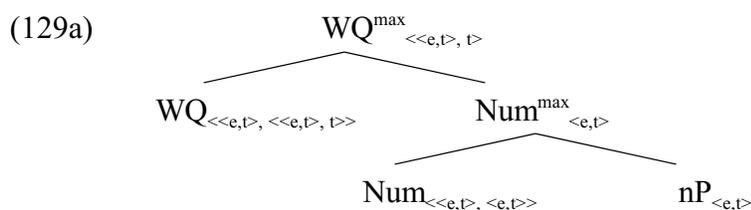
While this dissertation works with the assumption that nouns are predicates, it is important to point out that the view that common nouns are of type $\langle e, t \rangle$ is not universal. Among problems is that nouns do not ordinarily appear as predicates in English, as in (128).

(128) *That is damselfly

For views that common nouns are not of type $\langle e,t \rangle$ see e.g. Baker (2003), Zamparelli (1995), Krifka (1995), Tonciulscu (2006). Chierchia (1995a), explained in the next chapter, suggests that languages parametrically set their nouns as e-type or $\langle e,t \rangle$ -type.

2.3.3 The semantic type of NumP and CLP

Nouns are of type $\langle e,t \rangle$. NumPs, since they denote properties, are also of type $\langle e,t \rangle$. The head of NumP therefore must be an identity function, taking $\langle e,t \rangle$ -type entities (nPs) and yielding $\langle e,t \rangle$ -type entities (NumPs). A CLP is also of type $\langle e,t \rangle$ and the head of CLP must be the same identity function as Num. The semantic composition is as in (129a) for a NumP and (129b) for a CLP.



Section 3.3 discusses in detail the semantics of plurals but here I briefly indicate that CLPs and NumPs, as sets, are sets of pluralities of individuals. Given a set $\{a, b, c, d\}$, the pluralities are $\{a,b\}$, $\{a,c\}$, $\{b,c\}$ and all other pairs of elements, $\{a, b, c\}$ and all other sets of three elements, and finally the maximal set $\{a, b, c, d\}$.

(130) summarizes the correspondence of heads in DP with their features and semantic functions.

(130) Items in SQP/WQP

	<u>head</u>	<u>canonical features</u>	<u>semantic type</u>
(i)	noun:	[n]	<e,t>
(ii)	plural:	[u-n, group, rel]	<<e,t>, <e,t>>
(iii)	classifier:	[u-n, indiv, abs]	<<e,t>, <e,t>>
(iv)	numeral det:	[q, u-abs]	<e,t> ⇒ GQ
(v)	nonnumeral det:	[q, u-rel]	<e,t> ⇒ GQ

The semantic type in the function column should be transparent. These are the canonical associations. As briefly discussed above and as will be seen in more detail in chapter 4, languages may depart from the mapping in (130). The variation in how the features map to functional heads accounts for the variation in the behavior of classifiers and number morphology.

2.4 Chapter Summary

In this chapter I have outlined the morphological, syntactic and semantic assumptions to be used in chapters 4 and 5. Morphologically, I assume a Distributed Morphology model. The main point relevant here is that atomic roots are categorized by the head of nP. The mass/count distinction is also made with the introduction of [indiv]. Functional projections higher than nP add further features. Number features are typically associated with number morphology and classifiers. Part of the specification of NumPs and CLPs is how they are to be quantified. NumPs are generally flexible but CLPs must be quantified by numerals. NumPs and CLPs, characteristic functions, are also made into arguments by the quantifying determiners above them, WQ and SQ.

The composition of heads and phrases within DP, or within KP, is subject to both syntactic and semantic conditions. The syntactic conditions are agreement via subcategorization features while the semantic conditions involve composing the right semantic types. The set of features that appear in the heads of the projections in DP is small and universal. But variation in where the features spell out accounts for the nonuniform behavior of classifiers and number morphology across languages.

Chapter 3: Numeral classifiers and their function within DP

3.0 Introduction

This chapter focuses on numeral classifiers, which will be the entry point into a broader investigation of DP. The main goals of this chapter are to introduce facts about numeral classifiers crosslinguistically and to present two earlier accounts of classifiers that will prompt my own analysis in the following chapters. I proceed as follows. First, I provide a working definition of numeral classifiers and some general information about them as a linguistic phenomenon. Then I present two important recent proposals which have attempted to account for classifiers and related issues: Chierchia (1998a) and Borer (2005). I identify theoretical and empirical problems with each approach, particularly with regard to incorrect predictions about the distribution of Persian classifiers. The shortcomings of Chierchia and Borer lead to Chapter 4, which introduces an alternative account of classifiers that accounts for the Persian data but which also captures the generalizations observed in previous work. Classifiers are most closely tied with numerals and number morphology, and by extension, nouns. With coherent hypotheses about the lower portion of DP, we will be in a better position to analyze the higher projections that house determiners (WQ, SQ), sometimes alluded to in this chapter but to be covered in detail in chapter 5.

3.1 Basics on numeral classifiers

To start, we can define a numeral classifier as a functional morpheme that is required with a noun when it is being enumerated by a numeral. In some languages, such as Mandarin, the classifier is obligatory, as in (1) where the book classifier *ben* appears with the noun *shu* ‘book’ which is being counted by a numeral, in this case *san* ‘three’. As the example indicates, omitting the classifier is unacceptable.

- (1) san *(ben) shu *Mandarin*
 three CL book
 ‘three books’

However, we are immediately forced to adapt the working definition because in some languages the classifier is not obligatory. The Persian example (2) shows that omission of the classifier is acceptable even when the numeral appears with the noun.

- (2) se (ta) gorbe *Persian*
 three CL cat
 ‘three cats’

The sequence numeral-classifier-noun in (1-2) is common but it is not the only one. For example, the noun-numeral-classifier order appears in Thai, as in (3), from Singhapreecha (2000, p119).

- (3) nok saam tua *Thai*
 bird three CL
 ‘three birds’

Nung, a Tai language, generally uses numeral-classifier-noun order (4a) (Saul and Wilson 1979, p23), but the numeral ‘one’ must appear after the noun (4b) (Saul and Wilson 1979, p21) to get a classifier-noun-numeral order.²²

²²Greenberg (1972) says Bodo, a Sino-Tibetan language, may have noun–classifier-numeral order. The other possible orders, numeral-noun-classifier and classifier-noun-numeral, where the numeral is separated from the classifier, are said by Greenberg to not exist, but see example (4b), which with the numeral ‘one’ is said to be a special case by Saul and Wilson (1979). Aikhenvald (2000, p105) cites the literature for classifier-noun-numeral order in Ejagham, a Benue-Congo language. In any case, it seems the two most common orders are numeral-classifier-noun, like Persian and Chinese, and noun-numeral-classifier, as in Thai. In both these orders the numeral precedes and is linearly adjacent to the classifier.

- (4a) leo day ki pi mi slong tu luhc *Nung*
 then able several year have two CL child
 ‘Then after several years they had two children’
- (4b) ke nu hon teo kha tu ma nu’ng
 man in house again kill CL dog one
 ‘The man in the house killed a dog’

3.2 Numeral and nonnumeral classifiers

Classifiers constitute a range of devices for categorizing nouns. In the broadest sense, gender morphology, familiar in many European languages, might be considered a kind of classifier phenomenon that induces agreement of articles and adjectives with nouns.

- (5a) la fanciull-a bell-a *Italian*
 the.Fem.S child-Fem.S beautiful-Fem.S
 ‘the beautiful girl’
- (5b) il fanciull-o bell-o
 the.Masc.S child-Masc.S beautiful-Masc.S
 ‘the beautiful boy’

In gender-marking languages, the nouns in a class may share some semantic property such as being masculine, human, animate and so forth, but, as is well known in Italian and other Indo-European languages for example, gender is often a function of the phonological shape of the noun. For example, Italian nouns that end in *-a* typically trigger ‘feminine’ agreement in articles and adjectives, while nouns that end in *-o* are ‘masculine’.

Prototypical classifiers, however, simply categorize the nouns they appear with into groups whose members typically share some salient semantic characteristic such as shape, size, composition or animacy (Aikhenvald 2000). A clear example is the Japanese expression in (6).

- (6) ki ip-pon *Japanese*
 tree one-CL_{long}
 'one tree'

The classifier *hon* (*-pon* by phonological assimilation) is used to classify long things. It is specifically a numeral classifier, used only in numeral+noun constructions, the kind of construction that is the focus of this dissertation. In some languages, numeral classifiers are also used with quantifying determiners and demonstratives. So in Thai, the classifier *tua* appears with the quantifying determiner *laaj* 'many' in (7a) (from Singhapreecha 2000, p119), while the Kilivila classifier *to* appears with *m...na* 'this' in (7b) (from Lynch 1998). Kilivila is an Austronesian language spoken by the Trobriand Islanders.

- (7a) nok tua jaj laaj tua *Thai*
 bird CL big many CL
 'many big birds'
- (7b) tau m-to-na to-kabitam *Kilivila*
 man this-CL-this CL-intelligent
 'this intelligent man'

Besides numeral classifiers there is also a more general species of noun classifier. For example, besides using numeral classifiers, Jacaltec, a Mayan language, uses classifiers with virtually any noun, quantified or not. In (8) the person classifier *naj* appears with all arguments, regardless of whether they are quantified (from Craig 1977, p152).

- (8) xal naj pel chubil xil naj xuwan smam naj *Jacaltec*
 said CL Peter that saw Cl John his father CL
 'Peter said that John saw his father'

- (11) sa-batang batang pisang *Minangkabau*
 one-NUM.CL_{long/vertical} NOUN.CL_{tree} banana
 ‘one banana tree’

I point out noun classifiers, genitive classifiers and verbal classifiers only as a broader context for numeral classifiers in particular, as this dissertation addresses only numeral classifiers. Throughout this dissertation, unless otherwise specified, ‘classifier’ should be understood as synonymous with ‘numeral classifier’.

That said, numeral-classifier languages typically use classifiers that share a semantic feature with nouns, just as general noun classifiers do. In Japanese, as in (6) above, *hon* is used in numeral classifier constructions with nouns denoting long things. Other Japanese numeral classifiers include *satsu* for books, *kan* for larger volumes, *nin* for people, *hiki* for some animals, *dai* for vehicles, *ko* for spherical objects, and so on. There are hundreds of Japanese numeral classifiers, though perhaps only three dozen or so are commonly used (Downing 1986). Often languages allow a default, generalized classifier that can be used in lieu of more specific ones. Po-Ching and Rimmington (1997) state that Chinese *ge* is the most common classifier and can appear with nearly all nouns.²³ In (12), the general classifier *ge* can serve just as well as the more specific furniture classifier *zhang* when classifying *zhuozi* ‘table’.

²³According to informants, Po-Ching and Rimmington’s generalization is too broad or at least imprecise, at least in Mandarin. First, *ge* cannot be used with mass nouns (**liang ge shui* ‘two CL water’) and there are many count nouns it cannot be used with, such as words for animals (**liang ge mao / liang zhi mao* ‘two CL cat’), plants, mountains, bridges, etc. The first distinction between the use of *ge* with count or mass nouns will prove to be relevant in section 3.3.2, but the second distinction doesn’t concern me since it has to do with a semantic distinction other than count/noncount.

- (12) san zhang/ge zhuozi *Mandarin*
 three CL_{furniture}/CL_{general} table
 ‘three tables’

Similarly, *ta* in Persian can generally be used in place of other classifiers. For example, in (13) in place of *jeld*, a more specific classifier for books²⁴.

- (13) do ta/jeld ketab *Persian*
 two CL_{general}/CL_{book} book
 ‘two books’

Numeral classifiers are both a genetic and areal phenomenon. They appear in many language families in East Asia and Indonesia, many Dravidian languages and nearby South Asian Indo-European languages such as Persian and Marathi. Most Austronesian and Oceanic languages have classifiers. Classifiers are also found in many languages in Central and South America, and, more sporadically, in Papuan languages and in various American languages in the U.S. and Canada. They are rare in Indo-European, with the Indo-Iranian exceptions noted above, and are rare or nonexistent in Africa and Australia (Aikhenvald 2000).²⁵ Just to be clear, this dissertation focuses on classifiers used with count nouns. Thus the issue of so-called classifiers in expressions like *300 head of cattle* are not of concern, since *cattle* is a mass noun. Similarly, this dissertation doesn’t discuss so-called mensural classifiers, which create a unit out of a mass noun, as in *a shot of vodka*. These are mentioned in the following paragraphs.

²⁴While *jeld* and others are often described as classifiers, I argue in section 4.6.1 that *ta* is really the only classifier in Persian. *Jeld* and similar terms are modifiers of the classifier. When *ta* does not appear, *jeld* modifies a null classifier.

²⁵For general descriptions of numeral classifiers see Aikhenvald (2000, section 4.2), Senft (2000) and Craig (1986).

While the choice of numeral classifier depends on the class a noun belongs to, in turn the classifier itself can sometimes affect the meaning of the noun. For example, in Bengali (Aikhenvald 2000, p105) the variant numeral classifiers *-ta* and *-ti* induce a general reading (14a) and a diminutive one (14b), respectively.

- | | | | |
|-------|--------------------------------|------|----------------|
| (14a) | ek-ta | bai | <i>Bengali</i> |
| | one-CL _{nonhuman} | book | |
| | 'one book' | | |
| (14b) | ek-ti | bai | |
| | one-CL _{nonhuman/Dim} | book | |
| | 'one beautiful small book' | | |

Classifiers are characterized in the literature as comprising two major types, sortal and mensural. Lyons (1977), Croft (1994) and others define sortal classifiers as those that name the unit being classified. In contrast, mensural classifiers don't name a unit but rather create one out of a mass noun. Another way to describe the distinction is to say that sortal classifiers occur with nouns that denote cognitively individuated things like spoons and canaries. Gil (1987, p258) says that "count nouns come with a 'natural' unit for enumeration...". In contrast, mensural classifiers can be characterized as portioning out uncountable stuff like water and mercury into units, often conventionalized. In the Persian examples below, *jeld* classifies the noun *ketab* 'book', which denotes book units that already exist in the world (15a). *Livan* 'glass', in contrast, creates a unit out of the mass substance denoted by *cai* 'tea' (15b) (Iranians typically serve tea in glasses).²⁶

²⁶There are many such classifiers for liquids: *do livan ab* 'two glass water', *do piyale roghan* 'two container oil'.

- (15a) pænj jeld ketab
 five CL_{book} book
 'five books'
- (15b) do livan cai
 two glass tea
 'two glasses of tea'

Persian

However, naturally countable things, i.e. things that are 'inherently' unitized, in Gil's (1987) terms, do not map 1:1 with count nouns; languages impose conventions about which nouns are count and which are noncount. In English, individual grains of rice and lentils are about the same size and one particular piece of either would seem to have minimal cognitive or discourse salience. Yet, seemingly arbitrarily, *rice* is not count in English and cannot be ordinarily pluralized (**rices*) while *lentil* is countable and hence pluralizable (*lentils*). Nor is the small size of rice grains a necessary or sufficient condition for treating conceivably countable things as mass. Noncount nouns can also refer to objects that are much larger than grains of rice, such as *timber*, *lumber*, *rubble*, *infrastructure* and *flotsam and jetsam*.

3.3 Theoretical approaches to classifiers

3.3.0 Introduction

It has been noted that there is at least a rough complementary distribution between numeral classifiers and number marking (Greenberg 1972, Sanches and Slobin 1973, T'sou 1976). Sanches and Slobin describe the generalization weakly as: languages whose main form of numeral constructions involves classifiers do not require plural marking on the noun. The tendency toward mutual exclusivity of classifiers and plural has suggested to some that they are parallel devices serving a similar function. Paris (1981), Croft (1994), Iljic (1994) and Cheng and Sybesma (1999), Doetjes (1997), Chierchia (1998a), among others, suppose that classifiers serve

an “individuating” function that makes mass nouns into countable units. Doetjes (1997) and Borer (2005) are of the view that plural parallels classifiers in that both appear to serve the individuating function. This tendency toward mutual exclusivity of classifiers and number morphology and the idea that they serve a similar individuating function form the basis for two main theories of classifiers which are challenged in this dissertation, Chierchia (1998a) and Borer (2005).

Both Chierchia and Borer take as a point of departure the general complementarity of classifiers and plural morphology. Briefly, Chierchia sees the choice of classifiers or plural morphology as a function of the denotation of a language’s nouns. Noun denotation is parameterized in his Nominal Mapping Parameter. I discuss the Nominal Mapping Parameter in great detail below, but briefly it can be summarized as (16).

(16) Chierchia’s (1998a) Nominal Mapping Parameter (very short version)

- i) A language sets its nouns as arguments or predicates, corresponding to mass or count denotations respectively.
- ii) The parametric setting of nouns as arguments or predicates dictates whether a language has classifiers *or* plural morphology and determiners.

Under this view, if a language sets its nouns as mass arguments, a classifier is required to make them countable. Further, being mass, nouns in such a language are not ordinarily pluralizable. Such a language is a classifier language, with Chinese being a paradigm example. On the other hand, if a language sets its nouns as predicates, they are already countable and pluralizable, obviating the use of classifiers. French is a language of this type, requiring plural morphology on semantically plural nouns and not having numeral classifiers at all. In a revised approach to the problem of classifiers, Borer, rejecting Chierchia’s parameterized typology and opting for crosslinguistically universal syntactic principles, argues that nouns lack a mass/count denotation in

the lexicon but rather are given mass/count denotation in the functional syntax above NP. For her, the mutual exclusivity of plurals and classifiers stems from their both being “dividers” of mass; essentially, they serve the same semantic function and compete for the same syntactic position.

We will see that both Chierchia’s and Borer’s accounts have empirical limitations. An important empirical problem for Chierchia is that even in a prototypical classifier languages like Chinese, and even more so in Persian, nouns are not uniformly mass but do have clear mass/count distinctions. Another main problem is that, in order to account for the distribution of classifiers in Persian, Chierchia must make use of typeshifting; but in doing so he can then no longer successfully account for the distribution of classifiers in Chinese. For Borer, an important empirical problem is the fact that in Persian, and in other classifier languages, classifiers and plural can cooccur in the same numeral+noun construction. The following sections outline Chierchia’s and Borer’s theories and problems with them.

3.3.1 Chierchia’s (1998a,b) proposal

3.3.1.1 Background

In this section we take a close look at two influential papers, Chierchia (1998a) and (1998b). After outlining his account of classifiers, I point to a number of empirical problems with regard to Persian. One is that he incorrectly predicts that Persian nouns should all be e-type arguments. This is a more general problem than the Persian counterexamples will show because even Chinese, the language that serves as his paradigm case of a classifier language, shows a distinction between mass nouns and count nouns. A more substantial problem is that he predicts that, in principle, classifiers should not occur with plural morphology. This turns out to be untrue

for Persian. In order to allow for the cooccurrence of classifiers and plural morphology in Persian, Chierchia then leaves unexplained why the two cannot cooccur in Chinese.

Chierchia (1998a) suggests that a language's choice of classifiers or plural marking derives from the denotation of its nouns. All languages seem to have some mass nouns, such as *water* in English. But, according to Chierchia, in some languages a mass denotation is extended to all nouns. In Chinese, for example, even nouns for *cat* and *book* are in some sense like *water* and *furniture* in English. Simply put, since Chinese, he claims, has only mass nouns, it will have numeral classifiers but will not have plural morphology. It follows that the structure CL-N-PL (or some permutation of that order) should not occur.

The distinction between the denotations of mass and count nouns can be described in terms of individuals and pluralities of individuals. Following previous analyses of plurality in natural language (e.g. Link 1983, Landman 1989a, 1989b, 1995 and Bunt 1985), Chierchia (1998b) claims that mass nouns, in contrast to count nouns, come out of the lexicon with plurality already built into them. Thus, a mass noun denotes all the individual members of a set plus all pluralities constructed from them. Individual definite members of a set are considered singularities, or atoms, which themselves have no components.

As Chierchia (1998b) outlines, in a lattice-theoretic approach, U , the set of individuals, is a complete free join semilattice²⁷ generated by its atoms, as in (17).

²⁷A join semilattice is a partially ordered set of elements and an ordering, $\langle A, \leq \rangle$, that is reflexive, antisymmetric and transitive, if the supremum of any elements $\{a,b\}$ exists. For relevant details, see Partee, ter Meulen and Wall (1993) or any introductory text on discrete mathematics or abstract algebra, such as Dornhoff and Hohn (1978).

$$\begin{array}{ccccccc}
 (17) & & & & & & \{a\ b\ c\ d\ \dots\} \\
 & & & & & & \\
 & & & & & & \{a\ b\ c\} \quad \{a\ b\ d\} \quad \{a\ c\ d\} \quad \dots \\
 & & & & & & \{a\ b\} \quad \{a\ c\} \quad \{a\ d\} \quad \{b\ c\} \quad \{b\ d\} \quad \{c\ d\} \quad \dots \\
 & & & & & & a \quad b \quad c \quad d \quad \dots = \text{atoms}
 \end{array}$$

So in (18), a, b, c, d, \dots are atoms. Pluralities, then, are sets of atoms; some pluralities are subsets of other pluralities. The plurality $\{a, b\}$ is a subset of the plurality $\{a, b, c\}$, or in Chierchia's notation:

$$(18) \quad \{a, b\} \leq \{a, b, c\}$$

A structure of atoms and their pluralities is more formally described in the following terms. The sum (or join or union), \cup , of atoms or pluralities is the smallest element in the lattice that gives two elements as components. So,

$$(19) \quad a \cup b = \{a, b\}.$$

Which is to say that the sum of the elements a and b is the set $\{a, b\}$. The sum of pluralities is the sum of the atoms that make up the pluralities. So the sum of two sets, each with two atoms, is a new set that comprises all of the atoms that appear in the two sets, as indicated in (20).

$$(20) \quad \{a, b\} \cup \{c, d\} = \{a, b, c, d\}$$

Finally, an atom can join with a plurality to yield a new plurality of atoms, as in (21).

$$(21) \quad a \cup \{b, c\} = \{a, b, c\}.$$

In turn, for U , the set of all individuals, for any subset $X \subseteq U$, a supremum operator $\cup X$ is the sum of all the elements of X . So, when joining the atom a and the set $\{a, b\}$, we get the set of atoms that make up one or the other set, minus repeats. As in (22a), the join of a and $\{a, b\}$ is $\{a, b\}$, and the join of $\{a, b\}$ and the atom c is $\{a, b, c\}$, as in (22b).

$$(22a) \quad \cup \{a, \{a, b\}\} = \{a, b\}$$

$$(22b) \quad \cup \{\{a, b\}, c\} = \{a, b, c\}$$

An iota operator, ι , selects the greatest element of a set.

$$(23a) \quad \iota(\{a, \{a, b\}\}) = \{a, b\}$$

$$(23b) \quad \iota(\{\{a, b\}, c\}), \text{ undefined}$$

When operating on an atom and a set which contains that atom, as in (23a), the iota operator selects the larger structure, $\{a, b\}$. However, the iota operator is undefined if there is no subset membership relation between a set and an atom, as in (23b), where c is not a member of $\{a, b\}$.

Finally, for any subset in a domain, iota of that subset is the sum of that subset if the sum of the subset is an element of the subset, as in (24).

$$(24) \quad \text{for any } X \subseteq U, \iota X = \cup X, \text{ if } \cup X \in X; \text{ otherwise it's undefined}$$

So ιX is the greatest member of X if there is one. For example,

$$(25a) \quad \text{the cats} = \iota \text{CATS} = \text{the largest plurality of cats}$$

$$(25b) \quad \text{the cat} = \iota X = \text{the only cat, if there is one}$$

Assuming they are predicates, nouns are true or false of members of U in a world w. So if a, b and c are all the relevant tables in w, the extension of the count noun *table* in w is {a, b, c} and the extension of *tables* is {{a, b}, {a, c}, {b, c}, {a, b, c}}. That is, the individual tables generate the various pluralities of tables.

But for mass nouns like *furniture*, and, according to Chierchia, any noun in a language like Chinese, the plural-singular distinction is erased. While the count noun *table* is true of table individuals and *tables* is true of pluralities of tables, *furniture* in English is true of any one piece or pieces of furniture. As an example of the parallel in Chinese for all nouns, *xuesheng* ‘student’ is true of any individual student and any plurality of students. These are purported to be linguistic facts, not cognitive ones. For Chinese speakers there are of course individual students that may be referred to but there is no distinction in noun morphology that linguistically separates references to individuals from references to plural students: we only have *xuesheng* ‘student’.²⁸ Likewise, since we can’t pluralize *furniture* or *xuesheng* ‘student’, this amounts to saying, that mass terms are already pluralized in the lexicon (Chierchia 1998a, p345-348). Referring to the semilattice structure in (18), the extension of the set of singular count nouns is the atoms in the set {a,b,c...}. The set of pluralities of individuals is {{a,b}, {b,c}, {a,b,c}, ...}. The set for a mass noun includes both singulars and pluralities of individuals: {a, b, c, {a,b}, {a,c}, {a,b,c}, ...}.

²⁸Just what is a minimal element of the set referred to by *furniture*, *water* or *xuesheng* ‘student’ must remain vague, according to Chierchia.

3.3.1.2 The Nominal Mapping Parameter

From this view of plurality, Chierchia introduces his Nominal Mapping Parameter (see (19) above for a brief characterization and detailed discussion below) to derive various morphological and syntactic properties of nouns. In particular, he captures the different behavior of mass and count nouns on one hand and similar behavior between mass nouns and bare plurals on the other. In what follows, I outline the data he wants to explain with the Nominal Mapping Parameter and I briefly discuss what his explanation of that data is.

First, he points out that count nouns such as *raccoon* in (26a) can accept plural while mass nouns like *dirt* in (26b), ordinarily, cannot.

- (26a) There are raccoons in the alley
 (26b) *There are dirts in the alley

Second, only count nouns like *swan*, *goose* and *ring* (27a) can occur with numerals. Chierchia's explanation (1998b, p68) is that a count noun can select individual atoms, whereas a mass noun "does not single out a set of atoms, but a whole, qualitatively homogeneous sublattice". So *swan* selects an atom of the semilattice but *blood* does not and therefore is incapable of being enumerated.

- (27a) seven swans a-swimming / six geese a-laying / five golden rings
 (27b) *seven blood(s) / *six air(s)²⁹ / *five mercury(s)

²⁹*Airs* seems to me particularly awkward, although it and *an air* were used by chemists in the 18th century in the modern sense of *gas/gases* to refer to the various components of atmospheric air (Gribbin 2002, p258-259).

Third, mass nouns, but not count nouns, require a classifier or measure phrase when occurring with numerals.

(28a) *three rice / three grains of rice

(28b) *a dozen hay / a dozen bales of hay

Chierchia's explanation for the data in (28) is that since a term like *rice* is mass and unable to refer to individual atoms, the classifier term *grains of* is required to, in effect, make countable units out of the mass term.

I lump together what Chierchia lists as four related properties: the distribution of determiners with regard to mass or count nouns. Some determiners occur only with singulars (29a), some only with plurals (29b), some only with plurals and mass (29c), and others are unrestricted (29d).

(29a) only with singulars: *a, each, every*

(29b) only with plurals: *several, many, both*

(29c) only with plurals and mass: *some*

(29d) unrestricted: *the, any, no...*

Let's now look in more detail at how Chierchia tries to account for the data. In attempting to account for the bare plural data, singulars and the distribution of the various determiners with each, Chierchia discusses a suggested argument/predicate distinction in nouns. Some have claimed that syntactic arguments must project a Determiner Phrase (e.g. Brame 1981, 1982; Horrocks and Stavrou 1987; Szabolcsi 1981, 1984, 1987; Abney 1987; Stowell 1989, Longobardi 1994, and others). In contrast to this view, Chierchia accepts that, depending on the language, it is not the

case that all arguments must be DPs. The spirit of this assumption comes from Carlson (1977), who argues that English bare plurals denote, at their heart, kinds.

Carlson disagreed with the view that bare plurals are ambiguous. The ambiguity view was based on the interpretation of bare plurals as either generic or existential. For example, in (30), the noun *politicians* is used in making a generic statement where we are predicating something believed to be generally true about politicians. The bare plural does not refer to any particular politicians (30a). But in (30b), we are not talking about politicians in general but rather about some particular politicians.

(30a) Politicians are sleazeballs

(30b) Tom expected to meet some environmentalists but he had to spend the evening with politicians

We could rephrase (30b) as (31), where *sm* is the unstressed form of *some*.

(31) ..but he had to spend the evening with sm politicians

Facts like the paraphrase (31) of (30b) have suggested to some that the bare plural *politicians* in (30b) has a null determiner that corresponds to the overt *sm*. But based on some scope and opacity facts, Carlson shows this cannot be the case and that bare plurals must have a different analysis. For example, if bare plurals are indefinites they should behave like indefinites and exhibit both narrow-scope and wide-scope readings in the context of an operator. While *a young psychiatrist* is ambiguous in (32a), *young psychiatrists* in (32b) is not (from Krifka et al. 1995, p114-115).

- (32a) Minnie wishes to talk to a young psychiatrist
 - i) Minnie wishes that there is a young psychiatrist and she talks to him (narrow scope)
 - ii) There is a young psychiatrist and Minnie wishes to talk to him (wide scope)
- (32b) Minnie wishes to talk to young psychiatrists (only narrow scope)

Carlson further argues that the apparent ambiguity stems not from the bare plurals themselves but from context. A so-called individual-level predicate induces a generic reading of the bare plural while a stage-level predicate induces an existential reading. An example of an individual-level predicate is the predicate in *American presidents say they believe in God*; an example of a stage-level predicate is the predicate in *The president said he believes in God*. Carlson's overall solution is that bare plurals are not ambiguous but rather that they have a unified interpretation at their core, that of referring to a kind.

Carlson's idea that bare plurals denote kinds is a core assumption for Chierchia. For Chierchia, if we assume that bare plurals denote kinds, then they are e-type semantic entities. And if bare plurals are e-type entities, then there is no semantic reason they can't function as arguments. The basic kind denotation of bare plurals, according to Chierchia, is in a sentence like (33), where the bare plural *mongooses* is used with a predicate that can only take a kind.

- (33) Mongooses are extinct in Chicago

That *extinct* is specifically a kind predicate is evident in that it cannot be used with object-denoting nouns. Only classes or species can be extinct, not individuals.

- (34) *A mongoose is extinct in Chicago

Extinct can be used with a definite singular, but in that case the definite singular must be construed as a kind and not an individual.

- (35) The mongoose is extinct in Chicago (i.e. the mongoose kind, not some particular mongoose)

In English, bare nouns are restricted to bare plurals; bare singulars are ungrammatical.

- (36) *Mongoose is extinct in Chicago

In Chinese, however, bare singulars are permitted, and, importantly, they can refer to kinds. Chierchia does not provide the relevant data about kinds, but I provide some here for clarity. In the following sentence, *konglong* ‘dinosaur’, a bare singular, appears with a kind predication in (37).

- | | | | | |
|------|-------------------------|---------|----------|-----------------|
| (37) | konglong | miejue | le | <i>Mandarin</i> |
| | dinosaur | extinct | Particle | |
| | ‘Dinosaurs are extinct’ | | | |

Along the same lines as Chierchia, Krifka (1995, p399), who is cited by Chierchia, supposes that any language that allows bare nouns can use them to refer to kinds: bare plurals like *mongooses* in English and bare singulars like *konglong* ‘dinosaur’ in Chinese.³⁰

Chierchia sees a parameter here. Some languages, e.g. Chinese, give their nouns a [+arg] setting while others set their nouns as [+predicate], e.g. French. The [+arg] setting essentially means that nouns are e-type arguments that refer to kinds. Since Chinese nouns are [+arg],

³⁰Krifka’s is a broad claim. He provides no crosslinguistic evidence besides Chinese and English.

Chierchia says, they can serve in argument positions without the need of determiners. Their mass interpretation means they can no more be pluralized than can mass nouns in English, e.g.

**furnitures*. Further, since Chinese nouns are uniformly mass, in order to be counted they must be individualized by means of a classifier, on a parallel with mass nouns in English: *two pieces of furniture*. In contrast, French nouns, and Romance nouns in general, are of type <e,t> and can't serve as arguments without projecting DP. Also, French nouns can be pluralized. English, like Germanic languages generally, is a mixed language. English bare singulars are like all French nouns, i.e. they are predicates, but English plurals are like Chinese nouns, argumental and denoting kinds at their heart.³¹

All this boils down to Chierchia's Nominal Mapping Parameter. For a [+arg, -pred], classifier language, we get the following set of properties.

(38) Chierchia's description of a classifier language like Chinese

- i) generalized bare-noun arguments: bare nouns appear freely as arguments in syntax
- ii) the extension of all nouns is mass: e.g. *cat* comes out of the lexicon as mass
- iii) no plural (at least not of the common European variety)³²

³¹It's known that bare singulars can appear even in languages like French and English, though in quite restricted contexts. Stvan (2007) cites mostly cases of bare nouns inside PPs, such as *We'll do this project in house* but also some in what look like object positions: *leave work, attend school* regarding a "stereotypical activity". Stvan's takes a pragmatic approach to licensing conditions. Heycock and Zamparelli (2003) present syntactic analysis of coordinated bare singulars (e.g. *Mother and child are safe*). Brazilian Portuguese bare singulars are discussed in section 2.3.1.

³²Compare this with (39iii). In describing plural as "active" in a language like French (p355), Chierchia (1998a) does not define what he means by "active". On the same page he refers to [+arg, -pred] languages as lacking "true" plural marking as in Romance, and he also predicts elsewhere (p353) that [+arg, -pred] languages like Chinese will not have plural marking "of the kind familiar from many western languages", but, again, he provides no criteria for what he means by a plural language. Presumably, Chierchia means by a "plural" or "number-marking" language one in which plural morphology is required on semantically plural nouns. This is similar to Sanches and Slobin's (1973) meaning. In any case note, however, footnote 33: it is questionable that French, a [+pred] language, has plural nouns.

- iv) generalized classifier system: a classifier is needed to individuate masses into individuals

French is the opposite. With its nouns set as [-arg, +pred] under the Nominal Mapping Parameter, French has no bare-noun arguments, all of its nouns are predicates and require a DP projection, plural is active at least for count nouns³³, and there is no numeral classifier system. The generalizations for French are in (39).

- (39) Chierchia's description of a nonclassifier language like French
- i) no bare-noun arguments; DP is required for arguments
 - ii) the extension of all nouns is count
 - iii) plural is active
 - iv) no classifiers

In contrast, since English permits bare noun arguments, in the form of bare plurals, it is something of a cross between Chinese-type languages and French-type languages. English is [+arg, +pred], meaning that nouns can be arguments or predicates. The generalizations for English are in (40).

- (40) Chierchia's description of a nonclassifier language like English
- i) bare plurals can be arguments, bare singulars cannot
 - ii) the extension bare singulars is count, that of bare plurals is mass
 - iii) plural is active
 - iv) no classifiers

When he contrasts French and Chinese with English, Chierchia arrives at the following classification of language types:

³³While orthographically present, French plural is typically not pronounced, leading Bouchard (2002) and others to argue that plural is not realized on the noun but is rather instantiated on the determiner.

(41) Noun features in sample languages, according to Chierchia's Nominal Mapping Parameter:

	[-arg]	[+arg]
[+pred]	French	English
[-pred]	NA	Chinese

To be clear, the English setting does not mean that English nouns are both [+arg] and [+pred]. When Chierchia says that English is a [+arg, +pred] language he means that English has both options: English bare singulars are [+pred] and bare plurals are [+arg]. The NA slot in the table indicates that nouns which are neither argumental nor predicative would lack a denotation entirely.

Chierchia argues that the Nominal Mapping Parameter can account for the empirical generalizations about Chinese, French and English. Classifier languages lack articles because, it is claimed, nouns in those languages are arguments; predicate-taking determiners like *the* can't have them as complements. Various apparent exceptions are explained. For example, Chierchia considers how a classifier language might have determiners or determiner-like elements. English articles take <e,t>-type nouns, but since Chinese nouns are not predicates, an English-type article cannot compose with them. This is fixed "trivially", according to Chierchia, by supposing a classifier language would have a simple determiner variant, DET', which takes e-type nouns. That is, in a Chinese-type language $DET' = DET (\cup x)(P)$, where the nominalizing operator \cup shifts kinds to predicates. Phrased another way, DET', which is the Chinese variant of DET, takes an entity that has been converted from a kind into a predicate.

There is another apparent problem in that Romance languages like Italian and Spanish, in contrast to French, do allow bare-plural arguments, in postverbal position. Chierchia proposes that in such cases Italian and Spanish object nouns do project DP as his system predicts but that in these languages DP can be headed by null D as long as the null D occurs in an appropriately governed postverbal position so that the ECP is not violated (see the paragraph below (42) for a definition of the ECP). He refers to Rizzi's (1990) definition of head government, in (42).

- (42) Head government (Rizzi 1990, p6): X head-governs Y iff
- i) X is A, N, P, V, Agr, or T
 - ii) X m-commands Y
 - iii) no barrier intervenes
 - iv) Relativized Minimality is respected

(X m-commands Y iff neither node dominates the other and the first maximal projection that dominates X also dominates Y. XP is a barrier if it isn't directly selected by an X^0 that is not distinct from a [+V] element; that is, XPs not directly selected by a [+V] is a barrier for government. Relativized Minimality is defined in terms of what he calls α -government, which ranges over both head government and antecedent government: X α -governs Y only if there isn't a Z such that Z is a typical potential governor for Y and Z c-commands Y but doesn't c-command X. The Empty Category Principle places restrictions on empty categories. One version of the ECP is that a nonpronominal empty category must be either theta-governed or antecedent governed. Definitions from Rizzi (1990, p4, 6 and footnote 6).)

On this approach, sentence (43a) with the bare-plural object *potate* 'potatoes' is fine because, as is clear in (43b), the verb *mangio* '(I) eat' m-commands the null determiner δ , no

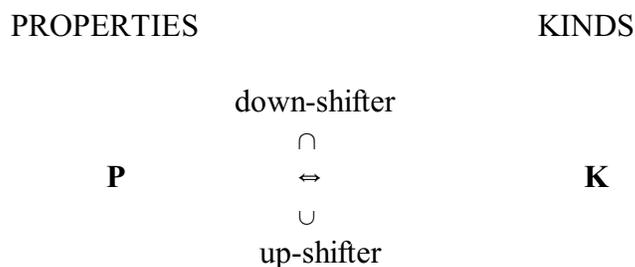
French apparently lacks null Ds entirely. Bare count nouns arguments are never acceptable, whether singular subject (45a), singular object (45b), plural subject (45c) or plural object (45d).

(45a)	*Enfant est terrible	/	L'enfant / un enfant	est terrible
	child is terrible	/	The'child / a child	is terrible
(45b)	*Nous avons enfant	/	Nous avons l'enfant / un enfant	
	we have child	/	we have the'child / a child	
(45c)	*Enfants sont terribles	/	Les/Des enfants sont terribles	
	children are terrible	/	the/some children are terrible	
(45d)	*Nous avons enfants	/	Nous avons les/des enfants	
	we have children	/	We have the/some children	

Further, even French mass nouns like *eau* 'water' require an article, in both subject (46a) and object (46b) position.

(46a)	*Eau est la-bas	/	L'eau est la-bas	
	water is over there	/	The'water is over there	
(46b)	*Nous avons bu eau	/	Nous avons bu l'eau	/ de l'eau
	we have drunk water	/	we have drunk the'water	/ some water

Further, whenever type mismatches arise, typeshifting (Partee 1987) is available as a last resort. For example, there is a typeshifting relationship between properties, instantiated by $\langle e, t \rangle$ -type nouns, and kinds, instantiated by e -type nouns. Properties can be converted to kinds via a down or nominalizing operator, $\hat{}$, while kinds can be converted to properties with an up or predicativizing operator, \cup . So if FERRET is the property of being a ferret, then $\hat{\text{FERRET}}$ is a kind, the ferret kind. The conversion between properties and kinds is illustrated in (47) (from Chierchia 1998a, p349).

(47) Typeshifting between properties and kinds

The shifts occurs as in (48a).

(48a) \cap FERRET = k, i.e the ferret property is made into the ferret kind via \cap

(48b) \cup k = FERRET, i.e. the ferret kind is made into the ferret property via \cup

3.3.2 Problems with Chierchia's proposal

Chierchia provides a clearly stated and testable theory to account for the distribution of classifiers, plurals and bare nouns crosslinguistically. But put to scrutiny, his system encounters both empirical and theoretical problems. Some perhaps are technical and could be patched up but I show that in certain cases doing so ends up undermining the system. I discuss what I believe are the problems in some detail below. In short, Chierchia's model makes incorrect predictions i) about the semantic type of nouns in classifier languages, ii) about kinds of determiners, iii) about how properties of classifier languages and nonclassifier languages line up, iv) the use of plural in Persian and reference to kinds, v) the cooccurrence of classifiers and plural in the same construction in Persian, vi) the fact that classifiers are optional in Persian.³⁴

³⁴A note on the optionality. The use of classifiers in Persian seems completely acceptable in the spoken language and their absence seems fine in more formal or written language. As for leaving them out in spoken language, informants vary on the acceptability. Classifiers do seem to be preferred. Some speakers feel strongly that omitting the classifier in spoken language is ungrammatical but most informants I have worked with, when presented with classifierless constructions, consider them fine. Also, it should be kept in mind that all my informants are Persian/English bilinguals and have lived outside Iran for many years. That said, I work with the assumption that classifier optionality is part of Persian grammar. Lambton (1953) and Mahootian (1997), among others, mention optionality.

Mass/count derivations

A first problem lies in his claim and prediction that nouns in classifier languages are uniformly mass. Counterexamples abound. In Persian, despite its being a classifier language, nouns show a clear mass/count distinction reflected in the syntax. For example, quantifying determiners such as *hær* ‘each’ are sensitive to the difference. As illustrated below, *hær* ‘each’ can appear with a count noun like *sændæli* ‘chair’ (49a) but not with a mass noun like *næmæk* ‘salt’ (49b). In contrast, *ye zærre* ‘a bit’ shows the opposite restriction, acceptable with a mass noun (49d) but bad with a count noun (49c).

(49a)	<i>hær sændæli</i> each chair ‘each chair’	(49b)	* <i>hær næmæk</i> each salt	<i>Persian</i>
(49c)	* <i>ye zærre sændæli</i> one bit chair (intended: ‘one bit of chair’)	(49d)	<i>ye zærre næmæk</i> one bit salt ‘a bit of salt’	

This kind of restriction isn’t peculiar to Persian. Cheng and Sybesma (1999) show that nouns in Chinese, Chierchia’s prototypical classifier language, also shows a mass/count distinction in its nouns. For example, the particle *de* is optional with mass nouns but barred with count nouns (50a,b), and some adjectives like *da* ‘big’ can appear only in mass contexts (50c, d).

(50a)	<i>san bang</i> three CL _{pound}	(de) <i>rou</i> DE meat	(50b)	* <i>san tou de niu</i> three CL DE cow	<i>Mandarin</i>
(50c)	<i>yi da zhang zhi</i> one big CL _{sheet} paper		(50d)	* <i>yi da zhi gou</i> one big CL dog	
	‘one large sheet of paper’				

Further, in Mandarin, the generalized classifier *ge* can only be used with count nouns with ‘one’

(51a), with ‘two’ (51,b) but not with mass nouns (51c).

(51a) yi ge xuesheng
 one CL student
 ‘one student’

(51b) liang ge xuesheng
 two CL student
 ‘two students’

(51c) *liang ge shui
 two CL water

For Cheng and Sybesma, in contrast to Chierchia, the distinction between Chinese and English is not in the denotation of nouns but rather in the syntax.

As one other example, in Japanese, which requires numeral classifiers in numeral+noun constructions, quantifying determiners also show a distinction based on whether the noun is mass or count. With count nouns *ikutsu* ‘how many’ is used (52a) while *dono gurai* ‘how much’ is used with mass nouns (52b).

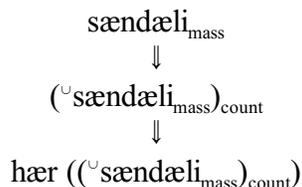
(52a) ikutsu no kuruma / *dono gurai no kuruma Japanese
 how many Particle car how much...
 ‘how many cars’

(52b) dono gurai no biiru / *ikutsu no biiru
 how much Particle beer how many...
 ‘how much water’

Faced with the Persian, Chinese and Japanese counterexamples, since typeshifting is available for Chierchia, he could insist that Persian nouns are all mass as we would expect in a classifier language but that they can typeshift to predicates so that they can compose with predicate-taking quantifying determiners.

(53) Possible derivation for *hær sændæli* ‘each chair’?

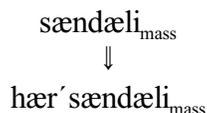
- *sændæli* is a mass noun
- *hær* takes a predicate



But in this scenario, one then must wonder what the semantic import is of setting Persian nouns as [+arg] in the first place, since in mass-noun languages quantifier/determiners are supposed to be of the variant DET’ type. On the other hand, if the noun is mass and the determiner is a DET’ entity, as in (54), we could posit the following derivation.

(54) Possible derivation for *hær sændæli* ‘each chair’?

- *sændæli* is a mass noun
- *hær* takes a mass noun



In (54) we can do away with having to typeshift the noun. But in that case, the DET’ version of *hær* also ought to be able to take mass nouns like *næmæk* ‘salt’, contrary to the data in (49b). Alternatively, one could suggest that some nouns are, or at least can be, predicates in Persian or that nouns randomly choose to be mass or count, or that they are neither or both. In any case, whether we have to typeshift the noun or select DET or DET’ as occasion arises, the neat parameterization of languages that Chierchia proposes stands on shaky empirical ground.

Determiners

Another problem concerns classifier-taking items that Chierchia doesn't discuss, such as demonstratives, his main concern being nouns' cooccurrence with numerals and determiners.

However, in some classifier languages such as Mandarin, classifiers occur with demonstratives (55a) (from Cheng and Sybesma 1999) and, optionally, with quantifying determiners (55b).

- | | | |
|-------|--|-----------------|
| (55a) | cong nei-ge jing-zi
from that-CL mirror
'from that mirror' | <i>Mandarin</i> |
| (55b) | hen duo (ge) xuesheng
many (CL) student
'many students' | |

It thus appears that numeral classifiers are not restricted to only numeral contexts and can also appear with demonstratives and quantifying determiners, which suggests that demonstratives and quantifying determiners share a counting feature with numerals. If that is so, then under Chierchia's analysis we would expect classifiers to be required, or at least permitted, when quantifying determiners are used with nouns in Persian. This expectation, however, is not borne out, since Persian bars classifiers from being used with demonstratives and quantifying determiners, unless a numeral is also present. As illustrated in (56), the demonstrative *hær* cannot appear with the classifier *ta* unless a numeral intervenes, in this case *se* 'three', between the demonstrative and the noun.

- | | |
|------|---|
| (56) | hær pesær / *hær ta pesær / hær se (ta) pesær
each boy each CL boy each three (CL) boy
'all three boys' |
|------|---|

If Chierchia assumes that demonstratives and certain quantifying determiners can be counters, then he would predict that Chinese quantifying determiners and demonstratives need a classifier to individuate a mass noun, just as numerals do. Very generally for Chierchia, then, all determiners/numerals want a predicate restrictor. But as shown in (56), some determiners cannot appear with a classifier unless a numeral is also present. This must be explained. There are several stipulations open to Chierchia, none of them especially satisfying. He could propose that demonstratives and quantifying determiners are parameterized, predicate-taking in some languages and argument-taking in others. But given the Nominal Mapping Parameter, one would expect that the demonstrative/quantifying determiners line up predictably with the noun type in a language, as the DET/DET' option is supposed to do. On another tack, perhaps Chierchia could say that demonstrative/quantifier functions are independent of the denotation of nouns according to the Nominal Mapping Parameter. This again undermines his claim that classifier languages have DET'-type determiners and one could of course ask whether the ordinary DET/DET' that Chierchia does mention might also be parameterized independently of the language's nouns.

Inconsistency of properties with language types

A third group of problems with the Nominal Mapping Parameter is that the purported lineup of properties in classifier languages, repeated here as (57), doesn't hold up well.

(57) Properties of [+arg, -pred], classifier languages and [-arg, +pred] nonclassifier languages

[+arg, -pred] languages

- i) generalized bare-noun arguments
- ii) noun extension is mass
- iii) no plural
- iv) classifiers

[-arg, +pred] languages

- i) no bare-noun arguments
- ii) noun extension is count
- iii) plural
- iv) no classifiers

that [+pred] languages can lack articles as a mere variant typology, the lack of articles in languages like Latin presents a more serious problem than he supposes.

A particular problem with the ‘trivial’ determiner variants proposed by Chierchia is in the DET’ variety of determiner. Recall that Chierchia introduced DET’ in order that classifier languages have a determiner of the right kind to compose with their [+arg] nouns. But as Borer (2005, p89) points out, DET and DET’ must be more than mere trivial variants of determiners. Importantly, it appears to be a stipulation that DET projects to DP in [+pred] languages but DET’ does not project to D’P in [+arg] languages. Similarly, Borer also notes, languages like Spanish and Italian seem to have null determiners, which are licensed in governed positions and shift predicates to kinds, just as phonetically expressed determiners do. Chierchia says this much, but then by his reasoning, says Borer, we would expect there to be analogous null DET’ determiners in classifier languages that shift kinds to predicates. The fact that such null determiners apparently do not exist must be independently stipulated.

As another example of problems with the purported constellation of characteristics of [+arg] languages, Baker (2003, p117) notes that Edo, a language in Nigeria, uses determinerless nouns in all argument positions but uses plural only on count nouns, as illustrated in (60).

(60)	abe ebe / *amen	de-le	<i>Edo</i>
	PL leaf / water	fall-PL	
	‘The leaves fell’ / *‘The waters fell’		

Edo also forms numeral+noun constructions without the use of a classifier, suggesting that Edo must be a [+pred] language that requires plural morphology. But in cases such as (61), the plural is not used, contrary to Chierchia’s prediction.

- (61) akhe eva
 pot two
 ‘two pots’

Once again, the use of classifierless bare nouns as arguments in numeral constructions at least questions the neatness of Chierchia’s Nominal Mapping Parameter.

Plural

If Persian nouns are as Chierchia says they are, [+arg] mass nouns that denote kinds, they ought not be pluralizable. Yet Persian can pluralize its nouns, for a variety of purposes. Perhaps the most robust use of plurals is to mark definiteness. In (62), the plural *bæcce-ha* can only be interpreted as referring to some specific or definite group of children. It cannot be interpreted indefinitely as English *children* can.

- (62) bæcce-ha *Persian*
 child-PL
 ‘the children’ (‘children’ is not an available reading)

Also, plural can sometimes be used in generic statements (Ghomeshi 2003). In (63), *dolæt-ha* ‘governments’ is used to make a general statement about how governments behave toward those who disagree with them; (63) is not necessarily making a reference to some particular governments and their particular behavior toward particular dissenters.

- (63) dolæt-ha dær moqabel-e [moxalef]-an-e xod
 government-PL against-EZ [dissenter]-PL-EZ self
 moqavemæt mi-kon-ænd
 resistance Asp-do-3P
 ‘Governments stand firm against their dissenters’

Of course a language may have alternative means to the same end, and in fact English too can use either the plural or definite singular to indicate a kind, although the latter seems less natural in this context.³⁶

- (67a) Dinosaurs are extinct
 (67b) The dinosaur is extinct

But if Persian is a [+arg] language, there is a significant difference between it and English that should allow the plural kind in English but rule it out in Persian. There are two syntactic varieties of kinds in English permitted by Chierchia since, per Carlson (1977), on the one hand, bare plurals are taken to be kinds and, on the other hand, the definite singular can be interpreted as a kind via a supremum operator, i.e. \cup DINOSAUR. For Persian, one can again resort to typeshifting and suggest that *dainosor*, an argument, is predicativized (68b) permitting it to be pluralized (68c) and then remade into a kind (68d).

- (68a) *dainosor* *mass noun*
 (68b) \cup *dainosor* *mass noun made into a predicate*
 (68c) PL(\cup *dainosor*) *pluralized predicate*
 (68d) \cap (PL(\cup *dainosor*)) *renominalized for kind denotation*

But, typeshifting, while largely unconstrained, is held by Chierchia to be a last-resort mechanism to fix type mismatches. In the case of (68), there is no accidental mismatch that needs a last-resort fix: *dinosor* in (68a) can function as a kind. The last-resort option produces a mismatch (68b) that

³⁶As is known, use of the kind-referring definite singular is more natural in cases like *The computer was invented by Leibnitz, Apple developed the iPod.*

must be typeshifted again (68d) in order to end up with the kind reading. That is, there is no motivation to produce the plural kind when the singular kind is available. This hardly seems like a last-resort scenario. Why shouldn't Persian be happy with the singular-count kind? While there is no a priori reason that Persian, like English, should not allow two mechanisms to refer to kinds, in Chierchia's analysis the English double option is entirely predictable while in Persian it is not.

Also, Persian allows plural on mass nouns to refer to multiple kinds or multiple conventional units.

- (69) qænd-ha
sugar-PL
'kinds of sugar' / 'packets of sugar'

This presents a problem similar to that in the case of Persian *dainosor*. Once again, Chierchia can resort to typeshifting but we end up with the wrong denotation. If *qænd* 'sugar' is typeshifted into the predicate \cup *qænd*, the plural should refer to a set of individual grains of sugar or sugar crystals, not the kind. It is also important to note that Chinese, Chierchia's paradigm classifier language, does not use the plural device for making kinds or units. Mandarin uses only the bare singular for a kind (70a) and only the classifier construction to form units of a mass (70b).

- | | | | | | |
|-------|-------------------------|--------------------|----------|--|-----------------|
| (70a) | konglong | miejue | le | | <i>Mandarin</i> |
| | dinosaur | extinct | Particle | | |
| | 'Dinosaurs are extinct' | | | | |
| (70b) | liang | wan | tang | | |
| | two | Cl _{bowl} | soup | | |
| | 'two bowls of soup' | | | | |

Further, the use of plural in Persian, while not required for semantically plural nouns as in English, is nonetheless extremely robust, both in its frequency and its range of interpretative possibilities. This contrasts with the case in Chinese, where the use of plural is extremely limited. Li (1999) describes the plural suffix *-men* as occurring only with definite human nouns.³⁷

Other classifier languages also have plural morphology. Nung, a Tai language spoken in Vietnam and China, has a general classifier usually required with numerals (71a), except for “powers of ten”³⁸ (71b) (both from Saul and Wilson 1979, p27). But while Nung is a classifier language, plural is available (71c) although Saul says it does not cooccur with a classifier (from Saul 1965).

- | | | | | | | |
|-------|----------------------------------|-------|---------|-------|-------|-------------|
| (71a) | au hu | slong | ohng | dehc | te | <i>Nung</i> |
| | take | give | two | CL | child | that |
| | ‘Give it to those two children’ | | | | | |
| (71b) | mi | slam | pac | (ahn) | hon | |
| | have | three | hundred | (CL) | house | |
| | ‘There are three hundred houses’ | | | | | |
| (71c) | man | ma | tep | tu | mew | |
| | PL | dog | chase | CL | cat | |
| | ‘Dogs chase a cat’ | | | | | |

The Nung example in (71c) showing that both plural and classifiers exist in that language raises an important issue with regard to the Nominal Mapping Parameter and has mixed ramifications for Chierchia. On the one hand, it violates the spirit of his system, which calls for a language to have classifiers or plural morphology depending on whether its nouns are mass or

³⁷Further, according to informants, it is difficult to use *-men* with nonhuman nouns such as animals even when they are humanized, as they might be in children’s stories: **mao-men* ‘cat-PL’.

³⁸More properly, it should be characterized as multiples of ten, since classifiers are optional with numerals like 300.

count. On the other hand, the availability of typeshifting in Chierchia accommodates the cooccurrence of classifiers and plural morphology, but the fix for Persian then leads to wrong predictions for Chinese.

Let's look first at the typeshifting accommodation available to him. The mere fact that classifier languages have plural does not in itself invalidate Chierchia's system, since he merely states that [+arg] languages will not have plural "of the kind familiar from many western languages" (Chierchia 1998a, p353). Chierchia's model does not rule out their cooccurrence. In fact, although we do not expect classifiers and plural morphology to cooccur on the assumption that a language's nouns are either mass or count, thanks to typeshifting both are available. As an example, assuming Persian is a classifier language, take a noun like *miz* 'table', which in his system gets a mass denotation in the lexicon. Being mass, it cannot be pluralized but it can be predicativized via typeshifting, to allow a derivation that permits a classifier to appear with plural.

(72) Derivation of *do ta miz-ha* 'two CL table-PL', via typeshifting in Chierchia's system

- | | | |
|------|---|---|
| i. | <i>miz</i> | <i>'table', a mass noun in the lexicon</i> |
| ii. | \cup <i>miz</i> | <i>turned into a predicate by the \cup typeshifter</i> |
| iii. | PL(\cup <i>miz</i>)
<i>miz-ha</i> | <i>the predicativized noun is licitly pluralized</i> |
| iv. | \cap (PL(\cup <i>miz</i>)) | <i>the plural noun is massified via the \cap typeshifter</i> |
| v. | CL(\cap (PL(\cup <i>miz</i>)))
<i>ta miz-ha</i> | <i>the classifier can appear with a massified plural</i> |
| vi. | do (CL(\cap (PL(\cup <i>miz</i>))))
<i>do ta miz-ha</i> | <i>the numeral can now appear with the classifier construction</i> |

After starting with a mass noun, *miz*, we can typeshift it into a predicate (ii) via \cup . As a predicate rather than a mass noun, *miz* can be pluralized (iii). The result can then be remassified by further typeshifting with \cap (iv). The classifier can now be used with the mass noun \cap (*miz-ha*) (v), although

the classifier must be licensed by the presence of the numeral *do* ‘two’ (vi), since bare CL+noun constructions are barred in Persian.

But the convenience of typeshifting to derive a construction that is in principle dispreferred raises at least two questions. First, if we rely freely on typeshifting to resolve any semantic mismatches, the morphology is no longer a function of whether the lexicon specifies nouns as count or mass. Rather, the choice between a classifier and plural is accommodated *anywhere* in the derivation and there is no longer any need to specify that nouns are mass or count in the lexicon, which is at the heart of Chierchia’s Nominal Mapping Parameter. With typeshifting for free, nouns, it would then seem, can be both mass and count, either or neither, so long as typeshifting converts an expression to a type appropriate to accommodate any morphology. Further, if Chierchia’s system can accommodate the cooccurrence of classifiers and plural morphology in Persian, we are left to wonder why such typeshifting is not available in Mandarin, which strictly prohibits a classifier and plural marker from occurring together, as illustrated in (73a) and (73b).

- (73a) liang ge xuesheng
 two CL student
 ‘two students’
- (73b) *liang ge xuesheng-men
 two CL student-PL

There is nothing in Chierchia’s system that suggests such typeshifting should not be available to allow *ge* to cooccur with *-men* in Mandarin. The unavailability of (73b) is unexpected if typeshifting is allowed as a last resort to fix type mismatches. We expect that, parallel to the Persian derivation in (72), (74) should be available in Chinese, but it is not.

(74) Expected derivation of *liang ge xuesheng* ‘two CL student’, via typeshifting

- i. xuesheng *‘student’, a mass noun in the lexicon*
- ii. ^υxuesheng *turned into a predicate by the ^υ typeshifter*
- iii. PL(^υxuesheng) *the predicativized noun is licitly pluralized*
xuesheng-men
- iv. [∧](PL(^υxuesheng)) *the plural noun is remassified via the [∧] typeshifter*
- v. CL([∧](PL(^υxuesheng))) *the classifier can appear with a massified plural*
ge xuesheng-men
- vi. *liang (CL([∧](PL(^υxuesheng)))) *the numeral can appear with the classifier construction*
liang ge xuesheng-men

As described in Greenberg (1972) and Sanches and Slobin (1973), the situation is not so much that classifiers and plural are absolutely mutually exclusive but rather that languages seem to prefer one form of morphology over the other. Clearly the typological facts are not as clean as Chierchia supposes. If nouns are [+arg] in a classifier language, then we really shouldn't expect to find plural at all. Yet we have seen that even Chinese has plural morphology available in limited contexts. And the more languages allow both classifiers and number morphology, the fuzzier the distinction between what Chierchia characterizes as classifier languages and nonclassifier languages. Further, the more plurals and classifiers can occur in the same language, the less it appears that a language's nouns are all limited to either e-type or <e,t>-type denotations.

Classifier optionality

Finally, a related problem lies in the fact that languages vary greatly in the degree to which a numeral classifier is required in numeral+noun constructions. Aikhenvald (2000, p100) says that classifiers can often be omitted in many languages, depending on a number of grammatical and sociolinguistic factors, such as register and the largeness of the numeral. While classifiers are required in numeral+noun constructions in Chinese (75a) (from Yang 2001), in other languages

they aren't required such as Persian (75b) and Indonesian (75c,d) (from MacDonald 1976). The Indonesian examples show the use of a classifier (75c) and the omission of a classifier (75d) with a numeral (from Chung 2000, p163).

- | | | |
|-------|---|-------------------|
| (75a) | yi *(zhi) xie
one *(CL) shoe
'one shoe' | <i>Chinese</i> |
| (75b) | do (ta) deræxt
two (CL) tree
'two trees' | <i>Persian</i> |
| (75c) | arah penjelasan yang di-runut ini
direction explanation which Pass-follow this
menimbulkan tiga buah pertanyaan
raise three CL question
'This line of argument raises three questions' | <i>Indonesian</i> |
| (75d) | muda-mudahan makalah ini telah memenuhi
hopefully then this already fulfill
dua tuguan pokok-nya
two goal principal-its
'Hopefully, this paper has fulfilled its two major goals' | |

Note also that Indonesian has access to plural morphology, as in (76) (from Chung 2000, p165), where the plural indicates plural individuals.

- | | | |
|------|--|-------------------|
| (76) | buat-lah kalimat-kalimat berikut menjadi
make-Emp sentence-PL following become
kalimat-kalimat negatif
sentence-PL negative
'Please make the following sentences negative' | <i>Indonesian</i> |
|------|--|-------------------|

And if we characterize Indonesian as a classifier language because it has access to numeral classifiers, then its bare nouns refer to kinds. So, according to the Nominal Mapping Parameter, we do not expect to see plurals referring to kinds. But, like Persian, Indonesian can use plurals for

kind reference, as in (77), where the plural of *buku* ‘book’ can refer to multiple books or kinds of books

- (77) buku-buku
book-PL
‘books’ / ‘kinds of books’

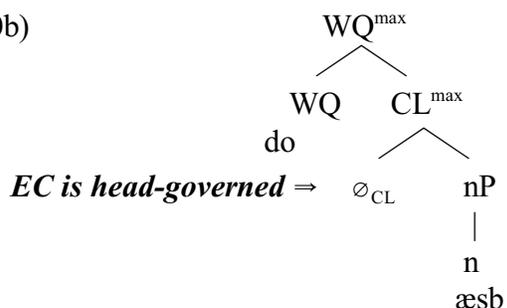
Tellingly, when plural is used on mass nouns, the denotation can only be a kind, according to Chung.

- (78) minyak-minyak
oil-PL
‘kinds of oil’

These Indonesian examples constitute further evidence that plurals can appear in classifier languages and they can serve the same functions as plurals do in nonclassifier languages.

Classifier optionality is another fact that Chierchia does not address. He assumes that classifiers are phonetically present for the purpose of individuating mass nouns into countable units. Syntax is not Chierchia’s focus, but he could address optionality of classifiers by positing that null classifiers are possible. His argument for classifiers is from their presence in Chinese, where they happen to be obligatory in numeral+noun contexts, but there is nothing either explicit or implicit in his theory that rules out the possibility of null classifiers. Further, from Chierchia’s standpoint one might suggest that null classifiers could exist as long as they are governed in an appropriate way, similar to the way he suggests null determiners can exist in Italian. Recall Rizzi’s (1990) notion of head government can be used to license null D for Italian bare nouns in object

(80b)

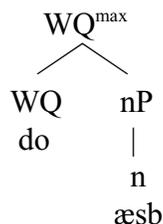


But in many languages, the optionality tends to fall along similar lines. For example, according to Aikenvald (2000, p100) large numerals do not require classifiers as much as small numerals do and abstract nouns need them less than concrete nouns. Citing Marnita (1996), she describes Minangkabau, an Austronesian language, as requiring classifiers only with the words for *one*, *two* and *three* and Thai as not using classifiers “with large numbers like 1000, unless individuation is implied”. Chung (2000, p162-163) cites earlier work on Indonesian that attests to classifiers often being omitted after numerals greater than two.³⁹

It is not clear why large numbers, for example, are less likely to require an overt classifier than small numerals. But given that classifiers are optional under certain circumstances, it must be determined whether in cases where classifiers do not appear the classifier is null or simply not projected. If the classifier is absent rather than null, we have a structure like (81), without a CLP projection.

³⁹Chung cites Hopper (1986), who studied Malay from the 19th century and found classifiers were used about 80% of the time when they could be. This is more than their use today, according to Chung. This could suggest historical change toward less use of classifiers, although Chung disregards that idea. Optionality will be more fully discussed in section 4.1.4.

(81)



These objections are not necessarily fatal to Chierchia's approach, since syntax is not his main concern, but they do represent a gap in Chierchia's system that must be filled.

Another important issue lies in Chierchia's treatment of nouns in nonclassifier languages as predicates, and more generally what noun denotations are and how they might or might not vary across languages. Chierchia's evidence for some <e,t>-type nouns is discussed primarily with regard to Romance, where the noun complement appears to be predicative.

(82) il est professeur
 he is professor
 'He is a professor'

French

But this kind of bare singular copular construction is marked in French, being restricted to predicate complements that refer to professions or social roles.⁴⁰ Generally, the complement must have a determiner if it is a count noun or a mass noun.

⁴⁰Bare singulars are more common than is sometimes assumed, in both Romance and Germanic. Heycock and Zamparelli (2003) analyze the acceptability of coordinated bare singulars such as *Goblet and spoon were set on the right of the plate*. Stvan (2007) points to a variety of bare singular structures and argues that when used generically they can appear as part of a predicate that conveys a "stereotypical activity". In her examples, bare singulars are usually, but not always, adjuncts. Using data from Romance and Germanic languages, de Swart, Winter and Zwarts (2007) argue that the acceptability of bare singulars is typically when they refer to "capacities" such as professions, religions or other social roles. Also see footnote 31.

- (83a) ça c'est un loup / *ça c'est loup
 that it's a wolf
 'That's a wolf'
- (83b) ça c'est l'eau / d l'eau / *ça c'est eau
 that it's the water / some water

And of course if English count nouns are predicates, the obligatory occurrence of the indefinite article in the same predicational construction (e.g. Mikkelsen 2005) with a count-noun predicate is something of a mystery. That is, since *wolf* is a predicate, **That is wolf* should be an acceptable predication.

- (84) *That's wolf / That's a wolf (under the count reading)

What's odd about (84) is that if nouns are of type $\langle e,t \rangle$, i.e. predicates, in English, by both common assumption and by explicit specification by the Nominal Mapping Parameter, the ungrammatical option **That's wolf* ought to be acceptable. Further, as Baker (2003, p117) notes, if one assumes that nouns are predicates, then they ought to behave like predicates outside their use as copular complements, but there is little evidence that nouns behave like predicates outside this context. In the end, Baker's conclusion is that all nouns in all languages are [+arg] and that in copular constructions like these the complements are embedded in predicate phrases, which may be surreptitiously realized as tensed phrases in languages like English (i.e. in IP in E. Kiss 1996). That is, Baker's analysis results in (85).

- (85) That [_{PreDP} is [wolf_{<e>}]]

3.3.3 Borer (2005)

In the previous section we found problems with Chierchia's Nominal Mapping Parameter. The basic idea in the Nominal Mapping Parameter is that languages set their nouns as mass or count. Various properties such as the distribution of classifiers and plural morphology fall out from the parametric setting. One main empirical problem is that it does not appear to be the case that in classifier languages all their nouns are mass.

Borer's (2005) approach to classifiers addresses problems she sees in Chierchia's model, but her analysis of classifiers is only part of her overall picture of the syntax of DPs. She claims that the structure of DP is based on the functional projection of semantic notions such as mass and count. Unlike Chierchia, she does not use typeshifting or depend on lexical ambiguity. She observes that words can be interpreted flexibly but that once words appear in the syntax via functional projections their interpretations are much more tightly constrained. For example, words can easily be coerced into various meanings. With regard to the mass-count distinction, as is well known, nouns whose typical interpretation is mass can be easily interpreted in a count sense (89a) and count nouns can easily be used as mass (89b).

(89a) We'd like three coffees, please (*coffees*, used as a count noun)

(89b) That's a lot of house for the money (*house*, used as a mass noun)

Borer (2005, p8-11) points to this kind of coercion as a general phenomenon, as can be seen in the use of verbs that go outside the prototypical limits of their argument structure, as in (90b) where *stare* can easily be made resultative, or where nouns are easily converted to verbs (90c,d).

(90a) The alien stared at Kim

(90b) The alien stared Kim out of the room

- (90c) I windowed the north wall (noun ⇒ verb)
 (90d) I screened the window (noun ⇒ verb)

According to Borer, listemes, her vocabulary entries, have such flexible ranges of meaning because it is the hierarchical structure rather than the lexicon that determines their interpretation. For example, by themselves, the listemes *wine* and *carpet* can be count or noncount. But the syntactic structure of *four wines* (91a) yields only a count interpretation for *wines* while *a lot of wine* (91c) can only be mass. Similarly, we can only get a mass interpretation for *carpet* in *too much carpet* (91d) and only a count interpretation in (91b).

- (91a) Ed has four red wines in his basement
 (91b) There's a carpet in the sunroom
 (91c) *a lot of wine is/are many
 (91d) too much carpet

Borer's lexicon is a list of listemes, a set of sound-meaning pairings where each meaning is a "conceptual package" and sound refers to a "phonological index" (Borer 2005, p15, 30). The listemes may still convey an idea, such that *canary* differs from *eagle*, but the lexicon provides no more than that. Borer wants to shift the computational power of the lexicon to the syntax. Rather than have, for example, *boat*, *dog* and *sink* categorized in the lexicon, their categories are determined by their position in the syntax. For example, in (92) we can get at least six derivations from these three listemes based not on their lexically specified categories but rather on which listeme occupies which head in the syntax: as nouns in the subject and object positions and as the verb.

- (92a) The dog boated the sink (92b) The dog sank the boat

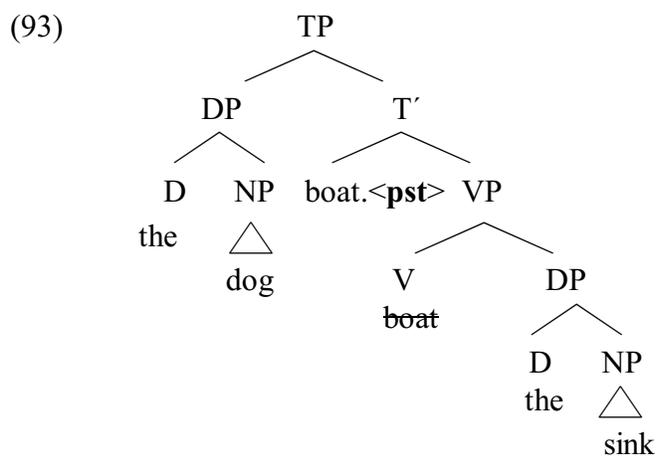
(92c) The sink boated the dog

(92d) The sink dogged the boat

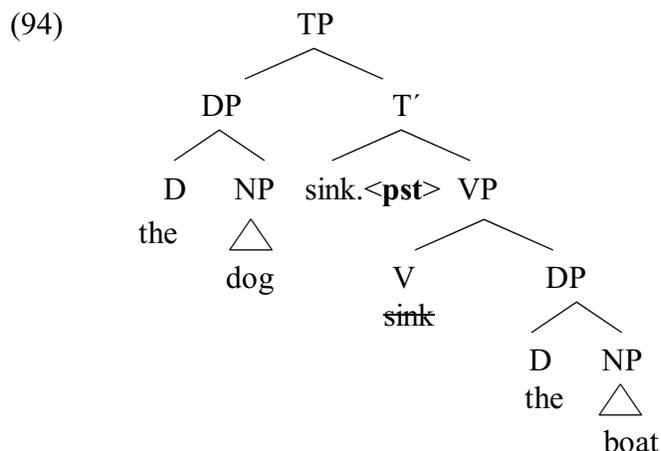
(92e) The boat sank the dog

(92f) The boat dogged the sink

To see how this works, consider the (simplified) tree in (93) for sentence (92a). The listeme *dog* ends up in the higher DP functional projection, which gives it its nominal interpretation. Likewise, *sink* ends up inside the lower DP for its nominal interpretation. *Boat* starts in V and raises to T, in a verbal functional projection, and *boat.<pst>* spells out as *boated*.



In contrast, in (94) two of the listemes, *sink* and *boat*, end up in different positions and get different categorial interpretations.



In (94), *dog* is realized in the same position inside DP as it is in (93) and therefore again gets a nominal interpretation. But *boat* is now realized in the lower DP instead of in V/T. In this case gets a nominal interpretation. The listeme *sink* in (94) has been generated in V, raises to T for tense as *sink.<pst>* and is spelled out as *sank*.

Derivations begin with functional projections that can be considered “open values”, which are assigned “range” by various competing sets of variables of the appropriate type. Open values are denoted by “<e>”; they are subscripted with a functional category designator. To consider one case, an open value is that in the quantity-phrase functional projection #P.

(95) $[_{\#P} \langle e \rangle_{\#} [_{NP}]]$

The open value $\langle e \rangle_{\#}$ is assigned a range, i.e. given instantiation, by a quantifying determiner such as *many*, *all* or *four*. We return to this in greater detail below.

In fact, Borer (2005, p30ff) begins the justification of her approach with the phenomenon of quantification. It is known (e.g. Lewis 1975, Heim 1982) that adverbs of quantification can

have both event readings and subject readings, although in any particular case one reading is typically more salient than the other. For the more salient readings of (96a,b), the adverbs range over the subjects *water* and *hummingbirds*, whereas the salient readings of (96c,d) have the adverbs *always* and *mostly* ranging over the interpretation of *water being lost* events and *drinking* events.

- (96a) During the summer, water in the pond mostly evaporates
- (96b) Hummingbirds always die young
- (96c) Water in the pond is mostly lost through evaporation
- (96d) Hummingbirds always drink from our feeder

Importantly, the readings are mutually exclusive: we should not be able to get both the subject and event readings in the same sentence from a single quantificational adverb. In (96b), for example, we cannot get the reading that all hummingbirds (subject quantification) are dying all the time (event quantification) and we do not interpret (96d) as meaning that all hummingbirds (subject quantification) are always drinking from our feeder (event quantification). Borer accounts for the data in (96) by suggesting that adverbs of quantification that associate with a DP are in complementary distribution with quantifying determiners inside the DP. That is, there is a quantifying position in DP, an open variable, that can be assigned range from either some DP-internal quantifying element or some quantificational adverb outside the DP. Hence, the ungrammaticality of (97a) where we seem to have double quantification. In Borer's terms, (97a) is bad because *most* and *always* are trying to assign range to the same open variable inside DP that quantifies *hummingbirds*. The same analysis holds for (97b), where *all* and *mostly* both vie for the same kind of quantification.

- (97a) *Most hummingbirds always die
 (97b) *All water in the pond mostly evaporates

Borer's proposal (p34-35) is that in the reading where the adverb of quantification quantifies over the subject, the adverb binds some piece of structure within DP, while in the event reading the adverb binds some piece of functional structure connected to the event. Both can't be available in the same structure because, in the nominal case, the adverb is in complementary distribution with a quantifier within DP. This piece of structure within DP, Borer proposes, is an open variable, $\langle e \rangle$, in the head of the DP; various means can assign range to the variable. In the case at hand, the adverb and a DP-internal quantifier compete to assign range to the open variable. Also, the open variable is associated with category information, which in turn determines the semantic class of the items that can assign range to it.

Borer says nominals get a nominalizer category label she calls "quantity phrase" ($\#P$, in her notation), which is headed by a specific open value $\langle e \rangle_{\#}$.

- (98) $[_{\#P} \langle e \rangle_{\#} [_{NP} \]]$

The open value $\langle e \rangle_{\#}$ can be assigned range by: i) an independent f-morph, ii) the projection of an abstract head feature which requires movement to it in order to be realized phonetically, or, in this case, iii) binding by a quantificational adverb outside the $\#P$. An independent f-morph is an "independent grammatical functional formative" (p21) or, equivalently, an independent morpheme such as *most*. Nouns (and verbs in the verbal domain) must raise via L-head movement, or movement of a lexeme, to a functional position above NP (above VP in the verbal domain).

Finally, if one mechanism operates to assign range to the open value $\langle e \rangle_{\#}$, the others are blocked from assigning range to it.

(99) Assigning range to $\langle e \rangle_{\#}$

i)	$[_{\#P} \langle q \rangle . \langle e \rangle_{\#} . N]$	$[_{NP} \mathbb{N}]$	head feature; L-head movement required
ii)	$[_{\#P} f\text{-morph}_Q . \langle e \rangle_{\#}]$	$[_{NP} N]$	free f-morph; L-head movement blocked
iii)	adverb $[_{\#P} \langle e \rangle_{\#}]$	$[_{NP} N]$	q-adverb; L-head movement not forced

In (99i), a bound morpheme for #P is a possibility, although Borer argues that is not an option in English. In (99ii), the f-morph is a free lexical item such as *most*, *all*, *three*, etc. And in (99iii), the available adverbs for assigning range to $\langle e \rangle_{\#}$ include *mostly*, *always* and *usually*. So examples for (99ii) and (99iii) are (100a) and (100b) respectively.

(100a) Most hummingbirds die young

(100b) Mostly, hummingbirds die young

For Borer, it is possible for a single functional morpheme to assign range to more than one open variable, via movement. So in (101), *every* can assign range to the open variable $\langle e \rangle_{\#}$ in the head of #P and the open variable in the D position, $\langle e \rangle_d$.

(101) $[_{DP} \text{every} . \langle e \rangle_d [_{\#P} \text{every} . \langle e \rangle_{\#} [_{NP} \text{dog}]]]$

Allowing a single functional morpheme to be able to assign range to more than one open variable is important because it unites the syntax to the semantics in a case like (101), where *every* seems to function both as a counter of quantity and a determiner for DP.

Let's now look at how Borer used open variables and range assigners to explain the the complementarity of classifiers and plural morphology. For nouns, the open value that assigns a

count interpretation in the head of a Classifier Phrase. Range can be assigned to this open value by either a classifier or by plural morphology (Borer 2005, chapter 4). This predicts, in general, that one or the other must appear; it very clearly predicts that a classifier and plural marker cannot appear together. First, she points to the general complementarity between numeral classifiers and number morphology noted above, which also motivated Chierchia's analysis. However, she indicates that Chierchia's observation is too crude. It is possible, Borer notes, for languages to have both classifiers and plural morphology, as long as they are not in the same structure. Recall that Chierchia's claim was that a language identifies its nouns as mass or count but not both. So it's not a problem, and in fact is a vindication of her theory, for Borer to note that both plural and classifier might be available to assign range to $\langle e \rangle_{\text{DIV}}$, an open value that must be assigned range, as discussed immediately below.

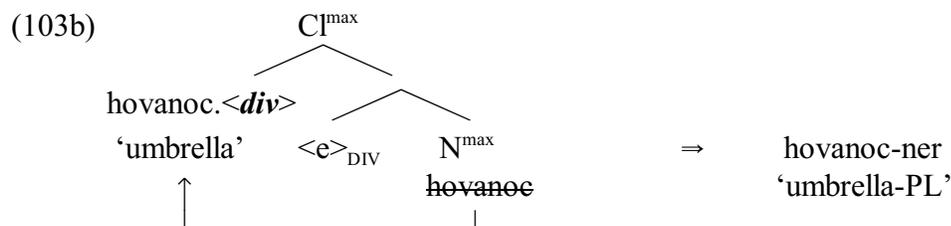
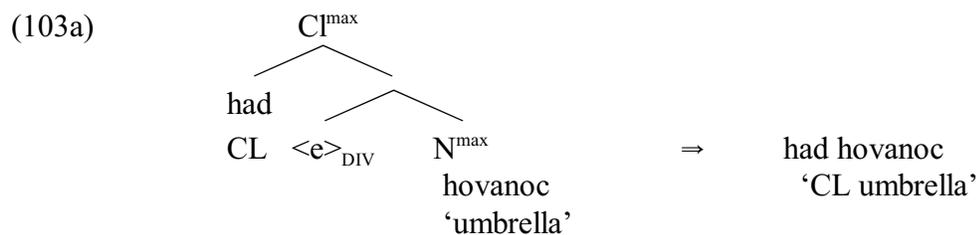
Borer notes the case of Armenian, which has both classifiers and plural morphology.

(102a) shows the noun *hovanoc* 'umbrella' used with neither classifier nor plural, (102b) with a classifier but no plural, (102c) with a plural but no classifier, and the ungrammatical (102d) with both classifier and plural.

- | | | | | |
|--------|------------------------|-------------|-------------|-----------------|
| (102a) | yergu | hovanoc | uni-m | <i>Armenian</i> |
| | two | umbrella | have-1S | |
| | 'I have two umbrellas' | | | |
| (102b) | yergu | had | hovanoc | |
| | two | CL | umbrella | |
| (102c) | yergu | hovanoc-ner | | |
| | two | umbrella-PL | | |
| (102d) | *yergu | had | hovanoc-ner | |
| | umbrella | CL | umbrella-PL | |

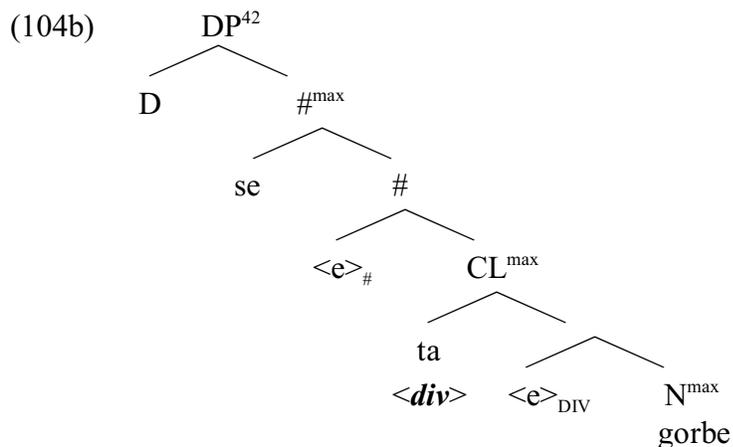
To account for the Armenian data, Borer makes an assumption that all nouns in all languages are mass, though by default and not categorized as such in the lexicon. A noun is converted to a count noun a head in the Classifier Phrase has the open value $\langle e \rangle_{\text{DIV}}$ which can be assigned range by either a numeral classifier or by plural marking to assure the noun's denotation is count. In the Armenian case, a divider can be realized by *either* a numeral classifier or by plural marking. The two vie to satisfy the same open value for the divider head. The Armenian data fall out from Borer's analysis of DP structure. The plural *-ner*, the realization of an abstract head, and the classifier *had*, a free f-morph, compete to assign range to $\langle e \rangle_{\text{DIV}}$: one or the other can assign range (102b, 102c), but not both (102d). The main advantage for Borer here is that a language is not constrained by a purported parameterization of its nouns to use a classifier or number marker. Both may be used, if the language in question has them, but they can't be used together.

Since both Borer (2005) and this dissertation deal with more than just classifiers, let's look a bit more at the grander architecture of Borer's analysis of the DP/nominal structure. Recall that nouns are uncategorized for mass/count in the lexicon and that their mass/count determination derives from their position in the syntax. If a classifier phrase projects and NP finds itself the complement of the head $\langle e \rangle_{\text{DIV}}$ of CLP/CI^{max}, the noun will be divided into units either with a classifier morpheme, which is often a free morpheme, or a plural morpheme, which is often a bound morpheme. Focusing on the Armenian data in (102b), which uses the classifier, and (102c), which uses the plural, the structures are as in (103a,b) (Borer 2005, p95).



In (103a), the open variable $\langle e \rangle_{\text{DIV}}$ is assigned range by the classifier, *had*, while in (103b) the open variable is satisfied by the noun raising and spellout of the abstract head feature $\langle \text{div} \rangle$ as the bound plural morpheme *-ner*. In both cases, the noun is 'divided' and hence available for a count interpretation. If a quantifying element is involved, there is higher projection. Consider (104b), the structure Borer would use for Persian (104a).

(104a) se ta gorbe
3 CL cat
'three cats'

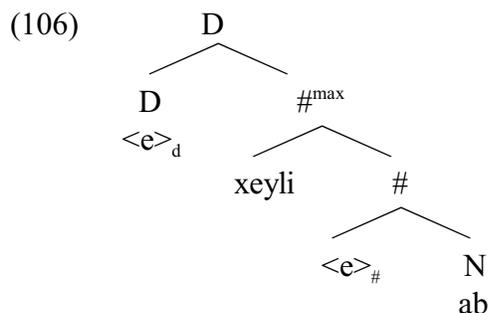


Adapting Borer's analysis to Persian, the free morpheme *ta* is the classifier that assigns range to $\langle e \rangle_{\text{DIV}}$ and functions to divide up the noun *gorbe*. For *cat*, English does not have classifiers but it does have the plural *-s*, which serves the same dividing function. The noun will raise to the specifier of $\#P$ so that the plural can be spelled out. The structure of the Persian and English cases are as in (105).

- (105a) [_{DP} [_{#P} se [_{CLP} ta [_{NP} gorbe]]]] *Persian*
 (105b) [_{DP} [_{#P} three [_{CLP} cat-s [_{NP} ~~cat~~]]]] *English*

What makes a noun mass is the lack of relevant dividing structure. If we have *xeyli ab* 'a lot of water', the structure is (106), without CLP (based on Borer 2005, p97, 110).

⁴²I address null D in chapter 5.



As is evident in (106), a mass noun can have quantity via #P, in this case *xeyli* ‘much’, but not a dividing structure.

Other positions, such as D, may be filled, and some morphemes may function to assign range to several open variables. The English article *the*, for example, can assign range to the divider $\langle e \rangle_{\text{DIV}(\#)}$, the quantity variable $\langle e \rangle_{\#(\text{DIV})}$ and the determiner variable $\langle e \rangle_d$. Also, only those phrases that are required are projected. As a summary of Borer’s analysis, consider the possible quantity and nonquantity structures in (107) (Borer 2005, p97).

Nonquantity structures:

(107a)	$[_{\text{DP}} \langle e \rangle_d$	$[_{\text{NP}} \text{cat}]$	<i>DETERMINERLESS MASS</i>	
(107b)	$[_{\text{DP}} \langle e \rangle_d$	$[_{\text{CL}} \text{cat} \langle \text{div} \rangle \langle e \rangle_{\text{DIV}}$	$[_{\text{NP}} \text{cat}]$	<i>DETERMINERLESS PL</i>

Quantity structures:

(107c)	$[_{\text{DP}} \langle e \rangle_d$	$[_{\#P} Q \langle e \rangle_{\#}$	$[_{\text{NP}} \text{cat}]$	<i>QTY MASS</i> <i>WEAK</i>	
(107d)	$[_{\text{DP}} \langle e \rangle_d$	$[_{\#P} Q \langle e \rangle_{\#}$	$[_{\text{CL}} \text{cat} \langle \text{div} \rangle \langle e \rangle_{\text{DIV}}$	$[_{\text{NP}} \text{cat}]$	<i>QTY PL WEAK</i>
(107e)	$[_{\text{DP}} \langle e \rangle_d$	$[_{\#P} a \langle e \rangle_{\#(\text{DIV})}$	$[_{\text{CL}} a \langle e \rangle_{\text{DIV}(\#)}$	$[_{\text{NP}} \text{cat}]$	<i>QTY SG WEAK</i>
(107f)	$[_{\text{DP}} \text{the} \langle e \rangle_d$	$[_{\#P} \text{the} \langle e \rangle_{\#}$	$[_{\text{NP}} \text{cat}]$	$[_{\text{NP}} \text{cat}]$	<i>DEF MASS</i>
(107g)	$[_{\text{DP}} \text{the} \langle e \rangle_d$	$[_{\#P} \text{the} \langle e \rangle_{\#}$	$[_{\text{CL}} \text{cat} \langle \text{div} \rangle \langle e \rangle_{\text{DIV}}$	$[_{\text{NP}} \text{cat}]$	<i>DEF PL</i>
(107h)	$[_{\text{DP}} \text{the} \langle e \rangle_d$	$[_{\#P} \text{the} \langle e \rangle_{\#(\text{DIV})}$	$[_{\text{CL}} \text{the} \langle e \rangle_{\text{DIV} \langle \# \rangle}$	$[_{\text{NP}} \text{cat}]$	<i>DEF SG</i>

For the nonquantity structures, (107a) is the simplest, an NP with a single functional projection, DP, which Borer assumes is required for arguments. The lexeme *cat* has been inserted

into the syntax inside NP. No dividing or quantity structure is available. So the noun has a mass reading in this case, as in *We enjoyed cat for dinner Sunday*. Structure (107c) differs from (107a) only in that (107c) includes a CLP projection to divide up the cat stuff. This is a determinerless plural, *cats*, as in *We cooked cats for dinner*.

In the quantity structures, masses can have a determiner, as in (107f), which denotes a definite mass, as in the mass reading of *The cat we had for dinner Sunday was a bit tough, wouldn't you say?*, where *cat* is mass like *beef*. The count quantity structures all have functional projections for dividing *cat* stuff. Note in particular (107d), where as shown above, the noun has raised to the CLP, where it will allow the abstract plural to be spelled out as *-s*. Also note (107h), where the definite article *the* has copies in the classifier phrase, where it serves a dividing function, and *the* in #P, where it has a counting function, and in DP, where it's pronounced as the definite determiner. (107e) shows the indefinite article *a* serving as a divider and raising to assign range to the quantity phrase head.

As is evident in the example structures in (107), DP is always present for arguments, in line with the assumptions mentioned above by Stowell (1989) and Longobardi (1994), who argued that an NP must ultimately project to DP in order to be an argument. Quantifying determiners come in two types based partly on their distribution, with strong ones generated higher within DP than weak ones, an issue I will return to in section chapter 5. D can be filled, or in Borer's terms $\langle e \rangle_d$ can be assigned range, by a variety of means. An obvious case is when *the* is generated in or is raised to the specifier of DP, as in (107f-h) above. Also, a numeral or other determiner generated in #P can raise to D to yield a strong reading. (108b) is the DP structure of the DP subject in (108a).

- (108a) Ten boys didn't show up $\text{ten} > \neg$
 (108b) $[_{DP} \text{ten} [_{\#P} \text{ten} [_{CL_{max}} \text{boy-s} [_{NP} \text{boy}]]]]$ *strong reading, widest scope*

And $\langle e \rangle_d$ can get range through existential licensing, where $\langle e \rangle_d$ is a bound variable. In Borer's system, as outlined earlier, an open variable can be assigned range by an element outside DP, such as a quantifying adverb. For (109a), as the structure (109b) indicates, the $\langle e \rangle_d$ open variable is not phonetically filled but rather is assigned range by the DP-external \exists .

- (109a) Ten boys didn't show up
 (109b) $[_{DP} \langle e \rangle_d [_{\#P} \text{ten} [_{CLP} \text{boy-s} [_{NP} \text{boy}]]]]$ $\neg > \text{ten}$
 (109c) $\exists^i [_{DP} \langle e \rangle_d [_{\#P} \text{ten} [_{CLP} \text{boy-s} [_{NP} \text{boy}]]]]$ *weak reading, bound by \exists*

Note the difference, then, between (108) and (109), where the difference between the strong and weak readings corresponds to different syntax. We get the strong reading when $\langle e \rangle_d$ is filled by the numeral *ten* and the weak reading when $\langle e \rangle_d$ is bound by \exists .

Quantifying determiners like *every* can start quite low (e.g. as a divider in the head of CLP) but raise to assign range to the open variables in #P and DP.

- (110) $[_{DP} \text{every} \langle e \rangle_d [_{\#P} \text{every} \langle e \rangle_{\#(DIV)} [_{CL_{max}} \text{every} \langle e \rangle_{DIV(\#)} [_{NP} \text{girl}]]]]$

Finally, $\langle e \rangle_d$ can be assigned range through a generic operator.

- (111) $\text{Gen}^i [_{\langle e \rangle_d} [_{\#P} \langle e \rangle_{\#} [_{\text{cats}}]]] \dots [\text{eat mice}]$
 Cats eat mice

Summing up, for Borer, hierarchical structure determines interpretation, shifting the computational burden from the lexicon and typeshifting to the syntax. Borer's analysis overcomes

some of the problems in Chierchia's approach, but it also faces some difficulties of its own, including the difficulty in accounting for the cooccurrence of a classifier and number marker in the same structure.

One can question whether the lexicon is what Borer says it is, a set of listemes with conceptual content but no syntactic information. But the one serious empirical problem with Borer's approach is that some languages such as Persian do allow a classifier and plural to appear in the same construction. While she has proposed a way to allow a language to have both classifiers and plurals as in Armenian, the analysis demands that they not appear together in the same structure because both are competing to assign range to the open variable in the classifier phrase. But, as mentioned earlier, Persian allows the cooccurrence of classifier and plural as in (112).

- | | | | |
|-------|--|----------------------|----------------|
| (112) | pænj ta
five CL
'the five girls' | doxtær-ha
girl-PL | <i>Persian</i> |
|-------|--|----------------------|----------------|

Other languages too permit classifier-plural structures. As in (113) (from Tang 2004, p385), Paiwan, a Formosan language, permits the classifier *ma* and the reduplicated plural together (the morpheme *a* is not explained).

- | | | | |
|-------|--|--|---------------|
| (113) | ma -telu
CL-three
'three girls' | a vavayav vavayan
A girl.Redup | <i>Paiwan</i> |
|-------|--|--|---------------|

Similarly, Itzaj Maya (Hofling 2000, p228), a Mayan language, permits both, the classifier *ka* ' and the plural *oo* '.

- (114) ka'=tuul im-mejen paal-oo'-ej Itzaj Maya
 2=CL.Animate is.a-small child-PL-Top
 'my two small children'

Other examples of the cooccurrence of numeral classifiers and plural morphology include Tariana, an Arawak language, (115a) (from Aikhenveld 2003, p94); Akatek, a Mayan language, (115b) (from Zavala 2000, p124); and Jacaltec, another Mayan language (115c) (from Craig 1977, p137).

- (115a) duha inafu kanaperi-pidana Tariana
 Art.Fem woman give.birth-Rem.P.Rep
 ñham-epa emi-peni
 two-NumCL.human youngster-PL
 'The woman gave birth to two children'

- (115b) kaa-(e)b' poon yalixh-taj Akatek
 two-NumCL plum small-PL
 'two small plums'

- (115c) xwil ca-wañ heb' no' winaj Jacaltec
 I.saw two-NumCL PL NounCL man
 'I saw two men'

Finally, there are other Persian languages that can use both the classifier and plural. In Tajik, they can cooccur if the noun is animate ((116a) from Ido 2005, p37; (116b) from Perry 2005, p163).

- (116a) бист нафар студент-он Tajik
 twenty CL student-PL
 'twenty students'
- (116b) дар мактаб-и мо 122 нафар пионер-он ва пионерка-гон ҳастанд
 in school-EZ us 122 CL pioneer.Masc-PL (and) pioneer.Fem-PL are
 'There are 122 pioneer boys and pioneer girls in our school'

The cooccurrence of classifiers and plural morphology is ruled out by Borer, and there is no easy way around these empirical counterexamples. It seems the only possibility for Borer to accommodate the cooccurrence of classifiers and plural is to argue that either what appears to be a classifier is not really one or what appears to be a plural marker is not really a plural marker. On a very basic level, in the Persian example (112) there is obviously a plural morpheme *-ha* and a classifier *ta*. Let's examine the Persian facts more closely to see if there is some way for Borer to account for them within her system.

First, recall that *-ha* is not only plural but also definite. Is there a way to split off the plural from the definite component? No. *-ha* always entails plurality. In (117a), *yek* 'one' is inconsistent with *-ha* and in (117b) *doxtær-ha* cannot possibly refer to only one girl.

- | | |
|---|----------------|
| (117a) * <i>yek doxtær-ha</i>
one girl-PL | <i>Persian</i> |
| (117b) <i>doxtær-ha</i>
girl-PL
'the girls' / #'the girl' | |

Persian does have another definite marker, the colloquial suffix *-e*, which marks the noun as discourse-familiar to both speaker and hearer, as in (118).

- | | | | | |
|-------|--|---------------------------------|-----------------------|-----------------------|
| (118) | <i>xærguš-e</i>
rabbit-E | <i>gol-a-ye</i>
flower-PL-EX | <i>ma-ro</i>
us-RA | <i>xord</i>
ate.3S |
| | 'That rabbit ate our flowers' (i.e. the rabbit that we were talking about) | | | |

But *-e* can only be used in the singular and is inconsistent with *-ha*.⁴³

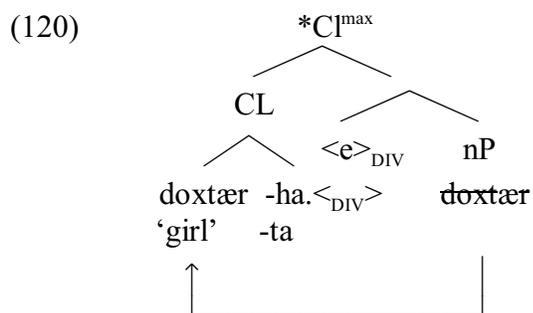
(119a) *xærguš-e-ha

rabbit-E-PL

(119b) *xærguš-a-ye

rabbit-PL-E

Is the fact that *-ha* has the double meaning of definite and plural relevant? I think not, given Borer's syntax. Plural is suffixed to the noun, just as in Borer's Armenian example above (102c). Consequently, at some point in the derivation, we have to have the structure in (120).



In (120) the noun raises to allow the Spellout of the plural morpheme. Meanwhile since the classifier is used it must also appear in the spec of Cl^{max} . But (120) is ungrammatical in Borer's system because we have both *ta* and *-ha* in the same position. Recall that they are supposed to be competing for the same position in order to convert the mass denotation of *doxtær* 'girl' into a count denotation. Besides illicitly appearing in the same position, they both assign range to the

⁴³In *ye gol-ha-i xærid-æm* 'a flower-PL-Ind bought-1S' *ye* means something like *few* rather than *a/one*: 'I bought a few flowers'.

same open variable, $\langle e \rangle_{\text{DIV}}$. In Borer's system there aren't separate phrases for a classifier and a plural marker.

Borer might suggest that Persian is special because *-ha* is not a true plural/classifier. But this is contrary to Borer's claim that one of them, CL or PL, must be serving this function. And, in Borer's view, it is PL that *is* doing the job in a construction where the plural appears without the classifier.

(121) do doxtær-ha
two girl-PL
'the two girls'

Borer might claim, as she does for Hungarian and Armenian, that the plural is doing the dividing because numerals are capable of assigning range to $\langle e \rangle_{\text{DIV}}$. Recall the Armenian data, repeated here in (122), where neither classifier nor plural is present.

(122) yergu hovanoc *Armenian*
two umbrella
'two umbrellas'

Since neither a plural nor a classifier appears in (122), Borer is forced to conclude that numerals themselves can be dividers (p116). This is a reasonable hypothesis and one we return to later. The problem here is that when numeral and plural are present we must override the plural, one of her prototypical dividers, to allow the range to be assigned from the numeral. The fact that plural in Persian has among its meanings the same plural denotation as in English or Armenian makes this tack suspect. Worse, shifting the CL function to the numeral by letting it assign range to the open

variable in CLP raises the problem of why the numeral and classifier don't compete for the same position when both appear, as in (123a) or when the numeral and plural both appear, as in (123b).

- (123a) *yergu had hovanoc*
 two CL umbrella
 (123b) *yergu hovanoc-ner*
 two umbrella-PL

In (123a), for example, we have both the numeral *yergu* 'two' and the classifier *had*, both of which can assign range to the divider head, just the kind of situation that Borer ruled out in cases like (124), where both the plural and classifiers appear.

- (124) **yergu had hovanoc-ner*
 two CL umbrella-PL

Further, in any case, Persian plural seems eminently capable of dividing up stuff. In English, plural can be used on mass nouns, but typically with the meaning of 'servings of' or 'kinds of', as in (125).

- (125a) Three coffees, please
 (125b) There are three trees that dominate the woods outside Albany: maple, beech and hemlock

In the first case, the plural functions like a mensural classifier, creating typical coffee units, say cups. In the second case, the plural is being used to designate kinds. Persian has analogs to (125), such as (126a), but more relevant here are data like (126b), from Sharifian and Lotfi (2003, p231).

- (127) geu-neun eongdeongi-e but-eun molae-deul-eul teol-eoss-da *Korean*
 3H-Top backside-Loc stick-Rel sand-PL-Acc brush-Past-Dec
 ‘He brushed off some sands which had stuck to his backside’

The empirical problems with Borer’s account are difficult to overcome. Borer could introduce another projection so that plural morphology and classifiers appear in separate projections, but that undoes the basis of her claim that classifiers and plural are two sides of the same coin, two mutually exclusive mechanisms that divide up mass stuff into countable units. In trying to solve the problem of Persian classifiers we will end up using some of the spirit and technology from Borer, but we will also be forced to consider that classifiers and plural are not merely parallel devices.

3.4 Mass and count

We have already seen in section 2.1 that the head *n* of *nP* is required to make a root into a noun. But nouns are either count or mass. The question is how to account for the mass/count distinction in the syntax. I assume that the difference between mass terms and count terms can be described set-theoretically (e.g. Link 1983, Landman 1989a, 1989b, 1995 and Bunt 1985) (see section 3.3.1.1). Sets can be arranged as individuals and their pluralities. These individuals and pluralities are arranged in a join semilattice where the individuals at the terminal nodes of the semilattice are considered the atoms. So the set of atoms might be {Farzad, Kia, Nasser, Hamid}. Pluralities are combinations of the atoms: {{Farzad, Kia}, {Farzad, Nasser}, {Farzad, Kia, Hamid}...}. When the atoms are present, as they are in {Farzad, Kia, Nasser, Hamid}, we are dealing with count terms. Mass terms, in contrast, typically have no atoms. Mass terms may be cognitively mass, as *water*, *concrete*, and *air*, where it is difficult to speak of water individuals,

concrete individuals and air individuals in the world in the same as we can speak of individual people such as Farzad and Kia. For cognitively mass terms, no matter how we divide up something like concrete we still have concrete. But with terms like *furniture* and *lumber* (“fake mass” nouns: Chierchia 2005) massness is a linguistic rather than a cognitive fact: such nouns are treated as mass terms even though we can identify individual pieces of furniture and lumber in a way that we cannot identify minimal bits of water. That *lumber* is linguistically mass is evident in that we cannot treat it the same way syntactically as we do true count terms: *one cat* v. **one lumber*. In addition, plural *cats* can refer to sets of individual cats or the cat kind; *lumpers* cannot refer to pieces of lumber or the lumber kind; it only refer to different kinds of lumber. Terms like *succotash*, a mixture of beans and corn, lead to complications of the simple view just described in that the minimal elements presumably include at least one kernel of corn and one bean. The point is that any semantic characterization of the mass/count distinction must make use of syntactic analysis.

Various approaches can be used to mark the syntactic difference between mass terms and count terms. As we will see in the next chapter, Chierchia (1998a,b) hypothesizes that the mass/count distinction is encoded parametrically in a language’s nouns. According to him, it is a parametric fact that Chinese sets all its nouns as mass in the lexicon and French does not. We will see that this approach does not hold up. Under a revised approach, Borer (2005) sees nouns as lacking mass/count denotation in the lexicon. In her view, nouns become count in a syntactically count context, as when they appear with “dividing structure” such as plural morphology, numerals or other determiners such as *the*, *a*, or *three*. If no such dividing element appears with the noun, the denotation of the noun defaults to mass. Of course one can ask why the default should be

mass rather than count and there is evidence that the default-mass assumption is not correct. Take compounds. In English, bare nouns, that is nouns without any of Borer's dividing structure like classifiers, number marking and determiners, may be used as modifiers in compounds.

(128a) cat lover

(128b) wife beater

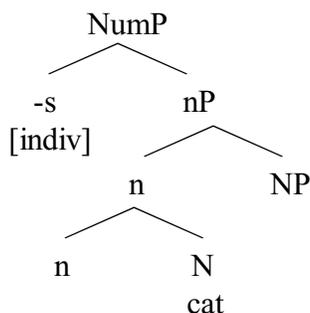
Yet despite the absence of any evident dividing structure for the noun *cat*, the salient reading of (128a) is not that of a person who loves cat meat but one who loves cats generically. An individual reading is also possible for (128a) but perhaps is more available in (128b). For *wife beater*, we aren't forced to interpret it as some guy who goes around wily-nilly beating his and other men's wives; it is certainly possible to read (128b) as referring to a person who beats *his* wife. The differences between individual and generic readings for expressions like (128a,b) aside, what is important is that an available reading, even a salient one, is not one who is a lover of cat mass. But in the Borer's proposal, since *cat* and *wife* do not have dividing structure we should only be able to get the mass reading. Borer of course sees this problem and tries to argue around it. Her suggestion is that the modifying noun is a "bare stem" functioning word-internally as "predicates of sort" (Borer 2005, p133). In a compound the modifying noun has no dividing structure and is thus neither singular nor plural. Her evidence is an example like *flea-infested*, where a singular reading of *flea* is inconsistent with the meaning of *infested*. Rather, words like *flea* in *flea-infested* "bring to bear on the structure nothing but their conceptual content" (Borer 2005, p133). But there are two problems with this approach. First, while it may be the case that the modifying noun in the compound is neither singular nor plural, it must be count or mass as

part of its conceptual content. This is similar to the observations above: if we can get an individual reading for *cat* and *wife* in (128a,b) there must be a specification that they are mass or count.

Second, back to the problem of the availability of the count reading of *cat* in (128a) despite there being no dividing structure like a classifier or number morphology, for Borer the ability to get the count reading depends crucially on the stem being somehow syntactically prior to the noun and perhaps therefore not subject to the condition that dividing structure will yield a count reading and lack of dividing structure will yield a mass reading. But Borer has already suggested just the opposite, claiming that “bare-stem nouns are mass unless divided by plural morphology” (Borer 2005, p112).

Given these problems, I assume a variant way to arrive at the mass/count distinction. What I propose is responsible for the distinction is Harley and Ritter’s (2002) [individuation] feature, an abstract feature for count at a very basic level and without further specification for either singular or plural. (Harley and Ritter’s number features will be discussed in more detail in the next section.) The feature [individuation], or [indiv], is a feature of number marking that licenses a count reading of nouns. Mass nouns, which do not ordinarily take number marking, do not have this feature. So a derivation of a count noun reading involves something like (129).

(129)



As we will see, [indiv] serves as a goal for its unchecked counterpart, [u-indiv], which appears on determiners.

There are parallels between this approach and Borer's (2005). We both say that something must be introduced in the syntax to get count nouns. For Borer it is dividing structure like plural morphology. I too accept that plural morphology is needed for count reading in the syntax. An important difference, however, is that under the proposal in this dissertation the lack of plural morphology does not necessarily lead to a mass interpretation. If we accept that the count/mass distinction is part of the conceptual meaning of a noun (discussed in chapter 3), [indiv] is a syntactic feature that assures the count noun can merge with number morphology. Thus, the lack of [indiv] does not automatically lead to a mass reading for expressions like *cat lover* whereas for Borer they must, leading to the contradiction in her account. Further, my proposal is more explicit in identifying a feature, although this is paralleled in Borer by the heads she uses in the syntax. Both our approaches reflect the fact that it never seems to be the case that mass nouns require more morphology than count nouns. In English, for example, bare mass nouns can be arguments but bare count nouns cannot.

(130a) Water is in the basement again

(130b) *Mouse is in the basement again (ungrammatical on the generic or individual reading)

Sentence (130b) is bad because English count nouns need some bit of morphology, at least number or a determiner, as in (131).

(131a) Mice are in the basement again

(131b) That mouse is in the basement again

And both approaches similarly allow for coercion by permitting virtually any count noun to get a mass reading. Minus individuation, a noun that is ordinarily count can get a mass interpretation, as (132b) suggests.

(132a) There was a dead possum on the road

(132b) There was possum all over the road

3.5 Summary

As I have presented, both Chierchia's and Borer's systems have much to offer in accounting for the classifier/plural distinction among languages. However, both systems have their weaknesses. On the whole, Chierchia's model makes some wrong predictions, but the availability of typeshifting can resolve some potential problems. His main empirical problems are that, contrary to his claim, the mass/count distinction does exist for nouns in classifier languages and that in order to allow for certain typeshifting in Persian to accommodate the data he leaves Chinese unexplained. Borer, on the other hand, in my view faces fewer technical problems but does suffer from a fatal prediction that plural and classifier cannot occur together.

Chapter 4 addresses these shortcomings by arguing for a universal DP syntax and reduced typeshifting, in the spirit of Borer. I will abandon Chierchia's Nominal Mapping Parameter. The proposed model will also accommodate the important observations made in the previous literature about the distribution of classifiers and plural morphology, for both Persian and Chinese. Once a system is in place to account for classifiers, I will proceed in Chapter 5 to account for projections above CLP/NumP.

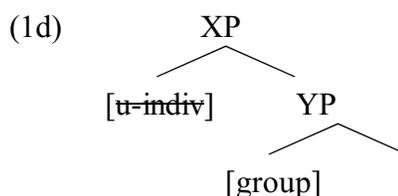
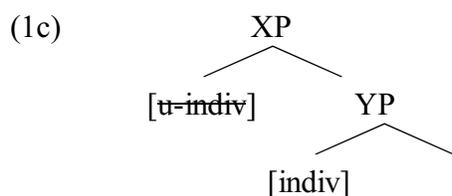
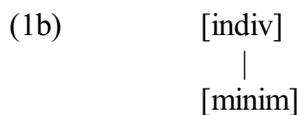
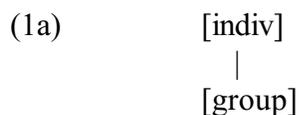
Chapter 4: A feature-driven theory of classifiers

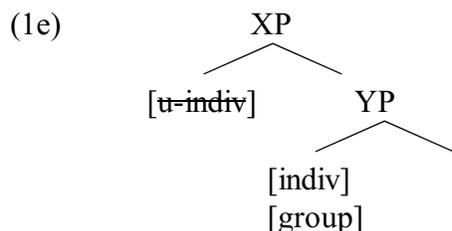
4.0 Introduction

In this chapter I show that the syntactic assumptions outlined in chapter 2 allow for a solution to the problems for earlier accounts of the distribution of classifiers and plural marking that were discussed in chapter 3. The model being proposed here also accounts for all the data that has been analyzed in the earlier theories and thus expands empirical coverage. The chapter proceeds as follows. After briefly summarizing the syntactic and semantic assumptions in chapter 2 and the main problems reviewed in chapter 3, I propose a solution to the problems that the Persian data presented for earlier theories. I work through the derivations of the basic numeral+noun constructions in Persian and for each derivation compare the adequacy of the present proposal with that of previous proposals. In many cases the proposals in this dissertation are as good as my predecessors' but in some cases the proposals in this dissertation are superior, in particular in allowing for the cooccurrence of a classifier and a plural marker. The proposed theory still allows for the general complementarity of plural marking and classifiers in that they both provide an individuating function. After working through the Persian data, I also demonstrate the derivations for the numeral+noun constructions in Mandarin, Armenian and English to show that the proposed model also accounts for the data presented by earlier theories and thus also holds potential for broad-based crosslinguistic application. I then discuss double classifiers and partitives. Finally, I address some Thai and Mandarin data where classifiers are used with nonnumeral determiners.

Recall from chapter 3 that the main problem for Borer (2005) with regard to the distribution of numeral classifiers and plural morphology is the permitted cooccurrence of classifiers with number morphology in Persian and other languages, a cooccurrence she predicts

should not happen. Chierchia (1998a,b) can in principle accommodate the Persian data by relying on typeshifting, but he is then left with the problem of why such typeshifting is not permitted in Mandarin, where classifiers are barred from occurring with a plural marker. Concerning theoretical assumptions from chapter 2, recall that I am adopting a Minimalist syntax. The heads of the functional projections above DP carry features which, if unchecked must be checked by the end of the derivation or the derivation will crash. With regard to the composition of NPs, Num/CLPs and numerals, number features in functional heads are arranged according to the hierarchical feature geometry of Harley and Ritter (2002). In their theory, the presence of some features entails the presence of other features. For example the presence of [group], a plural feature, entails the presence of [indiv], a more basic number feature (1a). Likewise [minim], a singular feature, also entails the presence of [indiv] (1b). As for feature checking, in (1c) the [u-indiv] probe seeks a c-commanded matching feature and is checked by [indiv]. In (1d), [group] checks the higher [u-indiv] probe. More precisely, it is the [indiv] feature whose presence is entailed by the presence of [group] that checks [u-indiv] (1e).





Semantically, nouns are assumed to be of type $\langle e, t \rangle$: extensionally a noun like *cat* denotes all cats in some world. According to the set-theoretic notion on nouns and pluralities in section 3.3, number/classifier morphology gives us atoms and pluralities: CLPs and NumPs are predicates. Quantifying determiners in turn function to convert the NumP/CLP predicates into generalized quantifiers. In this dissertation it is specifically generalized quantifiers as Quantifier Phrases below Case Phrase that have argument status, since what is traditionally held to be DP is treated as two independent phrases, SQP and WQP. (Recall that an argument is actually a Case Phrase, which will be discussed in section 5.5) In this chapter my discussion of quantifying determiners is restricted to numerals; other quantifying determiners will be explored in chapter 5. Finally, while the relevant functional features are always present, particular morphology need not be. A feature such as [group] usually is part of the Spellout of a plural marker, but [group] appears on the noun via feature raising in those cases where a classifier and number morphology are optional.

Chapter 2 concluded that the canonical lineup of the heads in DP with their associated functional features and semantic functions is as in (2), for Mandarin.

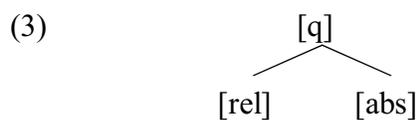
(2) Functional Items in the Mandarin DP

	<u>head</u>	<u>syntactic features</u>	<u>semantic type</u>
(i)	noun:	[n]	<e,t>
(ii)	plural:	[u-n, group, rel]	<<e,t>, <e,t>>
(iii)	classifier:	[u-n, indiv, abs]	<<e,t>, <e,t>>
(iv)	numeral WQD:	[q, u-abs, u-indiv]	<<e,t>, <<e,t>, t>>
(v)	nonnumeral WQD:	[q, u-rel, u-indiv]	<<e,t>, <<e,t>, t>>

According to (2), in [n] categorizes the root. Both classifiers and plural morphology take nouns and yield another <e,t>-type predicate. Number morphology carries either the basic [indiv] feature, which indicates only that number is involved, or a more specific feature, for example [group], which specifies plurality and entails the presence of [indiv] in that a plural noun has number, as in (1a). Classifiers tend to occur with numerals and not with other quantifying determiners. Although there is some crosslinguistic variation on this count, as discussed in section 1.1 and 4.6.3, at least for Persian the generalization is absolute. As such, classifiers are in effect in a subcategorization relation with numerals. Persian numerals have an uninterpretable feature of some kind that must be checked by a matching feature in the classifier. In Mandarin, classifiers are specified as [abs], capable of checking [u-abs] on the numeral.

As for the syntactic and semantic functions of [indiv] and its [group] and [minim] subtypes of [indiv], recall from sections 3.2.1 and 3.3.3 that Borer (2005) and Chierchia (1998a,b) did not discuss why the “individuation” function of a classifier for a noun is called for only when the noun is being quantified by a numeral quantifying determiner in a language like Mandarin. We can ask why nonnumerals like *every* cannot also be considered as individuating the noun.

However, the use of features provides syntactic details lacking in earlier theories in that number requirements are more fine-grained in the theory proposed in this dissertation. If a numeral quantifying determiner requires a CLP complement, this is specified with a [u-abs] feature on the numeral that is checked by [abs] on the NumP head. Recall the feature geometry where the presence of lower features entails the presence of higher features, as in (3).



While the features are claimed to be available from UG, the ways they bundle vary by language, as we might expect in lexical items. Differences in how the features map to morphology account for crosslinguistic variation in the behavior of classifiers and plural morphology. In section 4.1 I derive the four basic constructions of interest: numeral+noun, numeral+classifier+noun, numeral+classifier+noun+plural and numeral+noun+plural. I then show the derivations for the analogous constructions in Mandarin (section 4.2), Armenian (section 4.3) and English (section 4.4). Those constructions may or may not be grammatical in those languages and I explain why they are or are not. We will see that languages differ because the UG functional features can bundle in various ways. On the other hand, assuming that language generally seeks economy, since both classifiers and plural morphology have the same [indiv] feature, to use both requires redundancy. For example, I show that Mandarin classifiers must take an NP complement because Mandarin classifiers have a [u-n] feature that requires checking by [n] in nP. Persian classifiers, in contrast, can take a NumP as well as an nP so its classifiers are not [u-n]. Also,

classifiers are required in numeral+noun constructions in Mandarin although they are optional in Persian.

4.1 The Persian data on enumerated nouns

In this section I use the syntactic and semantic assumptions from chapter 2 to account for the four basic classifier/number structures in Persian: numeral+CL+noun, numeral+noun+PL, numeral+CL+noun+PL and numeral+noun. Recall that Persian uses numeral classifiers in numeral+noun constructions but the appearance of the classifier is not obligatory, as in (4).

- (4) hæft (ta) mænzel *Persian*
 seven (CL) house
 ‘seven houses’

In the accounts presented in Borer (2005) and Chierchia (1998a,b), the mass noun must be divided into countable units. The requirement that a mass noun be divided thus would explain the presence of *ta* when it does appear. But the optionality of the classifier must also be explained. Chierchia does not address this issue. Presumably he would typeshift the bare noun as a last resort so that the NP can compose with the numeral directly. But that, among other things, rather begs the point of there being languages whose nouns are all set as mass. In any case, this dissertation argues that a count/mass distinction exists in all languages’ nouns. Borer argued that, when a classifier is not present, the numeral itself can provide the function that divides the purported mass noun into units. Instead, I will argue that, in the absence of a classifier, the noun checks with an unpronounced feature in CL. But the most obvious empirical problem for both Borer and Chierchia is the possible presence of plural morphology with the classifier, as in (5).

- (5) car ta deræxt-ha
 four CL tree-PL
 ‘the four trees’

Persian

I show in section 4.1.3 how the feature-driven account can accommodate this.

4.1.1 Numeral+CL+noun

I start with what might be called the prototypical classifier construction, as in (6a), with a numeral, a numeral classifier and an uninflected noun. The derivation begins as in (6b). In (6b), the root is categorized. As mentioned in chapter 2, I abbreviate the movement of N to n in (6b) as (6c).

- (6a) car ta deræxt
 four CL tree
 ‘four trees’

Persian

- (6b)
- ```

 nP
 / \
 n NP
 √DERÆXT

```

- (6c)
- ```

      nP
      |
      n
    deræxt
    [n]
  
```

The next step is for nP to merge with the classifier. But before we turn to that step we must first identify the feature bundle associated with *ta*. Recall from chapter 2 that the Persian default classifier *ta* differs from Mandarin’s *ge* in that *ta* is inconsistent with the numeral *yek* ‘one’

(7a) while *ge* appears with any numeral (7b). *Ta* can, however, be used with any numeral other than *yek* ‘one’ (7c).

- | | | | | | | |
|------|---|----|----------|--|--|-----------------|
| (7a) | *yek | ta | danešju | | | <i>Persian</i> |
| | one | Cl | student | | | |
| (7b) | yi/liang | ge | xuesheng | | | <i>Mandarin</i> |
| | one/two | CL | student | | | |
| (7c) | do/se/car/pænj/dæh/bist/divist/hæft hezar | ta | sib | | | <i>Persian</i> |
| | 2/3/4/5/10/20/two hundred/eight thousand | CL | apple | | | |
| | ‘2/3/4/5/10/20/200/8,000 apples’ | | | | | |

That *ta* is consistent with any numeral other than *yek* ‘one’ indicates that *ta*’s number feature is not correctly specified by the general [indiv] feature; rather, *ta* is featured more precisely as [group]. That is, *ta* is a plural marker used with nouns quantified by numerals other than *yek* ‘one’. Two other facts weigh in here. First, *ta* cannot be used with nouns quantified by nonnumerals.

- | | | | | | | |
|-----|--------|----|-------|--|--|----------------|
| (8) | *xeyli | ta | ordæk | | | <i>Persian</i> |
| | a lot | CL | duck | | | |

The mismatch is between the determiner and the classifier. The determiner is [u-rel] while the classifier is [abs], which is incapable of checking [u-rel], as shown in (9).

- (9)
- ```

 *WQmax
 / \
 WQ CLmax
 xeyli
 [u-rel] / \
 CL nP
 [abs]

```

Second, there is a problem in that the derivation leading to a CLP produces a licit structure, but it cannot be used alone as a subject (10a), an object (10b) or a predicate (10c).

- (10a) \*ta gol qæšæng-e *Persian*  
 CL flower beautiful-is  
 (intended meaning: ‘The [flower / a flower / flowers] [is/are] beautiful’)
- (10b) \*ta gol gereft-i  
 CL flower received-2S  
 (intended meaning: ‘Did you get a/some flowers?’)
- (10c) \*un ta gol-e  
 that CL flower-is  
 (intended meaning: ‘That’s a flower’)

The violations in (10) are not that the CLP has been incorrectly derived, but rather that only a CLP has been produced. CLPs and NumPs, according to the analysis in this dissertation, cannot serve as arguments because a Quantifier Phrase, either strong or weak, is required for an NP to be an argument (under Case Phrase).<sup>44</sup>

So instead of the canonical lineup of heads and features for Mandarin (11a), Persian *ta* is featured as in (11b), where [group] replaces [indiv].

- (11a) Mandarin classifier features  
 [u-n, indiv, abs]
- (11b) Feature specification of the Persian classifier *ta*:  
 [group, abs]

---

<sup>44</sup>We see in section 5.3 that a CLP is a possible argument in Cantonese. This syntactic option is not available in Persian.

So while Mandarin and Persian classifiers differ with respect to their number feature, they are similar with regard to the feature [abs]. In Mandarin, [u-n] indicates that the classifier takes noun complements and [abs] indicates that the classifier is an absolute number marker.

Note that Persian *ta* has features in common with the plural marker *-ha* in that both are [group].

- (12) Features of the Persian plural *-ha*  
[group, rel]

This means that [group], i.e. plural, can map to two pieces of morphology in Persian, either the classifier or the plural. If [group] spells out on *ta* the meaning is simply plural. But when [group] spells out on *-ha*, the spelled-out result has features of both definite and plural. Because of this, (13) with *-ha* can only get a definite reading; the reading corresponding to the bare plural in English is infelicitous.

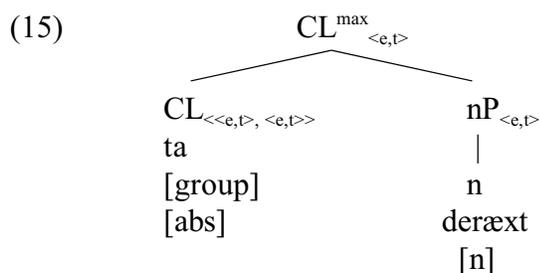
- (13) ordæk-ha *Persian*  
duck-PL  
'the ducks' / #'ducks'

More completely, then, the Persian features are as in (14).

- (14a) *ta* : [group, abs]  
(14b) *-ha*: [u-n, group, rel, def]

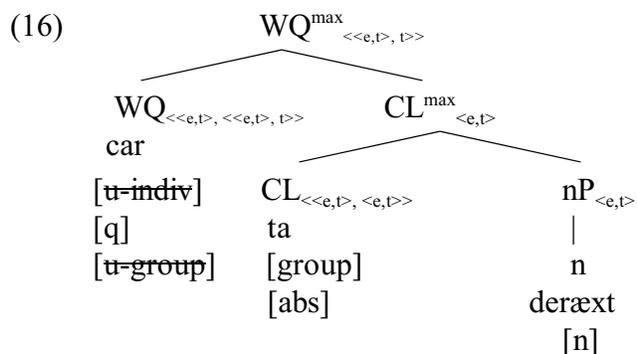
To recapitulate, the appearance of *ta* indicates plurality; its semantic function is to take a complement noun that denotes a set and produce a set of pluralities. It must enter into Agree with a numeral in the WQ head position other than *yek* 'one'.

Having discussed the features of *ta*, we can proceed with the next step in the derivation for (6a). The nP merges with the classifier (15).



As shown in (15), the classifier also adds two features: [group] for plurality and [abs] for numeral cardinality. Semantically, the classifier is a function from  $\langle e, t \rangle$ -type nPs to  $\langle e, t \rangle$ -type CLPs.

Finally,  $CL^{\max}$  merges with the numeral *car* 'four'.



In (16), the Persian numeral is [u-group] but not [u-abs] because, as we'll see in the next section, numerals can also compose with plural nouns. At this point, all features are checked and we have a generalized quantifier, meaning that the  $WQ^{\max}$  can be an argument (as part of Case Phrase), as in (17).

- (17) (par sal tuye hæyat )                    susk    [<sub>WQ<sub>max</sub></sub> car ta deræxt]    košt                    *Persian*  
 (last year in garden)                    beetle                    four CL tree    killed.3S  
 ‘(Last year) beetles killed four trees (in the garden)’

The phrases *par sal* ‘last year’ and *tuye hæyat* ‘in the garden’ are added for context to make the sentence more natural. What we have in (16) is a generalized quantifier, a WQP formed from a CLP that denotes a set of pluralities.

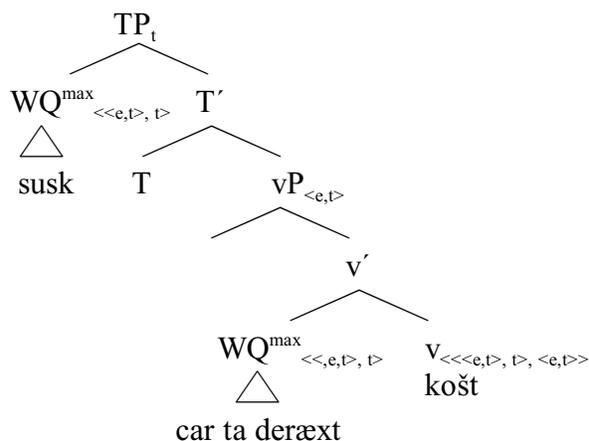
- (18a)  $ta_{\langle\langle e,t\rangle, \langle e,t\rangle\rangle} ([deræxt]_{\langle e,t\rangle}) \Rightarrow [ta \ deræxt]_{\langle e,t\rangle}$   
 (18b)  $car_{\langle\langle e,t\rangle, \langle\langle e,t\rangle, t\rangle\rangle} ([ta \ deræxt]_{\langle e,t\rangle}) \Rightarrow [car \ ta \ deræxt]_{\langle\langle e,t\rangle, t\rangle}$

The predicate in (17) is *car ta deræxt košt*, ‘killed four trees’, of type  $\langle e,t\rangle$ . The subject *susk* ‘beetle’ (I do not show the complete structure here as we will look at bare nouns later) is also a generalized quantifier. Since *car ta deræxt* ‘four CL tree’ is a generalized quantifier of type  $\langle\langle e,t\rangle, t\rangle$ , the semantic composition of the sentence is as in (19).<sup>45</sup> (The syntactic tree is based on Karimi’s (2005) proposal for the Persian sentence, discussed in section 1.3. I overlook details about features in T and ignore that Karimi assumption that the subject starts in SpecVP.)

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<sup>45</sup>If a verb is a two-place first-order relation, of type  $\langle e, \langle e,t\rangle\rangle$  (Gamut 1991, p81), then there is a type mismatch in (19) between the verb and its object, which I have characterized here as a generalized quantifier. Heim and Kratzer (1998, p178ff) mention two ways to fix the mismatch. One is to allow the quantifiers to have different semantic types. The other, they explain, is Montague’s approach of changing the type of the transitive verb, which I have done here, making it  $\langle\langle\langle e,t\rangle, t\rangle, \langle e,t\rangle\rangle$  as an alternative to  $\langle e, \langle e,t\rangle\rangle$ .

(19)



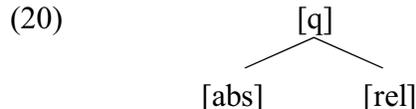
The derivation of the structure in (16) has parallels in both Chierchia (1998a) and Borer (2005), both of whom can account for the expression *car ta deræxt* within their theories. Recall that for Chierchia, nouns in a classifier language such as Persian are of type e with a mass denotation and must be individuated into countable units in order to be enumerated. Chierchia claims that the classifier is needed because in languages like Persian, a classifier language, *deræxt* ‘tree’ is mass. But chapter 3 showed that we have to abandon Chierchia’s assumption that nouns might be parameterized in some languages as all being mass. The main reason, recall, is that bare nouns in Persian and Mandarin (the classifier language that Chierchia focused on) are sensitive to the kind of quantifying determiner they can be the complement of; semantically count nouns like *student*, *xuesheng* in Mandarin and *danešju* in Persian can only be the complements of determiners that are sensitive to this distinction. Therefore, abandoning the idea that all nouns in some languages are mass is in better accord with the crosslinguistic facts. For Borer, on the other hand, a classifier is one of two alternatives for providing dividing structure for a noun lest it default as mass, the other being number morphology. Similarly, according to the analysis in this dissertation, a noun in effect becomes count by virtue of features in number/classifier morphology. While there

are some technical differences among the theories in Chierchia (1998a,b), Borer (2005) and this dissertation, (6a) is accounted for equally well in all three theories.

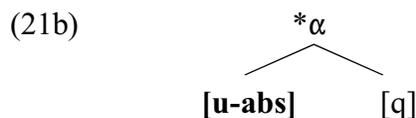
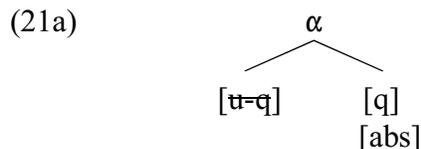
However, one advantage of the feature-based approach to (6a) is that it makes explicit the connection between a cardinal determiner and the classifier through the [u-abs]/[abs] checking relation that is not present between a classifier and a nonnumeral determiner, at least in Persian. In contrast to a numeral, a nonnumeral determiner lacks the [u-abs] feature. Previous theories attempted to explain classifiers as somehow individuating mass nouns into units, under the assumption that it is only numerals that call for individuated nouns. This seems to be the case in Persian, but there are languages such as Thai and Bangla<sup>46</sup> that require classifiers with nonnumeral quantifying determiners. Nonetheless, the phrase *many cats* must allow access to individual cats (the atoms of the semilattice in Chierchia's view) just as much as a phrase like *four cats* does, but Borer and Chierchia do not address why an individuating classifier is not required between a noun and a nonnumeral quantifying determiner. In contrast, the feature-driven system, in the context of Harley and Ritter's (2002) number features, clearly identifies a distinction between how numerals quantify and how nonnumerals quantify, depending on the language. For instance, Persian classifiers are only used with numerals, so we expect classifiers to be [abs] and numerals to be [u-abs]. In English, however, plural morphology is used with both numerals and nonnumerals, so only the more general [q] feature is involved, according to the feature geometry in (20).

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<sup>46</sup>E.g. Thai *dek laai khon* 'child several CL', *dek thuk khon* 'child every CL' (from Simpson 2005, p815). Similarly in Bangla: *kayek-Jon mohila* 'some-CL woman' (from Dasgupta 2003, p366). We see at the end of this chapter that classifiers can be used with nonnumeral quantifying determiners in some contexts. And while I have simplified so far in linking Mandarin classifiers with numerals, classifiers can also be used with other determiners in Mandarin.



The feature [q] is present when [abs] is present. So [abs], or more precisely the feature bundle [q, abs], can check [u-q], as in (21a), but [q] cannot check [u-abs] because the presence of [q] does not entail the presence of [abs] (21a). Structure (21b) is illicit because [u-abs] has not been checked.



Thus by precisely identifying the features and specifying a subcategorization relationship between numerals and their complements and between nonnumerals and their complements, feature checking accommodates that fact that in some languages classifiers only occur with numerals. In accord with earlier theories such as Borer (2005) and Chierchia (1998a), while nouns may have to be “individuated” in some way, using features to say exactly how allows for differences in what determiners nouns can take within and across languages.

#### 4.1.2 Numeral+noun+PL

The next structure to look at is one where a numeral occurs with a plural but without a classifier. Unlike the cooccurrence of PL and CL, plural without a classifier can be accounted for

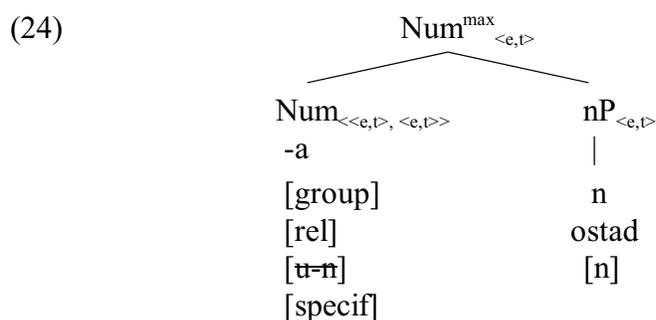


specific phrase is one where the speaker has a particular referent in mind (e.g. Ioup 1977, Lambrecht 1994). Lambrecht (1994, p80) offers the definition in (23).

(23) Specificity (Lambrecht 1994):

One way of describing the specific/non-specific distinction in pragmatic terms is to say that a specific indefinite NP is one whose referent is identifiable to the speaker but not to the addressee, while a non-specific indefinite NP is one whose referent neither the speaker nor the addressee can identify at the time of the utterance.

Let's then replace [def] with a specific feature, [specif], in *-ha*'s feature bundle. Here we will assume that [specif] is interpretable. The first step in the derivation for the expression in (22) is (24), where *-ha* merges with the noun.



The noun feature [n] checks Num's [u-n]. I assume per Distributed Morphology that syntax precedes Vocabulary Insertion into the terminal nodes, so that only after syntactic checking of unchecked features does any phonological Spellout occur (Halle and Marantz 1993, 1994).<sup>48</sup>

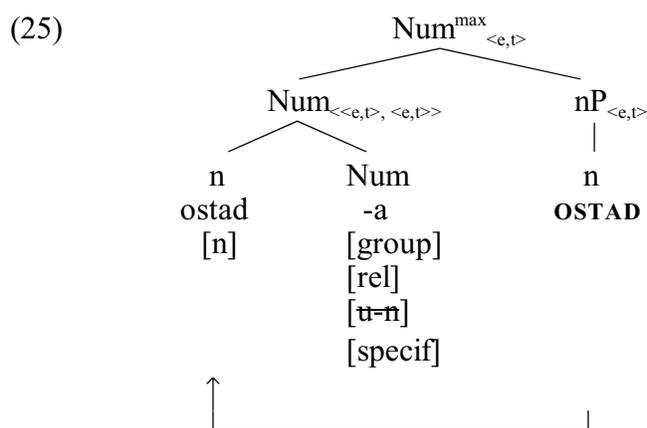
Among other things this means that operations such as head movement that “joins terminal nodes under a category node of a head...but maintains two independent terminal nodes under this

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<sup>48</sup>Technically, per DM, only the number *features* are inserted. But recall that in those cases where the features will spell out in the position where they are inserted I include the phonetic form for clarity.

category node” (Halle and Marantz 1994, p 116) will occur postsyntactically. Only after all syntactic features are checked are the feature bundles associated with phonetic material.

Therefore, following the checking of features and the concomitant semantic composition as in (24), the noun *ostad* moves to the Num head for phonological reasons, as (25) shows.



However, as will be shown in chapter 5, since an expression like *ostad-a* is specific the expression must be a WQP, and if it is definite it must be a SQP. Which suggests that when a numeral merges with *ostad-a*, which is specific, it should be merging with at least a WQP as in (26), contrary to the assumption that numerals merge with NumPs.

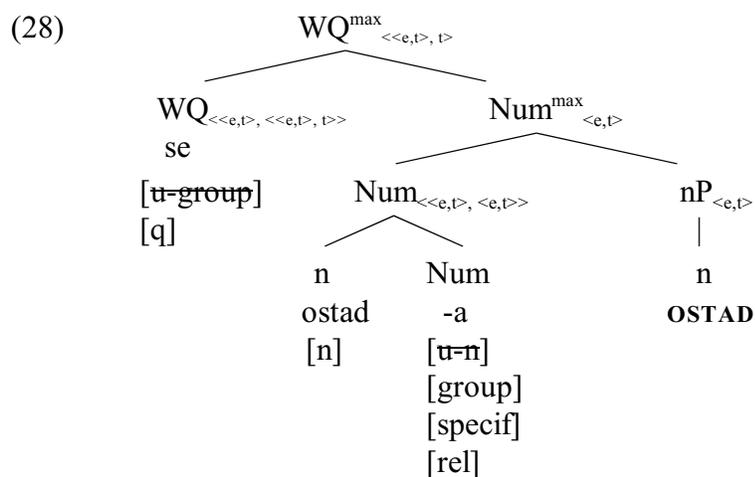
(26) \*<sub>[WQP se [WQP ostad-a]]</sub>

However, I argue in section 5.2.6 that, despite appearances to the contrary, the WQ *se* has a NumP complement, as in (27).

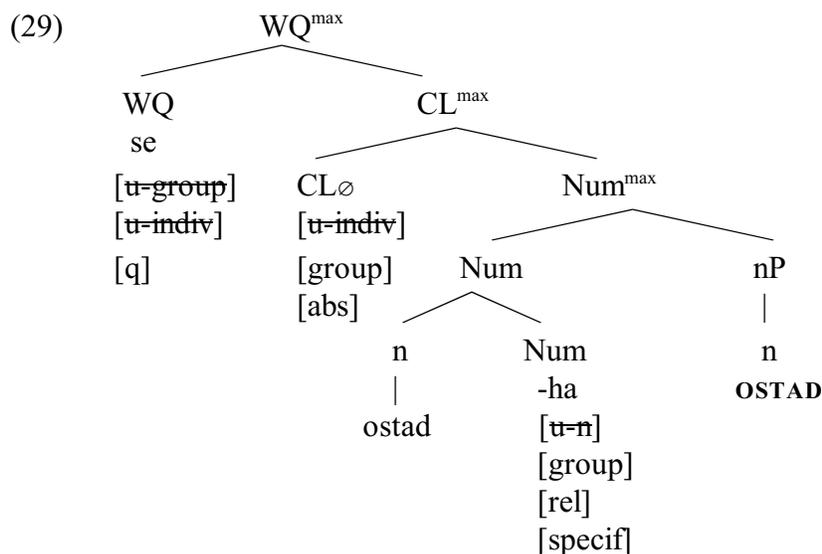
(27) <sub>[WQP se [NumP ostad-a]]</sub>

I show in more detail in chapter 5 that in order for specificity/definiteness to be realized the [specif] feature in *-ha* raises to the head of SQP. But when *ostad-a* merges with *se* it is in fact a NumP. So, despite appearances, Merge of plural *-ha* with a noun yields a NumP and not a WQP or SQP.

The derivation is therefore straightforward. The NumP in (25) merges with the numeral to yield (28), where the numeral functions to take a predicate and yield a generalized quantifier.



Recall that the numeral *se* is [u-group] because its complement must be a plural noun. The node that dominates nP in (28) must be a Number Phrase, since there is no overt classifier and since the quantity feature is [rel], in contrast to the classifier's [abs]. However, we can raise the question of whether the overt Number Phrase is accompanied by a null classifier, even if number morphology performs quite well on its own in serving up a set of pluralities for the numeral to merge with. That is, a possibility is that the syntactic structure for (22) might actually be (29) with a null classifier instead of (28).



The proposal in this dissertation is that the CLP with the null classifier is not present for lack of evidence. Certainly we don't need the classifier's [group] feature, since we have one in the plural marker. But avoiding redundancy is not the main point. An argument can be presented from a language-acquisition perspective. The Persian-learning child may have deduced that *some* number feature is required for making sets of pluralities. This is satisfied by *-ha*'s [group] feature. The child concludes that a null classifier is not required. Thus there is neither independent morphological evidence nor semantic evidence that a null classifier is present in this type of numeral+noun+plural structure. If the language learner hypothesizes the null classifier in (29) she quickly rules it out for lack of evidence.

A main reason for (28) rather than (29) being the preferred structure is that (28) is simpler than (29) because it has less structure. Clark and Roberts (1993, p313) suggest that "elegance" is taken into account by language learners and that, other things being equal, a hypothesis with a more compact representation, i.e. with fewer nodes, is preferred over one with more nodes (Clark

and Roberts 1993, p313). Further, if neither of two hypotheses about the data runs into a counterexample, the simpler hypothesis, the one involving fewer nodes, is preferred.

The derivation proposed here for the structure with a plural marker but not a classifier is parallel to Borer's account. While there are differences in particular syntactic mechanisms in our approaches, both our theories propose that either a CL or plural marker serves to project Number/Classifier Phrases. Borer's main idea is that a noun needs dividing structure to get a count reading; my point is similar except that I specifically rely on syntactic features with a corresponding semantics. Also for her, the CLP is universal, housing either a classifier or a plural marker. In this dissertation, as is apparent in the derivation below in section 4.1.3 for expressions with both a classifier and plural morphology, CLP and NumP can be independently generated; so when a classifier is absent but plural morphology is present, it is specifically the NumP which is generated. But empirically, Borer and I come out even and we both come out ahead of Chierchia's theory on this count (see sections 3.3.3 and 3.3.1.2). Since Persian uses classifiers, Chierchia, at least in spirit, would rule out the use of the plural marker in (22) since in his system the plural is inconsistent with what he holds to be mass nouns. In a weaker form, however, Chierchia might be able to account for (22). He could resort to the necessary typeshifting, which would require something like the presence of null classifiers. But Chierchia does not address the possibility of null classifiers.

#### **4.1.3 Numeral+CL+noun+PL**

Now let's go to the structure that is problematic for both Borer (2005) and Chierchia (1998a,b), where the classifier occurs in the same structure as plural morphology. Recall that for

Borer the cooccurrence of CL and PL is disallowed because both would be assigning range to the same open variable,  $\langle e \rangle_{\text{DIV}}$ , in a Classifier Phrase. In her terms, a noun like *dog* will default to mass unless it is individuated by dividing structure in the syntax. The individuation can be provided by a numeral classifier or number morphology. (See section 3.3.3.)

(30)  $[_{\text{CL}^{\text{max}}} \langle e \rangle_{\text{DIV}} [_{\text{NP}} \text{dog}]]$

The  $\text{CL}^{\text{max}}$  head's open variable,  $\langle e \rangle_{\text{DIV}}$ , is assigned range by a classifier or number morphology, which compete for the position: only one can apply, (31a) or (31b), but not (31c).

(31a)  $[_{\text{CLP}} \text{CL} \langle e \rangle_{\text{DIV}} [_{\text{NP}} \text{dog}]]$

(31b)  $[_{\text{CLP}} \text{PL} \langle e \rangle_{\text{DIV}} [_{\text{NP}} \text{dog}]]$

(31c)  $*[_{\text{CLP}} \text{CL PL} \langle e \rangle_{\text{DIV}} [_{\text{NP}} \text{dog}]]$

This follows from her analysis of quantificational adverbs, which, Borer observed, can quantify over subjects or events but not both. That was why Borer says (32) is bad. Although *always* can't quantify over dying events in a characterizing statement it can quantify over *hummingbirds*. But if it does, then *most* is prevented from also doing so.

(32) \*Most hummingbirds always die

Paralleling the quantificational adverb facts with elements within DP, Borer predicts that number morphology and classifiers cannot cooccur, since both are seeking to provide countable units for the mass noun while there is only a single variable for them to quantify over. Her account is corroborated by data in Mandarin, which only uses classifiers, data in English, which only uses

number morphology, and data in Armenian, which, she says, has both but uses no more than one of them in any particular construction.

For Chierchia (section 3.3.1.2), while his system can in principle account for the presence of CL and PL in the same expression through typeshifting, it isn't clear in his theory why the same typeshifting evidently isn't available in Mandarin, which rigidly bars the cooccurrence of CL and PL. That is, whatever typeshifting could be adduced to allow the cooccurrence of CL and PL in Persian (33a) ought to also allow it in Mandarin (33b), contrary to fact.

- |       |                                                                       |                 |
|-------|-----------------------------------------------------------------------|-----------------|
| (33a) | do    ta    danešju-ha<br>two   CL   student-PL<br>'the two students' | <i>Persian</i>  |
| (33b) | *liang ge    xuesheng-men<br>two   CL   student-PL                    | <i>Mandarin</i> |

We want to derive the expression in (34).

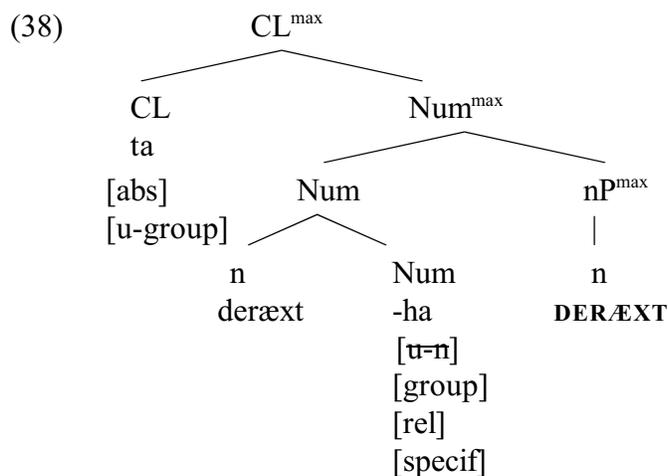
- |      |                                                              |                |
|------|--------------------------------------------------------------|----------------|
| (34) | car    ta deræxt-ha<br>four   CL tree-PL<br>'the four trees' | <i>Persian</i> |
|------|--------------------------------------------------------------|----------------|

The derivation begins by categorizing the root to give the noun *deræxt*, resulting in (35).

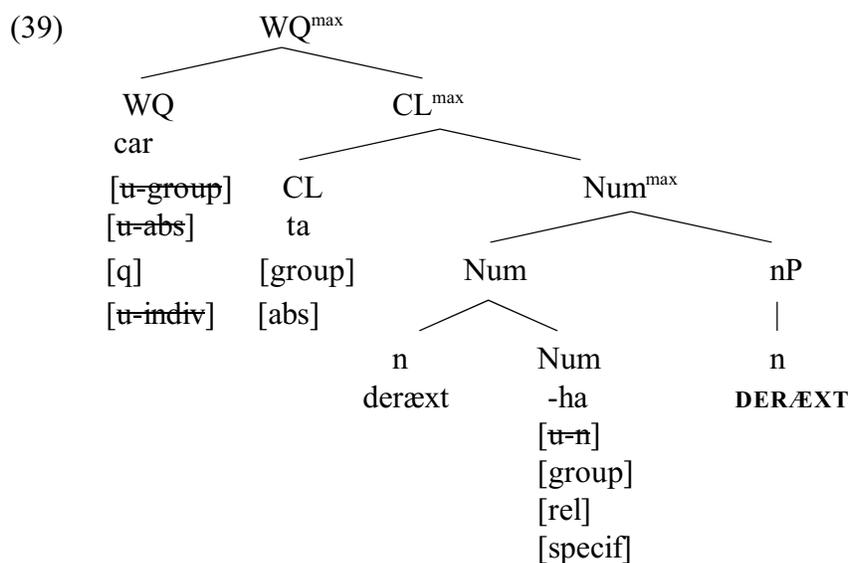
- |      |                               |
|------|-------------------------------|
| (35) | nP<br> <br>n<br>deræxt<br>[n] |
|------|-------------------------------|

The nP merges with the plural morpheme *-ha*, as in (36).





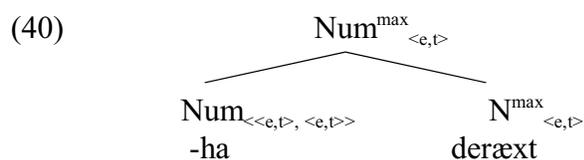
The classifier in (38) contains another [group] feature as well as the feature [abs]. There are no uninterpretable features in the classifier. But composition is assured by the semantic type. Recall that classifiers are of type  $\langle\langle e,t\rangle, \langle e,t\rangle\rangle$  and here the complement is of the right type, a NumP of type  $\langle e,t\rangle$ . The Classifier Phrase can then merge with the numeral *car* ‘four’ (39).



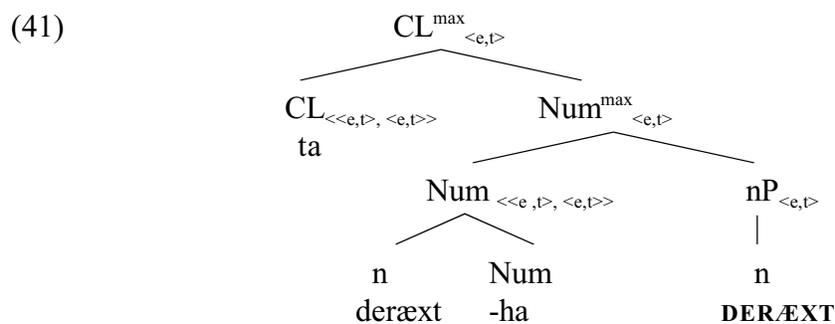
The numeral’s unchecked features are. At this point all unchecked features in the derivation are checked and the structure is syntactically well formed. A classifier and plural marker can cooccur

in Persian because the features don't block it. CLP and NumP are allowed to be separate projections.

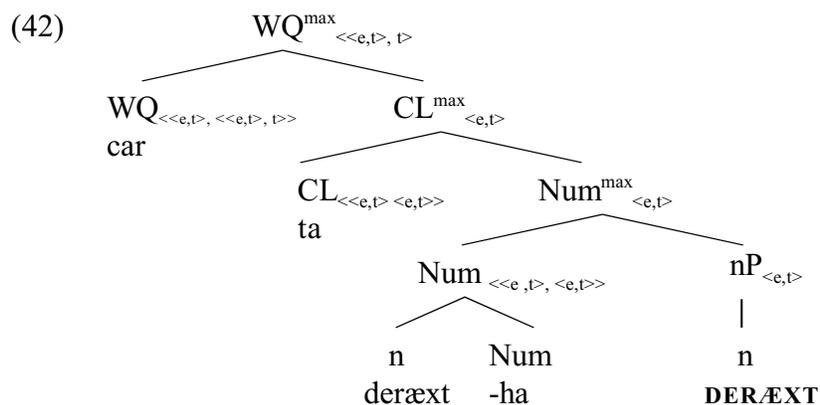
Let's consider the semantic composition. The plural marker merges with nP and serves as a function from  $\langle e, t \rangle$ -type nPs to  $\langle e, t \rangle$ -type NumPs. Recall that the set denoted by *deræxt-ha* is a subset of the set denoted by *deræxt*, which as predicate is the set of all trees.



$\text{Num}^{\text{max}}$  merges with the classifier, which in Persian takes  $\langle e, t \rangle$ -type complements to produce another  $\langle e, t \rangle$  object, the Classifier Phrase. The extension of the CLP is a set.



The numeral, a weak quantifying determiner, takes the set denoted by the Classifier Phrase and gives us a generalized quantifier (42), which can be an argument (43).



- (43)  $[[_{WQ_{max}} \text{car ta deræxt-ha}]_{\langle\langle e,t \rangle, t \rangle}$        $[\text{tændorost-ænd}]_{\langle e,t \rangle}_t$   
 four CL tree-PL      healthy-3P  
 ‘The four trees are healthy’

Again, we will see in chapter 5 that the subject of (43) is actually a SQP, since specificity is involved. And, to remind, recall that Quantifier Phrases appear under Case Phrases, discussed in section 5.5. The important point here is that we get the NumP and CLP to merge with a higher head that involves quantification.

This derivation successfully and easily accounts for the cooccurrence of CL and PL. The Persian derivation, in contrast to its Mandarin equivalent, is permitted by slight variations in how functional elements are featured. Persian *ta* is [group], or plural, while Mandarin *ge* is [indiv], meaning it can be used with any numeral. More importantly, while Mandarin *ge* is [u-n], meaning it requires a noun complement, Persian *ta* is not [u-n] and therefore not restricted to noun complements. That is, *ta* can take a NumP as a complement. Thus my model has more empirical coverage than the models of both Chierchia and Borer, who can not account for numeral+CL+noun+PL. To repeat, Borer predicts classifiers should not cooccur with plurals

while Chierchia's system, which can allow for typeshifting to allow their cooccurrence, cannot explain why Persian but not Mandarin should have such typeshifting.

#### 4.1.4 Numeral+noun: classifier optionality

In the derivation in 4.1.2 above, where a classifier is not morphologically present but plural is, I argued that the classifier is not present in a null form. In that sense, the classifier is optional in Persian. But what is important is not so much whether the classifier is optional as whether the features [abs, group] that it contributes to the derivation are optional. I have argued that isn't the case. These features are required for successful syntactic composition. Since count nouns are [u-indiv], that feature must be checked. To sum up, in the three derivations so far, number features have been introduced by overt means. In the basic construction (44) there is the classifier.

(44) car    ta deræxt                    *individuation by [group] on ta*                    *Persian*  
       four    CL tree  
       'four trees'

And there were the constructions with plural (45a) and both (45b).

(45a) se        ostad-a                    *individuation by [group] on -ha*  
       three    professor-PL  
       'the three professors'

(45b) car        ta deræxt-ha                    *individuation by [group] on -ha, redundant [group] on ta*  
       four        CL tree-PL  
       'the four trees'

These all contrast with (46), where neither plural nor classifier is present.

- (46) se     ostad  
       three professor  
       ‘three professors’

In learning Persian, a child finds evidence in by each of (44-45) that number of some kind is spelled out in overt morphology. However, in numeral+noun constructions without a classifier or plural marker there is no overt morphology present, as in (46), to produce a set of pluralities.<sup>49</sup> This could be called a case of classifier optionality, but we have already seen that the classifier is optional in numeral+noun+PL constructions. Since we are considering classifiers to be a form of number marking, (46) should more properly be called a case of number optionality in the sense that no overt morphology carries the relevant number feature. In brief, however, the model being proposed here accounts for constructions that do not contain a classifier.

Although as indicated in footnote 47 some speakers do not accept the absence of the classifier in expressions like (46), there are reasons to have an explanation for classifier optionality in the syntax. For one, the optionality is acceptable for some speakers. Second, the optionality of classifiers is attested in other Persian languages and dialects, as in (47a) and (47b) (from Lambton 1938, p19 (Meime) and p50 (Jaswhaqani)).

- |       |                                              |               |                   |
|-------|----------------------------------------------|---------------|-------------------|
| (47a) | do     (ta)<br>two   (CL)<br>‘two crows’     | γɛla:<br>crow | <i>Meime</i>      |
| (47b) | do     nafar<br>two   person<br>‘two people’ |               | <i>Jawshaqani</i> |

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<sup>49</sup>Recall that some find the numeral+noun unacceptable. The issue of optionality and acceptability is discussed immediately below.

Finally, optionality in the use of classifiers seems to be common, depending factors such as register and the size of the numeral. Optionality is attested in Indonesian (Chung 2000, McDonald 1976) and generally (Aikenvald 2000).

For those Persian speakers who find classifierless numeral data ungrammatical, their grammars require that the classifier have a [u-indiv] feature, as in Mandarin.

Borer (2005) addressed the optional classifier for Armenian. As we saw in chapter 3, Borer's syntax correctly predicts the paradigm in (48) for Armenian.

- |       |                        |             |             |                 |
|-------|------------------------|-------------|-------------|-----------------|
| (48a) | yergu                  | hovanoc     | uni-m       | <i>Armenian</i> |
|       | two                    | umbrella    | have-1S     |                 |
|       | 'I have two umbrellas' |             |             |                 |
| (48b) | yergu                  | had         | hovanoc     |                 |
|       | two                    | CL          | umbrella    |                 |
| (48c) | yergu                  | hovanoc-ner |             |                 |
|       | two                    | umbrella-PL |             |                 |
| (48d) | *yergu                 | had         | hovanoc-ner |                 |
|       | two                    | CL          | umbrella-PL |                 |

I return to the Armenian paradigm cited by Borer in more detail in section 4.3, but for now I am interested in Borer's proposal to account for the grammaticality of (48a), where neither a classifier nor number marker occurs. In principle, this should be okay, since Borer's main point is to rule out (48d). And barring the cooccurrence of CL and PL leaves open the possibility that neither might occur. Still, there remained the question of how the syntax handles individuation of the noun without an overt classifier or number marker, since without either of these dividers the noun defaults to a mass interpretation. For (48a), Borer proposes that the dividing function is

achieved through raising.<sup>50</sup> For her, this means allowing the numerals themselves to be mass-dividers. In her Hungarian example, the numeral begins life inside Borer's Classifier Phrase to serve as a divider and then raises to its position in her quantity phrase (#P) (from Borer 2005, p117).<sup>51</sup>

(49) [DP [ #P ket <e> #DIV [CL<sub>max</sub> ket DIV(#) [NP kalap ]]]] Hungarian  
two two hat

The same argument could be used for Persian, in which case we would have (50).

(50) [DP [ #P se <e> #DIV [CL<sub>max</sub> se DIV(#) [NP ostad ]]]] Persian  
three three professor

In this section I argue against this approach. First I explain why I reject Borer's syntax, and then I present the feature-raising approach. Simply, Borer's approach has a number of technical problems whose solutions point to a need for some kind of feature specification similar to the one I am arguing for. We saw that her syntax of assigning range to a variable in a phrasal head failed to explain why a classifier can appear with plural morphology in Persian, which raises general questions about her syntax. But there are other problems that arise regarding her derivation of a structure with a definite singular like *the cat* (Borer 2005, p160ff).

In Borer's terms, the DP *the cat* must have at least the noun in the head of NP and the definite article in the head of DP, as in (51). Remember that in Borer's syntax the <e> notation

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<sup>50</sup>Borer also cites Hungarian as using bare numeral+noun constructions, e.g. *ket kalap* 'two hat'. This is perhaps common. Brazilian Portuguese, a nonclassifier language, also allows numerals with nouns but without plural morphology (Nattalia Paterson p.c.). It is also possible in Persian as we have seen.

<sup>51</sup>Also recall that for Borer the empty D position is licensed by an operator outside DP.

indicates an open variable of various kinds:  $\langle e \rangle_d$  for definite,  $\langle e \rangle_{\#}$  for enumeration and  $\langle e \rangle_{DIV}$  for dividing structure that gives us count nouns.

(51)  $[_{DP} \text{ the } \langle e \rangle_d [_{\#P} \langle e \rangle_{\#} [_{CL_{max}} \langle e \rangle_{DIV} [_{NP} \text{ cat } ]]]]$

Borer's question at this point is how to give value to the open variables  $\langle e \rangle_{\#}$  in #P and  $\langle e \rangle_{DIV}$  in  $CL^{max}$ . A related problem is to block \**the a*. In order to block \**the a*, in that order specifically, Borer makes the reasonable assumption that the two articles must compete for the same slot at some point in the derivation, in #P. So, Borer reasons, *the* must start at least as low as inside #P before raising, where it assigns range to the open variable  $\langle e \rangle_{\#}$  to provide quantity. If *the* appears within #P, then *a* cannot have been in that position. Hence the complementary distribution of the articles. From #P, *the* moves to DP. So Borer presents at least the tentative structure in (52), with the open variable in CLP still in need of being assigned range.

(52)  $[_{DP} \text{ the } \langle e \rangle_d [_{\#P} \text{ ~~the~~ } \langle e \rangle_{\#} [_{CL_{max}} \text{ ??? } \langle e \rangle_{DIV} [_{NP} \text{ cat } ]]]]$   
 $\uparrow$   
***the* must have undergone Internal Merge here**

Based on Heim (1982) and Kamp (1981), Borer assumes that *the*, when it has a singular antecedent, “inherits the specifications of its antecedent” (Borer 2005, p167). So when the antecedent is singular, as in *the cat*, *the* must also assign range to the variable where the count distinction is made, inside CLP. This is where, Borer deduces, *the* must have begun. It subsequently raises to the two higher positions.

$$(53) \quad [_{DP} \text{ the } \langle e \rangle_d [_{\#P} \text{ the } \langle e \rangle_{\#(DIV)} [_{CL^{max}} \text{ the } \langle e \rangle_{DIV(\#)} [_{NP} \text{ cat } ]]]]$$

↑  
***the* undergoes External Merge here**

Note the subscripts for the open variables in #P and  $CL^{max}$  have changed between (52) and (53). This is because the range assigners for  $\langle e \rangle_{\#}$  and  $\langle e \rangle_{DIV}$  have fused (Borer 2005, p111), leaving them  $\langle e \rangle_{\#(DIV)}$  and  $\langle e \rangle_{DIV(\#)}$  respectively. Basically,  $\langle e \rangle_{\#(DIV)}$  tells us that the open variable for enumeration has been valued by the same morpheme as the divider;  $\langle e \rangle_{DIV(\#)}$  tells us that the open variable for dividing has been valued by the same morpheme as that providing enumeration.

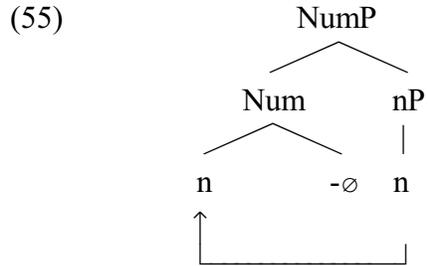
Let me point to a few problems with this approach. Borer seems to successfully account for the ungrammatical *\*the a*, but I think she leaves open the possibility of *\*a the*, *\*few the* and other ungrammatical orderings. In particular, note that the open variable in #P can be given range by a number of items, such as numerals and other weak quantifying determiners. Now, if *the* can assign range to  $\langle e \rangle_{DIV(\#)}$  inside CLP as in (54a), as she suggests in her proposed structure in (53), there doesn't seem to be anything to prevent leaving *the* inside  $CL^{max}$  and allowing a weak quantifying determiner from being inserted in #P, in its canonical position, to give the ungrammatical (54b). In short, *\*few the* ought to be grammatical for Borer.

$$(54a) \quad [_{\#P} \quad \langle e \rangle_{\#DIV} [_{CL^{max}} \text{ the } \langle e \rangle_{DIV(\#)} [_{NP} \text{ cat } ]]]$$

$$(54b) \quad *[_{\#P} \text{ few/a } \langle e \rangle_{\#DIV} [_{CL^{max}} \text{ the } \langle e \rangle_{DIV(\#)} [_{NP} \text{ cat } ]]]$$

A second problem involves *the*'s numberlessness. Since *the* is not inherently singular or plural or numbered at all in English, as in *the cat/the cats/the meat* respectively, it's hard to see why *the* is merged in the CLP as Borer supposes for the singular case. For plurals, she clearly states that the noun raises to the plural divider, which spells out as *N-s*. True, English has no overt

singular marker, but some languages do<sup>52</sup> and when there is a singular suffix the noun would presumably raise to it just as it does to the plural marker.<sup>53</sup> I have been assuming that also in the case of a singular noun the noun raises to adjoin to the null affix in the NumP head, as in (55).



So, two particular problems arise with Borer's approach: she predicts *\*a the* should be grammatical, and it is unclear why *the* should serve as a number-assigning element in the case of singular *the N*.

In what follows, I argue that raising the noun to CL/NumP in all cases, sometimes to an overt suffix and sometimes to a null one, but in both cases the real motivation for movement is to check uninterpretable features, possibly spelling out the features of two heads on a single head. Now, since we are dealing with an apparent null head of CL/NumP, there are two feature bundles that cannot be inserted in this case: [u-n, group, abs] and [u-n, group, rel, specif], as these would spell out as *ta* and *-ha* respectively. Transparently, the two bundles have [group] in common. Less transparently, they also have in common the basic number feature [q]. This is so because the

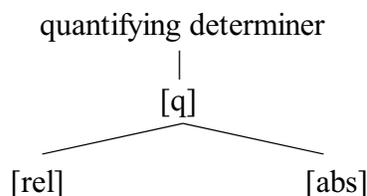
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<sup>52</sup>Latin marks singular overtly with an inflection on a root. So for the masculine noun root *ann-* 'year' there is *annus* (nominative singular) and *anni* (nominative plural). Similarly, Sanskrit adds number/gender/case inflections to stems: *deva-* 'god' (a masculine noun) ⇒ *devas* (nominative singular), *devau* (nominative dual), *devās* (nominative plural). In both languages sometimes the same phonetic form has more than one meaning. For example, *devau* is also vocative and accusative (Sanskrit data from Cardona 1990, p458). And of course modern Italian overtly marks both singular and plural, e.g. *soldat-o/soldat-i* 'soldier/soldiers'.

<sup>53</sup>The alternative is to lower the number marker if English nouns do not raise (e.g. Cinque 1994).

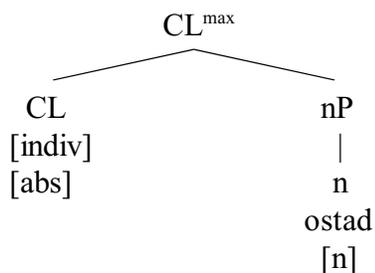
plural is [rel], meaning it can be checked by either a numeral or nonnumeral determiner, while the classifier's [abs] entails [q], as in (56).

(56) Feature geometry for quantifying determiners



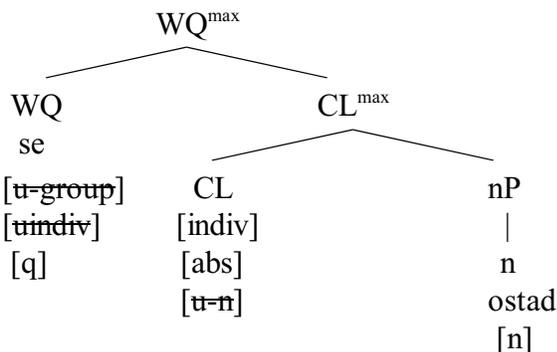
The null head is [u-n, indiv, abs]. The three forms, plural, classifier and null, are distinct in their feature bundles. Plural is [u-n, group, rel, specif], classifiers are [group, abs] and the null element is [u-n, indiv, abs]. Therefore, the tree so far is (57). Note that the feature bundle for CL does not have a Spellout.

(57)



And now  $CL^{\max}$  merges with the numeral *se* 'three', as in (58), with the WQ's [u-group] and [u-abs] checked by its matching features in the CL goal.

(58)

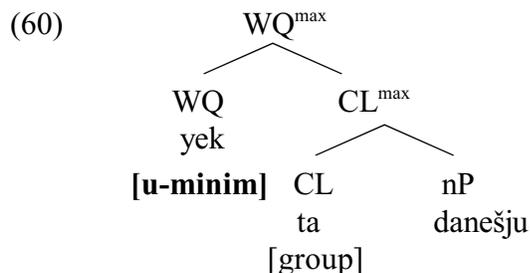


Summarizing, in cases of optional classifiers, a feature bundle is inserted in CL which does not match either the feature bundle of a classifier or the feature bundle of a plural marker and which therefore cannot spell out as either. The number-related feature bundle is not spelled out as a separate morpheme.

While *ta* is optional in Persian, recall that in one case in Persian, with the numeral *yek* ‘one’, it cannot be used, as shown above in section 4.1.1 and repeated here in the contrast between (59a) and (59b).

- |       |      |         |         |                |
|-------|------|---------|---------|----------------|
| (59a) | *yek | ta      | danešju | <i>Persian</i> |
|       | one  | Cl      | student |                |
| (59b) | yek  | danešju |         |                |
|       | one  | student |         |                |

The contrast in (59) was described above by suggesting that *ta* is featured as [group], i.e. plural, which, reasonably, is inconsistent with the singularity of *yek* ‘one’. In the case of *yek*, then, its relevant number feature is [minim], i.e. singular, rather than plural [group]. Therefore, *yek* is inconsistent with [group], just as *one* is inconsistent with the [group] features on the plural *-s* of *cats*. This leads to the derivation in (60) for (59a), where *yek*’s [u-minim] fails to get checked.



Chierchia (1998a) says nothing about the absence of classifiers when he predicts they should be present to make countable things out of purported mass nouns in classifier languages. He could presumably resort to typeshifting. But as we saw in section 3.3.2 the typeshifting in such cases introduces semantic derivations where extra steps are needed to convert mass nouns to count nouns and back to mass nouns to that both plural and classifiers can compose with their proper complements. If one aligns syntax and semantics, the extra semantic steps lead to extra syntactic steps in a derivation. Borer and I agree that even if the classifier is absent some mechanism must fulfill the semantic function of producing pluralities and individuals that can be counted. We disagree on which two elements are involved. For her, the numeral is generated in CLP and raises to #P (what I am calling WQP) whereas in the model presented in this dissertation it is the noun that raises, to the head of CLP or NumP. I suggest that my account is more complete than Borer's. For Borer, if the numeral starts out in CLP it must have a classifier's function. Borer says this much, but we must then ask why the numeral can't otherwise function as a classifier. Recall that her analysis proposed that the cardinals can be "dividing cardinals" that begin life inside  $CL^{\max}$  and then raise to the quantifying position inside #P, as in the derivation for Armenian *yergu hovanoc* 'two umbrella', as in (61a). But there is nothing in principle that would



#### 4.1.5 Summary of the feature-driven approach applied to Persian classifier data

To recap the main points of this section, we have used the features in (62) to account for the four basic classifier constructions in Persian: numeral+CL+noun (section 4.1.1), numeral+noun+PL (4.1.2), numeral+CL+noun+PL (4.1.3) and numeral+noun (4.1.4). The account proposed here provides for an explicit feature relationship between functional heads in the syntax. And, crucially, it makes correct predictions about the one case where Borer's analysis does not—where CL and PL can occur together. In comparing the feature account with Chierchia's model, the present proposal more easily accounts for the cooccurrence of CL and PL than his model does. Further, since we have seen that in classifier languages there is a mass/count distinction in nouns (see section 3.2), we assume a common crosslinguistic derivation of those syntactic structures that can function as arguments, which allows us to avoid the problems stemming from Chierchia's postulation that noun types are parameterized by language. Also, the feature-based treatment of classifiers is superior to Chierchia's in handling the situation when a classifier is not overt.

The following summarizes the characteristics of numerals and number morphology for Persian.

(62) Functional items in the Persian DP

|       | <u>head</u>      | <u>syntactic features</u> | <u>semantic type</u> |
|-------|------------------|---------------------------|----------------------|
| (i)   | noun:            | [n]                       | <e,t>                |
| (ii)  | plural:          | [u-n, group, rel, specif] | <<e,t>, <e,t>>       |
| (iii) | classifier:      | [group, abs]              | <<e,t>, <e,t>>       |
| (iv)  | null classifier: | [u-n, indiv, abs]         | <<e,t>, <e,t>>       |
| (v)   | numeral WQD:     | [q, u-group, u-indiv]     | <e,t> ⇒ GQ           |
| (vi)  | nonnumeral WQD:  | [q, u-group, u-rel]       | <e,t> ⇒ GQ           |

And, we saw that numerals are further featured as [minim] for *yek* ‘one’ and [group] for *do* ‘two’ or more. These associations of heads, features and semantic functions differ from those in Mandarin in the plural features and the classifier features. Persian *ta* is [group] rather than [indiv], meaning that it is a pure plural marker although it appears only with numerals. Another difference is that the Persian classifier lacks the [u-n] feature of Mandarin *ge*, meaning that Persian classifiers, but not Mandarin *ge*, can occur with a NumP as well as with an NP.

I will cover more issues of Persian classifiers and plural morphology below in section 4.6. But first, having covered all the basic Persian data, I apply the approach in this section to the Mandarin, Armenian and English data presented in section 3.3 to show that the analysis proposed in this dissertation accounts not only for the problematic cases but also for the data successively accounted for in earlier treatments.

#### 4.2 Mandarin

Recalling the features and semantic types of heads and phrases in the Mandarin DP, repeated in (63).

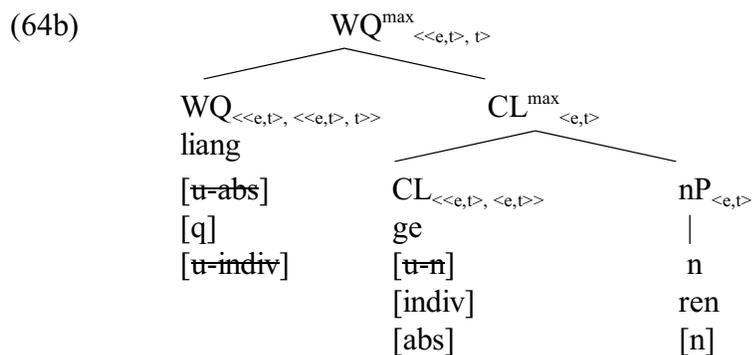
| (63)  | <u>Functional Items in the Mandarin DP</u> |                           |                      |
|-------|--------------------------------------------|---------------------------|----------------------|
|       | <u>head</u>                                | <u>syntactic features</u> | <u>semantic type</u> |
| (i)   | noun:                                      | [n]                       | <e,t>                |
| (ii)  | plural:                                    | [u-n, group, rel]         | <<e,t>, <e,t>>       |
| (iii) | classifier:                                | [u-n, indiv, abs]         | <<e,t>, <e,t>>       |
| (iv)  | numeral WQD:                               | [q, u-abs, u-indiv]       | <<e,t>, <<e,t>, t>>  |
| (v)   | nonnumeral WQD:                            | [q, u-rel, u-indiv]]      | <<e,t>, <<e,t>, t>>  |

#### **Numeral+classifier+noun**

In the basic numeral+CL+noun construction (64a), the derived structure in (64b) follows from the syntactic and semantic composition motivated by the associations in (63).

(64a) liang ge ren  
 two CL person  
 'two people'

*Mandarin*



In (64b), [u-n] on the classifier is checked by [n]. Then, [abs] on the classifier checks the feature [u-abs] on the numeral and [indiv] checks [u-indiv]. Semantically, the classifier is a function from <e,t>-type nPs to <e,t>-type CLPs. The numeral then is a function from <e,t>-type CLPs to a generalized quantifier.

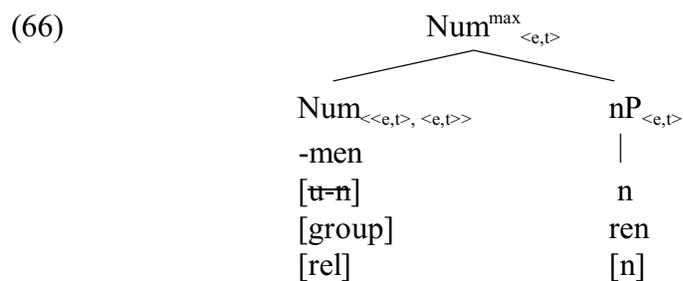
#### \*Numeral+noun+PL

If plural is used instead of the classifier the derivation crashes, as in the ungrammatical (65).

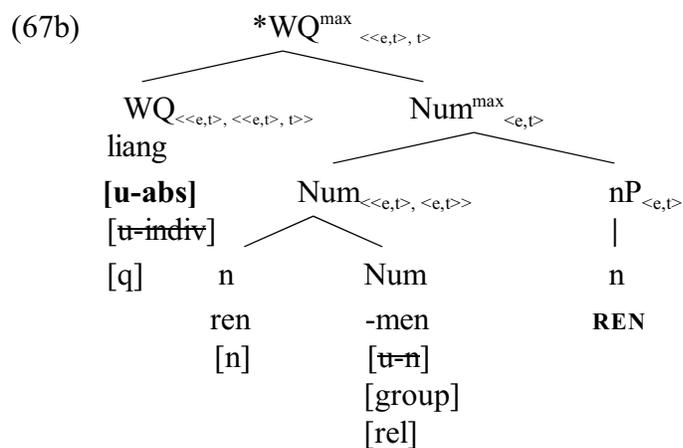
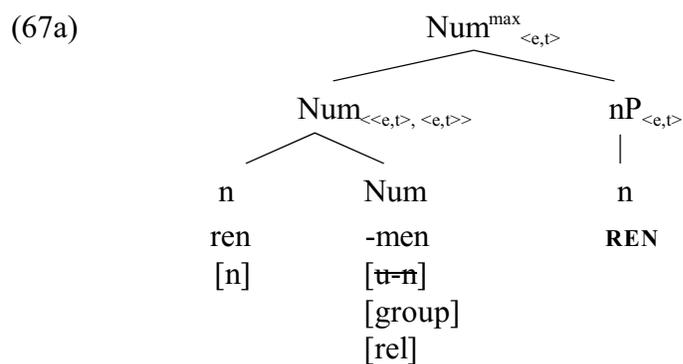
(65) \*liang ren-men  
 two person-PL

*Mandarin*

The basic point is that in Mandarin numerals are inconsistent with the plural marker *-men*. Recall from section 4.1, that Num merges with nP.



Following head movement of n to adjoin to Num, a suffix, we have (67a) and after Merge of WQ and Num<sup>max</sup> the result is (67b).



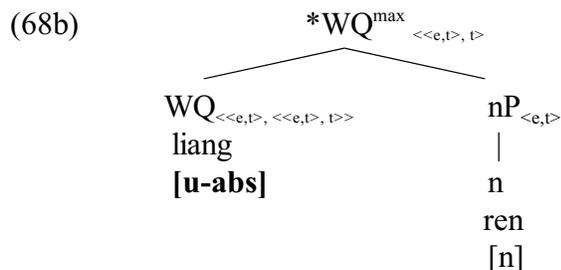
In (67b), while the semantic composition works, as the function in each head takes the correct input and yields the correct output, [u-abs] on *liang* ‘two’ has failed to get checked. The derivation crashes.

**\*Numeral+noun**

The ungrammaticality of numeral+noun without a classifier (68a) is also predicted under the feature-based theory. Syntactically, the composition results in [u-abs] being unchecked in (68b).

(68a) \*liang ren  
two person

*Mandarin*



While (68) is ungrammatical because [u-abs] is not checked, we can ask why Mandarin does not allow the option of a null classifier, as Persian does (see section 4.1.4). Recall that Persian has the following number feature bundles.

(69) Available feature bundles for CL/PL in Persian

|       |            |                           |   |             |
|-------|------------|---------------------------|---|-------------|
| (i)   | plural     | [u-n, group, rel, specif] | = | <i>-ha</i>  |
| (ii)  | classifier | [group, abs]              | = | <i>ta</i>   |
| (iii) | null       | [u-n, indiv, abs]         | = | $\emptyset$ |

There are differences among the three. The plural is [specif] and [rel] in contrast to the other two.

The overt and null classifier differ in that the overt classifier is [group] while the null one is

[indiv]. In effect, there are three separate feature bundles. But in Mandarin, the overt classifier is

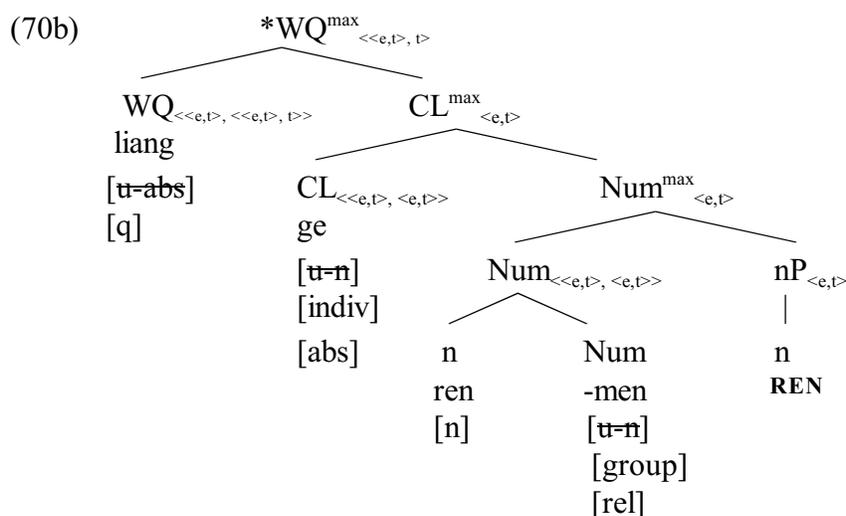
[indiv], which means that if Mandarin had the equivalent of (iii) in (69) it would comprise the same bundle of features as the overt form. It is important that the three items have distinct feature bundles so that they appear in distinct contexts. While Persian has a covert classifier, evidently, a null classifier feature bundle that is distinct from the overt one is not available in Mandarin.

### \*Numeral+CL+noun+PL

Once again, Mandarin does not permit the plural *-men* to be used in conjunction with a classifier as in (70a), with the structure in (70b).

(70a) \*liang ge ren-men  
two CL person-PL

*Mandarin*



For the ungrammatical expression in (70a), while the syntax and semantics appear to work there are two problems that rule it out. Where the syntax appears to work is in the feature checking: the uninterpretable features, [u-abs] in WQ and the two appearances of [u-n] in Num and CL, are checked by their matching goals. Semantically, all the functions are licit: Num is a function from  $\langle e,t \rangle$  to  $\langle e,t \rangle$  and the classifier to is a function from  $\langle e,t \rangle$  to  $\langle e,t \rangle$ . But the

violations include the cooccurrence of [rel] under Num and [abs] as well as the projection of separate CLP and NumP. The first violation, the cooccurrence of [rel] and [abs] is not an absolute one. As argued at the end of section 5.2.2, Harley and Ritter's (2002) feature geometry permits it in principle and it is possible that such an item may be lexicalized in English as *both*, [rel] in the sense of *all* and [abs] in the sense of *two*. But (70a) does not have the meaning of *all two*. Further, (70b) with separate projections for CLP and NumP violates the generalization made by the Mandarin-learning child: there is only one Number/Classifier projection available in Mandarin. This conclusion is similar to the proposal we have seen in Borer (2005): nouns must be individuated and they may be individuated by either a classifier or number marker but not both. Under the Chierchia (1998a,b) analysis, what is wrong with (70b) is the use of the plural with the noun; recall that for Chierchia Mandarin nouns are mass and not amenable to being pluralized.

### **Summary of the Mandarin data**

The feature-based approach predicts the basic grammatical and ungrammatical structures in the Mandarin classifier system. Borer (2005) and Chierchia (1998a,b) claim to also account for the Mandarin data, but I think at least one problem remains for them. Both of their accounts of the numeral+CL+noun structure are straightforward. Chierchia requires the classifier in order for the mass noun to allow access to individuals, since all Mandarin nouns are mass. Similarly, Borer predicts this structure to be fine because a classifier is assigning range to the open variable in CLP, giving count status to the noun. The numeral+noun+plural expression presents a problem for Chierchia, at least in a strict sense. Since Mandarin nouns are mass, pluralization of a noun is predicted not to occur, although he hedges a bit on this by calling the lack of plurality the

“normal” case. He could in principle typeshift the denotation of the noun from an entity to a set, but, again, that undermines the parameterization of Chinese nouns as mass. Borer’s theory too is challenged by the numeral+noun+plural situation. In principle, Borer requires the noun to get individuated by either a classifier or plural. Since a plural morpheme is present, the individuation should occur and (65) should be licit. The analysis proposed here also makes clear that Mandarin plurals check [u-rel] on the nonnumeral quantifying element. Hence, the feature-based system predicts the acceptability of (65), where Chierchia and Borer do not.

For the numeral+noun construction, Borer and myself are descriptively equivalent, both of us predicting this structure impossible. Chierchia, on the other hand, has a problem in that he predicts that the purported mass nouns of Chinese require a classifier, at least when quantified by numerals. As for the numeral+CL+noun+plural construction, the proposal in this dissertation clearly comes out ahead of Chierchia and Borer. Chierchia expects there not to be plural in Chinese, because plurals are inconsistent with mass nouns. Borer, on the other hand, has no problem with a classifier or plural being used, as long as they are not used together. She correctly predicts (70) to be bad, because in this case the plural marker and the classifier are competing to assign range to the same open variable in CLP. The feature-based system, in principle, allows CLP and NumP to be separate projections, because classifiers and number marking can vary in their syntactic features and semantic types.

### **4.3 Armenian**

To show that the feature-based system can account for the Armenian data presented by Borer (2005), I go through the four numeral constructions she covered. We both can account for

the data within our different syntactic proposals, but I believe that Borer's proposal makes predictions that don't hold up. Further, in what follows I present more data that indicates that Borer's paradigm of mutually exclusive classifiers and plural markers is not as absolute as she assumes. It is possible in a few cases for a classifier and plural morphology to occur in the same construction. This is counterevidence to her contention that classifiers and number marking cannot occur in the same structure in Armenian. To the degree that Armenian does allow their cooccurrence it is like Persian. And we saw in section 4.1.3 that the theory here being proposed easily allows for both. One other fact not discussed by Borer is that Armenian plurals, like Persian plurals, entail specificity/definiteness. This raises problems for Borer's analysis. Under the current proposal, if Armenian *is* different from Persian and does not allow the cooccurrence of classifiers and plural morphology, this is because of a difference in the feature specification of classifiers and number marking.

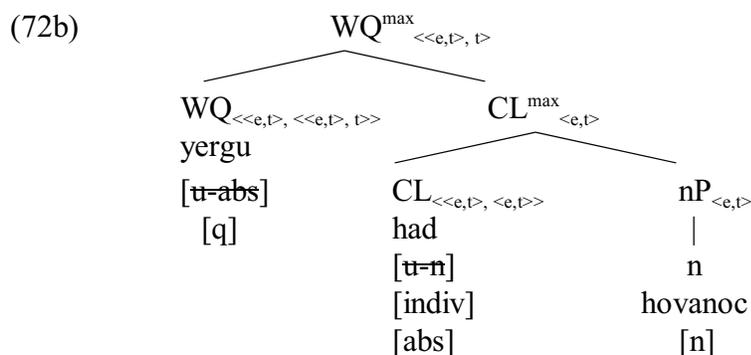
Assuming Borer's (2005) generalization about Armenian discussed in section 3.3.3, the noun and numeral can appear without a classifier or plural (71a), with a classifier (71b), with a plural (71c), but not with both (71d). For Borer in particular the Armenian data are crucial for her hypothesis that plural and classifier serve a similar function and are therefore mutually exclusive.

- |       |                        |             |                 |
|-------|------------------------|-------------|-----------------|
| (71a) | yergu hovanoc          | uni-m       | <i>Armenian</i> |
|       | two umbrella           | have-1S     |                 |
|       | 'I have two umbrellas' |             |                 |
| (71b) | yergu had              | hovanoc     |                 |
|       | two CL                 | umbrella    |                 |
| (71c) | yergu hovanoc-ner      |             |                 |
|       | two umbrella-PL        |             |                 |
| (71d) | *yergu had             | hovanoc-ner |                 |
|       | umbrella CL            | umbrella-PL |                 |

**Numeral+classifier+noun**

This construction is as in Mandarin. Semantically, the classifier *had* takes a set and yields another set, and the function associated with the numeral *yergu* ‘two’ takes that set and yields a generalized quantifier, as the structure (72b) for (72a) shows. Syntactically, the noun merges with a classifier and its n-head checks [u-n] on the classifier. When CLP merges with the numeral, the classifier’s [abs] feature checks *yergu*’s [u-abs].

(72a) *yergu had hovanoc* *Armenian*  
 two CL umbrella  
 ‘two umbrellas’



I have made three assumptions about Armenian features. First, I accept, for now, Borer’s (2005) characterization of Armenian classifiers as being inconsistent with Number Phrases and necessarily taking nPs. This assumption is backed up by data in Sigler (1997) and my own informant data. However, I discuss the possibility of using a classifier with plural below in the numeral+classifier+noun+plural section. The second assumption is that Armenian classifiers are [abs] and numerals are [u-abs]. This is backed up by (73). In (73a) *had* without a numeral or

other quantifying determiner is bad, and in (73b-e) any quantifying determiner other than a numeral is unacceptable.

- (73a) \*had hovanoc uni-m  
 CL umbrella have-1S  
 (intended, 'I have an umbrella/umbrellas')
- (73b) \*kani had gin-er namag gə-kre-i-n  
 a few CL woman letter Imp-write-Past-3P  
 (intended, 'A few women were writing letters')
- (73c) \*maro-n had zinvor des-av  
 Mary-Det CL soldier see.Aor-3S  
 (intended, 'Mary saw (some) soldiers')
- (73d) \*amen had usanoԾ  
 every CL student
- (73e) \*amen had kirk  
 every CL book

Therefore, Armenian *had* can be used only with numerals and classifiers.<sup>54</sup> Finally, I assume that *had* is associated with the feature [indiv], the general number feature that indicates the classifier is consistent with both *one* and other numerals. This assumption too is corroborated by data from Sigler (1997) and informant judgments, as in (74a) where *had* can be used with *meg* 'one' and (74b) where it appears with other numerals.

- (74a) meg had kirk  
 one CL book  
 'one book'
- (74b) yergu/yerek/hink had kirk  
 two/three/five CL book  
 'two/three/five books'

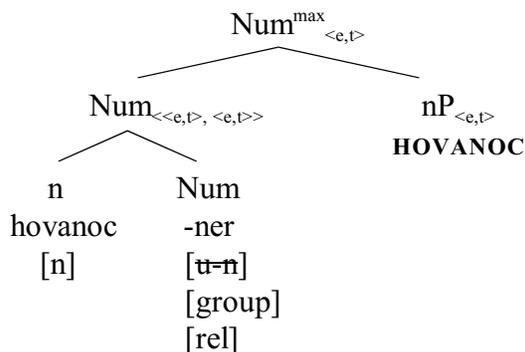
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<sup>54</sup>An exception is *kani had* / some CL 'how many?'. This parallels Persian: *caendta* / some+CL 'how many?'. *Caendta* can also mean 'a few'.

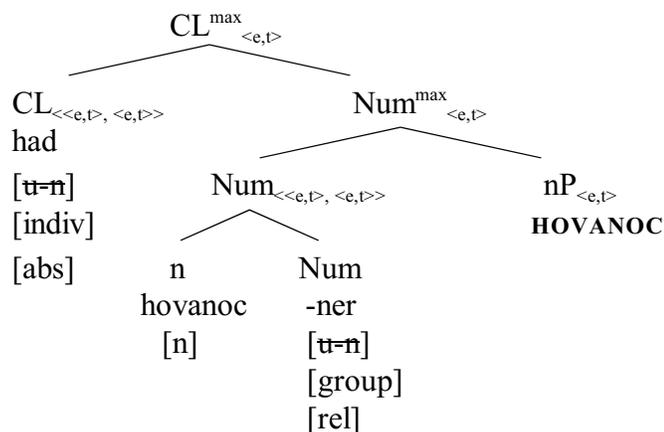




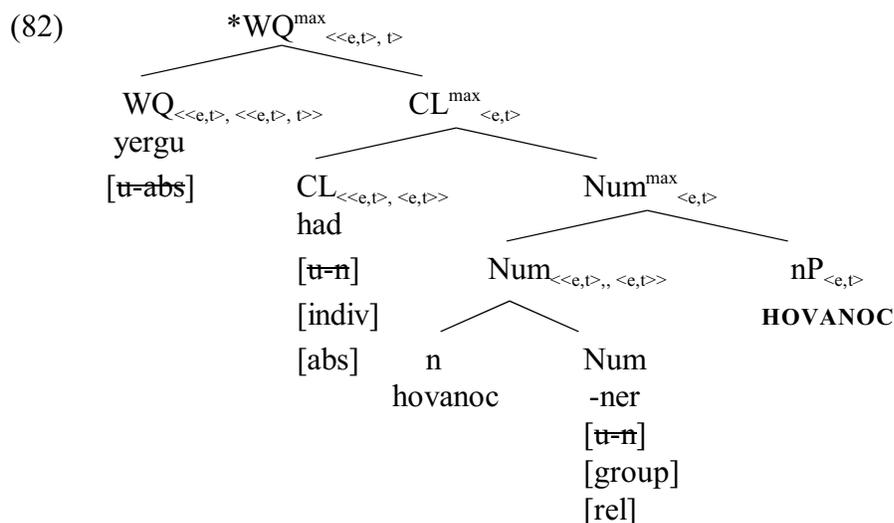
(81a)



(81b)



The final result would be (82) but the derivation has failed already because of the projection of both CLP and NumP. Similar to the explanation in section 4.2 for Mandarin, given the paradigm in (71) there is no evidence for separate CLP and NumP projections. Further, we have the contradictory appearance of [rel] and [abs], indicating both relative and absolute quantification respectively. However immediately below we see a possible exception to the generalization that CLP and NumP are mutually exclusive.



I have assumed that Armenian is characterized as not allowing classifiers with plural marking (Borer 2005, Sigler 1997), but here I point to some questions about the absoluteness of that characterization. While the generalization that classifier and plural morphology do not occur together is strong, it is not without exceptions. In a variation of an example from Sigler (1997, p152, example 208f), we find the acceptable (83) with both the classifier *had* and the plural marker *-(n)er* on the noun *hyur* ‘guest’.

- (83) mer utə **had** hyur-er-ə kisher-ə *Armenian*  
 our eight CL guest-PL-Det night-Det  
 mer kov-ə gec-an  
 our side-Det stand.Aor-3P  
 ‘Our eight guests stayed overnight’

It isn’t clear why (83) is acceptable as all other Armenian CL...PL expressions from informant work were deemed unacceptable, with one class of exceptions. In answer to a *How many?* question, the classifier and plural are fine, at least when the emphasis is on the numeral, as in (84b,c,d).

- (84a) How many ... were there ?  
 (84b) ute had hyur-er  
       eight CL guest-PL  
 (84c) hink had piβ-ner  
       five CL elephant-PL  
 (84d) yerek had zinvor-er  
       three CL soldier-PL

My tentative conclusion is that CL...PL is at least possible in Armenian, though evidently highly restricted. If CL...PL is possible it further questions the empirical basis of Borer's syntax, but it also raises questions about my interpretation of the ungrammaticality of (79). Further work is necessary to determine the conditions that allow the cooccurrence of CLP and NumP in Armenian. What is clear is that the explanation of classifier/number phenomena requires an analysis that is more subtle than either Chierchia's or Borer's and the feature-based approach may just provide the syntactic tools necessary.

### **Numeral+noun+plural**

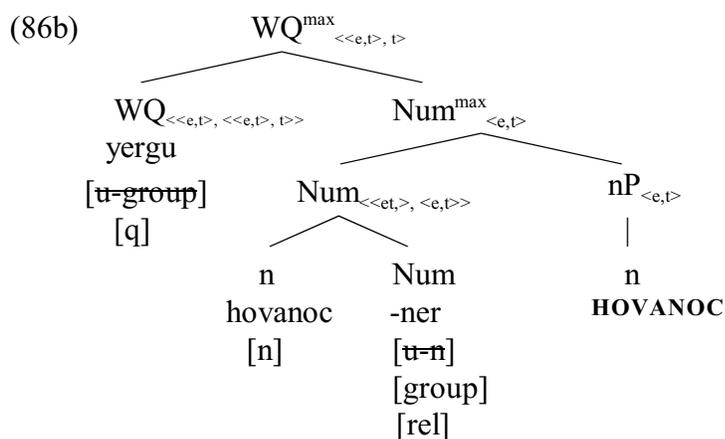
Here Armenian differs from Mandarin, which, recall, does not allow a numeral with the plural suffix *-men*. This means that, as in Persian, Armenian plural is flexible with regard to the type of quantifying determiner it can occur with. For example, consider the data in (85), where both numeral and nonnumeral quantifying determiners are consistent with the plural noun.

- (85a) yevek piβ-ner  
       three elephant-PL  
       'the three elephants'  
 (85b) šad hay-er  
       much Armenian-PL  
       'the many Armenians'

*Armenian*

The numeral *yergu* ‘three’ must therefore be featured as [q]. The derivation of (86a) proceeds with Merge of nP and the numeral, head movement of the noun to adjoin to Num, Merge of the NumP with the weak quantifying determiner. Uninterpretable features are checked and the semantic composition passes muster. The result is the structure in (86b).

(86a) *yergu hovanoc-ner*  
two umbrella-PL



However, note in the examples (85) that the translation of the noun is not simply plural but rather a definite plural. First, as will become clear in chapter 5, this means that the noun should project all the way to SQP rather than WQP. Second, the definite readings have repercussions for Borer’s analysis. Borer does not mention in her treatment of Armenian data that plurals are construed as definites. Despite this, Borer’s syntax would seem to allow for a definite reading of (86a), though not without problems. Assuming in Borer’s analysis that definiteness is in D, we can get a definite reading if the plural noun raises through #P into the head of DP, as in (87) for the expression *hovanoc-ner* ‘umbrella-PL’, i.e. *the umbrellas*.

(87)  $[_{DP} \text{ hovanoc-ner } [_{\#P} \text{ hovanoc-ner } [_{CL_{max}} \text{ hovanoc-ner } [_{NP} \text{ hovanoc} ]]]]$

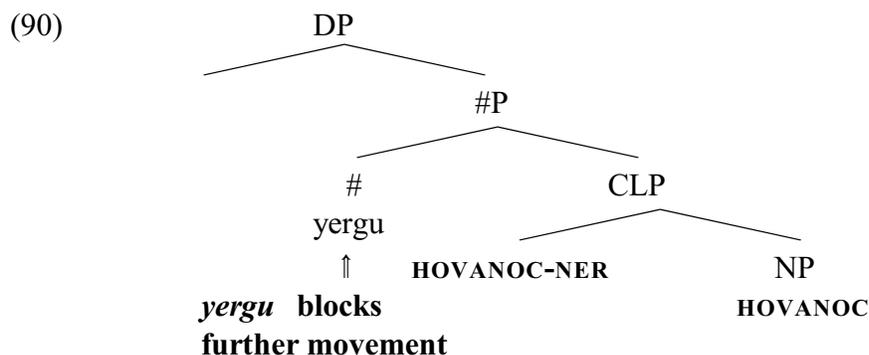
This, however, assumes that a noun or plural noun can satisfy the open value  $\langle e \rangle_{\#}$  in #P. If  $\langle e \rangle_{\#}$  in #P cannot be satisfied by a noun, singular or plural, it is not clear how the derivation would work. On the other hand, Borer does suggest that #P may be missing, for example with mass nouns, as in (88) (from Borer 2005, p96-97). But since (88) is the syntactic structure for a definite mass, it cannot refer to definite individuals.

(88)  $[_{DP} \langle e \rangle_d [_{NP} \text{ cat} ]]$

Also problematic for Borer is when there is a plural with a numeral, as in (89).

(89) *yergu hovanoc-ner* *Armenian*  
 two umbrella-PL  
 ‘the two umbrellas’

If (89) is interpreted definitely, we cannot simply raise the plural noun through the position in #P on the way to D because the numeral *yergu* blocks movement, as in (90).



That would leave it necessary to raise *yergu* from the quantity position to the slot in DP in order to value  $\langle e \rangle_d$ , where we are assuming definiteness to be. But if that is the case, then we would

expect all expressions with a numeral to be specific, which is not the case: numeral expressions are definite only with a plural noun.

Further, recall that for Borer either the classifier or number marking suffices to fill the open variable in CLP. However, the choice is not as free as she suggests. In those cases where we want a definite interpretation, only the plural can be used: the classifier construction cannot be interpreted definitely (or specifically).

- (91a) yerek aghchig-ner- $\emptyset$  (kisher- $\emptyset$  mer kov- $\emptyset$  gec-an)  
 three girl-PL-Det (night-Det our side-Det stand.Aor-3P)  
 ‘the three girls’ / #‘three girls’ (stayed overnight)
- (91b) yerek had aghchig  
 three CL girl  
 ‘three girls’ / #‘the three girls’

And an expression that is definite by virtue of a possessive must also use the plural, not a classifier.

- (92a) mer ut $\emptyset$  hyur-er- $\emptyset$  (92b) \*mer ut $\emptyset$  had hyur  
 our eight guest-PL-Det our eight CL guest  
 ‘our eight guests’

The fact that the plural must be used in a definite expression could conceivably be remedied in Borer’s syntax, with the proviso that she provide a way for the plural noun to raise past the numeral in her #P.

### Summary of Armenian data

(93) summarizes the items in the Armenian DP and their characteristics.

(93) Items in Armenian DP

|       | <u>head</u>     | <u>syntactic features</u> | <u>semantic type</u> |
|-------|-----------------|---------------------------|----------------------|
| (i)   | noun:           | [n]                       | <e,t>                |
| (ii)  | plural:         | [u-n, group, rel]         | <<e,t>, <e,t>>       |
| (iii) | classifier:     | [indiv, abs]              | <<e,t>, <e,t>>       |
| (iv)  | numeral WQD:    | [q, u-abs]                | <e,t> ⇒ GQ           |
| (v)   | nonnumeral WQD: | [q, u-rel]                | <e,t> ⇒ GQ           |

Note (93iii), which specifies the classifier as not being [u-n] and therefore able to take a NumP complement for those cases where a classifier is consistent with a plural. Nonetheless, as described above, while syntactically possible the option of a classifier occurring with a plural is highly restricted.

Borer (2005) and Chierchia (1998a,b) have difficulty accounting for the cooccurrence of classifier and plural whereas the present proposal can handle those cases. The feature-based system can handle all of the basic Armenian facts, as Borer (2005) does. Two problems arise for her theory. One is not devastating but the other is more serious. With regard to the first, Borer does not discuss the fact that Armenian plurals are interpreted definitely. In the simple case of a bare plural, she could assume that definiteness is available in the D position, since DP is available for all nominals. In this case the noun raises to the plural position in the Classifier Phrase, raises again to the quantifying position in #P, and finally raises a third time to the position in DP. In this way all the open values are satisfied.

#### 4.4 English

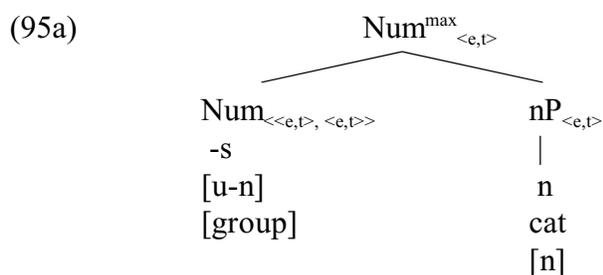
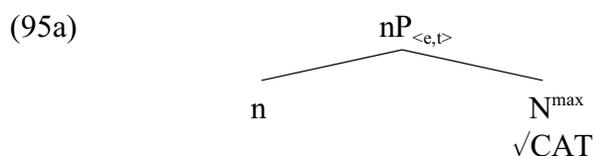
English does not have numeral classifiers and therefore presents no morphological evidence of there being a Classifier Phrase. But English count nouns, as I am arguing is true for all count nouns in all languages, are categorized by n in nP. The [n] checks the [u-n] feature on plural,

which is also [group]. English plural is similar to Persian's *-ha* plural marker and also to Persian's classifier *ta*, which is used with nonsingulars. English plurals can merge with either a numeral (94a) or nonnumeral quantifying determiner (94b). As an empirical fact, the plural must be morphologically realized (94c). This means that [group] obligatorily spells out in English, typically as *-s*.<sup>55</sup>

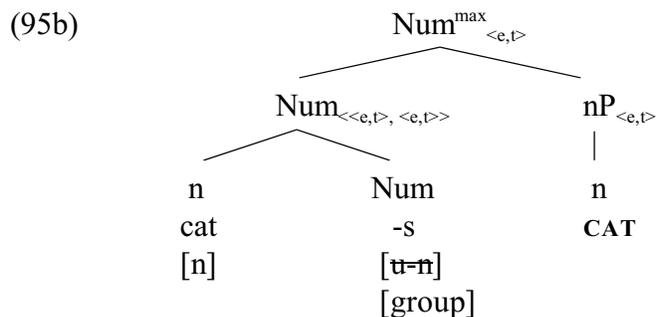
(94a) three cats      (94b) many cats      (94c) \*three cat

### Numeral+noun+PL

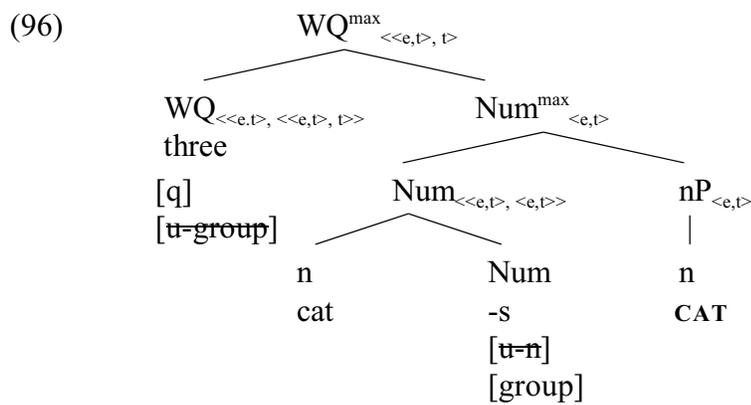
For an expression like (94a), the root  $\sqrt{\text{CAT}}$  is categorized as in (95a) just as we have seen count nouns nominalized in Persian, Mandarin and Armenian. The nP then merges with Num. In (95b), [u-n] is checked by [n]. Then the noun adjoins to the plural affix, leaving a copy in N, as in (95c). Note that English plurals are free to appear with both numerals and nonnumerals and are therefore featurally unspecified for a quantity feature.



<sup>55</sup>For irregular plurals, the regular *-s* form is blocked. According to Embick and Marantz (2008), for an irregular verb like *give*, T[past] competes with the *-ed* and wins for vocabulary insertion. For a noun like *child*, *children* wins the competition for vocabulary insertion over *\*childs* for N[plural].

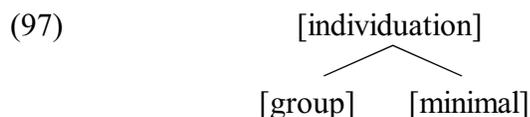


Finally,  $\text{Num}^{\max}$  merges with the numeral and the numeral's  $[\text{u-group}]$  is checked by  $[\text{group}]$  on the plural marker.



To be clear on the semantic composition, (96) includes the semantic types of each head and phrase. The composition is as in the earlier Persian, Mandarin and Armenian examples. The individuating feature in number morphology, which is plural in English, merges with a noun to produce an  $\langle e,t \rangle$ -type expression. The numeral then takes that set and produces from it a generalized quantifier, the Weak Quantifier Phrase. In the end, the interpretation of (96) is set of sets of three cats.

Persian, Mandarin and Armenian, with classifiers, do not have the same rigid number agreement on nouns that English does, due to differences in available morphology and feature specification. English consistently makes a singular/plural distinction in nouns in argument position<sup>56</sup>, although the morphological form varies among *-s* and its allomorphs and many irregular forms. For singulars English has  $-\emptyset$  (the Spellout of the singular feature [minim], or [minimal]). Recall that in Harley and Ritter's (2002) feature geometry, [group] and [minim] are two number features, corresponding to plural and singular respectively, that are more fine-grained number distinctions than the basic feature [indiv], which indicates number but doesn't specify singular with [minim], plural with [group] and dual, for example, with [group, minim].



For other than a singular, English uses *-s*, the Spellout of [group], with the proviso in footnote 55. So English numerals subcategorize for the type of NumP they take as complements. The numeral *one*, in addition to [abs], must also be featured as [u-minim] while other numerals are [u-group]. This will permit (98a) as in structure (98b) and block (98c) via the derived structure in (98d), where [u-minim] on the numeral is uninterpretable. Similarly, [u-group] on numerals other than *one* will permit (96) but block (98e) via (98f), where [u-group] on the numeral is left unchecked.

(98a) one cat

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<sup>56</sup>But of course not necessarily in nouns that are not arguments, such as in compounds: e.g. *duck hunter* / \**ducks hunter*.



Also, as is the case for plural in general and also Persian *ta*, these are consistent with numerals greater than one. So numerals in English, Persian and Armenian must be featured as [minim] for *one* and [group] for other numerals. My analysis is summarized in(99).

(99) Items in English DP:

|       | <u>head</u>    | <u>syntactic features</u>        | <u>semantic type</u> |
|-------|----------------|----------------------------------|----------------------|
| (i)   | noun:          | [n]                              | <e,t>                |
| (ii)  | plural:        | [u-n, group]                     | <<e,t>, <e,t>>       |
| (iii) | numeral WQD:   | [abs, u-group <i>or</i> u-minim] | <e,t> ⇒ GQ           |
| (iv)  | nonnumeral WQD | [rel, u-group <i>or</i> u-minim] | <e,t> ⇒ GQ           |

#### 4.5 Summary of the feature-based approach for classifiers and plural

In the feature-based syntax and compositional semantics outlined in chapter 2 and worked out in detail in the preceding sections 4.1 through 4.4, I derived the various numeral+noun constructions with a small but universal set of monovalent interpretable and uninterpretable syntactic features that drive Merge of functional heads with their complements. The features vary, by language, in how specific they are with regard to Harley and Ritter's (2006) feature geometry. This, along with what morphology is available, accounts for the variation in the behavior of classifiers and plural morphology across languages. For example, among the features in Mandarin classifiers is [indiv], the most basic number feature, which does not distinguish between singular and plural. Hence, Mandarin classifiers are used when enumerating one or more than one. In contrast, Persian's *ta* is inconsistent with a singular, just like English *-s*, hence requiring a numeral other than one. Importantly, while classifiers and plural morphology serve similar functions in assuring that nouns are syntactically count, they are not identical and are even permitted to

generate separate phrases, at least in Persian. For example, Mandarin classifiers are [indiv] while the sparsely used plural *-men* is [rel], and in Persian classifiers are [abs], to check a numeral.

I have demonstrated that the feature-based approach accounts for all of the data presented by Borer (2005) and Chierchia (1998a,b), and explains the cooccurrence of classifier and plural in Persian and Armenian. Beyond the greater empirical coverage, the feature-based approach and the assumptions underlying it are in better agreement with the facts about nouns in languages without articles. While Chierchia (1998) posited that some languages set their nouns as mass arguments, the fact that they behave similarly to nouns in nonclassifier languages with regard to which determiners they can be used with strongly suggests, contra Chierchia, that nouns are not parameterized by language. Also, it is a part of Chierchia's system that, in the strongest sense, plurals should not exist in classifier languages, but they do. The system presented in this dissertation accords more with Borer on this point. However, even her analysis, which allows for a language to have classifiers and plural, does not address their cooccurrence in Persian and other languages. Thus my system allows in principle for Num and CL to generate separate projections.

## **4.6 Ramifications of the feature-based system for other constructions with classifiers**

### **4.6.1 Other classifiers**

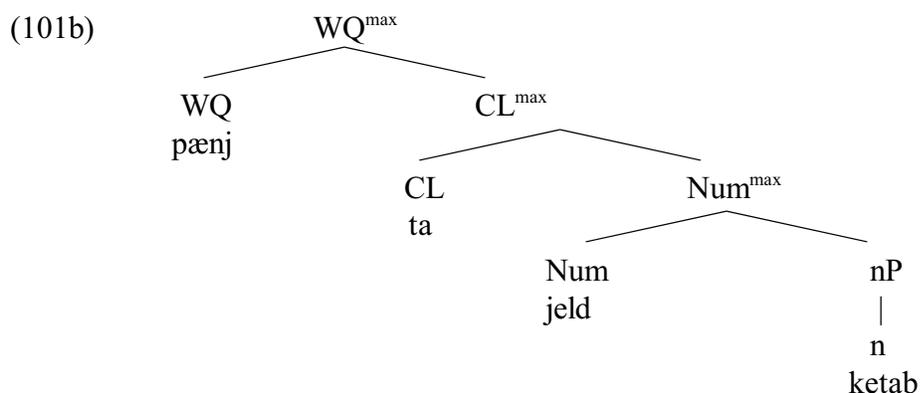
In this section I address what appear to be double-classifier constructions. The question is why what look like two classifiers show up in (100). I gloss *jeld* as a classifier for exposition, though in the end I argue it is something else, a modifier, and that there is only one true numeral classifier in Persian, *ta*.

- (100) pænj ta jeld ketab  
 five CL CL book  
 ‘five books’

Persian

Since there is only one position for a classifier, the head of CLP, (100) requires an explanation of where the apparent second classifier, *jeld*, is situated. If *jeld* is a classifier, it is therefore a kind of number marking. And since Persian has two possible positions for number marking, Num and CL, then *jeld* can conceivably appear in the head of NumP. So, (101a,b) could be hypothesized as the syntactic structure for (100).

- (101a) [<sub>WQP</sub> pænj [<sub>CLP</sub> ta [<sub>NumP</sub> jeld [<sub>nP</sub> ketab ]]]]
- five CL CL book



This is not quite right though, because the plural can also be used, at least for some speakers, as in (102). So, assuming that *-ha* occupies the head of NumP, (101) cannot be correct and *jeld* must be somewhere other than in the head of NumP.<sup>57</sup>

<sup>57</sup>Again, the use of *jeld* with plural is not accepted by all speakers.

- (102) pænj ta jeld ketab-ha  
 five CL CL book-PL  
 ‘the five books’

Alternatively, it is possible that *ta* is a numeral classifier whereas *jeld* might be a noun classifier. This kind of classifier doubling is common in noun-classifier languages. Recall that in noun-classifier languages a noun classifier accompanies nouns, even those that are not quantified, as in (103) from Jacaltec, a Mayan language (from Grinevald 2000, p65), where *naj* is a human noun classifier with *xuwam* ‘John’, and *no7* is an animal classifier with *lab’a* ‘snake’.

- (103) xil naj xuwam no7 lab’a Jacaltec  
 saw CL<sub>man</sub> John CL<sub>animal</sub> snake  
 ‘John saw the snake’

Now, when numerals and numeral classifiers cooccur in such a language, the noun classifier is still required. In (104), the noun classifier *no’* is obligatory with the animate noun *txitam* ‘pig’ at the same time as the numeral classifier *-c’oŋ* is needed for the numeral (from Craig 1977, p124).

- (104) xinlok ca-c’oŋ no’ txitam  
 I.bought two-NumCL CL<sub>animal</sub> pig  
 ‘I bought two pigs’

But the hypothesis that Persian *jeld* is a noun classifier doubling with the numeral classifier *ta* does not hold since there is no evidence that *jeld* otherwise functions as a noun classifier: *jeld* can only appear in the context of a numeral, as the examples in (105) attest.

- (105a) \*jeld ketab jaleb-e *Persian*  
 CL book interesting-is  
 (intended meaning: [a book / the book / books] [is/are] interesting)
- (105b) \*jeld ketab xærid-æm  
 jeld book bought-1S  
 (intended: 'I bought a book/books')

Since *jeld* is neither a noun classifier nor a kind of number marking, I argue that it is a modifier of the classifier.

*Ta* is a general numeral classifier that can be used with any count noun, regardless of the semantics of the noun. *Jeld* appears to be a semantically particular classifier, used only for books or volumes. While semantically particular classifiers are few and not much used in Persian, they are robustly present in some languages (see section 3.1). In Persian, besides the default classifier *ta*, some elements agree semantically with the noun with regard to shape, material, animacy, etc. Some of the more semantically specialized items in Persian are listed in (106) although they are not used very extensively (from Lambton 1953, p44).

(106) Some Persian particular “classifiers”<sup>58</sup>

|                     |                                            |
|---------------------|--------------------------------------------|
| <i>jeld</i>         | for books                                  |
| <i>dæstgah</i>      | for clocks, furniture, machinery           |
| <i>qæbze</i>        | for swords, rifles                         |
| <i>færvænd</i>      | for ships                                  |
| <i>zanjir</i>       | for elephants                              |
| <i>qetar, mehar</i> | for camels                                 |
| <i>næfær</i>        | for people                                 |
| <i>ædæd</i>         | for smallish inanimate things like pencils |

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<sup>58</sup>Many nouns are used as mensural or unit-creating classifiers of mass nouns: *ʧašoʧ* ‘spoon’ as in *yek ʧašoʧ næmæk* ‘one spoon salt’; *ye livan cai* ‘two glass tea’; *yek fenjun ʧæve* ‘one cup coffee’. This dissertation focuses on classifiers for count nouns.

We will look at *jeld* as representative of this set. At first glance, *jeld*, which means something like ‘volume’ and in fact can be used as a noun, appears to function as a numeral classifier. For example, in (107) it appears to be in the same position as *ta*, between the numeral and the noun.

- (107) hæft jeld ketab  
 seven CL book  
 ‘seven books’

Also, as we saw above, *jeld*, like *ta*, cannot appear without a numeral: it is ungrammatical with a nonnumeral quantifying determiner (108a) or with no quantifying element at all (108b).

- (108a) \*xeyli jeld ketab  
 a lot CL book  
 (108b) \*jeld ketab jaleb-e  
 CL book interesting-is  
 (intended meaning, ‘a book / the book / books is/are interesting’)

Despite the data in (107), however, there is strong evidence that *jeld* and *ta* are different beasts. One bit of evidence that *jeld* is not a classifier is that *jeld* (109a), unlike *ta* (109b), is consistent with *yek* ‘one’.

- (109a) yek jeld ketab  
 one CL book  
 ‘one book’  
 (109b) \*yek ta ketab  
 one CL book

This of course could merely reflect a feature difference between *ta* and *jeld* whereby *ta* is [group], essentially a plural marker, and *jeld*’s number feature is the more general [indiv]. But also, in these double-classifier constructions, *jeld* orders like a modifier. Note in (110a) that *jeld* can be

doubled with the default classifier, but only the order in (110a) is possible, as the ungrammaticality of (110b) shows.

- (110a) do    ta    jeld    ketab  
          two   CL   CL<sub>book</sub>   book  
          ‘two books’
- (110b) \*do    jeld    ta    ketab  
          two   CL<sub>book</sub>   CL    book

Compare the order of *ta* and *jeld* to that in ordinary noun modification. Modifiers of nouns in Persian follow the noun, in an ezafe construction, as in (111), which is typical of such constructions in that the ezafe particle *-(y)e* comes between the head and its following modifier.

- (111) gorbe-ye    caq  
        cat-EZ       fat  
        ‘a fat cat’

So if *jeld* is a modifier conforming to the noun-modifier order, it must be modifying *ta* and not *ketab*.

We should ask why, if *jeld* involves a modification structure, the ezafe particle is not present since it typically appears between heads and modifiers, as in (111). However the ezafe, which follows [+N] elements (e.g. Samiiian 1983), is not always present with modifiers. For example, in “lexicalized” compounds the ezafe is optional (112).

- (112) ab(-e)        jo  
        water(-EZ)    barley  
        ‘beer’

And the presence or absence of the *ezafe* affects meaning. As an example, (113a) can be taken to be a lexicalized form meaning ‘grandmother’, but the structure with the *ezafe* (113b) is more literally interpreted as ‘a mother who is big’.

- (113a) *madær-bozorg*  
 mother-big  
 ‘grandmother’  
 (113b) *madær-e bozorg*  
 mother-EZ big  
 ‘a large mother’

Another possible reason for there not being an *ezafe* between *ta* and *jeld* is that it may be the case that the *ezafe* is restricted to appearing only between lexical elements. For example, typical modifiers of nouns include other nouns (114a) and adjectives (114b).

- (114a) *pænjære-ye mašin*                      (114b) *lale-ye sefid*  
 window-EZ car                                      tulip-EZ white  
 ‘a car window’                                      ‘a white tulip’

But the *ezafe* does not occur with functional elements. Consider that *ezafe* is used in prepositional structures only with prepositions that are formed from nouns. Persian prepositions come in two classes, those that are “pure” prepositions and cannot take *ezafe* (115a,b) and those formed from nouns that take *ezafe* (115c,d) (adapted from Mahootian 1997, p59-60, 264).<sup>59, 60</sup>

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<sup>59</sup>And there are some where the *ezafe* is optional such as *tu* ‘in’ and *pælu* ‘next to’.

(i) *tu(-ye) mašin*                      (ii) *pælu(-ye) gol-ha*  
 in(-EZ) car                                      next(-EZ) flower-PL  
 ‘in the car’                                      ‘next to the flowers’

<sup>60</sup>See Samiian (1983) and Karimi and Brame (1986) on Persian prepositions.

- |                                                                                                   |                                                                                           |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| (115a) <i>ba ma</i> / * <i>ba-ye ma</i><br>with us<br>'with us'                                   | (115b) <i>dær edare</i> / * <i>dær-e edare</i><br>in office<br>'in the office'            |
| (115c) * <i>zir</i> / <i>zir-e</i> <i>miz</i><br>under / under-EZ      table<br>'under the table' | (115d) * <i>pošt</i> / <i>pošt-e mænzel</i><br>behind / behind-EZ house<br>'in the house' |

Also, only the noun-derived prepositions like *tu* 'in/inside' can be used by themselves as postverbal particles, not the "pure" prepositions such as *dær* 'in'.

- |                                                                  |                         |
|------------------------------------------------------------------|-------------------------|
| (116a) <i>be-r-im</i><br>Subjunctive-go-1P<br>'Let's go outside' | <i>tu</i><br>in/inside  |
| (116b) * <i>be-r-im</i><br>Subjunctive-go-1P                     | <i>dær</i><br>in/inside |

If we assume that "pure" prepositions like *ba* 'with' are functional items, the generalization seems to be that *ezafe* is only used when joining items from lexical classes, such as nouns and adjectives, with some "prepositions" being formed from nouns like *pošt*, i.e. *pošt-e*.<sup>61</sup> And assuming that numeral classifiers are functional items that appear in the head of a functional projection above NP, it follows that the *jeld* modifier of *ta* should follow *ta* without an *ezafe*.

Note also that neither the *ta* nor *jeld* can be doubled with itself.

- |            |             |             |              |
|------------|-------------|-------------|--------------|
| (117a) *do | <i>ta</i>   | <i>ta</i>   | <i>ketab</i> |
| two        | CL          | CL          | book         |
| (117b) *do | <i>jeld</i> | <i>jeld</i> | <i>ketab</i> |
| two        | <i>jeld</i> | <i>jeld</i> | book         |

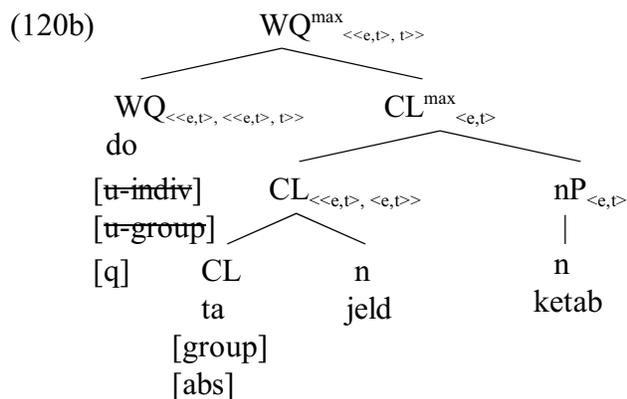
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<sup>61</sup>This is consistent with the earlier mentioned view of Samiiian (1983) that *ezafe* is with a [+N] element.



(120a) \*do ta xeyli jeld  
two CL very volume

Persian



It should be noted that it isn't entirely clear that *jeld* is a noun in (120b). It could be an adjective, except that it can't be modified by an adverb like *xeyli* 'very': \**do ta xeyli jeld ketab*. But in Distributed morphology, in order to be pronounced it must be categorized as something and calling it a noun seems a reasonable move.

In any case, semantically, since the classifier that is sister to nP is of type  $\langle\langle e,t \rangle, \langle e,t \rangle\rangle$ , we want to assure that the composition of *ta* and *jeld* does not result in a different semantic type. This is assured if we understand that Predicate Modification is involved (Heim and Kratzer 1998, p65-66), which does not alter the semantic type of *ta*. Therefore, the denotation  $\llbracket ta \rrbracket = \llbracket ta \ jeld \rrbracket$ . Put another way, if *ta* is a classifier and *jeld* modifies it, then  $\llbracket ta \ jeld \rrbracket$  is a subset of  $\llbracket ta \rrbracket$ . Since *ta* is of type  $\langle\langle e,t \rangle, \langle e,t \rangle\rangle$  and *jeld* as a modifier is of the same type,

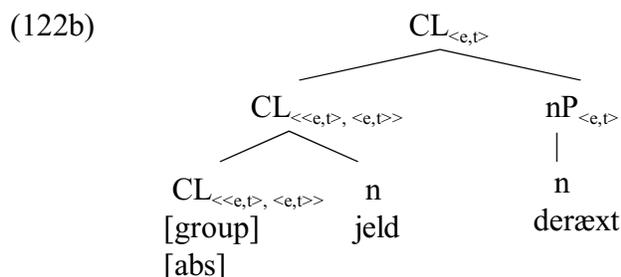
(121) for  $\llbracket CLP \rrbracket$ :  $\lambda x \in D_{\langle\langle e,t \rangle, \langle e,t \rangle\rangle} . \llbracket ta \rrbracket(x) = \llbracket jeld \rrbracket(x) = 1$

Making the denotation of *ta* the same as the denotation of *ta jeld* possibly resolves another technical matter. There must be some agreement relationship between *jeld* and *ketab* ‘book’ because there is a clear restriction based on the semantics of the noun, on which classifier modifiers can appear. In this case *do ta jeld ketab* is the only option; it is ungrammatical to replace *jeld* with another modifying element: *\*do ta dæstgah ketab* where *dæstgah* is used for clocks or *\*do ta næfær ketab* where *næfær* is used for people. Likewise, *jeld* cannot be used with nouns that are not booklike: *\*do ta jeld livan* where *livan* means ‘cup’ or ‘glass’. The choice of classifier modifier must depend on the noun and the noun, therefore, must have the interpretable feature. This is analogous to gender agreement in Romance languages, where the adjective agrees with the noun, not the other way around. The problem is that if we then posit an uninterpretable gender feature on *jeld* and assume that feature is a probe, it doesn’t c-command the noun *ketab*, as is clear in (121). But if the uninterpretable gender feature is transmitted to *jeld*’s dominating CL node, which seems reasonable if the denotation of *ta jeld* is the same as the denotation of *ta*, then the gender feature is in a c-commanding position vis-a-vis *ketab*. In effect, the complex classifier *ta jeld* carries the relevant features of its daughter nodes.

*Jeld* can appear without *ta*, as in (122a), in which case we have the structure in (122b). Recall from section 4.1.4 that when the number feature bundle is not overt it has the features [group, abs]. *Jeld* then can adjoin to this position, as in (122b), focusing only on the CLP. If *jeld* is a modifier here, it is of type,  $\langle\langle\langle e,t \rangle, \langle e,t \rangle \rangle, \langle\langle e,t \rangle, \langle e,t \rangle \rangle\rangle$ , since it is a function from CL to CL.

(122a) hæft jeld ketab  
 seven jeld book  
 ‘seven books’

Persian



So even though *jeld* in (122) looks like it is a classifier, it is still only a modifier.

Other classifierlike elements are of the mensural type (Lyons 1977, Croft 1994) that provide units for mass nouns, like *a bowl* in a *bowl of rice* although they are used for count nouns as well, as in *a jar of coins*. In Persian, the introduced unit takes a classifier in the context of a numeral (123a) but does not occur with *ta* if *yek* ‘one’ is present (123b). (123b) suggests that it is not *mošt* per se that results in ungrammaticality but the presence of *ta* which it is modifying that causes the ungrammaticality. *Mošt* is fine with other numerals (123c).

(123a) ye mošt berenj  
 one fist rice  
 ‘a handful of rice’

(123b) \*ye ta mošt berenj  
 one CL fist rice

(123c) se ta mošt berenj  
 three CL fist rice  
 ‘three handfuls of rice’

This suggests that the mensural classifiers, those that create units out of a mass, are not really classifiers but instead are ordinary nouns. Again, if *mošt* were an adjective it ought to be

modifiable by an adverb like *xeyli* ‘very’, but this is not possible: *\*ye xeyli mošt berenj*. So the likely categorization, which is required in DM for Spellout, is that of a noun. The examples in (123) involve mass nouns, although this dissertation has not focused on these types of ‘classifiers’. But some classifiers that can be used with mass nouns can also be used with count nouns, as in (124). These can be used with *yek* ‘one’ (124a) as long as the classifier is not used (124c).<sup>62</sup>

- (124a) *ye dæste gol*  
 one bunch flower  
 ‘a bunch of flowers’
- (124b) *do ta dæste gol*  
 two CL bunch flower  
 ‘two bunches of flowers’
- (124c) *\*ye ta dæste gol*  
 one CL bunch flower

This suggests that what is involved in these mensural classifiers is modification and that the real classifier in these constructions is *ta*. While items like *dæste* ‘bunch’ are sometimes called classifiers, they are not. It appears that *ta* is the only true numeral classifier in Persian.

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<sup>62</sup>In these constructions, if *dæste* is the head and *gol* a modifier, we expect the ezafe particle to appear between them. Some expressions like this may be at least quasi lexicalized, as with other items like *abjo*, an alternative to *ab-e jo* ‘water-EZ barley’, i.e. ‘beer’. Interestingly, when *dæste* is pluralized the ezafe is required: *do ta dæste-ye gol* ‘two CL bunch-EZ flower’. On the other hand, in examples like (124a,b) it is possible we have a pseudopartitive which is the same for both mass nouns and count nouns in Persian as in (123) and (124a), as in English: *two cups of flour/two cups of beans*. In a partitive, the PP contains a definite expression, e.g. *a slice of [the pie]*; in contrast, the complement of P in a pseudopartitive is not definite, e.g. *a slice of [pie]*.

#### 4.6.2 Partitives

We have seen that the feature [group] must appear to check [u-group] or [u-indiv] in the numeral determiner. There is variation, however, in where [group] appears. It can be on the plural suffix *-ha* in NumP or on the classifier *ta* in CLP. The upshot is that the classifier itself is morphologically optional. However, one interesting case where the classifier is obligatory is with a partitive.<sup>63</sup>

- |       |                                 |               |           |                 |            |                   |                |
|-------|---------------------------------|---------------|-----------|-----------------|------------|-------------------|----------------|
| (125) | <i>pænj</i>                     | * <i>(ta)</i> | <i>æz</i> | <i>pesær-ha</i> | <i>dir</i> | <i>resid-aend</i> | <i>Persian</i> |
|       | five                            | CL            | of        | boy-PL          | late       | arrived-3P        |                |
|       | 'Five of the boys arrived late' |               |           |                 |            |                   |                |

The Persian and English partitives differ in details but there is a general similarity in structure. Persian has a classifier and no definite article. English doesn't use a classifier, but does use the article for definiteness whereas Persian relies on the definiteness of the plural. The two languages are similar in that they both have a numeral and a definite phrase inside a PP. In (125) the numeral *pænj* 'five' is quantifying individuals within a PP in this construction. The complement of the preposition is, in this dissertation, a SQP that is a specific plural entity. Given the general optionality of classifiers in Persian, (125) raises the question of why one should be required in this situation.

A partitive in English is a PP structure headed by partitive *of* that c-commands a definite nominal phrase, DP or NP in most accounts (e.g. Barwise and Cooper 1981) but SQP (under Case Phrase) in this dissertation. Barker (1998, p699) calls the complement of partitive *of* 'a

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<sup>63</sup>There is another case of the obligatory classifier, in NP ellipsis, as in *bist ta <danešju>* 'twenty CL <student>' but \**bist <ta danešju>*.

definite description that picks out the (maximal) entity  $x$  such that  $x$  corresponds to”, in (126a), the collection of the girls.<sup>64</sup> A numeral or other weak quantifying determiner provides the cardinality.

(126a) [<sub>WQP</sub> three [<sub>Partitive</sub> of [<sub>SQP</sub> the girls]]]

(126b) [<sub>WQP</sub> many [<sub>Partitive</sub> of [<sub>SQP</sub> the girls]]]

I adopt Barker’s analysis of partitives. For him, the partitive *of*-phrase is a nominal modifier for an unpronounced element of category N, which for *three of the girls* gives us something like (127).<sup>65</sup>

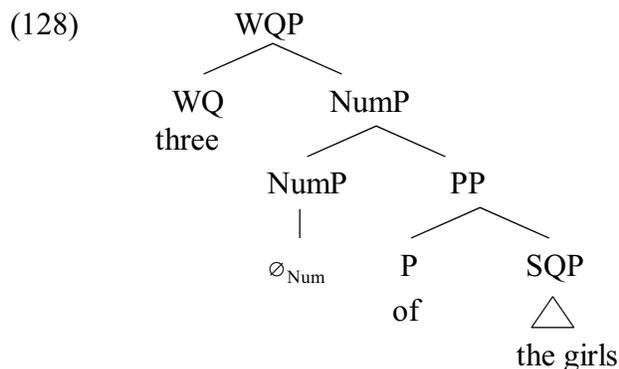
(127) [<sub>WQP</sub> three [<sub>NP</sub> [<sub>NP</sub>  $\varnothing_N$  ]][<sub>PP</sub> of [<sub>SQP</sub> the girls]]]]

Since the silent  $\varnothing_N$  is a complement of *three*,  $\varnothing_N$  must here be plural. I assume then that it is not an NP but rather a NumP. This also accords with the syntactic assumptions in this dissertation that numerals, in English, take NumP complements. Therefore (127) is modified as (128).

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<sup>64</sup>But see Abbott (1996) and Ladusaw (1982), who find no definite restriction on the complement of the preposition. The partitive structure I deal with here has a definite PP complement.

<sup>65</sup>Barker (1998) uses this structure with  $\varnothing_N$  and its modifier for his treatment of the partitive, but it is not crucial for his overall analysis. He allows alternatives. For example, he suggests that the  $\varnothing_N$  can be omitted if we shift the *of*-phrase from a nominal modifier to a nominal so that the determiner can be of a consistent type.



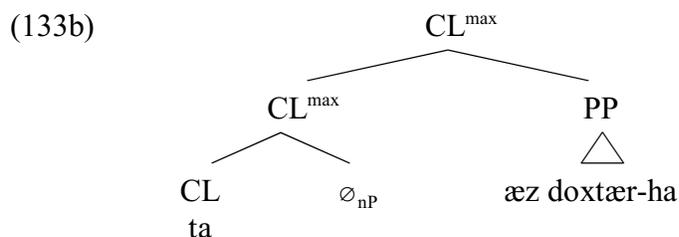
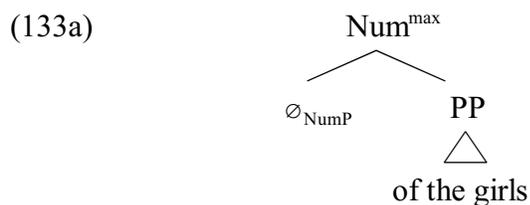
The phrase *the girls*, being a SQP, is a generalized quantifier, but according to Partee (1987) we can shift any denotation as needed among types  $e$ ,  $\langle e, t \rangle$  and  $\langle \langle e, t \rangle, t \rangle$ . For Barker, since the PP is a modifier, of type  $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ , the preposition must be of type  $\langle e, \langle \langle e, t \rangle, \langle e, t \rangle \rangle \rangle$ . Since NumP (an NP for Barker) is a predicate, by Predicate Modification it yields a predicate.

Semantically, for Barker (1998, p698), we have the following meaning for a partitive.

(129) Barker's translation of the *of*-partitive  
 $[[of_{\text{Part}}]] = \lambda x \lambda P \lambda y [P(y) \wedge y < x]$

Barker's definition characterizes the *of*-partitive as a property. The variable  $x$  assures that the SQP object of *of* is an entity and not a generalized quantifier. Also, the definition provides that  $y$ , the denotation of the quantified NumP, is a proper subset of  $x$ , the denotation of the definite description. The semantic composition of (128b) is therefore as detailed in (130).





This obligatory presence of the classifier is what we want to explain.

Two things are important. First, *ta* is not a bound morpheme, in contrast to English *-s*, which is. Second, in NP ellipsis the classifier is obligatory in situations where English can elide the entire NumP.

(134a) How many girls went to see Hannah Montana?

(134b) Twenty <girls>

(134c) cændta doxtær          ræft-ænd          Hannah Montana-ro    be-bin-ænd  
           how.many girl          went.3P            Hannah Montana-RA    Subjunctive-go-3P

(134d) bist ta <doxtær> / \*bist <ta doxtær>

Neither Persian nor English, reasonably, can elide the complement of the bound plural morpheme.

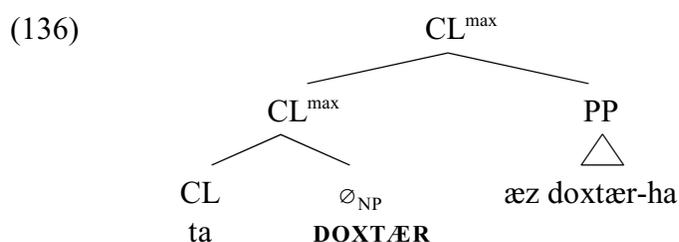
(135a) \*Twenty <girl>-s

(135b) \*bist <doxtær>-ha (if definite)

The generalization is that an adjoined structure like *girl-s* can elide but a bound morpheme cannot be stranded: if the noun elides the bound plural elides with it. However, since the noun does not adjoin to the classifier, *ta* then does not elide. I suggest that *ta* does not elide because, as

explained above, the features in Num must spell out somewhere. They spell out in the classifier, in the plural, or, when the classifier is optional, they spell out as the noun raises to the CL position (see section 4.1.4). If the classifier is elided with the noun there is no Spellout of the relevant number features. Note that this might also explain the alternation in (134d), where the classifier cannot be elided along with the noun.

One conceivable way around this constraint is to move the noun from the *of*-phrase, with the stipulation that the noun inside PP be pronounced but not the moved copy, as in (136).



But this can't work for at least two reasons. First, in (136) we have an otherwise unmotivated illicit chain between elements not in a c-command relation. Second, in order for the noun *doxtær* to move out of the PP we have to first get it out of preposition's SQP complement. This is difficult to explain in that head movement of the noun is blocked because the preposition *æz* occupies the head of the PP. In fact, extraction from PP, such as in preposition stranding, does not occur in Persian.

Summarizing, the proposed syntax for classifiers and plural morphology, in conjunction with NPs and quantifying determiners predicts the obligatory presence of the classifier in Persian partitive constructions.

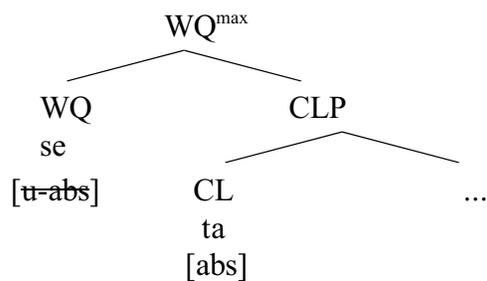
### 4.6.3 Numeral classifiers with nonnumeral quantifying determiners

Finally in this section I look briefly at one other structure that has been mentioned in passing, that of a classifier appearing with nonnumeral quantifying determiners. It is the case in Persian that classifiers can only be used with numerals. But, as we have seen, some languages permit or require classifiers with nonnumeral determiners, as in Thai (137a) (from Simpson 2005, p815). In another language, Bengali, Bhattacharya (2001, p193) says that a numeral or quantifying determiner must be followed by a classifier, as in (137b,c,d) (from Bhattacharya 2001, p204).

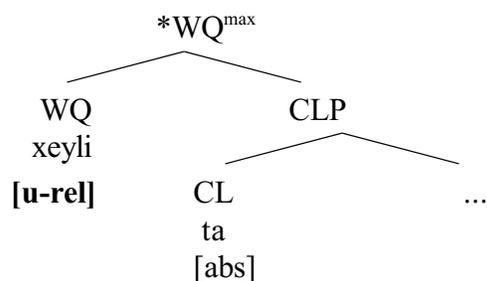
|        |                    |         |          |                |
|--------|--------------------|---------|----------|----------------|
| (137a) | dek                | laai    | khon     | <i>Thai</i>    |
|        | child              | several | CL       |                |
|        | 'several children' |         |          |                |
| (137b) | paMc-Ta            |         | hati     | <i>Bengali</i> |
|        | five-CL            |         | elephant |                |
| (137c) | Onek-gulo          |         | hati     |                |
|        | a lot-CL           |         | elephant |                |
| (137d) | kOek-Ta            |         | hati     |                |
|        | some-CL            |         | elephant |                |

According to the most of the Persian, Armenian and Mandarin data I have presented, classifiers appear in the context of numerals. (Also recall numeral+noun constructions without classifiers in, e.g., 4.1.4.) Numerals are [u-abs], meaning that they need the [abs] feature of the classifier to be checked. Other determiners are not [u-abs] but instead are [u-rel]. Therefore nonnumeral determiners cannot be checked by [abs] on the classifier. An abbreviated structure for the expression *se ta ...* 'three CL ...' is in (138a). If the classifier appears with a nonnumeral quantifying determiner as in *xeyli ta ...* 'many CL ...' (138b), we end up with [u-rel] unchecked.

(138a)

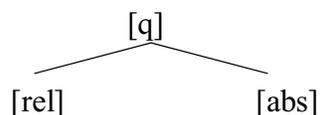


(138b)



The derivation that results in the structure in (138b) fails, recall, because [rel] and [abs] are sisters in the feature geometry: while they both entail the most primitive [q] feature they do not entail each other and therefore cannot check each other.

(139)

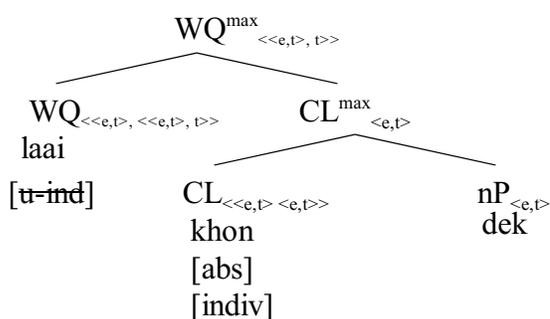


To explain the Thai situation, where the nonnumeral quantifying determiner can appear with a classifier, all that is needed is to specify the determiner with the feature that is typically in a numeral that calls for a CLP complement. Since Thai determiners like *laai* ‘several’ require a classifier, in contrast to the case in Persian, it can be argued that the relevant Thai determiners are [u-abs] rather than [u-rel] but this leads to a question of interpretation since a quantifying

determiner like *laai* ‘several’ is presumably [rel]. Therefore, the determiner’s feature is [u-indiv], checked by [indiv].

A full structure for the Thai example in (137a) appears in (140), focusing only on the features under discussion. Here I assume per Simpson (2005) that the NP starts as the complement of the classifier and moves. (140) indicates the structure before movement of the noun.

(140) Structure of Thai *dek laai khon* ‘child several CL’ before NP-movement



Although I have characterized Mandarin as using classifiers only with numerals, in fact some other determiners require or allow a classifier, as in (141) ((141b,c) from Cheng and Sybesma 1999).

- (141a) mei ge ren *Mandarin*  
 each CL person  
 ‘each person’
- (141b) cong nei-ge jing-zi  
 from that-CL mirror  
 ‘from that mirror’
- (141c) hen duo (ge) xuesheng  
 many (CL) student  
 ‘many students’

The Thai example shows once again the flexibility of the feature-based system, which assumes that particular features can vary in the geometry, as we expect in the lexicon, so as to allow for crosslinguistic variation in the behavior of classifiers, number marking and weak quantifying determiners.

#### **4.7 Summary of chapter 4**

The aim of this chapter was to show that the explicit use of syntactic features organized along the lines of Harley and Ritter (2002) can account for the behavior of numeral classifiers and numerals in parallel with the semantic composition. I have demonstrated that this feature-based system accounts for the Mandarin, Armenian and English data that were analyzed in previous accounts. Also, I have demonstrated that the feature-based system, which involves a small set of universal features that appear in the functional heads above NP, can account for problematic data that were assumed or explicitly argued not to be possible. The most serious case is the cooccurrence of numeral classifiers and number marking in Persian and other languages. I have also shown that the same set of features account for an obvious phenomenon not addressed by earlier accounts, that classifiers tend to occur only with numerals. This is as important as the classifier+plural issue discussed in sections 4.1.2 and 4.1.3 because any system that sees number/classifier morphology as being semantically related to the individuation of nouns must explain why a classifier, if it has an individuating function, occurs primarily with numerals and not with other quantifying determiners that are just as individuating as numerals. The feature-based system not only can account for this but is flexible enough to allow for some languages to permit or require that classifiers also be used with nonnumeral determiners. The crosslinguistic tendency,

as well as the tendency within a language, for plural and classifiers to be mutually exclusive can be hypothesized to stem from economy. The crucial feature that both plural and classifiers have is [indiv]. Plural also has [group], but since [group] entails the presence of [indiv] the use of [group] in conjunction with a separate [indiv] provides for two instantiations of [jndiv]. No harm done in this, but not as economical as having one [indiv].

On a broader front, the current proposal argues for a commonality of the semantic type of nouns,  $\langle e, t \rangle$ , in all languages. It argues for a common syntax in the functional projections above NP and allows for Number Phrase and Classifier Phrase to be separate projections. The variation in the behavior of classifiers and plural morphology stems from variation in what morphology is available and how features are bundled.



## Chapter 5 The argument phrases: WQP and SQP

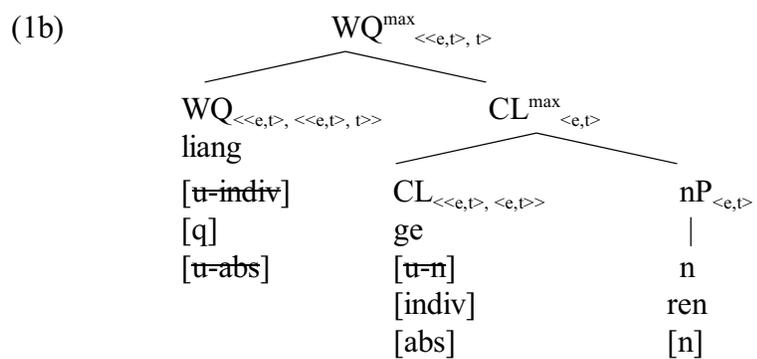
### 5.0 Introduction

Chapter 4 focused on accounting for the distribution of number morphology and numeral classifiers, interpreting both as kinds of number marking. Briefly, the model developed so far operates as follows. Syntactically, the head of a CLP or NumP has a [u-n] feature, an [indiv] feature or its [group] or [minim] variants, and a feature for quantity, [abs] or [rel]. The [u-n] feature is checked by [n] in nP. The numerals in the WQ position have a [u-indiv] feature that must be checked by [indiv] (or its variants) in CLP or NumP. WQ also has a [q] feature and/or its variants [abs] for absolute quantification in the case of a numeral or [rel] for nonnumerals. Semantically, the elements in WQ take set-denoting NumPs and convert them into generalized quantifiers in a Weak Quantifier Phrase. WQ is thus of semantic type  $\langle\langle e,t\rangle, \langle\langle e,t\rangle, t\rangle\rangle$ .

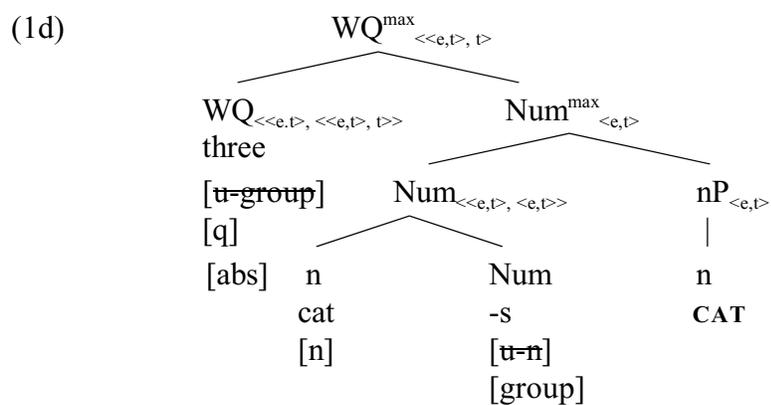
Generally, the WQ position's [u-indiv] feature is checked by [indiv] in the head of NumP, but in a classifier language the quantifying element in WQ establishes a feature relationship that assures numeral classifiers are used with numerals. In a nonclassifier language, there is no distinction between numerals and other quantifying determiners in that both take English-type singular and plural number morphology. An important part of Chapter 4 was to show that slight variations in the features that appear in classifiers and number morphology allow the cooccurrence of number morphology and classifiers in a single expression, which proved to be a counterexample to earlier theories which disallowed their occurring together. A tree showing the case for a classifier language like Mandarin is in (1b) for (1a) and a tree for a number language is in (1d) for (1c). The special case for the cooccurrence of a numeral classifier and number morphology is in (1f) for (1e).

*Mandarin*

- (1a) liang ge ren  
two CL person  
'two people'

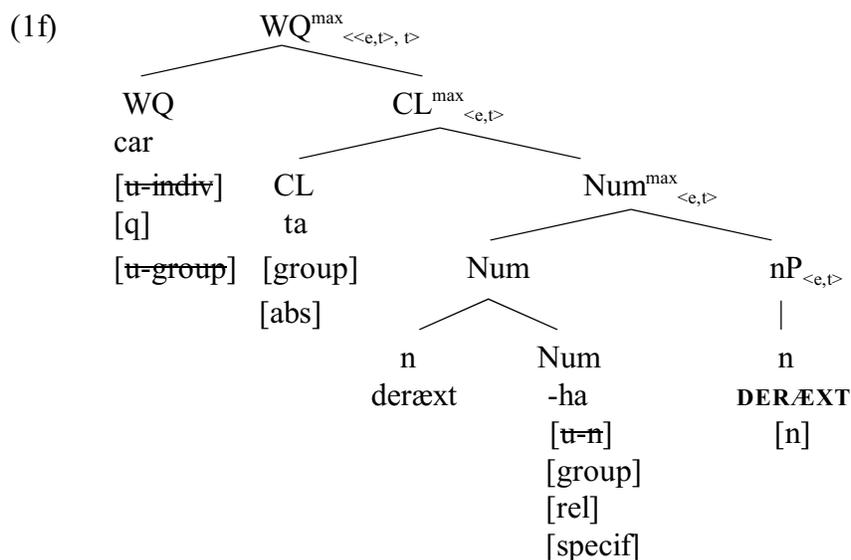


- (1c) three cats



- (1e) car ta deræxt-ha  
three CL tree-PL  
'the four trees'

*Persian*



In (1b) note that [q] is present. I have sometimes omitted [q] when a subfeature like [abs] is present since the presence of [q] is entailed by [abs] according to the feature geometry.

Similarly in (1f), [q] is overtly noted as present given the [abs] feature.

Given the tight connection between numerals and classifiers, Chapter 4 was interested in the WQ position as a bearer of numerals with regard to their relationship to CL/NumP. This chapter pays closer attention to other syntactic and semantic contributions of WQ and WQ's relation to SQP, the quantifier phrase above WQP which houses the definite article and strong quantifying determiners. Four main issues are covered. In section 5.1 I provide further evidence from Persian for there being two phrases, WQP and SQP, showing that the proposed split has crosslinguistic application. Second, section 5.2 examines how the WQP and SQP are composed syntactically and how certain pragmatic associations with the syntactic features in those phrases' heads contribute to the interpretation of the phrase with regard to specificity and definiteness. The results lead to a proposed explanation for the ungrammaticality of the cooccurring articles *\*the a*,

which is otherwise predicted to be possible in a syntax that has two heads for determiners and assumes that *a* is not inherently indefinite. Third, section 5.3 discusses null heads in SQP and WQP, focusing on null WQ, which leads to a discussion of bare noun arguments in section 5.4. Finally, in section 5.5, I present arguments from earlier literature for there being a Case Phrase and suggest that the Case Phrase's head can take either a SQP or a WQP as a complement. This solves a potential licensing problem. If the verb or T calls for a DP in standard theory, then in the model of this dissertation with two determiner phrases the verb or T would have to be able to take two kinds of arguments: SQPs and WQPs. However if the Quantifier Phrases are always dominated by a Case Phrase then once again the verb or T calls for a single kind of complement: KP. In turn, the head of KP calls for a complement with the feature [q], a SQP or a WQP.

The point about the pragmatic features involved with specificity requires some comment here, although I discuss the issue in much more detail in section 5.2. In chapter 4 we were primarily interested in the formal syntactic features, and associated semantics, that yield WQPs. We saw that WQPs are generalized quantifiers and hence can function as arguments, inside KP. This chapter will argue that, besides the syntactic feature [q] and certain uninterpretable features that assure that a WQ merges with a CLP or NumP, in the case of indefinites the WQ position introduces syntactically represented pragmatic features that identify whether a referent is presupposed to exist, whether it is specific, and who (speaker and/or addressee) it is specific for. In this way, it is argued, definiteness can be dispensed with as a primitive semantic/pragmatic notion. This means that there should not be any syntactic feature that corresponds to [definite] and that definiteness has no ontological status in the syntax and semantics; rather, definiteness is a composite of more-primitive features. A further syntactically represented pragmatic feature is also

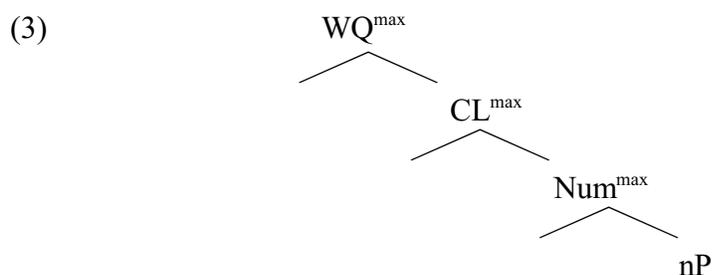
introduced in SQ for definite expressions. The use of pragmatic information in the syntax has precedent in earlier work. Some analyses, particularly regarding the verbal domain, have suggested that pragmatic information may be syntactically represented at the left periphery of the clausal domain (e.g. Rizzi 1997, Cinque 1999, Scott 2002, Speas 2004, Tenny 2006). In the nominal domain, semantic features such as an  $\iota$  or Max operator for *the* and definiteness have been proposed, but it has also been argued that there must be pragmatic, context-sensitive facts underlying the use of the definite article (e.g. Strawson 1950, discussed below). This chapter makes use of these pragmatic presuppositions held by the speaker about whether the addressee can identify a referent and correlates these presuppositions with features that appear in the syntax. In particular, I will argue that certain features in the determiner heads are associated with the speaker's presuppositions about the speaker's and the addressee's knowledge about a referent.

Chapter 4 showed that crosslinguistic variation in the behavior of numeral classifiers and number morphology can be accounted for by a small but universal set of privative functional features, minor lexical variation in which features appear in which heads, and how feature checking takes place in the nP and the functional heads above it. Composition of nP with Num, NumP with WQ, etc. is also universal: even if a functional item such as a classifier is not morphologically present, features typically associated with a classifier are, assuring that both syntactic and semantic composition occur consistently.

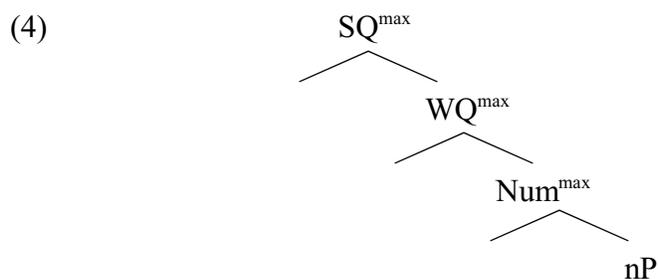
So far, the determiners I have focused on have been numerals, given their close association with classifiers. I have worked under the assumption that the numerals are realized as heads of WQP. In this chapter I explore other weak quantifying determiners and strong quantifying determiners with a focus on articles. Then I will argue in this chapter that there are



may be fused, as in (2) where CLP and NumP do not have independent projections; in particular Num<sup>max</sup> can be a single phrase in Mandarin and English, as shown in sections 4.2 and 4.4. But it is also possible for classifiers and number marking to project independent phrases to give the structure in (3), which occurs in Persian and other languages, such as Itzaj Maya, Paiwan, Tariana, Akatek and Jacaltec (see section 3.2.3).



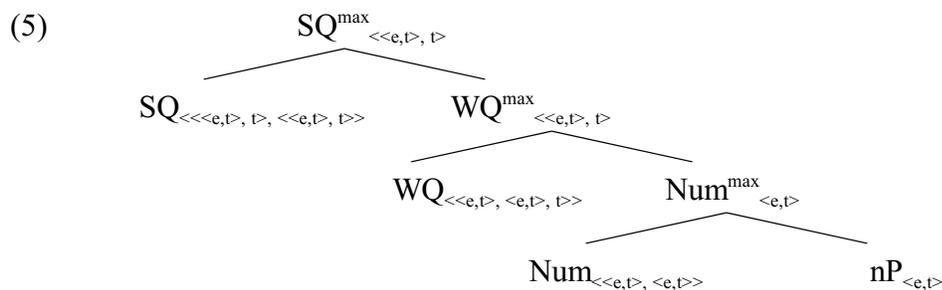
Minimally, the structures in (2,3) are required for an nP to be an argument. Section 5.2 in this chapter shows when a nominal is definite that (3) must be dominated by a SQP, as in (4). Again, I argue in section 5.5 that the Quantifier Phrases are dominated by a Case Phrase but I ignore KP for now.



There is variation in the precise features that are used and how they are bundled with other features. Num<sup>max</sup> houses number morphology and CL<sup>max</sup> houses numeral classifiers, but classifiers

and number morphology serve basically the same syntactic function of merging with nouns and the same corresponding semantic function of providing sets for determiners. One example of variation is which feature is used with numeral classifiers and number morphology. As discussed in section 2.2.2.2, a classifier is featured as [indiv], the most basic number feature, since classifiers typically show no singular/plural preference for the nouns they occur with. Plural morphology, on the other hand, is specified for number, so besides being [indiv] plural morphology has the [group] subfeature, indicating plurality.

The head of  $WQ^{\max}$  is where the weak quantifying determiners appear while the head of  $SQ^{\max}$  is where we see strong quantifying determiners and the definite article. Meanwhile, the semantic composition is as in (5a). A concrete example is in (5b).



(5b) [<sub>SQP</sub> the [<sub>WQP</sub> three [<sub>NumP</sub> boy-s [<sub>nP</sub> boy ]]]]

In an example like *the three boys*, as shown in (5b), the noun *boy* externally merges in the head of nP and raises to adjoin to the suffixal head of NumP, *-s*. The semantic function of the plural marker *-s* is to take the predicate noun and product a predicate NumP. The numeral *three* externally merges in WQ and is a function from the NumP predicate to the WQP generalized

quantifier. The definite article then externally merges in SQ and functions to give back another generalized quantifier. The motivation for the semantic type of SQ,  $\langle\langle\langle e,t\rangle, t\rangle, \langle\langle e,t\rangle, t\rangle\rangle$ , is presented in sections 2.2.2.4 and 5.1.1 for English and 5.1.2 for Persian. The basic idea is that at least in some cases where both determiners are overt, a definite article, for example, takes a WQP complement, as in *the three tenors*. The expression *three tenors* is a WQP syntactically, headed by a weak quantifying determiner, and generalized quantifier semantically. The article *the* takes the WQP and semantically produces another generalized quantifier, the SQP. In SQPs with a definite article, I assume that the resulting  $SQ^{\max}$  generalized quantifier can be typeshifted as necessary to an entity denotation (Partee 1987).

## **5.1 The SQP/WQP distinction**

### **5.1.1 Semantic evidence for the SQP/WQP distinction**

In section 2.2.2.4 I presented English data that supported previous claims (e.g. Bowers 1975, Jackendoff 1977 and Milsark 1979) that there are distributional differences between what Milsark called weak and strong quantifying determiners. This was part of the motivation for positing the structure in (5) with a SQP and a WQP instead of a single DP. In this section I do two things. First I provide more semantic evidence for a split between strong and weak determiners to buttress the claim that they project separate phrases. Then I draw on Persian data to show that (5) is instantiated crosslinguistically.

Keenan (1987) argued that the two kinds of determiners, strong and weak, contribute different properties regarding the inferred existence of their complements. For Keenan, existential NPs are “just those that occur in ET [existential there, L.G.] contexts with an existential reading” (Keenan 1987, p289). Existential NPs are then defined in terms of the basic existential

determiners that introduce them. Existential determiners are just those that make existential NPs, i.e. those permitted in *There is/are* sentences. Basic existential determiners are the monomorphemic weak quantifying determiners such as *some* and certain more complex ones such as *at least n*, where *n* is some number. By “complex determiners” Keenan means those formed by certain operator combinations, such as *Det-1 and Det-2*, *Det-1 or Det-2*, *not Det-1*, and *neither Det-1 nor Det-2*, and variants. Now, existential determiners are defined in (6) (from Keenan 1987, p291). Note that “1” is the property that all individuals have.

- (6) Keenan’s (1987) definition of an existential determiner:
- a. A basic determiner is called existential iff it is always interpreted by an existential function, where
  - b. a function  $f$  from properties to sets of properties is existential iff for all properties  $p, q$ 

$$p \in f(q) \text{ iff } 1 \in f(q \wedge p)$$

According to (6), saying that  $f$ , a determiner, is existential is the same as saying that  $f(q)$ ’s (i.e.  $\text{Det } q$ ) are  $p$ ’s iff  $f(q)$ ’s who are  $p$ ’s) are individuals, i.e. iff they exist.

Here is where a crucial distinction between strong quantifying determiners and weak quantifying determiners becomes clear. To know that *some* is an existential determiner, Keenan says we must show that (7a,b) are true in the same conditions (Keenan 1987, p291).

- (7a) Some student is a vegetarian
- (7b) Some student who is a vegetarian exists

Based on (6), for (7) we show that  $\text{some} = f$ , where  $f(\text{student})$  is a vegetarian is true only if it is also true that  $f(\text{students who are vegetarians})$ . So for existential determiners, (7a) and (7b) are both true under the same conditions. But for a strong quantifying determiner the picture is

different because (8a) and (8b) need not both be true in the same conditions for the strong quantifying determiner *every*, for example.

- (8a) Every student is a vegetarian
- (8b) Every student who is a vegetarian exists

Clearly, (8a) can be true without (8b) having to be true. Given this distinction between strong and weak quantifying determiners, Keenan argues that his existential determiners are precisely those that Milsark argued are “weak”. In turn, this Keenan/Milsark class includes just those determiners I have argued occur in the head of WQP. The determiners that are not existential, “strong” in Milsark’s terms, are the ones I place in the head of SQP. Hence, at least for English, in conjunction with the distributional properties, the semantic distinction between strong and weak determiners provides some justification for their heading separate projections, since they have different semantic functions that we correlate with the syntax.

To be clear, that determiners have different semantic functions does not in itself indicate that the determiners are in different syntactic positions. But we have seen that there are ordering and cooccurrence restrictions among the determiners that suggest two positions for them and that each of these positions corresponds with a semantic function (section 2.2.2.4). While both WQPs and SQPs are generalized quantifiers, their heads have different functions. A WQ is a function from sets to generalized quantifiers while a SQ is a function from generalized quantifiers to generalized quantifiers. While cooccurrence and ordering restrictions could conceivably be handled semantically, the systematic arrangement also suggests a syntactic association between the heads and different positions.

Importantly, I do not adopt the theory that indefinites are predicates. For example, Kamp (1981) and Heim (1982) argue that indefinites are properties and never “have any quantificational force of their own” (Heim 1982, p122). Part of the reasoning for the view that NPs (my WQPs) are not quantificational is that indefinites, but not definites, can behave like predicates, as in (9).

(9) That is [a mongoose]

However, the use of *an NP* as a predicate seems overwhelmingly restricted to complements of verbs like *be*, *become* and other copular verbs; the most common use of *an NP* is with all other verbs as an argument, which I argue *are* quantificational (see section 2.3.2) because of the feature [q] in WQ. Another reason for doubting that *an NP* is fundamentally predicative is that it is arguably quantificational by virtue of the singular indefinite article. If Lyons (1999) is correct in his analysis, *a(n)* is a kind of cardinal that appears in the same syntactic position as ordinary cardinals, and *an NP* is analogous to *one NP* and *two NPs*. So if an expression like *two horses* is quantificational, which seems so, then *a mongoose* must also be quantificational.<sup>66</sup> Third, theories like those of Heim and Kamp and others can be accommodated in a syntactic view that links a Num position with a WQ position. For Borer (2005), for example, *a* can be considered a singular number marker in NumP that raises to her #P (analogous to WQP). If, then, elements that merge in the WQ position have a syntactic feature [q] (see section 5.2.2 for details) that corresponds to semantic quantification, the functional head in WQ provides for the quantification that Heim provides in the element that binds the NP. For Heim, the quantificational force of an indefinite is

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<sup>66</sup>Note that *two horses* can also be used predicatively, if put in a copular construction: *those are two horses*.

“provided by a different expression in the indefinite’s linguistic environment, or by an interpretative principle...” (Heim 1982, p122). So in *If a man owns a donkey he beats it, a man* and *a donkey* are variables bound by an “invisible ‘always’”; in the expression *every man, man* is bound by *every* (Heim 1982, p130-131).

### 5.1.2 Crosslinguistic evidence for the SQP/WQP distinction in syntax: Persian

At this point I present evidence for (5) being universal by showing that the distribution of determiners in Persian works out precisely as in English, as shown in section 2.2.2.4. This sets the stage for analyzing Persian data in terms of the syntax and semantics assumed in this dissertation. First, strong quantifying determiners but not weak quantifying determiners are subject to a definiteness effect. (10a) and (10b) are most naturally construed as being existential statements similar to *There is/are* statements in English.<sup>67</sup>

|       |                                                    |               |      |                |
|-------|----------------------------------------------------|---------------|------|----------------|
| (10a) | ye muš                                             | tuye zirzæmin | hæst | <i>Persian</i> |
|       | a mouse                                            | in basement   | is   |                |
|       | ‘There’s a mouse in the basement’                  |               |      |                |
| (10b) | muš                                                | tuye zirzæmin | hæst |                |
|       | mouse                                              | in basement   | is   |                |
|       | ‘There are mice / there’s a mouse in the basement’ |               |      |                |

The same holds for other weak quantifying determiners: *cændta* ‘some’ (11a), *tedad-e ziyad-i* ‘many’ (11b) and *xeyli* ‘many’ (11c).

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<sup>67</sup>(10a) can also mean ‘A mouse is in the basement’ and (10b) can mean ‘Mice are in the basement’. Persian does not have an expletive *there* to indicate an overt distinction. The number ambiguity in singular *muš* in (10b) is clear in that *Cændta muš?* ‘How many mice?’ is a reasonable followup question in Persian to (10b). This contrasts with English: (i) *There’s a mouse in the basement*, (ii) *??How many?*, where the followup question in (ii) for the number of mice is odd given the singular *a mouse* in (i).

- (11a) cændta muš tuye zirzæmin hæst  
 some mouse in basement is  
 ‘Some mice are in the basement’
- (11b) tedad-e ziyad-i muš tuye zirzæmin hæst  
 amount-EZ many mouse in basement is  
 ‘There are a lot of mice in the basement’
- (11c) xeyli muš tuye zirzæmin hæst  
 many mouse in basement is  
 ‘There are a lot of mice in the basement’

But, as in English, the use of Persian definite-entailing morphology such as the definite plural marker *-ha* on the noun renders the statements odd because of a definiteness effect.<sup>68</sup> For example, (12a) is akin to English *#There are the mice in the basement*. Similarly, (12b) is something like English *There is the mouse in the basement*. (Examples (12c-e), while bad, are probably not bad for the same reason. Their oddity or perhaps ungrammaticality is perhaps perhaps because of a clash between definite *-ha* and the indefinite determiners *cændta*, *xeyli*, *tedad-e ziyad-i* respectively.)

- (12a) #muš-ha tuye zirzæmin hæst-ænd  
 mouse-PL in basement be.3P  
 (Infelicitous on the reading ‘There are mice in the basement’. It can mean ‘The mice are in the basement.’)
- (12b) #muš-e tuye zirzæmin-e  
 mouse-Spec in basement-is  
 (Infelicitous on the reading ‘There is the mouse in the basement’. It can mean ‘The mouse is in the basement’)

---

<sup>68</sup>Also, as in English, such sentences with definite nouns can be licensed in special circumstances. (12a) *muš-ha tuye zirzæmin hæst-ænd* is possible in the same kind of context as the definite copular complement is in English. For example, when my hungry partner grumbles *We have nothing in this house for dinner!*, I can respond, *Well, there’s the leftover chicken* (example from Gregory Ward, p.c.). In fact, these kinds of apparent counterexamples to the definiteness effect have led some to propose that the effect is a pragmatic rather than a syntactic one. See Ward and Birner (1995), Keenan (2003), Zucchi (1995) for discussion. The fact remains, however, that it is only definites and strong quantifiers that are subject to the effect.

- (12c) \*cændta      muš-ha      tuye zirzæmin      hæst-ænd  
 some            mouse-PL      in basement      are  
 (Ungrammatical)
- (12d) \*xeyli muš-ha      tuye zirzæmin      hæstænd  
 many mouse-PL      in basement      are  
 (Ungrammatical because of definiteness effect.)
- (12e) \*tedad-e ziyad-i      mus-ha      tuye zirzæmin      hæst  
 amount-EZ a lot      mouse-PL      in basement      is  
 (Ungrammatical)

Second, as in English, other strong quantifiers can yield a definiteness effect.

- (13a) \*haem-e      muš      tuye zirzæmin      hæstænd  
 all-EZ          mouse      in basement      are  
 (Akin to *There are all the mice in the basement.*)
- (13b) \*haem-e      muš-ha      tuye zirzæmin      hæstænd  
 all-EZ mouse-PL      in basement      are  
 (Bad on the *There are* reading but okay on the reading *All the mice are in the basement.*)
- (13c) \*haer muš      tuye zirzæmin      hæst  
 each mouse      in bsement      is  
 (Bad on the *There is* reading.)

Third, weak quantifying determiners compete for the same position, evidenced by their mutual exclusivity.

- (14a) \*cændta ziyad / \* ziyad cændta      gorbe  
 some/a lot      / a lot/ some      cat
- (14b) \*cændta xeyli / \*xeyli cændta      gorbe  
 some/a lot      / a lot/ some      cat
- (14c) \*se cændta      / \*cændta se      gorbe  
 three some      / some three      cat
- (14d) \*se xeyli      / \*xeyli se      gorbe  
 three a lot      / a lot three      cat

Fourth, strong quantifying determiners compete for the same syntactic position, based on their mutual exclusivity. Note that in (15b) there is a conflict between *hær* ‘each’ and *-ha*

‘the.PL’, even though they are pronounced in separate positions. (I show in section 5.2.6 how *-ha* is connected to the SQ position.)

- |       |                             |         |
|-------|-----------------------------|---------|
| (15a) | *bištær hæR / *hæR bištær   | irani   |
|       | most each / each most       | Iranian |
| (15b) | *hæR irani-ha               |         |
|       | each Iranian-PL             |         |
| (15c) | *hæme bištær / *bištær hæme | irani   |
|       | all most / most all         | Iranian |
| (15d) | *hæme hæR / *hæR hæme       | irani   |
|       | all each / each all         | Iranian |

It is possible to consider that the mutual exclusivity of the items in (14a) and the items in (15a) could be accounted for by adducing semantic inconsistency rather than by their competing for the same syntactic position. So in (14a) for example, *\*cændta ziyad / \*ziyad cændta* might be ruled out because *cændta* ‘some’ and *ziyad* ‘many’ are semantically incongruent. If semantic, the incongruence may stem from the meanings they express. *Some* expresses a vague and relative cardinality that doesn’t exceed some agreed on degree of cardinality. In contrast, *many* expresses some cardinality below which its use is infelicitous. The reason the two are incongruous could be that the potential degree of cardinality of *some* and the degree of cardinality of *many* do not intersect. Although *Many went to the press conference* entails that *Some went to the press conference* in the same sense that *Four went to the conference* entails that *Three went to the conference*, to state that *Many went* when one means to claim that *Some went*, is a violation of Grice’s (1975, p61) maxim to be truthful. The case is less clear with *\*se cændta* ‘three some’, in which the numeral is not inconsistent with *cændta*. We could say that there is a mismatch between a precise quantification and a vaguer relative one. It is possible that semantics can rule out the use

of some pairs of determiners, but the assumption that they are competing for the same position is simple and effective.

In cases like *\*hæme hær / \*hær hæme* in (15c), there does not seem to be a truth-conditional difference between expressions using one or the other term. But there are differences. For one, English *each* is distributive and *all* is not, as in (16).

- (16a) All atheists gathered in Daly Plaza  
 (16b) \*Each atheist gathered in Daly Plaza

But if we hold that the various quantifying determiners are in the same position, their mutual exclusivity falls out from the syntax.

Fifth, strong quantifying determiners cannot appear with a morpheme that entails definiteness, like plural *-ha* and singular *-e*.

- (17a) \*hær irani-ha  
 each Iranian-PL(def)  
 (17b) \*hær irani-e  
 each Iranian-Sing(def)  
 (17c) \*bištær irani-ha  
 most Iranian-PL(def)  
 (17d) \*bištær irani-e  
 most Iranian-Sing(def)

Notably, *hæme*, like its English counterpart *all*, can appear with a definite morpheme. I show in section 5.2.6 how the definite suffixes *-ha* and *-e*, while pronounced low, are connected to the SQ position, thus blocking the appearance of another strong quantifying determiner.<sup>69</sup>

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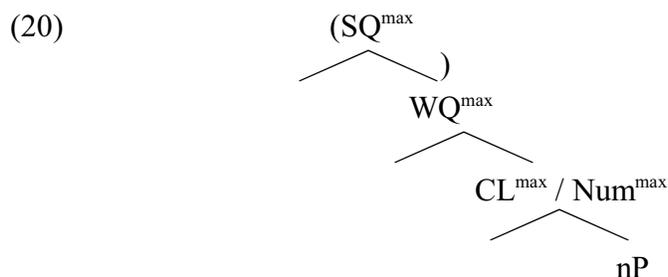
<sup>69</sup>*All* is a problem. Giusti (1995), for example, posits a higher Q position.

- (18) hæme irani-ha  
 all Iranian-PL  
 ‘all Iranians’ / ‘all the Iranians’

And, sixth, some strong quantifying determiners can precede some weak quantifying determiners, assuming again that pronouns are in, or at least end up in, the SQ position.

- (19) ma se ta irani-ha  
 we three CL Iranian-PL  
 ‘We three Iranians’

Summarizing, the Persian data corroborate the English evidence presented in section 2.2.2.4 that: 1) a definiteness effect can result from using a definite morpheme in *There is/are* constructions, 2) other strong quantifying determiners yield a definiteness effect in *There is/are* constructions, 3) weak quantifying determiners compete for the same syntactic position, 4) strong quantifying determiners compete for the same syntactic position, 5) a definite morpheme can’t appear with other strong quantifying determiners, and 6) at least some strong quantifying determiners can precede some weak quantifying determiners. These distributional facts support the idea that in Persian, as in English, strong quantifying determiners and weak quantifying determiners are in separate positions and that strong quantifying determiners occupy a position higher than weak quantifying determiners. For Persian as well as English, argument nominals must have at least a WQP and may have a SQP, for definites, as in (20) (parentheses around SQ<sup>max</sup> indicating syntactic optionality).



We have seen in both Persian and English that the distribution of strong quantifying determiners and weak quantifying determiners is the same. It is important to point to one other important syntactic difference between strong quantifying determiners and weak quantifying determiners that holds in both languages. It has been observed that, while English phrases headed by a weak quantifying determiner can be extracted from (21a), phrases headed by a strong quantifying determiner (21b) cannot (Fiengo and Higginbotham 1987, Bowers 1988, among others).

- (21a) Who<sub>i</sub> did you see [photos of t<sub>i</sub>]?  
 (21b) \*Who<sub>i</sub> did you read [every book by t<sub>i</sub>]?

Karimi (1999) shows that a similar distinction holds in Persian. Example (22a) shows that extraction is possible from a phrase headed by the weak quantifying determiner, *ye* 'a'. But in (22b), with the demonstrative *in* 'this' and the specificity marker *-ra*, extraction is blocked (from Karimi 1999, p126). Note that Karimi assumes that wh-movement in Persian, a wh-in-situ language, occurs at LF.

- (22a) Kimea diruz [ <sub>NP</sub> ye she'r æz ki ] xund?  
 Kimea yesterday [ a poem from who ] read.past.3P  
 'Who did Kimea read a poem by?'

- (22b) \*Kimea diruz            [NP in she'r æz ki]-ro            xund?  
 Kimea yesterday        [ this poem from who]-RA        read.past.3P  
 \*'Who did you read this poem by?'

Karimi notes that it is not specificity alone that blocks extraction, given the example in (23) where extraction from a specific phrase is acceptable (from Karimi 1999, p128).

- (23) Kimea [NP ketab-e kodum nevisanda]-ro            dust-dar-e  
 Kimea [ book-EZ which writer]-RA            friend-have-3S  
 'Which writer's book does Kimea like?'

Since (23) is good but (22b) is not even though both involve specific phrases, Karimi argues what blocks extraction is not semantic specificity but the syntactic condition of having a lexically filled Spec position. Spec is empty in (23), but extraction is blocked in (22b) because Spec is filled by *in* 'this'. I will discuss the nature of null WQs and SQs in section 5.3, but the main point here is that once again Persian DP structure parallels English DP structure in the heads available and the phrases they generate, as well as the behavioral distinction between what I am calling SQPs and WQPs.

## 5.2 Definiteness

### 5.2.1 Problems with a unitary treatment of definiteness

In this section I argue that we can eliminate definiteness as a primitive feature. In the following sections, 5.2.2. and 5.2.3, I discuss in detail the issues that are crucial to my argument about the syntactic, semantic and pragmatic issues involved in definiteness and how I will tie them together via syntactic features, but in what immediately follows in this section I outline the spirit of the approach. Simplifying somewhat for now but discussed in detail below, among the criteria

by which an expression can be considered definite is that the addressee, and speaker, in a discourse are presupposed by the speaker to be able to identify the intended referent. It will be argued that appropriate use of definite *the*, for example, cannot be reduced to the function of an iota operator that picks out the maximal element of a semilattice; while a maximal element may be unique and possibly a necessary condition, more than semantic uniqueness must be available for the speaker to use *the*. The speaker must presuppose that the addressee can know which *x* with property *P* is associated with the uniquely assumed referent. Definiteness can therefore be eliminated as a primitive by allowing specificity to apply to both the speaker and the addressee. In this way, a definite expression can be redefined as an expression that is specific for both the speaker and the addressee. A specific indefinite is one that is specific for the speaker but not the addressee and a nonspecific indefinite is one that is specific for neither the speaker nor the addressee. Thus we can reduce the term “definite” to a merely descriptive one under the view that definiteness has no independent ontological status. Concomitantly, indefiniteness disappears as a primitive and the definite/indefinite distinction is no longer meaningful in any explanatory way. If that is the case, then specificity becomes the key issue. This switch might be considered primarily a terminological one and not really a simplification: on the view that NPs are nonspecific indefinite, specific indefinite or definite (see Lyons 1999, chapter 2 for an overview), there are three degrees of specificity. In the proposal here we still have three factors: specificity, speaker’s presupposition about the speaker and speaker’s presupposition about the addressee. But this numerical equality of complexity, judging by the number of factors involved, is an illusion. Speaker and addressee presuppositions are implicit components of traditional definiteness and also components of specificity in the traditional view in that they were what defined definiteness

and specificity. But the revised view, while still requiring three factors, merely makes explicit two factors that are implicit in earlier work. If this view holds, some economy will have been achieved. Further, it is useful to try to analyze definiteness into components since it has proven difficult to provide a unified criterion for definiteness and for the use of the definite article, as we will see in the following paragraphs.

But we can simplify things even more by eliminating specificity as well. Chapter 4 used [q] as a syntactic feature in WQ whose semantic correlate is quantification over the set denoted by NumP. We will see below that the semantic interpretation associated with [q] is a choice function that selects some *x*, any *x*, from a set whose members have some property *P*.<sup>70</sup> Speaker presuppositions about an *x* apply directly to the *x* in the following way. For what is traditionally called a specific indefinite, the speaker knows which *x* with property *P* is the referent; for what is traditionally called a definite expression, both the speaker and addressee know which *x* with property *P* is the referent. Again, more specifically, the speaker presupposes that the addressee knows which *x* is being talked about. Thus, even the notion of specificity is not required as a primitive, although I will continue to use “specific” and “definite” as descriptive terms. We only need the syntactic feature [q], and its associated semantics, and syntactic features that correspond to speaker’s presuppositions about participants’ knowledge of a referent.

The English articles that correspond to definite NPs and specific NPs can thus be decomposed into the semantic correlates of the syntactic feature [q] and two other features for presupposed speaker and addressee awareness that I will introduce in the syntax based on the

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<sup>70</sup>A choice function “maps a property onto an entity that has the property” (Chung and Ladusaw 2004, p5). This is discussed section 5.2.2.

Harley and Ritter (2002) feature geometry. When both speaker and addressee features are absent, the expression is specific for neither participant and is therefore a nonspecific indefinite. This absence of both participants' features parallels Lyons's (1999) contention that indefiniteness is simply the absence of definiteness, although more precisely under the present proposal we might say that nonspecific indefiniteness is the absence of specificity for both speaker and addressee. But most precisely, Lyons's idea about definiteness can be expressed by saying that indefiniteness is merely the absence of either speaker awareness or addressee presuppositions of which *x* with property *P* has been selected by the choice function.

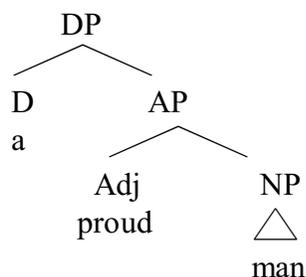
In this way this analysis of articles allows the features to be combined in various ways that correspond to the features and their pragmatic associations. Depending on how features for quantification and for the speaker's presupposition about which participants might know the referent are bundled, we can easily compose articles in various languages that have different interpretations than English articles do. For example, while the English *the/a* distinction breaks down on definite/indefinite lines, other languages have articles that break down along specific/nonspecific lines. Rather than having this be a completely arbitrary fact, we can see that both types of languages use the same primitive features but bundle them variously as different lexical items. Again, it is in the lexicon where we expect such difference. The key is that the feature geometry specifies whether the speaker and/or addressee knows *which one* of the set of individuals with property *P* is the referent.

The rest of section 5.2 is organized as leading to the solution of what I will call Lyons's Problem, the barring of *\*the a*. The solution to Lyons's Problem provides a motivation for and shows a syntactic effect of there being two determiner heads and feature movement from WQ to

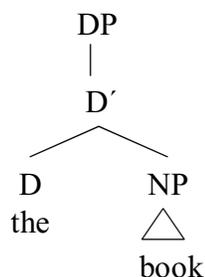
SQ in the case of definites. Recall that according to Lyons (1999) *the* and *a* are in separate heads and that there is thus no syntactic reason the two articles cannot cooccur. Further, Lyons says that while *the* is definite *a* is not indefinite. Therefore, there is no semantic reason they cannot cooccur. We will see that the phonological constraint that Lyons proposes fails to explain facts in Persian. I show in section 5.2.4 that a solution to Lyons's Problem falls out naturally from the feature-based syntax I will describe. Before I turn to a solution to Lyons's Problem, I will review the problem, potential solutions and theoretical issues that are involved.

Articles, located in the head of DP according to the DP hypothesis, have been argued to encompass a number of related roles. For example, they are seen as bearing referentiality (Löbel 1989, Longobardi 1994), as the grammatical encoding, in some languages, of a semantic/pragmatic concept of definiteness (e.g. Lyons 1999), and as a subordinating head that gives an NP the status of an argument (e.g. Abney 1987, Stowell 1989 and Szabolsci 1994). Representing these views we can say that the D position typically houses articles, quantifying determiners, proper names, pronouns and English possessive *-s*. For example, Abney puts both *a* (24a) (1987, p327) and *the* (24b) in D (from Abney 1987, p25).

(24a)



(24b)



Longobardi (1994), arguing for the DP hypothesis, assumed that it is necessary to fill the D position to give argument status to an NP and that D can be filled with a definite or indefinite article or can be filled by N-to-D raising. This, according to Longobardi, accounts for the examples in (25) (from Longobardi 1994, p623).

- (25a) *il mio Gianni* *Italian*  
           the my Gianni  
 (25b) [<sub>DP</sub> *il* [<sub>NP</sub> *mio* [<sub>NP</sub> *Gianni* ]]]  
 (25c) *Gianni<sub>i</sub> mio*  
           *Gianni my*  
 (25d) [<sub>DP</sub> *Gianni<sub>i</sub>* [<sub>NP</sub> *mio* [<sub>NP</sub> *t<sub>i</sub>* ]]]  
 (25e) \**mio Gianni*  
           *my Gianni*  
 (25f) \*[[<sub>DP</sub> [<sub>NP</sub> *mio* [<sub>NP</sub> *Gianni* ]]]]<sup>71</sup>

Assuming that *mio* ‘my’ is adjoined to NP and does not move, Longobardi says (25a) is good because *il* ‘the’ fills D, as in (25b). (25c) is good because *Gianni* has raised from N to D (25d). Finally, (25e) is bad because D is left empty, being filled by neither *il* nor *Gianni* (25f). Thus (25e) cannot be used as an argument. That a filled D is needed specifically for arguments, Longobardi says, is evident in that nonarguments need not fill D, as in the case of predicates (*Gianni è tenente* ‘Gianni is lieutenant’) and vocatives (*Diavolo!* ‘Devil!’) (from Longobardi 1994, p612).

But as early as Jackendoff (1977) it was observed that positing a unique position for determiners is suspect because of the permitted and nonpermitted orderings as presented in

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<sup>71</sup>Longobardi mentions a fourth order, *il Gianni mio*, as being contrastive, as in ‘My Gianni, not your Gianni’. However, he does not suggest what the structure might be. Within Longobardi’s syntax, the structure for *il Gianni mio* would seem to have both *il* and *Gianni* in D, preceding *mio*. If the DP split between SQP and WQP being presented in this dissertation is on the right track, it provides a landing site for *Gianni* via N-to-WQ head movement while still allowing *il* to be in its position in the highest head, SQ.

section 2.2.2.4 for English and 5.1.1 for Persian. For Jackendoff, in a pre-DP account, the various kinds of determiners occupied different positions within NP. Items like *Fred's, the, those* were in spec of N'' while *several, few* and *many* were in Q'' under N'' (Jackendoff 1977, p104). But the DP hypothesis (Abney 1987) and its refinements in subsequent years added a separate D position and other functional heads that provided for more sites to house determiners. For some, articles were in D and demonstratives were in SpecDP. Borer (2005), for example, puts *a* in #P (which corresponds to a phrase for cardinality), although the higher D position is still necessary. That is, for Borer the D position is still required but it can be empty if licensed from outside DP by an appropriate operator. This is in spirit similar to Longobardi's (1994) argument that null-D objects, but not null-D preverbal subjects, are possible in Italian because the empty D of the direct object is licensed by a lexical governor, the verb.

In contrast, following Lyons (1999) and Borer (2005), I have argued on distributional and semantic grounds that the definite and indefinite articles are in separate positions. Further, this dissertation proposes that while argument nominals require at least a WQP projection, SQP, where definiteness is determined, is only required for definites. That is, SQP is syntactically optional in that a SQP is not a necessary condition for argumenthood if the expression is indefinite.

The frequent assumption that *a* and *the* are in the same position, say D, offers a convenient explanation for the fact that *a* and *the* cannot appear together.

(26) \*a the war / \*the a war

But if DP is split into two phrases with separate heads for a WQ and a SQ, then just as in Lyons's analysis there are two positions for *the* and *a* to appear in, a situation which in principle allows for the presence of both articles. Lyons, who reserves DP for definite *the*, is aware of the problem. For him, *a* is a cardinal that heads a lower Cardinality Phrase. If so, then like other cardinals it ought not be inherently indefinite, since other cardinals like *three* can occur with *the*, as in (27a).

- (27a) the three tenors
- (27b) three tenors
- (27c) Go buy milk

If cardinals were inherently indefinite, then (27a) is predicted to be ungrammatical because of the mismatch with definite *the*. Since (27a) is grammatical, *three* therefore cannot be inherently indefinite. Further evidence that *a* should not be considered inherently indefinite, according to Lyons, is that it is not a necessary condition for indefinite expressions (Lyons 1999, p33ff), as the indefinite expressions *tenors* in (27b) and *milk* in (27c) attest.

What the indefinite expressions *three tenors* and *a tenor* have in common is that they both lack a definite determiner. So, concludes Lyons, we do not need indefiniteness as a primitive: it is simply falls out from the lack of definiteness. But if so, and there is no definite/indefinite mismatch, there has to be another way to rule out *\*the a*. Unable to rule it out on syntactic or semantic grounds, Lyons's main argument for the proscription against (26) is a phonological one. He reasons that forms like articles that are phonetically weak can only occur at the left edge of a phrase. In *\*the a*, *a* is in a nonleft position, thus violating the constraint.

Lyons's proposed constraint is unconvincing as a reason for barring *\*the a*. For one, the phonological account fails in Persian. In (28), there is both an indefinite element *ye* and a specific element *-e* on the noun *muš* 'mouse'.

|      |                  |      |          |      |                |
|------|------------------|------|----------|------|----------------|
| (28) | *ye muš-e        | tuye | zirzæmin | hæst | <i>Persian</i> |
|      | a mouse-Sing.Def | in   | basement | is   |                |

Assume that *ye* functions as an indefinite article in the head of WQP and that *-e* is a specific suffix (I show in section 5.3 how the colloquial definite marker *-e* is connected to the SQ position). The main point here is that (28) is bad but not because of Lyons's proposed constraint. The unstressed suffix *-e* is not located to the immediate right of another unstressed element on a left edge, yet the expression is ungrammatical. Clearly, Lyons's phonological account of the constraint against *\*the a* in English is insufficient to account for the Persian facts. It would be better to find a common syntactic and/or semantic explanation for both the English and Persian data. But, if Lyons is right in his overall approach, we cannot block (28) by referring to inconsistent features such as [def] and [indef] or [+def] and [-def]. The solution must lie elsewhere. Let's give the name "Lyons's Problem" to the problem of blocking *\*the a* in English and *\*ye ...-e* in Persian. While it may appear to be a small technical point, the path toward its solution offers a significant amount of explanatory power concerning determiners, their syntactic features and pragmatic associations corresponding to (in)definiteness and (non)specificity. The rest of this section works toward a feature account from which the solution to Lyons's Problem falls out for free.

In solving Lyons's Problem we can rule out *\*a the* with the syntax worked out so far and indeed by some of Lyons's assumptions themselves. The order *\*a the* is ruled out by the structure

in (5), where the higher head is for strong quantifying determiners and the lower one is for weak quantifying determiners. Thus, absent a motivation for moving *a* left of *the*, there is no way to get *a* to precede *the*. Lyons's real problem is to rule out *\*the a*. In what follows I present a feature-movement account that, in effect, corresponds to the intuition that the pragmatics of *\*the a N* is incongruent but which actually stems from syntax. However, it will not be necessary to refer to either definiteness or indefiniteness. Instead, I will make further use of Harley and Ritter's (2002) hierarchical feature geometry to break down definiteness into component features. Indefiniteness, as Lyons proposes, falls out from the lack of one of these features. The key component is specificity, but other determiner features contribute as well. To be clear, *the* and *a* will end up having different pragmatic interpretations, as we expect, but I try to show that the differences are derived from syntactic movement of features and their concomitant semantics.

In English, the articles *the* and *a* are traditionally termed the definite and indefinite articles respectively, meaning that *the* adds or reflects definiteness in the nominal it occurs with and *a* adds or reflects indefiniteness (e.g. Payne and Huddleston 2002, p368ff). But clearly things are more complicated than this. It is unlikely that definiteness can be reduced to a single notion. First, not all languages have articles that encode definiteness and indefiniteness, such as Mandarin and Japanese; Persian has specific/definite/indefinite morphology but it is not always used. Second, it is known that even in languages with both definite and indefinite articles the articles don't behave the same across languages. As one example, in English (29a) the mass noun *water* can occur without (in fact, here, *must* occur without) an article. In French, however, the definite article is required (29b,c).

- (29a) Water is a chemical compound / \*The water is a chemical compound  
 (29b) L'eau est un composé chimique *French*  
 the'water is a compound chemical  
 (29c) \*Eau est un composé chimique

Further, within a language the exact relation between articles and definiteness is not clear. While English can make a definite/indefinite distinction with *the* and *a*, other languages have articles that do not make such a distinction, at least not in the same way. For instance, Gillon (2006, 2007) argues that articles in Skwxwú7mesh, a Coast Salish language also known as Squamish, do not show a definite/indefinite distinction, although argumental nouns nonetheless must be introduced by the use of these articles. Any of the Skwxwú7mesh determiners can be used regardless of definiteness, although they differ in deixis. So all four determiners are grammatical in the varying contexts of (30) (from Gillon 2006, p5).

- (30a) chen kw'ách-nexw **ti/ta/kwa/kwi** swí7ka *Skwxwú7mesh*  
 1sg.s look-tr(lc) det man  
 'I saw a man'  
 (30b) tsí7 **ti/ta/kwa/kwi** swí7ka ná7 ta lám'  
 exist det man loc det house  
 'There's a man in my house'  
 (30c) na kw'áy' **ti/ta/kwa/kwi** swí7ka  
 rl hungry det man  
 'The man is hungry'

(30a) uses the articles in introducing *swí7ka* 'man' as novel to the discourse; the noun with *ti/ta/kwa/kwi* can be construed nonspecifically. But in (30b) the same articles are used to indicate a specific man and in (30c) the intended reading is of a definite man. Gillon's analysis is that so-called D-determiners (i.e articles but not numerals and quantifying determiners, for example) may vary with regard to uniqueness features but that what they all share is domain restriction, which

restricts the domain of quantification. More specifically, Gillon assumes an unpronounced element C that the quantifier introduces and which restricts the possible domain to a contextually salient domain. The sentence *Every freshman is from out of state* is not saying something about every freshman in the world (Gillon 2006, p70). Borrowing from von Stechow (1999), Gillon claims that C contextualizes, i.e. restricts the domain, of *freshman* such that: every  $\lambda x [C(x) \ \& \ \text{freshman}(x)]$  [ $\lambda x$  [out of state (x)]]. This formalizes the referent to contextually relevant freshman.

Lyons (1999, p58) gives an example from Samoan (from Mosel and Hovdhaugen 1992) where the same article is used for indefinite and definite. In (31), the article *le* is used when the noun *ulugali'i* ‘couple’ is introduced, or is novel to the discourse, and also with the definite *tane* ‘husband’ and *fafine* ‘woman, wife’.

- (31) sa    i ai    **le** ulugali'i    'o    papa            **le**    tane            *Samoan*  
 PAST exist    ART couple    PRES husband            ART husband  
 a        'o        eleele **le**        fafine  
 but     PRES Eleele ART woman  
 ‘There was **a** couple, Papa **the** husband, and Eleele, **the** wife.’

Unlike the articles in the Skwxwú7mesh examples which make no assertion of (in)definiteness or specificity, the Samoan article *le* is specific in that the speaker has a particular couple in mind.

Similarly, Blackfoot articles encode assertion of existence but do not distinguish definite from indefinite. Glougie (2000) takes a definition of “assertion of existence” from Givon (1978): “the speaker’s intent to ‘refer to’ or ‘mean’ a nominal expression to have non-empty references—i.e., to exist—within a particular universe of discourse (i.e., not necessarily in the real world)”. So example (32a) asserts existence but makes no claims about the definiteness of *piita*

‘eagle’ since it allows both indefinite (32b) and definite (32c) readings, logically expressed as (32d) (from Glougie 2000, p126).

- |       |                                 |              |                  |
|-------|---------------------------------|--------------|------------------|
| (32a) | nits-ino-a                      | [om-a piita] | <i>Blackfoot</i> |
|       | I-see-3                         | dem-3 eagle  |                  |
| (32b) | ‘I saw an eagle’ (novel)        |              |                  |
| (32c) | ‘I saw the eagle’ (familiar)    |              |                  |
| (32d) | $\exists x$ , eagle(x), I saw x |              |                  |

Glougie’s semantics in (32d) indicates that both the novel expression (32b) and the familiar expression (32c) have in common the existential force that an x exists.

In another example of how articles and associated semantics do not map 1:1 across languages, the English determiner morphology bifurcates into a definite specific *the* on one hand and multiply ambiguous indefinite *a* on the other. In contrast, Klallam, a Coast Salish language, has articles such as *cə* that encompass both the meaning of English *the* and specific indefinite *a*, as in (33) (from Montler 2008, p1).

- |      |                                      |    |       |                |
|------|--------------------------------------|----|-------|----------------|
| (33) | nəsqečʔ                              | cə | huʔpt | <i>Klallam</i> |
|      | my catch                             | SP | deer  |                |
|      | ‘I caught [a (specific) / the] deer’ |    |       |                |

Zribi-Hertz (2002) questions both whether definiteness stems from a single feature and whether it involves a single position in the head of DP. In particular, she is led to the conclusion that not all identifiability/referentiality information is in D because identifying elements are in various positions. This is illustrated by the French examples in (34) (from Zribi-Hertz 2002, p134).

- (34a) La mouche m'embête *French*  
 the fly me'bothers  
 'The fly is bothering me'
- (34b) Cette mouche m'embête  
 this fly me'bothers  
 'This fly is bothering me'
- (34c) Cette mouche-là m'embête  
 this fly-there me'bothers  
 'This/that fly is bothering me'

(34a) involves the feminine definite *la*, which lacks locative features and is hence unspatialized (Zribi-Hertz 2002, p134). By “unspatialized”, Zribi-Hertz means that the spatial location of the fly is not signaled linguistically; rather (34a) signals to the addressee to identify the fly “by pragmatic inference (‘whatever fly is relevant to the utterance’)”. Demonstrative *cette* in (34b) is similarly definite but also contains a “weak” locative feature suggesting that the hearer “locate fly in utterance space”. In contrast, the additional postnominal *-là* in conjunction with prenominal *cette* in (34c) strongly asserts the spatialization of the fly. Similarly, Haitian allows different referentiality markers in different positions, as in (35) (adapted from Zribi-Hertz 2002, p135). Here both the demonstrative *sa* and the article *la* contribute to the definite interpretation of the noun.

- (35) Mari achte ti liv sa la *Haitian*  
 Mary bought little book Dem the  
 'Mary bought the/this little book'

The cooccurrence of articles and demonstratives also occurs in Spanish (Brugè 1994) and Romanian (Giusti 1994).

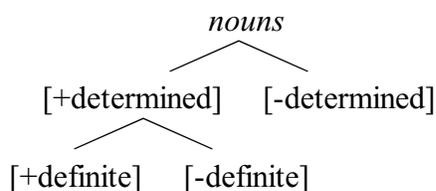
The main point in the above is that there is more to definiteness than a single feature or position. Below, I propose an account for definiteness that involves a syntactic representation of pragmatic features that refer to the presuppositions of the participants in a discourse. These features may be spread across more than one head.

### **5.2.2 Specificity and the speaker's presuppositions**

In this section I review some previous accounts of the relation between definiteness and indefiniteness and show that they can be subsumed under an account that uses component features that allow us to reduce definiteness and indefiniteness, as well as specificity, to derived notions. Gil (1987) proposes that languages come in two types, Type A and Type B, based on a number of correlations. Type A languages obligatorily mark (in)definiteness, obligatorily mark plural in plural contexts and show hierarchical interpretations of stacked adjectives. Type B languages lack these characteristics and instead have a number of other properties: they have obligatory numeral classifiers, have adnominal distributive numerals, show free constituent order within DP and have nonhierarchical stacked adjective constructions. For Gil, these correlations are a function of two basic differences between the two language types. Type A languages have configurational DPs and show a distinction between mass nouns and count nouns. In contrast, Type B languages are nonconfigurational within DP and treat all nouns as if they were mass. The mass-count characteristics parallel Chierchia's (1998a,b) idea that we saw in chapter 3, but the main point for our purposes here is that for Gil common nouns in Type A languages require an article while common nouns in Type B languages do not.

Putting Gil's observations of the noun differences between the two language types into a syntactic perspective, Löbel (1993) suggests that since nouns in a Type A language require an article, definite or indefinite, there must be something core to both definite marking and indefinite marking that is able to convert a noun into an argument. She refers to "determination" as a superordinate term for both definiteness and indefiniteness. If one speaks of the bivalent features [+definite] and [-definite], these are two realizations of the more abstract [+determined]. To be clear, for Löbel [+determined] does not mean definite, since either article suffices to make a noun [+determined]. So going back to Gil's observed characteristics of Type A and Type B languages, Löbel says that English common nouns like *book* are [-determined] and require an article while Japanese common nouns like *hon* 'book' are [+determined] and do not need an article to be an argument.<sup>72</sup> In English the feature [+determined] is realized as either *the* or *a* in D. Importantly, English *the* is more than simply [+determined] since it is also definite. One way of thinking of the relationships is to suggest a Harley and Ritter-style (2002) feature geometry, as in (36) where [definite] and [indefinite] are subfeatures of [determined].

(36) Schema for Löbel's (1993) article features under a Harley and Ritter (2002) analysis




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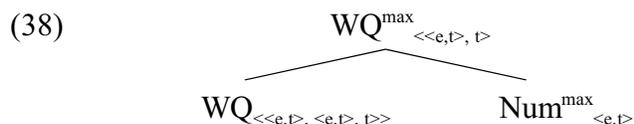
<sup>72</sup>There are, as Gil and Löbel observe, exceptions and clarifications are needed. For example, Löbel says that proper names in English are like common nouns in Japanese, i.e. determined.



neither definiteness nor indefiniteness is a core semantic property but instead that both imply something more fundamental.

I propose that Löbel's [determined] corresponds to the syntactic quantity feature [q] that I have suggested occurs in the head of WQP. The basic idea for equating them is this. Löbel's [determined], indicating definite or indefinite, is a characteristic of arguments. In this dissertation, [q] is the feature that corresponds to all arguments, whether definite or indefinite. A major difference, however, is that I shift Löbel's [determined] from a lexical feature to [q] as a syntactic feature. We will see shortly that for Chung and Ladusaw (2004) and Winter (1997) indefinites, which here correspond to WQPs, can be argued to involve a choice function (discussed in the next paragraph), which specifies that there is an entity with a certain property but that there need not be any particular entity called for. The entity,  $x$ , is not unique in that any  $x$  will satisfy the choice function. Along with the syntactic feature [q] corresponding to a choice function are criteria of specificity. Part of definiteness, in particular "specificity" in traditional terms, is set as a sister feature to [q] in the feature geometry. But specificity, in turn, is no longer a primitive and is instead indicated in terms of whether the speaker or addressee or both are presupposed to of an expression. These are syntactically represented as the features [i.know], corresponding to the speaker's awareness of the referent, and [you.know], corresponding to the speaker's assumption that the addressee knows the referent. Both features are discussed in more detail below. Teasing apart definiteness in this way can account for articles like *the* in English, which are strongly associated with definiteness, *a*, which is associated with indefiniteness, and articles in languages like Skwú7mesh that do not distinguish definiteness and indefiniteness.

The feature [q] in WQ corresponds to a function from predicates to generalized quantifiers. I associate this syntactic feature with a choice function. Semantically, a choice function “maps a property onto an entity that has the property” (Chung and Ladusaw (2004, p5); i.e. the choice function takes an  $\langle e,t \rangle$ -type expression and maps it to an expression of type  $e$ . Reinhart (1997) and Winter (1997) further specify that the set being operated on by the choice function be nonempty. Winter in particular provides for a choice function to be of the most general type by having it produce generalized quantifiers, of type  $\langle \langle e,t \rangle, \langle \langle e,t \rangle, t \rangle \rangle$  (Winter 1997, p448). Seen this way, this choice function is the semantic type that we have ascribed to the WQ position, as in (38).



For Chung and Ladusaw, the choice function assures us there is an  $x$  with property  $P$ , but it does not specify which  $x$  is involved. As an example, (39) (from Chung and Ladusaw 2004, p5-6) tells us that  $j$ =John fed a dog but “no conditions are placed on which dog it is”. In (39a), the choice function is indicated by CF, operating on the predicate  $\text{dog}'$ . The choice function then gives us an element of  $\text{dog}'$ ,  $d$ , represented in (39b), and the inside function application gives us (39c). The outside function application yields (39d).

(39a) FA (FA ( $\lambda y \lambda x$  [feed'(y)(x)], CF (dog')), j)

(39b) FA (FA ( $\lambda y \lambda x$  [feed'(y)(x)], d), j)

(39c) FA ( $\lambda x$  [feed'(d)(x)], j)

(39d) feed'(d)(j), i.e. John fed a dog

It is important to note that Chung and Ladusaw introduce a variant derivation that they call predicate restriction, which does not saturate the predicate but only restricts it to a subset of the predicate. According to Chung and Ladusaw, under predicate restriction we interpret the property argument as a restrictive modifier of the predicate under a mode of composition they call Restrict. The composition Restrict is as in (40) (Chung and Ladusaw 2005, p5).

$$(40) \quad \text{Restrict } (\lambda y \lambda x [\text{feed}'(y)(x)], \text{dog}') = \lambda y \lambda x [\text{feed}'(y)(x) \wedge \text{dog}'(y)]$$

Restrict in (40), since it does not saturate the predicate, allows for the predicate to be saturated by existential closure.<sup>73</sup> Under predicate restriction, we interpret the property argument as a restrictive modifier of the predicate. A predicate is composed directly with a property, resulting in another predicate but without changing the degree of saturation. The effect is to restrict the predicate with a property to elements that have that property and leave open the possibility of later saturation of the predicate. Thus we can get (41a,b), which is equivalent to (39).

$$(41a) \quad \text{FA } (\text{EC } (\text{Restrict } (\lambda y \lambda x [\text{feed}'(y)(x)], \text{dog}'), j)$$

$$(41b) \quad \exists y [(\text{feed}'(y)(j) \wedge \text{dog}'(y))]$$

According to Chung and Ladusaw, the results of (40) and (41) are logically equivalent in that the proposition expressed by each is the same. They differ in their semantic composition. In (40),

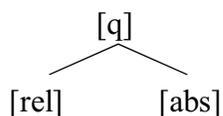
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<sup>73</sup>Heim (1982, section 2.2) proposes existential closure. For Heim, the structure of indefinites includes a quantifier (in her terms, a quantifying element like *every*), a restrictor and a nuclear scope. For the generic statement *Pigs are visible*, there is a silent generic Gn, quantifying over  $\text{pig}(x)$  and a predicate  $\text{visible}(x)$  as the nuclear scope. Heim's basic idea is that when an NP stays in the nuclear scope it must be existentially bound, or closed, by  $\exists$ .

there is a particular dog but without any conditions about which dog. In (41), however, there is no dog specified, leaving the predicate unsaturated.

Here I adopt the first method of derivation since we are deriving the semantics within the nominal projection. However, I leave open the path via Restrict and existential closure for cases where existential closure is relevant, such as in incorporation-type constructions.

As mentioned above, the proposal in this dissertation differs from theories such as Heim's (1982) and Kamp's (1981) where indefinites denote properties that place restriction on a variable (see the end of section 5.1.1). In this dissertation NumPs denote properties and indefinites are WQPs. As mentioned earlier, an important reason for having indefinites as arguments rather than properties is, if we put cardinals in the same position as *a*, they ought to have the same semantic function. Cardinals would seem to be pretty clearly quantificational, since it is hard to see an expression such as *two horses* as not quantificational. Here I have argued that the function of the weak quantifying determiner is to take sets and yield semantic objects that can be arguments without further function application. It is the semantic interpretation of the syntactic feature [q] which quantifies the set denoted by CL/NumP; that is, besides providing for a choice function [q] tells us there is some quantity involved. So both quantificationally vague determiners like *some* and precise ones like *four* will have the feature [q]. Recall from the feature geometry adapted from Harley and Ritter (2002) that numeral and nonnumeral quantifying determiners may vary in how they quantify. Numerals are precise quantifying elements associated with [abs], giving a precise quantification, while nonnumerals like *many* provide relative quantification via [rel]. But fundamental to both is the basic quantificational feature [q], as in (42).

(42) Geometry for quantifying features

It is [q] that I will associate with a choice function of taking a set and giving a generalized quantifier. In the next section, I discuss how this ties in with earlier accounts of what determiners do and then introduce more details on feature geometry that link the choice function in [q] to specificity. As it stands, the features in quantifying determiners say nothing about specificity. According to the properties of the feature geometry, (42) allows for quantifying determiners to be either [rel] or [abs] or both. A likely candidate for a [rel, abs] determiner is English *both*, with the [rel] component equivalent to *all* and the [abs] component indicating the cardinality of two. If so, *both* then means something like ‘all two’ rather than ‘the two’. There is coherence to this interpretation. If the semantics of *all* and *two* spell out as the single morpheme *both*, then the relative feature for *all* should not be independently available. Hence the awkwardness of the expressions *\*all two* and *\*all both*, as opposed to the perfectly acceptable *all three*.<sup>74</sup> On the other hand, *the* seems more easily available as an independent morpheme with *both*: *the both of them*, *both the left and the right*. And it is expected that not all languages have this option. French is one language without a word for *both*, having to spell it out in three pieces: *tous les deux* ‘all the two’.

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<sup>74</sup>*All two* is available in a sarcastic context: *Did all the undergrads show up at the colloquium? Yeah, all TWO of them!*

### 5.2.3 The feature geometry of specificity, definiteness and indefiniteness

In this section we look at some characteristics of definite and indefinite expressions. I argue that putting pragmatic features into the syntax can provide for a simple characterization of the distribution of English *the* and *a*. Noting some of the problems of definiteness pointed to in the preceding section, I show that a Russellian semantic approach that associates definiteness with uniqueness can be superseded by a pragmatic approach to definiteness, indefiniteness and specificity. None of these has to be incorporated as syntactic features or primitive semantic notions. All we really need is to know how a language spells out various feature bundles involving [q] (quantification, interpreted as a choice function), [i.know] (indicating that the speaker presupposes that a referent exists and that he can identify it) and [you.know] (indicating that the speaker presupposes that the addressee also knows the referent).

A specific nominal is often thought of as one when the speaker has a particular individual in mind (e.g. Lyons 1999, Hellan 1981, Ioup 1977). Similarly, specificity has been correlated with a *de re* reading (Saarinen 1981). A *de re* reading concerns a “belief ‘about the thing referred to’”. This is in contrast to a *de dicto* reading, which is “a belief ‘about what is said or mentioned’” (Cann 1993, p24-25). For instance, the subject in *The president is elected every four years* has a *de dicto* reading because it’s not about any particular president while the subject in *The president is from Hawaii* is about a particular president; not all presidents are from Hawaii. Saarinen (1981, p5-7) argues that we get *de re* readings of NPs when they are about a particular entity. To use Saarinen’s example, consider the statement that Reginald believes that a high official of the university is a spy. If Reginald’s belief is about a specific person, we have the *de re* reading. But if Reginald’s belief is that some official or other is a spy we have the *de dicto* reading.

Another view treats specificity in terms of scope. According to Fodor and Sag (1982), a wide-scope argument is specific. For example, in (43a), *a conference* is specific if it gets a wide-scope reading where there is some particular conference that every creationist went to.

- (43a) Every creationist went to a conference on October 23  
 (43b)  $\exists x, \text{conference\_on\_October\_23}(x), \forall y, \text{creationist}(y), y \text{ went to } x$

But *a conference* must also be specific in the sense that there is a conference which the speaker has in mind and it is that conference that the creationists went to, even if the addressee cannot identify which conference it is. The speaker presupposes that such a conference exists and that he can identify it. But for an expression to be definite, in Strawson's (1950) terms, discussed below, the speaker also presupposes that the addressee will know from context the identity of the referent.

Enç (1991) argues against the scopal characterization of specificity. Among Enç's arguments against the wide-scope characterization of specificity are data showing that the relationship between wide scope and specificity are not consistent. Citing Hintikka (1986), Enç points out that English nouns with the expression *a certain*, which typically is associated with specificity, can have narrow scope with regard to a higher quantifier (from Enç 1991, p2).

- (44) For every committee, the dean must appoint a certain student to represent the students' point of view

In (44), says Enç, there need not be a particular unique student that the dean must appoint. That is, the interpretation is not necessary and it is indeed difficult to get the meaning where *a certain student* scopes over both the quantifier *every committee* and the modal *must*, as in (45).

- (45)  $\exists x, \forall y$ : student (x)  $\wedge$  dean (y), for every committee, y must appoint x to represent the students' point of view

Enç also shows, in contrast to Hintikka's approach, that *a certain NP* can have narrow scope with respect to an epistemic operator associated with a verb like *believe*. In the last sentence in (46), *a certain unicorn* has narrow scope with respect to *believe* (from Enç 1991, p3).

- (46) John believes that there are unicorns living in his backyard. He claims that he can distinguish each unicorn from the others, and has even given them names. He believes that **a certain unicorn** is responsible for destroying his roses, and wants to catch him.

Therefore, argues Enç, there is no requirement that *a certain NPs* have wide scope with any operator, modal, quantificational or epistemic. She proceeds to analyze specificity independently of scope facts and develops a theory of definiteness and specificity through linking to discourse referents. Basing her proposal on Heim (1982) and Kamp (1981), Enç says that an NP has two indices, j and k, each of which carries a definiteness feature. The feature on j determines the definiteness of an NP while the feature on k determines specificity by “constraining the relation of the referent of the NP to other discourse referents” (Enç, 1991, p7). An NP is specific only if the second index, k, is definite. The full definition is in (47) (from Enç 1991, p7).

- (47a) Every [NP  $\alpha$ ]<sub><j,k></sub> is interpreted as  $\alpha(x_j)$  and  
 (47b)  $x_j \subseteq x_k$  if NP<sub><j,k></sub> is plural, and  
 (47c)  $\{x_j\} \subseteq x_k$  if NP<sub><j,k></sub> is singular.

The use of the indices by Enç corresponds to Heim's (1982) File Change Semantics. For Heim, by a Novelty Condition, an indefinite introduces a new variable, which Heim likens to introducing a

new blank file card. Under the Novelty Condition the blank card will correspond to the use of the indefinite article. When a variable is reused, it is subject to a Familiarity Condition, which requires that the discourse referent be in the discourse domain before the NP is mentioned. In short then for Enç, an NP is specific iff the k index is definite. Since according to (47)  $x_j$  is a subset of  $x_k$ , a definite must also be specific. And the index j for  $x_j$  is definite in a definite expression.

This becomes clearer with an example provided by Enç, the two sentences in (48) (from Enç 1991, p8).

- (48a) Several children entered the museum  
 (48b) I saw two boys at the movies

Enç says that *two boys* in (48b) is an indefinite specific if the two boys are not a subset of the earlier introduced *several children*. In this case, both indices, j and k, are not definite; *two boys* is entered as a new file card under the Novelty Condition. But Enç also claims that *two boys* can be interpreted specifically if those two boys are among the several children who earlier went to the museum: *two boys* is included in the referent of *several boys*. That is, since indefinites are open as to their specificity, as is known, we can have specific indefinites and nonspecific indefinites.

So in Enç's account, specificity and (in)definiteness crosscut into four possible relationships: [+/-specific] x [+/-definite]. However, I assume that both definiteness and specificity are derived notions. The feature [q] can be interpreted as introducing a nonspecific entity. Features corresponding to the speaker's presuppositions about the referent will determine specificity. Definiteness then occurs when, given an entity selected by the choice function, the speaker presupposes i) that an entity exists and knows which one it is and ii) the speaker

presupposes that the addressee can also identify the referent. This represents a simplification of a system such as Enç's since we can eliminate the features that are not primitive. The feature [q] is independently motivated, and the participant-knowledge features, which are at least implicit for an understanding of specificity and definiteness anyway, now become explicit. I show that nominals are nonspecific if there is no participant feature that indicates so.

Thus I rely on a pragmatic notion of specificity, core to definiteness, that is built into the syntax. The main reason, we will see, is because pragmatic presuppositions are crucial to determining the appropriate use of the definite and indefinite articles beyond set-theoretic notions such as Russell's which see *the* as corresponding to an iota operator that identifies a maximal element of a set. Since uniqueness doesn't clearly distinguish when to use *the* and when to use *a*, the semantics is perhaps a necessary but not sufficient condition for allowing the felicitous use of the articles. Consider the set-theoretic definitions (49) used by Chierchia (1998a) (see section 3.1 above) and Kadmon (1992).

- (49a)  $\iota X$  is the largest member of  $X$  if there is one:
- (49b) the cats =  $\iota \text{CATS}$  = the largest plurality of cats,
- (49c) the cat =  $\iota X$  = the only cat, if there is one
- (49d)  $[\text{the}] = \lambda P \max(\lambda x [P(x) \wedge C(x)])$

Both definitions, (49a-c) and (49d), roughly, refer to a maximal and unique individual. But this semantic specification is not enough to explain the difference between using *the* and *a* in some cases. The *the* case is clear enough, but the definitions will also apply to some cases where *a* is used. Take (50), where *a magazine* can be interpreted as either a specific or nonspecific indefinite.

- (50) I want to buy a magazine on the way to Russell's lecture

What interests us here is the specific indefinite reading. From the speaker's point of view, since the book referred to in (50) is unique and a maximal element of the set of books, the set-theoretic definitions of *the*/definiteness would seem to apply. So even though the addressee does not know the referent, according to (49), *the* ought to be licensed. A similar case holds even when the speaker does not know the referent. Suppose that one morning Cassandra finds a pile of bones and feathers on her lawn and concludes (51). In this case the same maximality and uniqueness conditions hold, even though Cassandra herself, as the speaker, does not know which cat was responsible for the fell deed.<sup>75</sup>

(51) A cat killed the cute little robin

So there can be a set-theoretically maximal and unique element, e.g. *a cat*, the killer of the robin, in (51), even if neither speaker nor addressee is aware of which one of the set of cats it is. Yet by maximal and unique criteria *the cat* should be able to replace *a cat* in (51).

The approach here is to sidestep the problems of determining exactly how the specific referent is agreed upon through the semantics and accept that the speaker makes pragmatic assumptions that the addressee can determine the referent in context. I do not deny that the speaker might rely on various mechanisms for determining whether the addressee can identify a referent, but in the end it is a pragmatic presupposition by the speaker that the addressee can, or cannot, guess the referent.

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<sup>75</sup>Of course Cassandra can be wrong if it was a raccoon that killed the bird.

Among the mechanisms that have been proposed to account for the use of a definite article is familiarity, the assumption by the speaker that the addressee is familiar with the intended referent (e.g. Christopherson 1939, Prince 1979, 1992). The familiarity can be internal to the discourse or part of more broadly shared cultural knowledge. A slightly different approach is that the speaker assumes the addressee, if not already familiar with the referent, can quickly identify it in context. This approach purports to account for *Pass me the hammer*-type references (e.g. Hawkins 1978, Lewis 1979, Birner and Ward 1994<sup>76</sup>) where a hammer may not have yet been introduced in the discourse but is salient enough in context that the addressee can pick out the intended hammer (See the discussion regarding example (60) below.). One version of this is accommodation (Lewis 1979). In accommodation, if a presupposition P is required for a reference to be felicitous but P is not yet presupposed, then P can come into existence in order that the reference be felicitous. (See (61) for a more explicit definition and the comment in footnote 78.) For now, note that certain limits must be put on Lewis's accommodation, and in fact Clark (1977) had earlier proposed a specific mechanism of bridging to provide a link between discourse entities and definites that have not been earlier introduced in a discourse. In bridging, an earlier introduced discourse entity carries with it some shared assumptions. In particular, the addressee, upon hearing a referring expression, knows it is given information. If the referent hasn't been explicitly presented, the addressee bridges, or makes the necessary implicatures to arrive at the referent (Clark 1977, p413). For example, in talking about a wedding, we can refer to *the bride* with the definite article even on the first mention of her. Clark calls this kind of bridging

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<sup>76</sup>For Birner and Ward unique identifiability is a sufficient condition for felicitous use of *the*.

implicature “indirect reference by association” (Clark 1977, p415), meaning that the implicature from weddings to the presence of brides is necessary, or at least highly predictable, since at weddings we expect to find brides, not to mention grooms, cakes and bands.

The main point of the above paragraph is that the speaker can felicitously use the definite article on the assumption that mechanisms are available for the addressee to determine the referent. All of them may entail that the referent is unique, but uniqueness seems to be at best a necessary condition.<sup>77</sup> Thus the importance of pragmatic presupposition on top of logical criteria.

Strawson (1950), taking issue with Russell’s (1905, 1918) theory of descriptions and reference, points to some faults he finds in Russell’s treatment of what constitutes referring. Among Strawson’s points is that Russell failed to appreciate that truth cannot rest solely with propositions, sentences or logical formulas. It is the speakers who *use* sentences that “mean”; it is people, not formulas, that give meaning to an expression. According to Strawson (1950, p328):

Now as a matter of fact there is, in English, a sense of the word ‘mean’ in which this word does approximate to ‘indicate, mention or refer to’; e.g. when somebody (unpleasantly) says, ‘I mean you’; or when I point and say, ‘That’s the one I mean’. But *the one I meant* is quite different from *the meaning of the expression* I used to talk of it. In this special sense of ‘mean’, it is people who mean, not expressions. People use expressions to refer to particular things. But the meaning of an expression is not the set of things or the single thing it may correctly be used to refer to: the meaning is the set of rules, habits, conventions for its use in referring.

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<sup>77</sup>Even here there are problems. Christopherson (1939), and others, have pointed to the use of the definite article in sentences like *Towards evening we came to the bank of a river* (p140) even though there is no unique bank since rivers have two banks.

As outlined above, there have been many suggestions as to what is involved in definiteness such as familiarity and identifiability. But these can be argued to be *how* a speaker and/or addressee arrives at the agreed-upon referent. But neither the means to arrive at the referent nor its uniqueness is the operative factor for correctly using a definite expression, according to Strawson (p331):

When a man uses such an expression [i.e. *the king of France*], he does not *assert*, nor does what he says *entail*, a uniquely existential proposition. But one of the conventional functions of the definite article is to act as a signal that a unique reference is being made – a signal, not a disguised assertion. When we begin a sentence with ‘the such-and-such’ the use of ‘the’ shows, but does not state, that we are, or intend to be, referring to one particular individual of the species ‘such-and-such’. *Which* particular individual is a matter to be determined from context, time, place, and any other features of the situation of utterance. ... Now whenever a man uses any expression, the presumption is that he thinks both that there is *some* individual of that species, and that the context of use will sufficiently determine *which one* [emphasis mine, L.G.] he has in mind.

Others too have pointed to the importance of the speakers in that they, not sentences or propositions, are the ones making presuppositions (e.g. Stalnaker 1974, p200).

One advantage that Strawson claimed for the presuppositional account over a Russellian uniqueness account is that sentences like *The king of France is bald*, used in a world where there is no king of France, become simply inappropriate and that therefore the truth value of the sentence when there is no referent for *The king of France* is not relevant for the conversation: the

truth or falsity of such a sentence is not what would concern a discourse participant as much as the violation of pragmatic constraints.<sup>78</sup>

Stalnaker (1974) is among those who argues for presuppositions being pragmatic in the sense that a speaker uses language in the context of background information that the addressee is assumed to share. For him, presuppositions are taken for granted by the speaker. We may assume that presuppositions are a set of propositions that make up a common ground of knowledge assumed by the speaker. This is modified by Lewis's accommodation (see footnote 79). One reason Stalnaker prefers a pragmatic approach over a semantic one is that pragmatics allows us to explain some things about presuppositions in terms of general maxims of rational communication rather than in terms of complicated and ad hoc hypotheses about the semantics of particular words and particular kinds of constructions" (Stalnaker 1974, p198). Under pragmatic presuppositions, sentences can be used in shifting contexts for different meanings without having to alter the semantics of the words involved. As an example, citing an example from Langendoen (1971), Stalnaker (p204) says that the sentence *My cousin isn't a boy anymore* can "mean" several things, depending on context. Perhaps most saliently it means that the cousin has grown up, but it could also be describing a situation in which the cousin had his sex changed. Allowing pragmatics to determine the meaning allows the semantics to remain the same and to therefore be kept simple. On another point, Stalnaker (p205) suggests that constraints on what is presupposed are often a matter of degree, and such would be hard to explain via semantics without taking into

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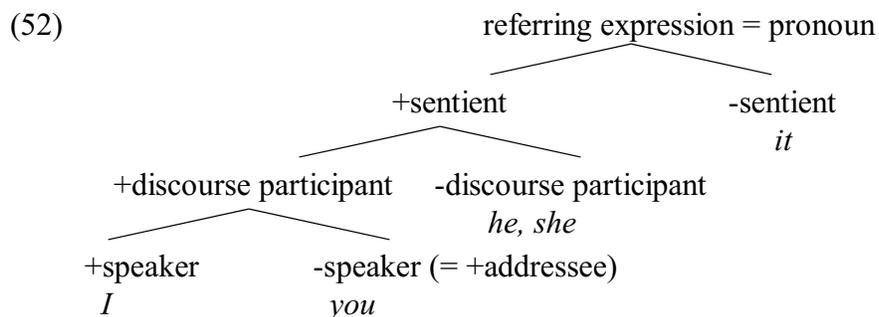
<sup>78</sup>Beaver (2001) points out that it is difficult to find evidence that distinguishes the presuppositional pragmatic account and the semantic account. He says it is hard to even come up with a way to put the question to naive informants whether a particular sentence is true/false or meaningless (Beaver 2001, p10).

account presuppositions. I do not resolve the debate about whether presuppositions are semantic, pragmatic or both, but I do lean on the side that a speaker's assumption of what an addressee knows or what knowledge can be assumed to be common ground, is pragmatic (see Abbott 2006a for an overview). And if pragmatics is involved in determining whether a definite or indefinite article is to be used, then it is possible for the determiner syntax of nominal phrases make use of pragmatic information. (Also see Groenendijk and Stokhof (1980) on the part of pragmatics in the syntax with regard to specificity and nonspecificity.)

How much pragmatics, or discourse-contextual aspects of meaning beyond truth conditions, can or should be built into the syntax is a big question (e.g. Gazdar 1979, p2, Green 1996, p1-2, Fromkin 2005, p199), but it is clear that there is some relationship between the two domains. As early as Mathesius (1928) correlations were noted between syntactic constituent order and discourse roles. Much of the literature cited in the preceding sections on definiteness and specificity implicitly refers to knowledge of the participants that licenses, for example, the felicitous use of *the* versus *a*, e.g. identifiability. For the verbal domain, Rizzi (1997) has proposed splitting CP into a number of phrases for force, focus and topics, while Cinque (1999) has suggested functional adverbial heads for things such as evidential mood and speech act mood. For parallels in the nominal domain, Scott (2002) proposes adjectival phrases within DP such as Subject Comment Phrase and Evidential Comment Phrase to house participants' attitudes which have clear effects on adjective order.

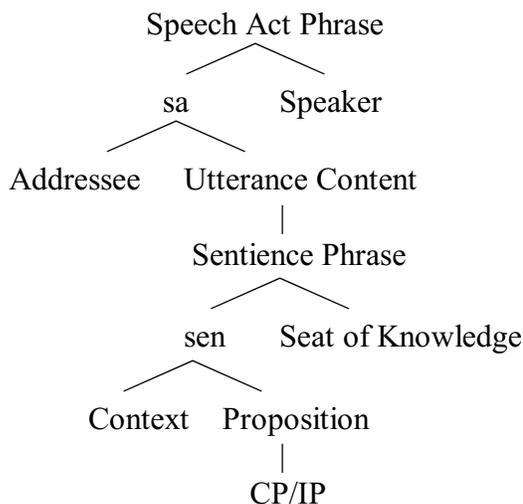
Tenny (2006) makes use of morphosyntactic features that refer to sentience properties in Japanese. Specifically, she makes use of a revised version of Harley and Ritter (2002) pronoun-feature system that I introduced in section 2.2.4. For Tenny, there is a [sentience] feature in the

specifier of a Sentience/Evidentiality projection. This [+/- sentience] feature is situated in a pronoun-feature geometry between Harley and Ritter's nodes for [referring expression] = pronoun and [participant], as in (52) (from Tenny 2006, p64).



The feature [+sentient] is associated with sentient entities, or those that can have epistemic states. Only phrases that are [+sentient] can be subjects of predicates with speech-act projections, for example. For Tenny, the Sentience/Evidentiality Phrase has three main components: a seat of knowledge, a proposition and context; CP/IP comes under context. The Sentience/Evidentiality Phrase situates under Utterance Context, which with Addressee and Speaker make up the three arguments of a Speech Act Phrase. Simplified, Tenny's syntax is as in (53). Note that the left-branching tree is for Japanese (adapted from Tenny 2006, p260-261).

(53)



Speas (2004) argues for the existence of syntactic projections that bear pragmatic features such as point of view and source of evidence, which, she says, have traditionally been treated as purely pragmatic with little interest for syntax. She locates these phrases on top of CP. One motivation for such pragmatically sourced phrases in the syntax is the obligatory appearance of morphemes in languages like Tibetan and Quechua that refer to the nature and strength of the evidence presented for a proposition. Examples of such obligatory morphemes from Makah are in (54) (Speas 2004, p258).

- |       |                        |                                                               |              |
|-------|------------------------|---------------------------------------------------------------|--------------|
| (54a) | wiki-caxa- <b>w</b>    | 'It's bad weather (directly experienced)                      | <i>Makah</i> |
| (54b) | wiki-caxa- <b>pid</b>  | 'It looks like bad weather (inference from physical evidence) |              |
| (54c) | wiki-caxa- <b>wa.d</b> | 'I'm told there's bad weather'                                |              |

These morphemes are syntactically obligatory, suggesting a tight connection between the pragmatics of sources of information and syntactic projections. Besides being obligatory, these evidential morphemes are closely related to syntactic inflectional features and are highly restricted in the sense that there are many fewer of them than we might expect possible and that they are

organized such that the presence of some entails the presence of others. That is, the restricted number of evidential morphemes available to languages is many fewer than we might “expect if they simply expressed some range of pragmatically-determined source of evidence” (Speas 2004, p257). For example, Speas says that there are many conceivable evidential morphemes that are apparently never grammaticalized in languages, such as “experience reported by loved one”, “divine revelation”, “legal edict”, “teachings of prominent elder/authority”, etc. As for morphemes that are grammaticalized, such as those in (54), they are grammaticalized hierarchically in that if a language has only one evidential morpheme it will be the “directly experienced” morpheme as the Makah *-w*, and if a language has an “inference” morpheme, it will also have a “directly experienced” morpheme. Further, while languages may conflate two evidential meanings into a single morpheme such that the morpheme is ambiguous, the conflation is between adjacent terms on the markedness hierarchy in (55), where “personal experience” is the least marked (from Speas 2004, p258).

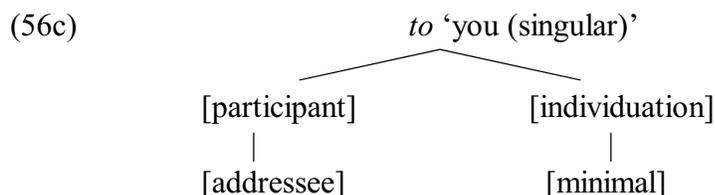
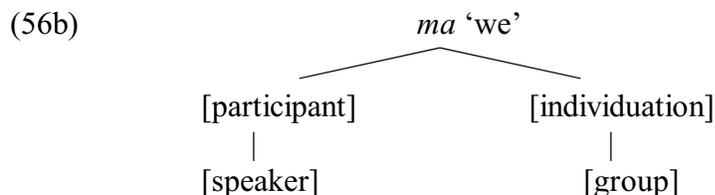
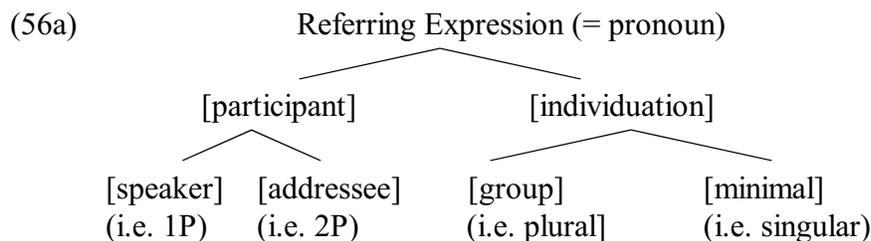
(55) personal experience > direct sensory evidence > indirect evidence > hearsay

So, according to Speas, if a language uses the same morpheme for what are two separate expressions in another language, those two morphemes could be, for example, “personal experience” and “direct experience” but never “personal experience” and “indirect evidence” to the exclusion of “direct sensory experience”.

The organization of evidential features therefore suggests a geometry like that of Harley and Ritter’s (2002) geometry of pronoun features. Finally, in languages without such evidentiary suffixes, Speas claims, evidential features spell out as features with modal auxiliaries,

propositional-attitude predicates and other forms that have tightly restricted properties relevant to both syntax and LF. For Speas, syntactic projections carry pragmatic features relevant to such evidential information. These features “check (or attract) the features of a [Point of View] operator” (Speas 2004, p266). For example, *think* subcategorizes for an Evaluator Phrase and attracts a [+Point of View] feature. In contrast, *know* subcategorizes for a Evidential Phrase.

I will make similar use of the pragmatics of participants’ knowledge states or presuppositions in the feature geometry for weak and strong quantifying determiners. The key features will be those that make up specificity, which has been associated with the articles *the* and *a* in English. Pragmatic features tell us who an expression is specific for: either the speaker and/or addressee, akin to the way that Harley and Ritter (2002) use pronoun features. The features that I introduce assure the syntactic composition of the phrase and their semantic/pragmatic associations contribute to meaning. Instead of looking at specificity in terms of only the speaker, let’s also include the addressee as participating in knowing, or not, which referent the speaker has in mind. Recall that Harley and Ritter established pronoun features partly in terms of speaker and addressee. The pronoun has at least two main features: [participant] and [individuation]. [Participant] is further specified for person, first or second, and [individuation] is further specified for number, singular or plural, as in (56a). A particular pronoun is a Spellout of a subset of these features. For example, Persian *ma* ‘we’ is featured as in (56b) and *to* ‘you (singular)’ as in (56c).

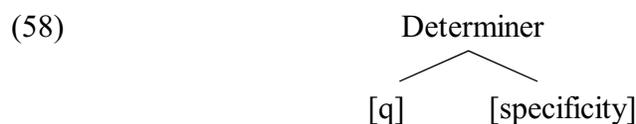


The idea is to apply this insight to determiners to reflect the participants' presuppositions with regard to specificity. The determiners in WQ have a syntactic feature [q] that corresponds to a choice function that says there is an x with some property P but does not specify *which* x. The feature [q] has sister features associated with the speaker's presuppositions about whether the speaker and/or addressee know which x the referent is. It is these features that define specificity and definiteness. So a proposed feature geometry for a determiner is in (57).

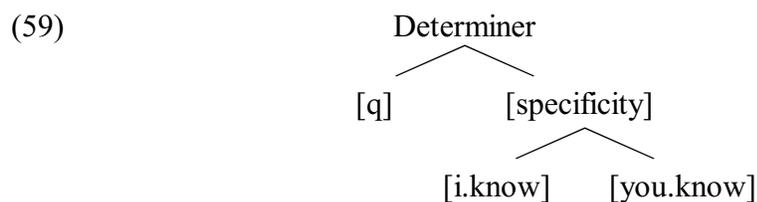


However, the details and goals of the system being proposed in this dissertation differ from those of Harley and Ritter's feature geometry. Recall that their aim is to account for

pronouns. Their [participant] node identifies first and/or second person; for them the absence of the [participant] node indicates third person. The aim in this chapter is, roughly speaking, to distinguish definite expressions from indefinite expressions. Looking ahead a few pages, this means that features will account for articles as well as pronouns. So both to avoid confusion and to be clear about the differences between the feature geometry being presented here and that of Harley and Ritter I will rename the sister node to [q] as [specificity]. In this way, the spirit of Harley and Ritter's feature geometry is extended for even more explanatory power. The revised feature geometry for a determiner, then, is (58).



By analogy with Harley and Ritter's (2002) [speaker] and [addressee] subfeatures of [specificity] for pronouns, I suggest that, when the speaker knows *which one*, i.e. which x with a property P, there is a [specificity] subfeature [speaker.knows.which.one], or [i.know] for short. If the speaker presupposes that the addressee can ascertain from context *which one*, there is a subfeature [addressee.knows.which.one], or [you.know] for short. So (58) is elaborated as the feature geometry in (59). Recall from the feature geometry that since they are sister features [i.know] does not imply [you.know] and that [you.know] does not imply [i.know].



Any subset of these features, as long as the feature implications are adhered to, is possible. These feature subsets correspond to the various specific and nonspecific readings of SQP and WQP. For example, one possible subset of the features is [q, i.know], which we will see shortly corresponds to a specific indefinite. Another subset is [q, i.know, you.know], which corresponds to a definite. We work through the applications of (59) to derive various determiners. However, (59) is tentative and will be further refined to overcome some problems.

Some philosophical caveats. The feature [i.know] more precisely specifies not what the speaker knows but rather what the speaker presupposes, and the feature [you.know] specifies not what the addressee knows but more precisely what the speaker presupposes the addressee presupposes. Further, in line with the notion of identifiability, [you.know] is flexible with time. In an example like (60), at the precise moment when the speaker utters the phrase *the sledgehammer*, the addressee might not know which one is being referred to.

(60) Hand me the sledgehammer

However, the speaker assumes that in very short order the addressee will be able to locate and identify said sledgehammer. So even though [you.know] is not strictly relevant at the instant of the utterance of *the sledgehammer* in (60) since the speaker must presuppose that the sledgehammer has not been previously referred to, I will use that designation as indicating that the speaker assumes the addressee will forthwith be able to determine the referent. The speaker's presupposition that the addressee will be able to pick out the as yet unmentioned referent corresponds to the notion of identifiability in that the addressee is assumed to be able to pick out

the referent. Or, the assumed ability of the addressee to pick out the referent can be understood in terms of accommodation in the sense of Lewis (1979) mentioned above. According to his rule of accommodation (from Lewis 1979, p340):

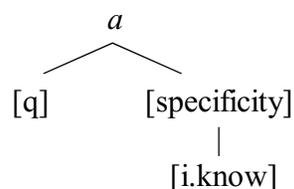
(61) Lewis's Rule of Accommodation

If at time  $t$  something is said that requires presupposition  $P$  to be acceptable, and if  $P$  is not presupposed just before  $t$ , then - ceteris paribus and within certain limits - presupposition  $P$  comes into existence at  $t$ .<sup>79</sup>

Now, in the Strawson (1950) sense quoted above, if a referent is known to the speaker but not the addressee, we have what is usually called a specific indefinite. A bit more precisely, if the presumption is that the speaker, but not the addressee, thinks both that there is some individual with the relevant property and that the context will sufficiently determine which one he has in mind, then we have a specific indefinite. The feature geometry indicates that: i) a choice function via [q] selects an  $x$ , i.e. a sledgehammer, and that ii) the speaker knows *which one* of the set of sledgehammers is being referred to. The absence of [you.know] indicates that the addressee is not presumed to be able to know which individual has the relevant property. This determiner spells out in English as  $a$ . Here I focus on the specificity features and ignore other features of in WQ such as [u-indiv].

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<sup>79</sup>Lewis's notion has been criticized as imprecise and "magical" (e.g. Abbott 2006b). Also see von Stechow (2006) for a revision of Lewis's original notion. However, Lewis's well known proposal is sufficient for my purposes.

(62) Feature geometry for specific indefinite *a*

The use of the determiner in (62) is exemplified by (63), where the speaker has a particular sledgehammer in mind needed for smashing up some sidewalk in the back yard.

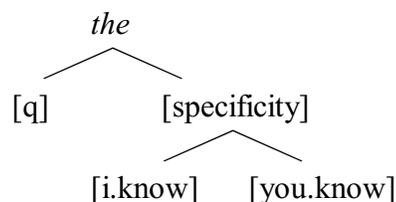
## (63) I want to stop off at Lowe's and buy a sledgehammer

Upon hearing (63), the addressee may think that *a sledgehammer* is a nonspecific indefinite and that any old sledgehammer will do the trick. But unbeknownst to her what I want to purchase is the 16-pound Ludell beauty with a heat-tempered forged-iron head of surprising destructive power, with a handsome hickory handle, made in the U.S.A., hanging on a rack on the wall at the end of the pesticide aisle, the last one of its kind on the rack, at the Lowe's two miles from my home: it is *that* particular sledgehammer that I wish to buy although by using *a* I assume that the addressee is not privy to the sledgehammer in my mind's eye. If I assumed the addressee does know, I would opt for the definite article.

Now if both the speaker and addressee know which sledgehammer the speaker is referring to, as in (64a) uttered as I am about to smash some sidewalk in the back yard, then it is specific for both the speaker and addressee, and [you.know] will thus also be present. In this case the Spellout is *the*, with the features indicated in (64b).

(64a) Hand me the sledgehammer

(64b)



There are cases where a specific hammer is mentioned but it is specific for neither the speaker nor the addressee. Here, the features [i.know] and [you.know], and hence the [specificity] node entirely, are absent. As an example, let's say that the cat got out of the bag and I have learned that my wife's surprise gift for my birthday is a sledgehammer. I can say (65).

(65) My wife bought me a sledgehammer for my birthday

In uttering (65) to an addressee, I do not know which sledgehammer was bought and I assume the addressee doesn't either, although certainly my wife and the clerk at Lowe's, both nonparticipants, know *which one*. So in (65), *a sledgehammer* is a nonspecific indefinite and the article *a* has the feature geometry in (66).

(66) Features for nonspecific indefinite *a*



When nonspecific indefinite *a* is used with an nP all we have is a quantified phrase. Since *a*'s [q] feature is associated with a choice function, *an nP* tells us there is an *x* with the property of the nP, but the speaker presupposes that neither he nor the addressee knows which *x* it is. The

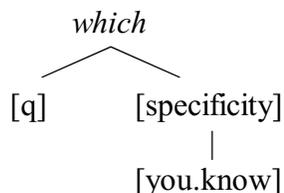
referent may be known to a third party, or it may be known to no one although it is in principle possible to find out a “referent”. This holds in the earlier case where Cassandra discovers a pile of bird bones and feathers and surmises (67).

(67) A cat killed the cute little robin

In (67) *a cat* is quantified via a choice function associated with the syntactic feature [q]. It is nonspecific for the discourse participants. It may, however, be specific for someone in the sense that there is a particular cat lurking out there in the world, perhaps the neighbor’s cat, guilty of robin-killing.

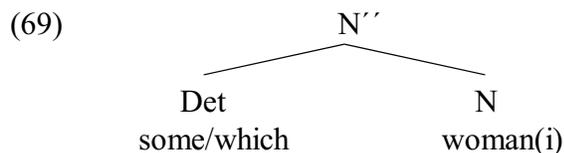
Now, according to the feature geometry in (59), it should be possible for [you.know] to appear without [i.know]. In this case the addressee but not the speaker is presupposed to know *which one*, as might be the case in a *which*-question. The speaker does not know the referent but assumes the addressee does, or at least might, know. The spellout for [q, you.know] is *which*, which has been considered a determiner at least since Jackendoff (1977), as in (68).

(68) Feature geometry for specific *which*



Jackendoff (1977, chapter 5, p105) identifies *which* as one of a set of prenominal elements that can precede certain other quantifying determiners such as *few* and *several*. Similarly, within the

proposed syntax of this dissertation, *which* can be interpreted as a determiner, specifically a strong quantifying determiner since it behaves like SQ elements as presented in sections 2.2.2.4 and 5.1.2. For example, it can precede the weak determiners *three* and *few*: *Which two Wall Street investment banks went under?*, *Which few centrist Republicans bolted to the centrist Democrats?*. More recently, Engdahl (1986, chapter 4) has considered *which* a determiner, though under NP with a common noun as a sister. Reinhart (1998) sets *which* as a determiner under N' and sister to N, as in (69), for *some/which woman*.



The *i* for *woman* indicates an index argument that must be bound; for (69) *woman(i)* is bound by *some* or *which*. Reinhart lets the determiner be a choice function variable that applies to the set denoted by the noun. The result is  $f(\text{woman})$ , or an entity from the set of women.

The notion of *which* in (68) is consistent with some earlier notions. Higginbotham and May (1981, p41ff) discuss the common characterization of a question like *Which people came to the party?* as *for which people x, x came to the party*, where *x* is a bound variable. In a *which*-questions like *Which people came to the party?*,  $\phi(x)$  is an open sentence with a free variable. Truth values are assigned to  $[\phi(x)](a)$  where  $a \in$  a “definite collection of individuals” *D* (Higginbotham and May 1981, p42). Each assignment of truth values to  $[\phi(x)](a)$  where  $a \in D$  is called a theory. The set of such theories is the question that corresponds to *for which x,  $\phi(x)$ ?*<sup>80</sup>

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<sup>80</sup>For a view where wh-phrases are not generalized quantifiers see Ginzburg and Sag (2000), chapter 4.

Lastly, there are indefinites where neither the speaker nor hearer has any inkling as to a referent because there is none. As an example, tired of seeing cracked sidewalk in the back yard and wanting to smash it up, I determine that I will need a sledgehammer to do the smashing. So I might utter (70), without having any particular sledgehammer in mind.

(70) I want to stop off at Lowe's and pick up a sledgehammer

In contrast to the example in (66) where a nonparticipant might know the referent, in this case *a sledgehammer* is specific for neither speaker nor hearer and is also unknown to any nonparticipant.

Summarizing, (71) tabulates the feature bundles and their associated meanings and Spellouts for determiners with a de re reading.

(71) Feature combinations and their determiner meanings in English

|       | <b>Features</b>       | <b>Meaning</b>                       | <b>English Spellout</b> |
|-------|-----------------------|--------------------------------------|-------------------------|
| (i)   | [q, i.know, you.know] | speaker-specific, addressee-specific | <i>the</i>              |
| (ii)  | [q, i.know, minim]    | speaker-specific                     | <i>a</i>                |
| (iii) | [q, minim]            | nonspecific for speaker, addressee   | <i>a</i>                |
| (iv)  | [q, you.know]         | addressee-specific                   | <i>which</i>            |

Note in (71) that [minim], singular, is relevant for *a* but that *the* and *which* are not specified for number. As (71) shows, English *a* is at least two-ways ambiguous, depending on which features are present. It seems to be common that determiners are ambiguous. Turkish, for example, uses the suffix *-(y)i* (subject to vowel harmony) for both [q, i.know] and [q, i.know,

you.know]. According to Enç (1991), *-(y)i* is used for both (72a), a definite in that the addressee knows the referent, and (72b), where the addressee does not know the referent. ((72a) from Enç 1991, p9, and (72b) from page 4-5).

- |       |                                     |               |           |         |                |
|-------|-------------------------------------|---------------|-----------|---------|----------------|
| (72a) | Zeynep                              | adam-i        | gördü     |         | <i>Turkish</i> |
|       | Zeynep                              | man-Acc       | saw       |         |                |
|       | 'Zeynep saw the man'                |               |           |         |                |
| (72b) | ali                                 | bir piyano-yu | kiralamak | istiyor |                |
|       | Ali                                 | one piano-Acc | to.rent   | wants   |                |
|       | 'Ali wants to rent a certain piano' |               |           |         |                |

The noun *piyano* 'piano' in (72b) with the accusative marker is specific, for example in the context where there is some particular piano that was once owned by a famous linguist and Ali wants that particular piano. The noun *adam-i* in (72a) indicates a definite man known to both participants, while in (72b) only the speaker knows the referent. Persian has some overlap with the Turkish facts and I next provide some detail about Persian specificity marking, though I leave the connection of specificity and the accusative marker *-ra* until section 5.

Persian has several ways of noting that a noun is definite, i.e. whose referent is presupposed by the speaker to be known by both participants. There are proper names, as *Fauna* in (73a), and pronouns, as *ma* 'we' in (73b). Also, Persian uses bare nouns that can be interpreted as definite, as *mašin* 'car' in (73c) interpreted definitely.

- |       |                                   |                    |                  |  |                |
|-------|-----------------------------------|--------------------|------------------|--|----------------|
| (73a) | Fauna                             | xahær-e            | Kia-st           |  | <i>Persian</i> |
|       | Fauna                             | sister-EZ          | Kia-is           |  |                |
|       | 'Fauna is Kia's sister'           |                    |                  |  |                |
| (73b) | ma                                | Shahname-ro        | næ-xund-im       |  |                |
|       | we                                | <i>Shahname-RA</i> | Neg-read.past.1P |  |                |
|       | 'We didn't read <i>Shahname</i> ' |                    |                  |  |                |

- (73c) mašin kesif-e  
 car filthy-is  
 ‘The car is filthy’

In these cases the overt marking for definiteness is lacking so there is no overt Spellout. However, as has been noted, Persian can indicate definiteness with *-e*, a colloquial marker for singular definites (74a), and *-ha*, a plural definite marker (74b). The colloquial *-e* tends to be a discourse marker referring to an entity mentioned earlier in the discourse (Mahootian 1997, p201).

- (74a) zæn-e            be mæn            goft            ke    barun    miyad  
 woman-Def    to me            said.3S        that    rain    comes  
 ‘The woman told me that it’s raining’
- (74b) mašin-a        kesif-ænd  
 car-PL            filthy-are  
 ‘The cars are filthy’

Thus definiteness corresponds to several expressions. The feature bundle for singular definiteness, [q, i.know, you.know, minim], is optionally *-e*, otherwise null. In the case of a plural definite, *-ha* is required.

The suffix *-i* indicates indefiniteness but is perhaps noncommittal to whether it is specific or not. Mahootian (1997) claims that *-i* is specific, as in (75) (adapted from Mahootian 1997, p203).

- (75) durbin-i  
 camera-Ind  
 ‘a certain camera’

Windfuhr (1990) argues that *-i* has nonspecific interpretations at least in certain contexts.

Windfuhr says that *dombal-i* in (76) can refer to a particular apartment or to any old apartment (from Windfuhr 1990, p533). Karimi (p.c.) doubts that *-i* involves specificity.

- (76) dombal-e      aparteman-i    mi-gærd-æm  
 ‘I’m looking for an apartment/a certain apartment’

In any case, indefiniteness (when the speaker does not know the referent) can take *ye* ‘a, one’, *-i* or both.

- (77) (ye)    ketab(-i)  
           a      book-Ind  
           ‘a book’

Therefore, assuming that *-i* is not specific, at its most basic *-i* is [q]. To the degree that some speakers may find it specific, it may also have the features [i.know].

Finally, like English *which*, Persian *kodum* is specific for the addressee.

- (78) kodum            gorbæ-ro      xærid-i  
       which            cat-RA        bought-2S  
       ‘Which cat did you buy?’

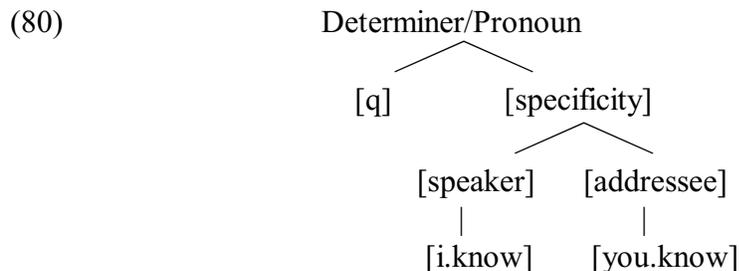
The table in (79) summarizes Persian feature bundles and their Spellouts with regard to specificity.

## (79) Feature combinations and their determiner meanings in Persian

|       | <b>Features</b>              | <b>Meaning</b>                                 | <b>Persian Spellout</b> |
|-------|------------------------------|------------------------------------------------|-------------------------|
| (i)   | [q, i.know, you.know, minim] | speaker-specific, addressee-specific, singular | <i>-e, ∅</i>            |
| (ii)  | [q, i.know, you.know, group] | speaker-specific, addressee-specific, plural   | <i>-ha</i>              |
| (iii) | [q, i.know]                  | speaker-specific                               | <i>-i, ∅</i>            |
| (iv)  | [q]                          | nonspecific for speaker, addressee             | <i>-i, ∅</i>            |
| (v)   | [q, you.know]                | addressee-specific                             | <i>kodum</i>            |

The analyses for English and Persian at least show the feasibility of particular feature bundles mapping to particular morphology. However, now we must return to English to address some problems about how to distinguish certain items that according to (71) contain some of the same features. The analysis in this dissertation adapts the pronoun feature system of Harley and Ritter (2002) to a feature system for articles. As noted, it is important to point out that whereas Harley and Ritter's features are expressly for pronouns, as adapted here they distinguish specific from nonspecific articles. I have ascribed [i.know, you.know] to *the*, but, since a second person discourse participant is known to both the speaker and addressee, the pronoun *you* is also [i.know, you.know], known to both speaker and addressee. Similarly, *a* is [i.know], just as the first person is.

However, we can distinguish the pronouns from articles by integrating Harley and Ritter's original pronoun features, [speaker] and [addressee] into the feature geometry in (59) and subordinating [i.know] and [you.know] to them as dependent features. The result is the feature geometry in (80).



Such a feature geometry makes sense in at least four ways. First, it is consistent with ideas that there is a tight connection between pronouns and determiners, going back at least to Postal's (1969) suggestion that pronouns are a subset of the larger class of definite articles. For Postal, pronouns like *she* are actually articles along with features like [+PRO, +Def], etc.; i.e., pronouns are articles plus something else. Lujan (2000) takes the opposite view, claiming that determiners are kinds of pronouns. For him, definite D, e.g. *the*, is a kind of third person pronoun while indefinite D, *a*, is a variety of *one*. Here we specify, per (80), that articles are feature complexes arranged in a geometry that include pronoun features and article features dependent on the pronoun features. Second, it is reasonable in such a feature geometry that [i.know] should be subordinate to [speaker], and [you.know] to [addressee] on the assumption that a participant's presupposition, or knowledge state, should depend on the presence of the participant. Third, recall that Harley and Ritter's feature geometry is meant to represent implicational universals: the presence of lower dependent features entails the presence of higher features. The upshot of (80), then, is a prediction that articles are more marked than pronouns since [i.know] and [you.know] are lower, dependent features in the geometry. Empirically, it does seem to be the case that a language with pronouns might or might not have articles but that the presence of articles in a

languages entails the presence of articles. That at least is the case for Persian and Mandarin.<sup>81</sup>

Fourth, and the main empirical point, is that we can distinguish i) speaker and addressee pronouns from each other, ii) definite and indefinite articles from each other and iii) articles from pronouns. Omitting Harley and Ritter's number feature, or [individuation], for simplicity in exposition, let's focus on speaker and addressee and assume that the number is singular, or [minim]. A feature geometry with [speaker] corresponds to *I*, while [addressee] is *you*, just as Harley and Ritter say. But when any of the presupposition subfeatures are present what spells out is an article. So we have the following distinct feature bundles and corresponding distinct Spellouts.

|      |                                                 |                 |
|------|-------------------------------------------------|-----------------|
| (81) | <u>Determiner/Pronoun feature and Spellouts</u> |                 |
|      | <u>features</u>                                 | <u>Spellout</u> |
| i)   | [speaker]                                       | <i>I</i>        |
| ii)  | [addressee]                                     | <i>you</i>      |
| iii) | [speaker, i.know]                               | <i>a</i>        |
| iv)  | [speaker, addressee, i.know, you.know]          | <i>the</i>      |
| v)   | [addressee, you.know]                           | <i>which</i>    |

Languages with more distinctions have features for number and gender, for example. And of course another distinction between determiners and pronouns is that the former are transitive, requiring a complement (Sommerstein 1972). Some uninterpretable article features, in WQ or SQ, must be checked by their interpretable counterparts in lower phrases and the semantic types

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<sup>81</sup>I will work under that assumption. Swadesh's list of 100 basic vocabulary items, based on crosslinguistic observation, consists of "universal and simple things, qualities, and activities..." (Swadesh 1972, p275). The majority of the terms are basic nouns, verbs and adjectives, but topping Swadesh's list are pronouns (*I, we, you*), demonstratives and interrogatives; articles do not appear on the list. Wierzbicka (1996) and Goddard and Wierzbicka (1994) investigate whether proposed semantic "primes" that are irreducible to other concepts are universally lexicalized. Wierzbicka's (1996, p26) list includes primes for pronouns (*I* and *you*) and the demonstrative *this*, but no articles. Lyons (1999, p48) claims that all languages have pronouns but that many lack articles. While his book includes data from many languages without articles, he cites no corroborative studies for the claim about all languages having pronouns.

associated with articles take set-denoting or GQ complements. However, pronouns, generally intransitive,<sup>82</sup> do not depend on set-denoting complement phrases for their semantics and may be inserted directly into the SQ position as e-denoting entities. In contrast, expressions that are definite by virtue of an article are generalized quantifiers whose denotation has shifted to that of an entity, an assumption stated at the end of section 5.0.<sup>83</sup>

One other issue to comment on is the difference between *which*-expressions on the one hand and *who* and *what* on the other. I focus on *who* as also representative of *what*. Both *which* and *who* are question words which, under the analysis being presented, the speaker uses in assuming that the addressee might know the answer to the question. Therefore, both *which* and *who* are [you.know] (but not [i.know]). So what is to distinguish them? We consider that part of the answer parallels the pronoun/article distinction and part of the answer lies in their semantic types.

One distinction between *who* and *which*-phrases involves superiority effects. As an example of a superiority effect, note the contrast in (82) (from Pesetsky 2000, p15).

- (82a) Who \_\_\_\_ bought what?  
 (82b) \*What did who buy \_\_\_\_ ?

---

<sup>82</sup>As is known, some are optionally transitive, in one interpretation, in cases like *we free-market economists* (e.g. Postal 1969). Also, the nature of pronouns in syntax and semantics is not settled. See Elbourne (2008) for an overview of various contending theories.

<sup>83</sup>One problem that immediately comes to mind is what to do with soliloquizing *the*. *The* is argued to have the feature [you.know], but when I shout to an empty house “Where the hell are the keys?”, there is no addressee participant present that I assume might know which keys I’m asking the whereabouts of. Without an addressee there can be no [you.know] feature. However, if I am both speaker and addressee in such an instance, then [you.know] is licensed. That seems intuitively correct, particularly if I find the keys and mutter, “Oh, there they are”. I am, after all, “talking to myself”.

One characterization of the contrast is that of Kuno and Robinson (1972), cited in Pesetsky: a *wh*-word cannot be preposed over another *wh*. The ungrammaticality of (82b), therefore, stems from the object *what* moving past the subject *who*. This is reformulated in Chomsky (1995a), again cited in Pesetsky, as Attract Closest, which basically says that if  $\alpha$  and  $\beta$  both target K, then  $\alpha$  cannot raise to K if  $\beta$  is closer to K than  $\alpha$  is.

But in some cases the Kuno/Robinson-Chomsky superiority constraint is at least ameliorated, as in (83b) (from Pesetsky 2000, p16).

- (83a) Which person \_\_\_\_ bought which book?  
 (83b) Which book did which person buy \_\_\_\_ ?

Although in (83b) the object crosses the subject just as in (82b), (83b), unlike (82b), is acceptable. Pesetsky says that the difference between (82b) and (83b) lies in what he calls *D-linking* (Pesetsky 1987, 2000). A D-linked *wh*-question, i.e. a *which*-phrase, asks for answers taken from a set of individuals already mentioned or salient in the discourse. According to Pesetsky, it is a D-linked *wh*-phrase that disables the superiority effect. In contrast, *who* is not D-linked and is open as to the answer in that it does not presuppose the answer must come from a discourse-established set. While the distinction may not always be clear since *who*-questions may sometimes presuppose some discourse-predetermined set, in an “aggressively” non-D-linked phrase the very point is that the speaker has no idea what the domain of possible answers might be, as in *What the hell did you read that in?* (from Pesetsky 1987, p111).

Now, in terms of the determiner/pronoun features, is there any difference between *which*-phrases and *who*-questions? I will assume that in both cases the speaker presupposes that the

addressee knows or might know the answer and that both *which* and *who* are therefore [you.know]. However, *who* is likely a pronoun, particularly since it is intransitive. Meanwhile, *which*, which we are calling a determiner, is like a determiner in that it can take a complement.<sup>84</sup> Since *which* is transitive, like articles it depends on a set-denoting Number Phrase for its semantics and valuing features. So at some point in the derivation, a *which*-phrase is a generalized quantifier. But intransitive *who* does not depend on a lower phrase for its syntax and semantics. Therefore we can consider it entering the derivation as an e-type entity without ever having been a generalized quantifier. Now we are at a possible path toward at least a deeper description of how D-linking overcomes superiority effects within the context of the proposals in this dissertation. Without going into details about the various Spec positions in Pesetsky's syntax for multiple wh-questions, let's suppose that one of them, the one that attracts the wh-object past a wh-subject, has a semantic constraint in that it specifically attracts generalized quantifiers, not e-type entities. This allows *which*-phrases to move, even if they are later typeshifted from generalized quantifiers to e-type entities. In contrast, *who*, being of type e from the start, cannot be attracted by any Spec that attracts only generalized quantifiers. In addition, perhaps alternatively, the relevant Spec position could have a feature corresponding to Gillon's C domain restrictor that attracts D-linked phrases (see the discussion of examples (30) in section 5.2.1 above). As one brief aside, note that if Cinque (1990) is right in saying that D-linked phrases are specific then *who* could then start in WQ, and the absence of a superiority effect could then stem from a requirement that the specifier

---

<sup>84</sup>In bare-*which* questions, I assume that the complement is elided. So, *Which did you buy?* is really *Which (one) / Which (bourbon) did you buy?*

position attract a [you.know]-featured phrases. However, it does not seem that D-linked phrases differ from *who* in this way. Both seem equally specific.

#### 5.2.4 Lyons's Problem

Finally we are in a position to propose an explanation for the impossibility of *\*the a* and understand it as an effect of there being two syntactic positions for determiners and pragmatic syntactic features distributed between them. At the same time, we will investigate where the features in (71) reside and where they might move to in order to resolve some potential Spellout issues.

Recall that Lyons (1999) suggested that the sequence *\*the a* is in principle syntactically permitted, since the two articles occupy different heads. Further, since *the* is definite but *a* is neither definite nor indefinite there should not be a semantic conflict if they both appear. Instead of relying on syntax or semantics to block *\*the a*, Lyons says the sequence is blocked because of a phonological constraint that restricts an unstressed element to the left edge. However, we saw in section 5.2.1 that the phonological constraint fails to block the ungrammatical (84).

(84) \*ye muš-e                      tuye zirzæmin hæst                      *Persian*  
       a mouse-Sing.Def            in basement    is

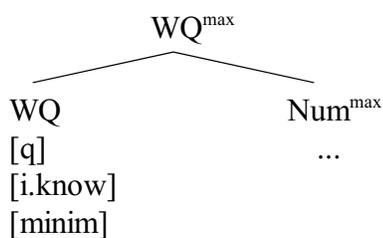
The explanation that follows says that if a feature bundle in WQ can spell out it must spell out in WQ. But if the features in WQ lack a Spellout then the bundle raises to SQ as a Last Resort, with the resulting feature bundle in SQ spelling out as *the*.<sup>85</sup>

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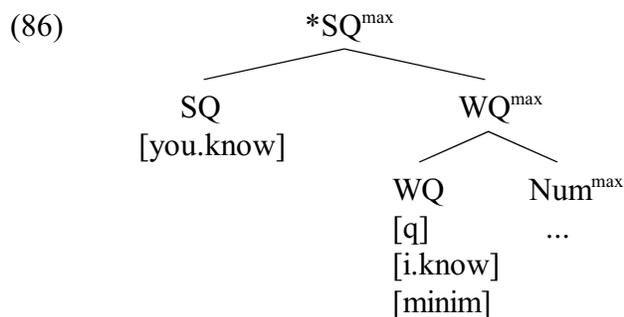
<sup>85</sup>According to Chomsky (1995, p28), economical derivations require that “computational operations must be driven by some condition on representations, as a ‘last resort’ to overcome a failure to meet such a condition”.

As argued in sections 2.2.2.4 and 5.1.1, the indefinite determiner *a* heads WQP. Let's consider the specific indefinite. If specific indefinite *a* has the feature specification [q, i.know, minim] ([minim] for singular), then we have the structure and features in (85), where WQ spells out as *a*.

(85) A specific indefinite determiner = *a*



But (71) indicates that *the* is [q, you.know, i.know]. Which means that [q, i.know] must raise from WQ to SQ since we cannot have [you.know] and [q, i.know, minim] being read by the phonology across a “scattered object” (Bošković and Lasnik 2007, p8), or a set of features distributed across more than one head. In short, (86) is an illicit structure.




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In this case, the principle of Last Resort drives movement of WQ features to obtain a Spellout.

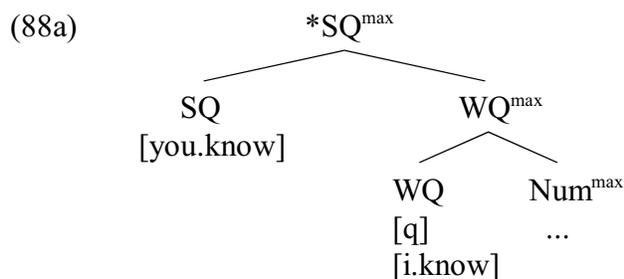
Since [q, i.know, you.know] spells out as *a* and doesn't raise, [you.know] is isolated in SQ without a Spellout.

One conceivable way to get the WQ features to SQ is to suppose that SQ also contains a [u-i.know] feature that seeks and attracts an [i.know] goal. Further, if [i.know] is attracted then the other features will pied pipe with it (e.g. Chomsky 1995, Chapter 4; Lasnik 2003). For example, Chomsky's (1995) suggestion is that movement of a feature F attracted by a target K results in the other features associated with F as pied piping (from Chomsky 1995, p265) with it:

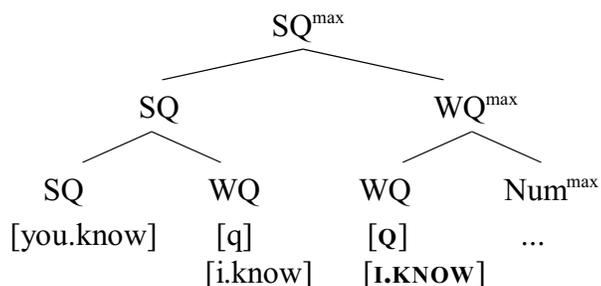
(87) Move F "carries along" FF(F).

However, it can't be that SQ has [u-i.know]. If this were the case, then for *which*, which is in SQ, we would end up with an interpretable [i.know], which is not part of the feature bundle for *which*. Recall that *which* indicates the speaker is presupposed not to know which one of the set is the referent. While this looks like an impasse to getting WQ's features to SQ, we can nonetheless get the WQ features to SQ as a Last Resort procedure to save the derivation.

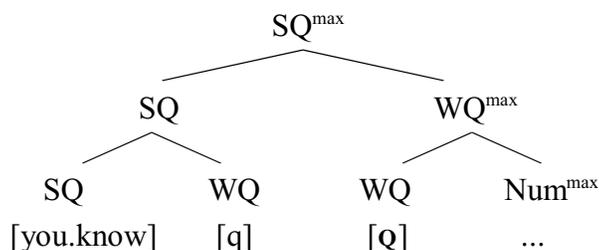
In contrast to the WQ feature bundle [q, i.know, minim] in (85), consider that there is a variant feature bundle [q, i.know] without [minim]. In contrast to [q, i.know, minim], which spells out as *a*, [q, i.know] lacks a Spellout. If it is merged in WQ and SQP is projected, we have (88a), similar to (86) except that in (88a) WQ lacks [minim]. Still in (88a), however, [you.know] is isolated and unpronounceable. The way to save (88a, in English, is to pied pipe the features in WQ to SQ, giving us (88b).



(88b) The definite article *the*



As suggested above, SQ cannot house a [u-i.know] feature because that would end up attracting [i.know] to SQ for the Spellout of *which*. This is movement we don't want since the nature of a *which*-question is such that the speaker does not know the referent. Similarly, for *which* the feature bundle in WQ in (88a) cannot be what raises. If it did, we would have [i.know] landing in SQ, contrary to the meaning of *which*. So for *which*, the WQ position has the single feature [q]. Once again, assuming this is a bound morpheme in need of a host, it raises to SQ with the result in (89).

(89) The interrogative article *which*

If the preceding has provided a viable account of the distribution of *the* and *a* in English, we are nonetheless left with one problem. I argued that [q, i.know, minim] spells out as *a* in WQ and that [q, i.know] raises from WQ to SQ to spell out as *the*, leaving nothing to be pronounced in WQ. But as seen in 2.2.2.4 for English and 5.1.2 in Persian, there are cases where both SQ and WQ are pronounced, as in (90), with *the* is SQ and *four* in WQ.

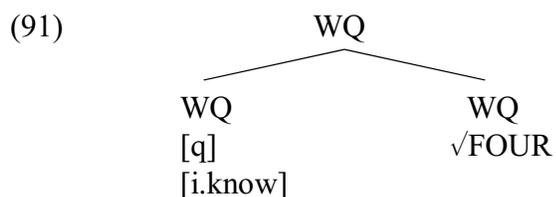
(90a) the four horsemen

(90b) [<sub>SQP</sub> the [<sub>WQP</sub> four [<sub>NumP</sub> horsemen ... ]]]

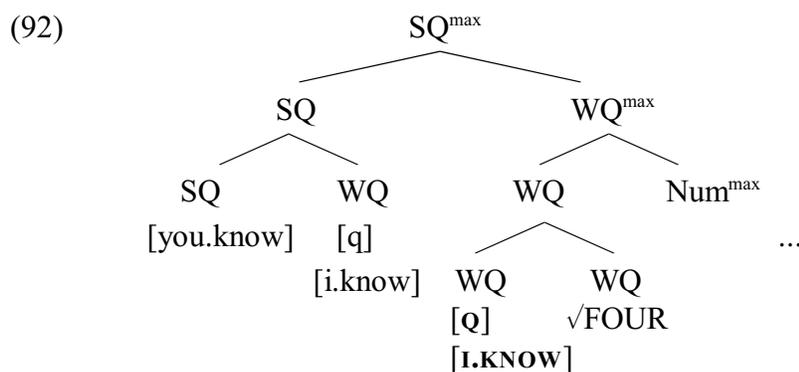
I have argued that numerals are weak quantifying determiners and thus have the feature [q]. Also, since phrases with numerals can be specific indefinites, numerals can be [i.know] just like specific indefinite *a*. Since [q, i.know] spells out in the numeral, in a definite expression like (90) the SQ position appears to have only [you.know] as in (88a). I have argued that *the* is [q, i.know, you.know], so [you.know] cannot spell out by itself.

A possible solution follows from the Last Resort movement of [q, i.know] that was exploited for (88) and (89). But for a definite expression with a numeral we must assume that the functional features of the numeral are separable from the semantic contribution of the numeral's

cardinality. Let's suppose that for a numeral like *four*, the semantics of the cardinality, which corresponds to lexical content, adjoins to the functional features of WQ, as in (91), where the lambda notation indicates the meaning of *four*, the property of a set such that the number of elements in the set is at least four. *Four* is externally merged as a root



The functional features can thus pied pipe to SQ, as they do when the WQ position is not pronounced, e.g. *the horse*. The lexical content of *four* is left to be spelled out in WQ. If the functional features move to SQ, we have (92) and *the* spells out SQ with the numeral in WQ.



Concluding this section, in getting the features in the right places we have assured that *the* will never spell out with *a*. If [q, i.know, minim] spells out as *a*, then it does not raise. However, variant WQ elements, [q] and [q, i.know], do not have Spellouts and can raise as a Last Resort move to spell out *the*. This solves Lyons's Problem.

### 5.2.5 Semantics

The preceding section identified the semantics associated with particular features in WQ and SQ. The feature [i-know] in WQ indicates that the speaker presupposes that he knows but that the addressee does not know *which one* of a set of elements is the referent. The result is a specific indefinite. Also, the feature [you.know] in SQ was argued to be associated with the pragmatic presupposition by the speaker that the addressee knows *which one*. Here I tie together the other aspects of the semantics. Chapter 4 showed that CL/NumP denotes a set and that an item in WQ produces from the set a generalized quantifier. In this chapter we have seen that the semantics associated with the [q] feature in WQ gives us at least an x with some property, via a choice function. If NumP denotes a set, then the semantics associated with [q] in WQ assures us that there is some x with a property P. And since the WQ position is for weak quantifying determiners, which contains an assertion of existence (see Keenan's definition in section 5.1.1), the WQ, in effect, provides for an  $\exists$  operator. The  $\exists$  operator may be missing in object position if a bare noun does not project, as we see for Persian incorporated nouns. For a specific indefinite in object position, however, we assume that existential closure is operative in the case of bare nouns.

So in the Persian example (93), *sib* 'apple' appears to be bare and nonprojecting. If so, then there is no WQ position to house [q]. But (93) allows a reading that a particular apple was eaten. On this reading existential closure applies to the object noun inside VP.

(93) Mina sib xord  
 Mina apple ate.3S  
 'Mina ate an apple'

*Persian*

In the case of both specific indefinites and definites, both of which carry [i.know] indicating the speaker knows the referent, the generalized quantifier is open to being typeshifted to an entity, an option according to Partee (1987). In (94), the composition leading to SQP has yielded a generalized quantifier, but since a specific entity is involved the generalized quantifier can be shifted to an e-type entity via the Lower shift.

$$(94) \quad [{}_{\text{SQP}} \text{ the cat } ]_{\langle\langle e, t \rangle, t \rangle} \Rightarrow_{\text{Lower}} [{}_{\text{SQP}} \text{ the cat } ]_e$$

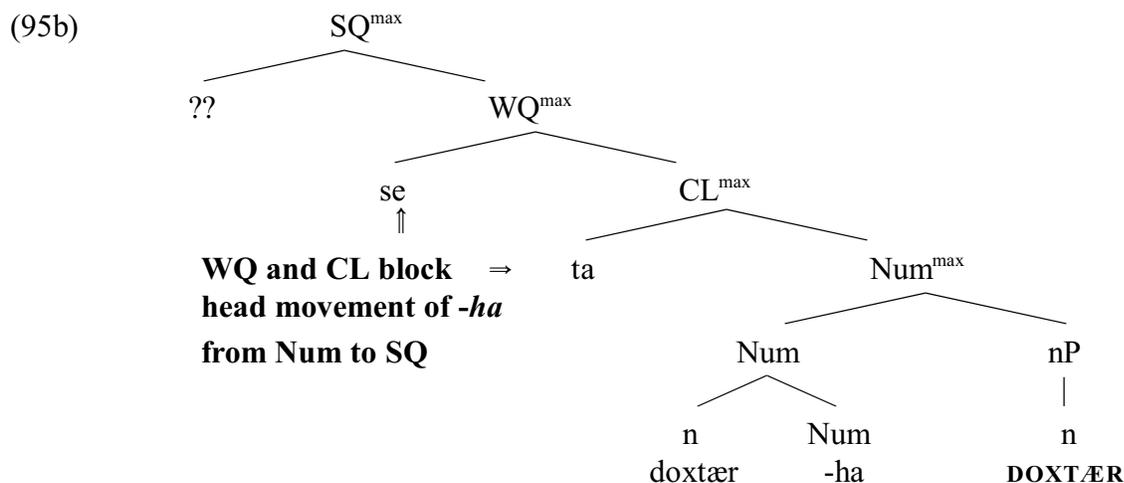
### 5.2.6 The Persian definite plural *-ha*

We have seen that Persian plural nouns like *doxtær-ha* ‘girl-PL’ should be interpreted definitely as ‘the girls’. Yet it cannot be the case that *-ha*, independently or attached to the noun, head-moves to SQ because intervening heads can be occupied to block movement. Still, we do get the definite reading, as in (95a). Raising *-ha*, covertly or overtly, violates the Head Movement Constraint (Travis 1984) because *ta* occupies the CL position and *se* occupies the WQ position, as in the structure in (95b).<sup>86</sup>

$$(95a) \quad \begin{array}{lll} se & ta & doxtær-ha \\ \text{three} & \text{CL} & \text{girl-PL} \\ \text{‘the three girls’} & / \# \text{‘three girls’} & \end{array}$$

---

<sup>86</sup>In more modern versions, the Head Movement Constraint is derived. Chomsky (1995a, sections 2.1 and 2.2) derives the constraint from the ECP. Lasnik and Uriagareka (2006, sections 3.3-3.6) explain the descriptive fact of the Head Movement Constraint as a constraint on movement via Attract. Attract is local:  $\alpha$  cannot attract  $\beta$  if a  $\gamma$  of the same type as  $\beta$  and is closer to  $\alpha$  than  $\beta$  is. In (95b), SQ can attract WQ (or features in WQ), so SQ cannot attract Num. In section 5.2.4 we saw that the movement of WQ features to SQ is driven as a Last Resort to spell out *the*.

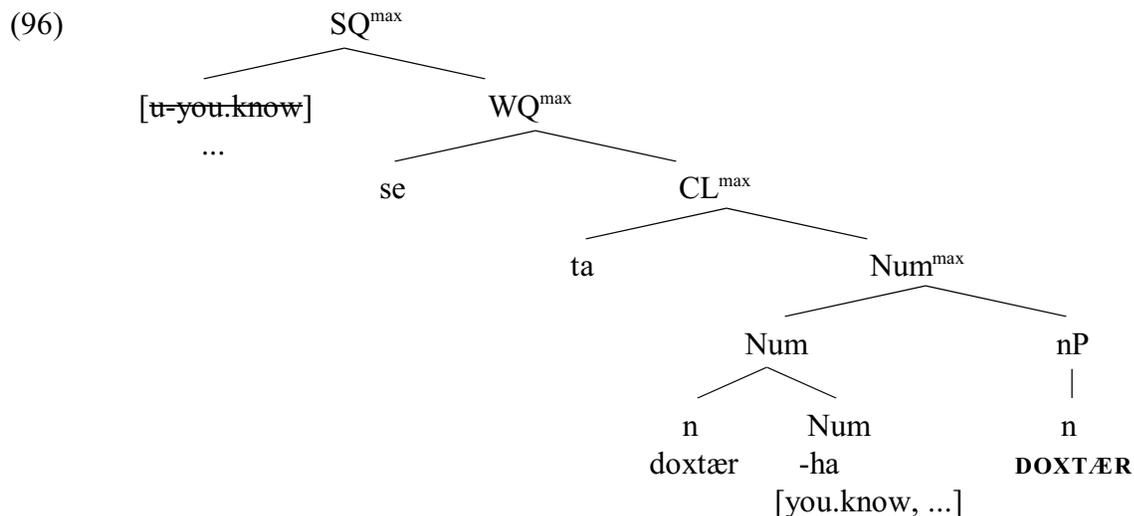


But using the features presented so far, we can provide an account of the relationship between an unpronounced SQ position and the position where definiteness is overtly interpreted, in Num.

In the previous section, English *the* was argued to be featured as [you.know, ...]. Persian does not have a word for *the*, but the language does have access to a SQ position, as was argued in section 5.1.2. Also, more generally, even those languages that lack articles still have demonstratives, pronouns and proper names, which are argued to occur in DP. So under the DP hypothesis the lack of articles does not mean a language doesn't have access to a DP projection; in the context of this dissertation the lack of articles does not mean the lack of WQP and SQP. This is demonstrated by the example in (95) above. And since SQ is the position argued to house the [you.know] feature required for definiteness, we assume that this must be the case even when an article is not present. (Further arguments for DP, or SQ and WQ, in languages without articles are presented in section 5.3.1 below.)

If movement of *-ha* is not permitted, as in (95), there is still Agree at our disposal to assure a connection with the SQ position. Let's make one more assumption, that in a structure

without a definite article with interpretable features the feature of the determiner in SQ is then uninterpretable. While [you.know] is interpretable on *-ha*, its matching feature in SQ is [u-you.know]. Then [u-you.know] contains a probe that seeks the first available Matching feature. So while the Head Movement Constraint blocks *-ha* from moving from Num to SQ, Num's features are still available for checking the feature [u-you.know], which seeks the first asymmetrically c-commanded goal. So, focusing on the [you.know] pair, we have (96), where [u-you.know] in SQ is checked and the derivation converges.



If the checking account proposed in (96) is on track, we may have a way to test consistency across languages with regard to empty heads. If a head is empty, at least some of its features—say F—might be uninterpretable since there is no pronounced element to interpret. If that feature appears elsewhere in the syntax, where it *is* interpretable because there is a phonetic representation for it, then the feature in the empty head is [u-F]. Thus, empty heads are a function of whether particular feature bundles are pronounceable. The feature [you.know] is interpretable

in English is because it is part of the feature bundle that spells out in the SQ position. In contrast, [u-you.know] is uninterpretable in SQ in Persian because it is not spelled out there. More broadly, if such an approach is on the right track, we have a possible factor to weigh in on the debate about whether null heads are available in the Cinque (2002) cartographic approach that assumes universal syntactic *structure* and how null heads might be licensed.

### 5.3 Other empty positions in SQPs and WQPs

#### 5.3.1 Availability of SQ position

In the previous section it was argued that a phrase interpreted definitely projects SQP, which, after feature movement, is headed by the feature bundle [you.know, u-i.know] if SQ is empty. SQP is only projected for strong quantifying determiners and there is no need to license an empty SQ for indefinites because there is none. It was suggested, however, that in a definite expression such as Persian *doxtær-ha* ‘the girls’ the SQ is present even though nothing is pronounced in that position. In English we saw how WQ might not be pronounced in a definite expression like *the sledgehammer*. In this section we look at other empty positions in WQ, for indefinite expressions.

The main issue is why such heads, and their projections, should be interpreted as being present if nothing overt appears. When a head is empty but still seems to have semantic content the problem has been to license the null element. But there is little doubt that null things exist, as, for example, the vast literature on PRO attests. This was part of the tack of researchers like Longobardi (1994) in trying to understand crosslinguistic differences in the use of bare nouns. For example, some languages require articles, other languages allow bare plurals but not bare singulars, while bare plurals might be permitted in object position but not subject positions. Still

other languages quite freely allow bare nouns in any argument position, though a bare noun in a particular position may not be open to all interpretations.

Let's review some evidence for phrases being present even when their heads may not be overt by looking back at the literature on the traditional D position for languages without articles. Progovac (1998) argued for a DP in Serbo-Croatian, a language without articles. Her argument is based on noun/pronoun asymmetries with regard to adjectives. There are some adjectives in Serbo-Croatian that can modify pronouns, such as *samu* 'alone'. While the adjective must precede a noun, it can, or must, follow a pronoun. (96a,b) show that *samu* 'alone' is fine before the noun but ungrammatical if after the noun. In contrast, (96c,d) show that the adjective after the pronoun is fine but questionable at best if it precedes a pronoun (from Progovac 1998, p167).

- |       |                            |          |          |      |           |                       |
|-------|----------------------------|----------|----------|------|-----------|-----------------------|
| (96a) | I                          | samu     | Mariju   | to   | nervira   | <i>Serbo-Croatian</i> |
|       | and                        | alone    | Mary     | that | irritates |                       |
|       | 'That irritates even Mary' |          |          |      |           |                       |
| (96b) | ?*i                        | Mariju   | samu     | to   | nervira   |                       |
|       | and                        | Mary     | alone    | that | irritates |                       |
| (96c) | I                          | mju/mene | samu     | to   | nervira   |                       |
|       | and                        | her/me   | alone    | that | irritates |                       |
|       | 'That irritates even me'   |          |          |      |           |                       |
| (96d) | ?*I                        | samu     | nju/mene | to   | nervira   |                       |
|       | and                        | alone    | her/me   | that | irriates  |                       |

This suggests that nouns and pronouns are in different positions. Following Longobardi (1994), who argued that Italian nouns move past an adjective to D if D is not occupied by an article, Progovac proposes a DP for Serbo-Croatian, even though Serbo-Croatian lacks articles. She argues that a DP in Serbo-Croatian allows a place for pronouns to appear, D, ahead of the

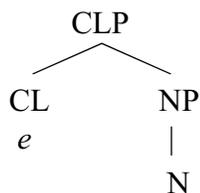
adjective. And this would be consistent with others who place pronouns in D anyway. Rutkowski (2001) argues for DP from similar facts in Polish, another language without articles.

Besides providing evidence for the existence of DP in a languages without articles, the facts, says Progovac, argue for DP being part of UG. Since sentences with modified pronouns are rare in Serbo-Coatian, she reasons that children thus have little direct data upon which to hypothesize a DP and that the existence of DP must therefore stem from UG. Further, even if some languages lack articles, those languages have demonstratives and pronouns, which, if in SQ or SpecSQ, provide language-acquisition evidence that there is a SQP. So to the degree that demonstratives and pronouns are in DP in languages with articles, their existence in languages without articles ought to provide evidence for the availability of DP in those languages too. And finally, in the spirit of the cartographic approach to syntactic structure (Cinque 2002), I have been arguing that DP syntax is universal by virtue of the same small set of UG features. The weaker claim, but in the same spirit, is that regardless of apparent evidence to the contrary, syntax across languages is fairly constant, with differences explainable by Fusion of phrases such as CLP and NumP.

Chinese languages have no articles, and nouns typically appear morphologically bare, without determiners, case or number morphology. Nonetheless, Cheng and Sybesma (1999) argue for at least a Classifier Phrase above NP in Chinese, even when a classifier is not used. As I discussed in chapter 3, Cheng and Sybesma argue against the claim in Chierchia (1998a) that Chinese nouns are uniformly mass, since classifiers are sensitive to whether the noun is mass or count. What they do assume is that the classifier position serves the function of individuating or singularizing the denotation of nouns. In this, they say, a classifier overlaps with the function of a

determiner and operates on a predicate to choose an individual(s). Further, since D is argued to also serve as a linker between predicates and entities in the world, D, as described by Cheng and Sybesma, has a deictic function, and CL in Chinese has the same purpose. That is, “in Chinese Cl<sup>0</sup> performs some of the functions performed by D<sup>0</sup>” (Cheng and Sybesma 1999, p518). Further, in Cantonese in particular, the interpretation of nouns is distributed like the interpretation of nouns in Italian as described by Longobardi (1994). If an indefinite is as in (98a), then according to Longobardi’s argument that an empty D must be lexically governed it can only appear in postverbal position and in that position can only be interpreted indefinitely (adapted from Cheng and Sybesma 1999, p518) as in (98b) (from Cheng and Sybesma 1999, p510).

(98a)



(98b) Wufei heoi maai syu  
 Wufei go buy book  
 ‘Wufei went to buy a book/books’

*Cantonese*

But if the CL position is filled with a classifier, we can get a definite interpretation, as in (99)

(from Cheng and Sybesma 1999, p511).

(99) Ngo zungji tong zek gau waan  
 I like with CL dog play  
 ‘I want to play with the dog’ (not: ‘I want to play with dogs’)

The main problem, as I see it, with this analysis, is that if a classifier takes over some of the functions of D because Cantonese lacks articles, Cheng and Sybesma attribute not only a deictic function to CL but also a typeshifting function that converts predicate nouns into arguments as well as an iota function that yields a definite interpretation (Cheng and Sybesma 1999, p520). But if that is the case then we ought to get a definite reading whenever classifiers are present, a prediction that is not borne out. In Cantonese we get only the indefinite reading in (100a) (Cheng and Sybesma 2005, p276), as in Mandarin. Yet we can get a definite meaning with a numeral if a demonstrative is present as in (100b) (from Cheng and Sybesma 1999, p527).

- |        |                     |                 |
|--------|---------------------|-----------------|
| (100a) | saam bun syu        | <i>Mandarin</i> |
|        | three CL book       |                 |
|        | 'three books'       |                 |
| (100b) | zhe san ben shu     |                 |
|        | Dem three CL book   |                 |
|        | 'these three books' |                 |

Cheng and Sybesma's conclusion is that indefinites are Numeral Phrases of the form  $[_{\text{NumeralP}} [_{\text{CLP}} [_{\text{NP}} ]]]$  and that definites are Classifier Phrases. But of course the definite in (100b) is more than a Numeral Phrase. Further, they note that classifier reduplication is available in both Mandarin (101a) and Cantonese (101b), in both cases yielding a universal reading (from Cheng and Sybesma 2005, p275-276). Other classifier languages too allow either classifiers as definite markers (101c) or reduplicated classifiers for definites (101d) (both cited in Simpson 2005, p825-826).

- |        |                 |                 |
|--------|-----------------|-----------------|
| (101a) | ge-ge xuesheng  | <i>Mandarin</i> |
|        | CL-CL student   |                 |
|        | 'every student' |                 |



indefinitely. Under the assumptions that generalized quantifiers can be arguments, WQP, inside a Case Phrase, can thus be an argument without a SQP. We have also seen that number morphology, in the form of number marking or a numeral classifier, is not always morphologically required. For example, Persian, while preferring a classifier between numerals and nouns in colloquial speech, accepts null expression of the classifier. And since the overt plural marker *-ha* entails definiteness, nondefinite plural must be null; there is no marking that simply means plural.<sup>87</sup>

It is well known that bare plurals are possible in English (e.g. Carlson 1977). In this dissertation bare plurals must be syntactically more than NumPs since we need at least a WQP for an argument.<sup>88</sup> Some have argued that syntactic bare plurals, or even bare singulars, can be arguments in some languages at least some of the time (e.g. Chierchia 1998a, Dobrovie-Sorin et al. 2006). The position here is to maintain that what appears overtly in WQP and SQP is partly a matter of the morphology available in a language. For a definite, English has a pronounceable morpheme, *the*. Some languages do not spell out the feature bundle for a definite article in SQ. Persian and English differ on this, since Persian often leaves null some positions that English pronounces. But one place where Persian and English are alike is their frequent absence of overt morphology in the WQ position. In English, bare plurals are available in both subject and object position. So if we are assuming that arguments must be generalized quantifiers, i.e. either a WQP or a SQP, we must provide evidence that an empty WQP is being projected and why it might be projected in English but not, for example, in French, which disallows bare plurals entirely.

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<sup>87</sup>Recall from chapter 4 that the classifier in Persian, *ta*, is plural because of its [group] feature. However, also recall that the classifier, at least in Persian, is licensed only with numerals.

<sup>88</sup>Predicates can be subjects in principle, if they involve second order predicates. But predicates are not agents or experiencers and, I hold, are not ordinary arguments. Also see footnote 16.

Further, we must account for empty WQ when a strong quantifying determiner is present. Recall that I argued on distributional and semantic grounds for (102) in English.

(102a) [<sub>SQP</sub> [<sub>WQP</sub> [<sub>NumP</sub> [<sub>NP</sub> ]]]]

(102b) [<sub>SQP</sub> the [<sub>WQP</sub> three [<sub>NumP</sub> tenor-s [<sub>NP</sub> **tenor** ]]]]

However, for definites it is common to not overtly fill the WQ position as in (103), raising the question of why we should assume WQP is there.

(103a) the tenors

(103b) [<sub>SQP</sub> the [<sub>WQP</sub> ?? [<sub>NumP</sub> tenor-s [<sub>NP</sub> **tenor** ]]]]

The absence of a pronounced WQ head was explained in section 5.2, in the section on the component features of specificity. We will now look at apparently empty WQs for indefinites.

Focusing on English, we note that bare plurals have semantic counterparts with expressed weak quantifying determiners.

(104a) Frogs ate our tulips / Some frogs ate our tulips

(104b) We saw loons near Lake Superior / We saw some loons near Lake Superior

In (104) *frogs* is interpreted as *some frogs* and *loons* is interpreted as *some loons*. In fact in these eventive sentences involving stage-level predicates *some* is the only interpretation we can give to the bare plural. *Frogs ate our tulips* does not mean *Many frogs ate our tulips* or that *All the frogs ate our tulips* or *Most frogs ate our tulips*. The determiner *some* appears to be optional. This would violate the spirit of a blocking principle mentioned in Chierchia (1998a, p360).

(105) Chierchia's (1998a) Blocking Principle

For any type shifting operation  $\tau$  and any  $X$ :

\* $\tau X$  if there is a determiner  $D$  such that for any set  $X$  in its domain  $D(X)=\tau(X)$ .

Basically, this means if you have a determiner meaning and there is a determiner available in the lexicon, then you must use that determiner. For definites, *the* is available so a null definite typeshifter cannot be used in its place. Generally applied, the Blocking Principle predicts that *some* must be used if its meaning is intended. But the *some* cases in (104) indicate that the Blocking Principle cannot be without exceptions. In fact Chierchia suggests that the blocking principle stated in (105) might be too strong (Chierchia 1998a, p362).

In fact, even *the*, depending on its meaning, is sometimes optional. A clear case in English is in a subject with a kind reference. Here, while the article is possible, the bare plural seems the most natural option, at least with a kind predicate like *extinct* in (106), although the definite plural and definite singular are also possible.

(106a) Stegosaur is extinct

(106b) The stegosaur is extinct

(106c) The stegosaur is extinct

But in object position with a verb that does not typically take a kind object, the article is required. In (107), *kill*, which ordinarily takes individuals, is presumably typeshifted to a kind-taking verb, but typeshifted *kill* does not permit a bare-plural kind-denoting object. This is unexpected since we should be able to get the kind reading on pragmatic grounds if it's commonly believed that

dinosaurs were wiped out by the effects of a comet hitting the earth 65 million years ago. But as the contrast in (107) shows, we need the definite article to get the kind reading.<sup>89</sup>

(107a) \*A comet killed dinosaurs (on the kind reading of *dinosaurs*)

(107b) A comet killed the dinosaurs.

What I argue is required is that a position for the feature [q] be available for bare plurals if they are arguments. Recall that [q] corresponds to a choice function that provides an x with a property P. So, how is the WQ position filled, or licensed, if there is no overt element occupying it? There is little evidence that English nouns raise, at least overtly, given the adjective-noun order in English vis-a-vis the noun-adjective order in Romance (e.g. Cinque 1994).

(108a) the green book

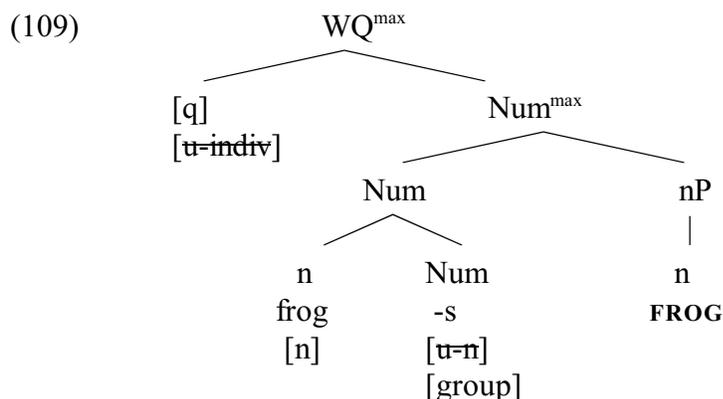
(108b) le livre<sub>i</sub> vert t<sub>i</sub>  
the book green

*French*

For (104), the structure for *frogs* is (109).

---

<sup>89</sup>This is an interesting contrast to those predicates that typically take kind-denoting objects and *can* take bare-plural kind objects: *The Babylonians invented observatories*. However, even with *invent*-type verbs, the definite singular seems better: *Babbage invented the computer* seems better than *Babbage invented computers*, on the kind reading.



The WQ is [q], which, recall, indicates that there is at least one, a specific one, but that the speaker does not know which one of the potential set of referents it is. For English, this particular feature bundle is optionally spelled out. In French, the structure in (109) is impossible because in French number is realized on the determiner: both *Des* in (110b) and *Les* in (110c) are plural. As the determiner must spell out, (110a) is bad, but (110b) and (110c) are good in French.

- (110a) \*grenouilles ont mangé les tulipes *French*  
 frogs have eaten the tulips  
 ‘Frogs have eaten the tulips’
- (110b) Des grenouilles ont mangé les tulipes  
 some frogs ...
- (110c) les grenouilles ont mangé les tulipes  
 the frogs ...

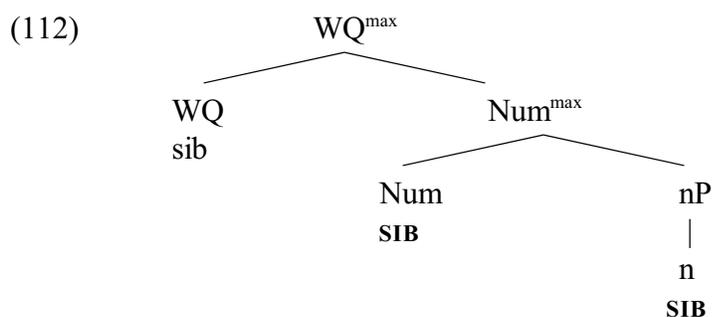
#### 5.4 Bare arguments in Persian

My focus here will be bare subjects, but I mention Persian bare objects in passing, and accept that they are incorporated into a verbal predicate. As (111) shows, bare nouns are possible in object position.

- (111) Pari sib xord  
 Pari apple ate.3S  
 ‘Pari ate an apple/apples’

*Persian*

In this case the intended number of *sib* ‘apple’ is not clear and it can be interpreted as singular or plural. In the spirit of this dissertation, in order for *sib* ‘apple’ to be an indefinite argument we must have a WQP. This could be accomplished by raising the noun from n to Num and then to WQ, as in (112).



It is arguable that Persian nouns can raise, if one adopts the Kayne (1994) position that word order is underlyingly the same universally. If adjectives precede nouns, then the overt noun-adjective order in Persian can be understood by moving the noun. And it is the case that nouns precede adjectives in Persian in an ezafé construction.<sup>90</sup>

- (113) mænzel-e bozorg  
 house-EZ big  
 ‘a big house’

*Persian*

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<sup>90</sup>Modification of a noun generally requires the ezafé construction, with the ezafé particle *-e* intervening between the noun and its following adjective or possessor (see section 1.2). There is much debate about the syntax of ezafé, whether it generates a phrase or is inserted, for example. See Samiiian (1983) and Mahootian (1993) for discussion. I do not discuss the ezafé but for exposition simply suffix it to the noun.

However, particularly in the case of bare nouns, in contrast to N-movement in Romance which has articles, a common analysis, which I adopt, is incorporation of the bare-noun object into the verb along the lines of Mithun (1984) and Baker (1988). Several have argued this position for Persian, where bare-noun objects fuse with the verb to form a predicate (e.g. Ghomeshi 1997). Some of the main points for this analysis are that the nouns are typically interpreted nonreferentially, that bare nouns lack morphology that would indicate a phrasal status and that the resulting [<sub>v</sub> N+V] can then take an object, as it clear in the presence of the accusative suffix *-ra* on *baqce* ‘garden’ (adapted from Samiian 2001, p361).<sup>91</sup>

- (114) Omid baqce ra ab dad  
 Omid garden RA water gave.3S  
 ‘Omid watered the garden’

What (114) is intended to show is that *ab* ‘water’ is no longer the object but has incorporated into a light verb. The resulting predicate [*ab dad*] can then take an object *baqce-ra* ‘the garden’.

So assuming that bare-noun objects become part of the verb, the focus here will be bare subjects. The subject in (115) is typically interpreted as definite. Given the assumption that a SQP is required for a definite argument, the task is to show how the SQ position plays a role when there is no overt determiner to suggest so.

- (115) mænzel bozorg-e  
 house big-is  
 ‘The house is big’

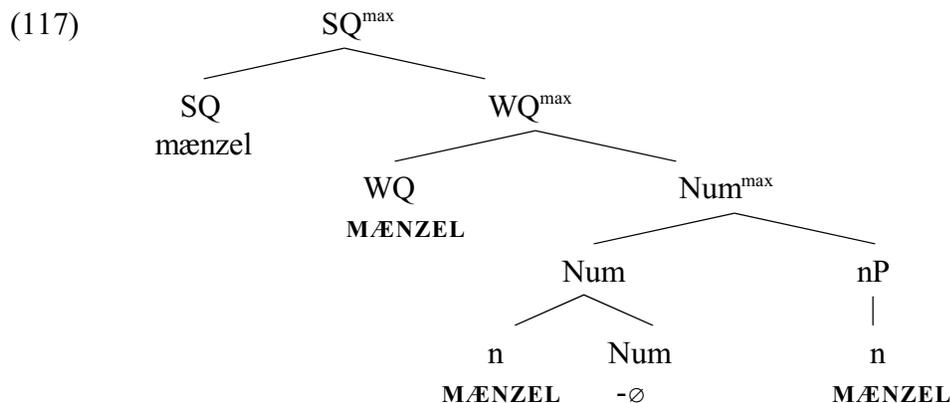
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<sup>91</sup>However, Samiian (2001) takes an alternative view where bare nouns have independent syntactic status.

Note that a variant with the definite suffix is possible.

- (116) *mænzəl-e*      *bozorg-e*  
house-Def      big-is  
‘The house is big’

Since, given that the noun-adjective order in (113) is independent evidence of N-movement in Persian, we allow the noun to head-move all the way to SQ. The noun *mænzəl* moves through Num and WQ, finally landing in SQ.

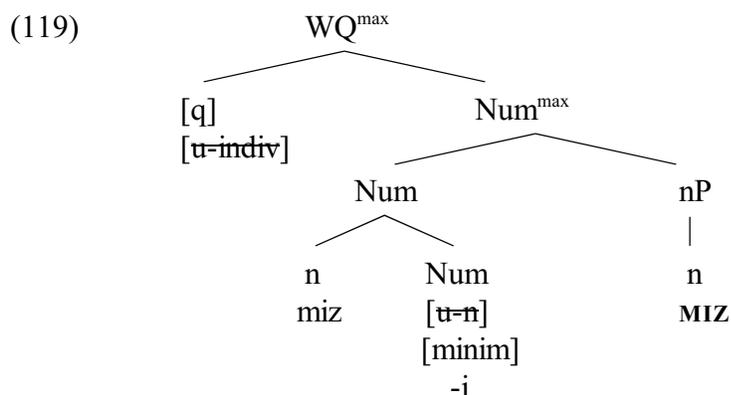


The variant in (116) would have the same structure except that *-e* is in SQ and the noun adjoins to it. However, *-e* is not entirely a matter of optionality, since while both (115) and (116) are definite, the use of *-e* suggests that the noun has prior reference in the discourse.

Now for an indefinite subject, while it is possible to have a bare noun, the preferred option seems to be to have the indefinite marker *-i*. We saw before that there is some debate about whether *-i* is specific, and it may be for some speakers. Let's, however, assume it is not specific. So (118) indicates that *miz* 'table' is not known to either the speaker or addressee.

- (118) miz-i  
table-Ind  
'a table'

If *-i* is a nonspecific indefinite, then its features in WQ are [q, u-indiv], because it takes noun complements, is singular and, as a number marker, needs to be quantified. As in English, Persian can leave open the WQ position for an indefinite. While I have focused on particular features in many of the derivations, in what follows I provide full feature sets for the syntactic composition.

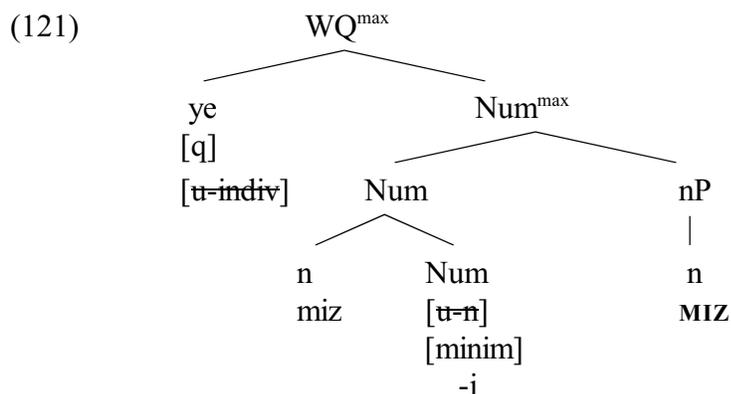


In (119), all features are checked. The [q] in WQ, unpronounced, nonetheless serves its syntactic and semantic functions.

There is a variant indefinite, with *ye* 'a, one'.

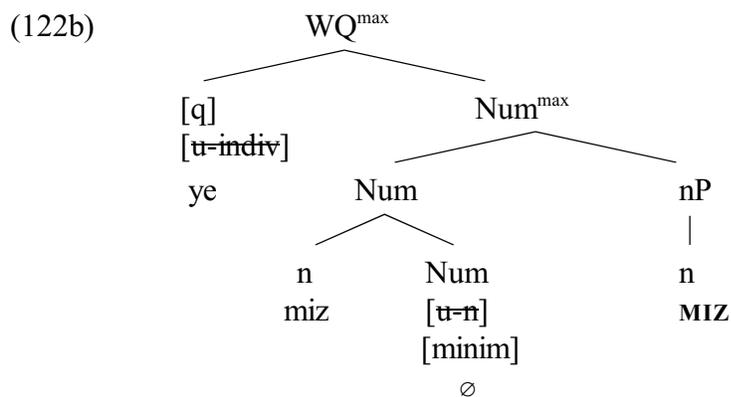
- (120) ye miz-i  
a table-Ind  
'a table'

In this case the WQ position is pronounced, as in (121).



And finally, *ye* is possible without *-i*, as in (122a), with the corresponding structure in (122b).

(122a) *ye miz*  
*a table*  
 'a table'



While bare-noun indefinite subjects are possible, it is preferred to have some marker of indefiniteness, either in the  $WQ$  position or in  $Num$ . The fact that at least one or the other indefinite marker is possibly nonexpressed has parallels elsewhere in Persian and in English. First, the  $WQ$  position can be overt as *some* in English. Second, Persian seems to have more flexibility

with other elements being optional. For this, again we rely on the lexicon and how functional feature bundles spell out.

## **5.5 Case Phrase**

### **5.5.0 Introduction**

Chapter 4 and the preceding sections in this chapter developed the theory that feature bundles merge in the heads of the functional phrases above NP. Languages are presumed to have the same inventory of features as a part of UG, but the features may bundle variously and have various ways of spelling out, in some cases having null expression. Also, features can sometimes raise and undergo Internal Merge with features of a higher functional head. While some details of the feature-based model differ from those in earlier approaches, the heads and their functions that are presented in this dissertation correspond to heads of phrases have been posited in earlier analyses. For example, nP, NumP and CLP are essentially the same here as in earlier proposals. This dissertation also follows on previous arguments that there are two positions for determiners, the head of a Weak Quantifier Phrase and the head of a Strong Quantifier Phrase. WQP can occur by itself; SQP is projected on top of WQP for definites.

But if there are two determiner phrases rather than a single DP and either can occur as an argument of a verb, one question that arises is that of the licensing of phrases that are one or the other Quantifier Phrase. Under a view where a verb takes DP arguments, no special conditions apply in that the verb presumably calls uniquely for DPs in its argument structure.<sup>92</sup> But if a verb

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<sup>92</sup>Keep in mind that, as mentioned previously, some argue that NP or NumP can be an argument (e.g. Chierchia 1998a, Dobrovie-Sorin et al. 2006).

can take either SQPs or WQPs as arguments, then we must be explicit about the verb's subcategorization relationship to the subject and object which are not of a uniform syntactic type.<sup>93</sup> One way to accomplish this is by stipulation and claim that a verb variously takes SQPs and WQPs, as in (123a), where the curly brackets indicate the domain of phrases from which a syntactic argument can be taken. (123a) replaces a more traditional subcat frame in (123b).<sup>94</sup>

(123a) *love*: verb, {SQP, WQP} \_\_\_ {SQP, WQP}

(123b) *love*: verb, DP \_\_\_ DP

However, subcategorization information like (123a) misses a generalization about what the two phrase types have in common. One thing they do have in common is the presence of the syntactic feature [q] and the semantics associated with it. Since [q] is introduced in the head of WQP, it is available in a definite expression that has a SQP. In principle, this feature could in effect be what a verb is looking for, in which case the subcategorization frame might look more generally like (124) instead of (123a).

(124) *love*: verb, [..., q, ...] \_\_\_ [..., q, ...]

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<sup>93</sup>Note, however, that there is no semantic problem if SQP and WQP are of a uniform semantic type, generalized quantifiers, which I have argued.

<sup>94</sup>Early subcat frames for verbs specified NP arguments and typically excluded the subject, which, by the EPP, is required for all verbs (as in Radford 1981, chapter 4; Haegeman 1991). But a frame as in (123) is consistent with the idea that the subject is generated VP-internally (e.g. Koopman and Sportiche 1991).

The subcat frame in (124) suggests that verbs have a feature [u-q] that serves as a probe looking for a matching [q] goal. However, another way to simplify the relationship between the verb and its arguments is to use case, a relationship that exists independently.

### 5.5.1 The Case Phrase intermediary between SQP/WQP and the verb

I accept that WQPs and SQPs must in some sense “get” abstract case (often “Case” in the literature) to function as arguments. Abstract case is a licensing condition for arguments of a verb that roughly parallels the appearance of morphological case in those languages that show case in their morphology, but abstract case is always required, regardless of a language’s morphology. Vergnaud (1977, in Vergnaud 2008) suggested that abstract case, regardless of the poverty of its morphological expression in many languages, is required on NPs. Chomsky (1980) expressed the case requirement on NPs by the case filter in (125) (Chomsky 1980, p25).

(125) \*N, where N has no Case

This is revised in Chomsky 1981 (p175) as (126), to accommodate presumably caseless PRO and the trace of moved wh, which is subject to the case filter.

(126) \*[NP  $\alpha$ ] if  $\alpha$  has no case and  $\alpha$  contains a phonetic matrix or is a variable<sup>95</sup>

Chomsky (1986) distinguished structural case from inherent case. Inherent cases are associated with particular thematic roles such as dative or ablative. Structural cases are those associated with the verb’s subject and object that may or may not be associated particular thematic roles.

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<sup>95</sup>Chomsky (1981) said that case is a property not so much of NPs but of chains of NPs and their traces.

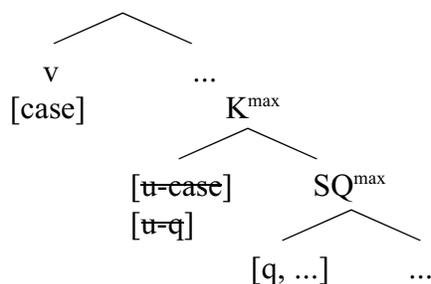
Nominative and accusative are structural cases, where nominative, for example, can be associated with an agent, an experiencer or, in a passive, a patient.

Many others have investigated details about case in the context of GB and later theories: the licensing of nominative and accusative cases, the relationship of case to government, traces and PRO; the relation between case and the assignment of theta roles; and how case is checked or assigned (see Lasnik 2008 for an overview). Here I will be interested in case with regard to full lexical NPs, or, in the terms suggested in this dissertation, Weak or Strong Quantifier Phrases. For simplicity I refer to structural cases, primarily accusative, not, for example, that case purportedly associated with PRO, which Chomsky and Lasnik (1995, p119ff) argue involves a different kind of case they call null case. Nor will I be concerned with such topics as quirky cases like Icelandic dative subjects (Zaenen, Maling and Thrainsson 1990, Sigurðsson 1991) or other idiosyncratic morphological cases. And as the focus here is on the structure of WQPs and SQPs, I am not concerned with precisely which verbal element is involved in checking or assigning case such as the head of *v*P or the head of an AgrP (see Hornstein et al. 2005, section 4.3 for discussion), or the differences between case realization in nominative/accusative languages and ergative/absolute languages (e.g. Aldridge, in press, Legate 2008).

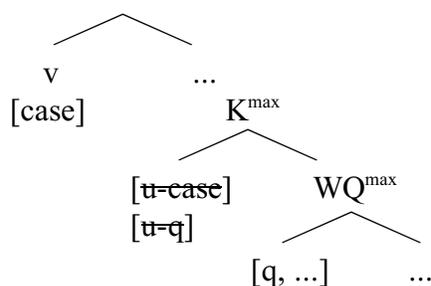
I assume that case enters the derivation with phi features (e.g. Radford 2004, p284ff; also Lasnik and Uriagereka 2005, p132ff). The phi features are interpretable but case is not. The verb, or little *v*, contains probes for the phi features and attracts case along with them. Case is then checked or assigned by *v*, or by T for subjects. Now, phi features are introduced in different positions. Person is entered in a Quantifier Phrase position and number is entered in NumP. These features are available to *v* by either feature percolation or more simply they are simply available

for any checking within a relevant domain, from functional heads above nP to v via the ability for multiple Agree (Hiraiwa 2001). One question is where case, or [u-case], is entered in the functional projections above NP. Below I present arguments for there being a Case Phrase where a [u-case] case feature is entered that is a goal for v. Case Phrase, via [u-q], requires a SQP or WQP complement. The proposed syntax is as in (127a) for a definite and (127b) for an indefinite, where  $K^{\max} = \text{KP} = \text{Case Phrase}$ . I assume that an object's case is checked by v, but the identity of the functional head in the verbal domain that does the checking is not crucial to the analysis presented for case's role within the functional projections above nP.

(127a)



(127b)



There are at least two theories about the position of case in the functional projections above NP. One argument holds that case is tightly connected to DP and that case is assigned to DPs (e.g. Giusti 1995, Horrocks and Stavrou 1987, both discussed below). A variant theory argues that there is a separate projection for case, a Case Phrase, or KP, that dominates DP

(Ogawa 2001, and others, discussed below). In the former position, where DP bears case, a parallel is proposed between DP and CP. This argument rests partly on the observation that both DPs and CPs can be arguments of verbs, as in (128).

(128a) Ralph read [<sub>DP</sub> the Nye Commission report]

(128b) [<sub>DP</sub> The Nye Commission report] was read by Ralph

(128c) Ralph believes [<sub>CP</sub> that big banks may have urged the U.S. to enter WWI]

(128d) [<sub>CP</sub> That big banks may have urged the U.S. to enter WWI] surprised Ralph

Horrocks and Stavrou (1987) showed that focus movement within DP can be interpreted much as phrasal movement in CP, although they also suggest that languages may vary in whether it is CP or IP that DP corresponds to. On the DP/CP parallel, case is tightly connected to the D position. Among others denying an independent projection for a phrase headed by case, Giusti (1995) and Löbel (1993) hold that case is part of DP. Giusti considers two possible arrangements of phrase heads, as in (129) (from Giusti 1995, p78-79).

(129a) K - D - Agr<sup>n</sup> - etc. - N

(129b) F - Agr<sup>n</sup> - etc. - N

Note that the sequence in (129b) collapses K and D of (129a) into a single head F. Part of Giusti's (1995) argument for adopting the (129b) alternative is the rough complementary distribution of overt case and definite articles and the evolution of Proto-Indo-European<sup>96</sup> into many of the more or less morphologically caseless modern Indo-European languages. Even in languages like

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<sup>96</sup>Szemerényi (1980), cited in Baldi (1990), reconstructs Proto-Indo-European nominal inflections as eight cases and three numbers. Not all the inflections are morphologically distinct and some are null. Also see Mallory and Adams (2006), section 4.2.

German, morphological case, while residual on some nouns, rests primarily on determiners, as shown in the paradigm for the noun *Schwester* ‘sister’, where the noun form changes only for number, not for case. Case *is* reflected in the *die/der/den* alternation of the determiner.

(130) German *the sister*

|     | <u>singular</u> | <u>plural</u>  |
|-----|-----------------|----------------|
| nom | die Schwester   | die Schwestern |
| acc | die Schwester   | die Schwestern |
| gen | der Schwester   | der Schwestern |
| dat | der Schwester   | den Schwestern |

Another bit of evidence for case being uninterpretable on nouns comes from floating quantifiers. Giusti (1995, p80) notes that in German the plural article *die* is completely optional in (131): both are syntactically fine and in both the presence or absence of the article does not affect the reading of specificity or genericity, which stems from other factors (adapted from Giusti 1995, p81).

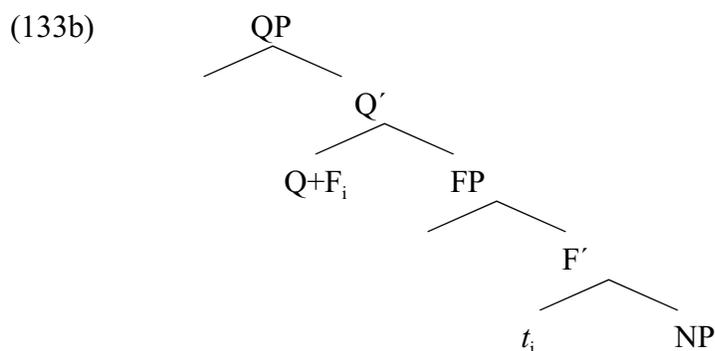
- (131a) alle (die) Kinder sind laut *German*  
 all (the) children are noisy  
 (131b) alle (die) Kinder in dieser Schule sind laut  
 all (the) children in this school are noisy

But when the noun is separated from *alle* ‘all’ the article is required.

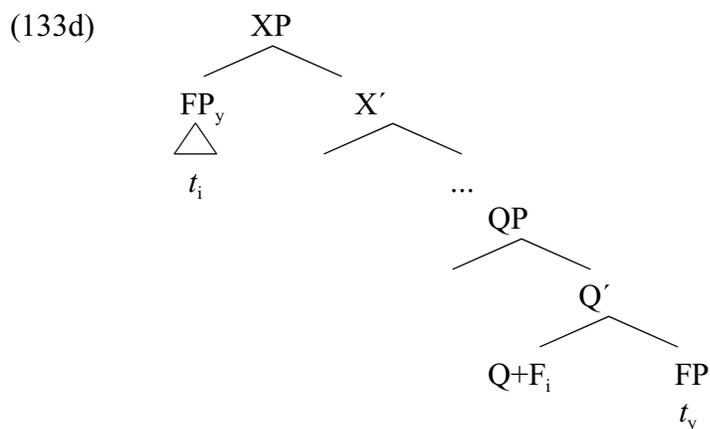
- (132a) die/\* $\emptyset$  Kinder sind alle laut  
 the children are all noisy  
 (132b) die/\* $\emptyset$  Kinder in dieser Schule sind alle laut  
 the children in this school are all noisy

Giusti presumes that (131a,b) involve topicalization of the noun. Hypothesizing a single FP rather than separate KP and DP, and assuming that FP is dominated by a QP (Quantifier Phrase), Giusti then hypothesizes that the optionality in (131a,b) is a consequence of F being immediately dominated by Q, thereby allowing incorporation of F to Q (133a,b). But for (132) we have (133c,d), where the trace of incorporation in the FP that has been topicalized c-commands its antecedent in Q (bracketed structures from Giusti 1995, p82). That is, in (133d)  $t_i$  c-commands  $F_i$ .

(133a)  $[_{QP} [_{Q'} [Q+F_i] [_{FP} [_{F'} [F t_i [_{NP} ]]]]]]$



(133c)  $[_{FP} [_{F'} [F t_i [_{NP} ]]]]_y \dots [_{QP} [_{Q'} [Q+F_i] [_{FP} t_y ]]]]$



Löbel (1993) agrees with Giusti's analysis and includes case along with number, gender and person as features in D. Cornilescu (1992) also argues, from Romanian data, for case being realized in D rather than heading a separate phrase

In contrast to the DP/CP parallel, however, many have argued for separate KP and DP projections, including Löbel (1994). These theories see KP rather than DP as the analog to CP. Let's review some of these arguments, whose conclusion, that KP is in principle independent of DP, I adopt, under the analysis that DP is actually SQP/WQP. Lamontagne and Travis (1986, 1987) and Löbel (1994) base part of their argument for KP on a purported parallel between CP in the verbal domain and case in the nominal domain. They note that while complementizers are optional in English, they are highly preferred when the verb is separated from the complement CP (from Lamontagne and Travis 1986, p57). My intuitions are not as strong that *that* is highly preferred, but I do sense a contrast whereby the presence of *that* is better in (134b) than its absence.

(134a) John believes (that) Mary will win

(134b) John believes wholeheartedly \*(that) Mary will win

Morphological case can show a similar restriction on optionality. In Turkish, an accusative marker appears on a specific object (from Lamontagne and Travis 1986, p53).

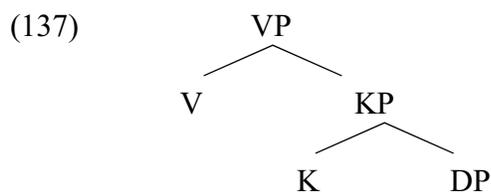
- |        |                                 |           |       |          |          |                |
|--------|---------------------------------|-----------|-------|----------|----------|----------------|
| (135a) | Hasan                           | dün       | bu    | pasta-yi | ye-di    | <i>Turkish</i> |
|        | Hasan                           | yesterday | this  | cake-Acc | eat-past |                |
|        | 'Hasan ate this cake yesterday' |           |       |          |          |                |
| (135b) | Hasan                           | dün       | pasta | ye-di    |          |                |
|        | Hasan                           | yesterday | cake  | eat-past |          |                |
|        | 'Hasan ate cake yesterday'      |           |       |          |          |                |

(135a) with the accusative marker *-yi* is only interpreted specifically, while (135b) without the accusative marker is only interpreted nonspecifically. But the specific/nonspecific distinction is not the only factor, since in (136) the nonspecific *pasta* ‘cake’ must be marked for case if it is not adjacent to the verb.

|       |        |       |           |          |
|-------|--------|-------|-----------|----------|
| (136) | *Hasan | pasta | dün       | ye-di    |
|       | Hasan  | cake  | yesterday | eat-past |

As in Giusti (1995), (136) can be explained along the lines of complementizer optionality.

Morphological case is required when the noun is separated from the verb. If the verb and noun are adjacent (137), then case can incorporate from K to V.



Lamontagne and Travis and Löbel reach the same conclusion: just as there is a CP phrase in the verbal projection, there must be a parallel phrase for nouns, which they call a Case Phrase. Löbel specifies that it is distinct from DP. KP is for the syntactic function of case and DP is for marking referentiality.

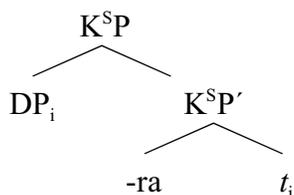
Ogawa (2001) presents several arguments for a KP, two of which I repeat here. One argument involves floating quantifiers and pronoun shift. In contrast to object nouns (138b), object pronouns can precede *all* (138d) (based on Ogawa 2001, p237-238).



Further, since *ki-nek* ‘who-Dat’ is getting case other than from nominative, it must be getting case from the pre-D position it is moving to. And, as Ogawa argues, if DP corresponds to TP, then *ki-nek* must be moving to the nominal analog of CP. This phrase is his Case Phrase.

Karimi (1996) presents evidence for KP from Persian. For her, however, case is integrated with specificity, since the accusative suffix *-ra* indicates both. Consequently, Karimi distinguishes her own,  $K^{SP}$ , where the S-superscripted K indicates specificity, from other syntacticians’ purely case-related Case Phrase. For Karimi, *-ra* is generated in the head of  $K^{SP}$  and the noun raises to  $SpecK^{SP}$  to check specificity, as in (141) (adapted from Karimi 1997, p185).

(141)



That the DP should move to check specificity is based on Karimi’s assumption that movement in Persian is motivated primarily by semantic considerations.

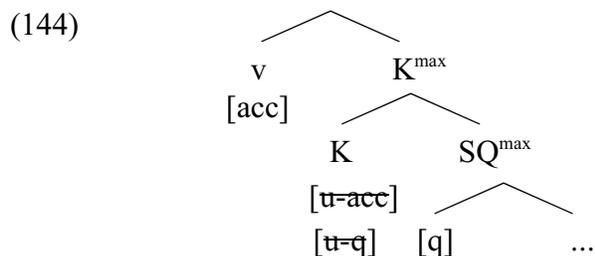
In this dissertation, KP on the one hand and SQP and WQP on the other are, at least in principle, separate, even in Persian. It is sometimes the case that specificity, or definiteness, spells out in conjunction with case, as with Persian *-ra*, which is morphologically unanalyzable. But languages can separate case and definiteness, such as German, where articles, demonstratives and possessive pronouns are composed of a bound definite element and a bound agreement element for case, number and gender (e.g. Wiltschko 1998, and references therein). As an example consider the paradigm for the singular masculine definite article in (142).

|       |         |         |         |         |               |
|-------|---------|---------|---------|---------|---------------|
| (142) | d-er    | d-es    | d-em    | d-en    | <i>German</i> |
|       | the-Nom | the-Gen | the-Dat | the-Acc |               |

Unlike the German articles, however, the Persian accusative/specific marker *-ra* is not transparently decomposable. However, Persian does allow for specificity and case to be separated, as in (143a), with the definite suffix *-e/-æ* followed by *-ra*, and (143b) with the definite plural followed by the case marker.

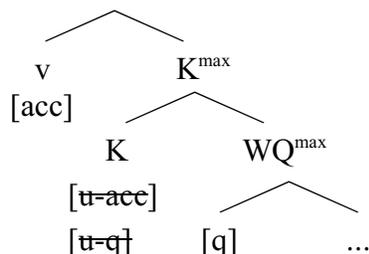
|        |                    |         |                |
|--------|--------------------|---------|----------------|
| (143a) | sib-æ-ro           | xord-æm | <i>Persian</i> |
|        | apple-Def-Acc      | ate-1S  |                |
|        | ‘I ate the apple’  |         |                |
| (143b) | sib-a-ro           | xord-æm |                |
|        | apple-PL-Acc       | ate-1S  |                |
|        | ‘I ate the apples’ |         |                |

I discuss the syntax of *-ra* below, but the main point here is that the most general description is that KP and DP are independently available, although in some languages they may be fused, as we saw can be the case in chapter 4 for CLP and NumP. So on the assumption that a case feature on the verb checks a case feature on the noun, we have the relationship in (144) for accusative.



And since WQPs are also licit arguments, (145) is possible.

(145)



One issue I do not fully resolve is why [acc] is “interpretable” on the verb and “uninterpretable” on K, but these are the assumptions I make. It can be argued that [acc], or more generally [case], is interpretable on the verb in accordance with its argument structure and the semantics of its object, which tends to be a patient or theme. Also, by having [acc] instead of [u-acc] on the verb, we leave open the possibility that some verbs optionally omit their objects, such as *eat*. If *eat* were a [u-acc] probe, then without an [acc] goal in the object the uninterpretable feature would be left unchecked, predicting that the derivation will crash. But with [acc] on the verb, even if an object is omitted, no checking problem arises. As for the noun being [u-acc], as discussed above, according to checking theory we want an unchecked feature with the noun’s interpretable phi-features so that the noun is active for checking and possible movement. For example, a subject noun’s phi-features will check their uninterpretable counterparts in T when the noun moves from vP to TP. But the subject noun would be unavailable for movement if it did not have an unchecked case feature on it.

### 5.5.2 The specific accusative suffix *-ra* in Persian

The Persian suffix *-ra* (and variants *-ro*, and *-o*) is often described as marking definite accusative nouns (e.g. Forbes 1828, Phillott 1919, Farouhy, 1944, Lambton 1953, Boyle 1966, Rubinchik 1971, Mahootian 1997), as in (146).

- (146) Mina abjo-ro xord *Persian*  
 Mina beer-RA drank.3S  
 ‘Dad drank the beer’

Soheli-Isfahani (1976), perhaps not so interested in details of *-ra*, glosses its uses simply as “object”. However, Browne (1970) and Karimi (1989) argue that *-ra* marks specificity rather than definiteness since it can also occur on indefinite nouns, as in (147) (from Karimi 1989, p55).

- (147) mæn (yek) ketab-(i) ra did-æm  
 I a book-Ind RA saw-1S  
 ‘I saw (some) book’

There is much evidence for a specificity interpretation of *-ra*. Here I follow the observations in Karimi (1989, p60ff). For example, (146) without *-ro* would be interpreted as ‘Mina drank some beer’. Second, proper nouns, clearly definite, must take the suffix in object position.

- (148) Farzad-o did-im / \*Farzad did-æm  
 Farzad-RA saw-1P  
 ‘We saw Farzad’

*-Ra* is also used on object pronouns.

- (149) ma-ro did-ænd / \*ma did-ænd  
 we-RA saw-3P  
 ‘They saw us’

Fourth, the *-ra* suffix is required with a demonstrative.

- (150) in ketab-o xærid-æm / \*in ketab xærid-æm  
 this book-RA bought-1S

‘I bought this book’

Fifth, *-ra* is used with particular or ‘a certain’ readings.

- (151) kar-e            mored-e            næzær-o            peyda kærd-æm  
 work-EZ          case-EZ            sight-RA            found did-1S  
 ‘I found the job (I had) in mind’

Sixth, a noun phrase with *-ra* can be coreferential with a clitic pronoun though a noun phrase without *-ra* cannot be.

- (152) ketab-o            xærid-æm-eš            / \*ketab xærid-æm-eš  
 book-RA            bought-1S-it  
 ‘As for the book, I bought it’

Also note that *-ra* must appear with *kodum* ‘which’, indicating specificity.

- (153) kodum-o            xærid-i            / \*kodum xærid-i  
 which-RA            bought-2S  
 ‘Which (one) did you buy?’

Finally, the plural suffix *-ha* and the singular *-e*, both of which indicate specificity, require *-ra*.

- (154a) gol-a-ro            bæraye            Shahrzad            xærid-æm            / \*gol-a ...  
 flower-PL-RA            for            Shahrzad            bought-1S  
 ‘I bought the flowers for Shahrzad’  
 (154b) emruz bum-æ-ro            did-æm            /            \*bum-e did-æm  
 today owl-E-RA            saw-1S  
 ‘I saw the owl today’

Given the data above, while *-ra* marks both definite and specific indefinite expressions, the more general description is that *-ra* marks specific expressions, since definites are specific.

It should be noted that while the marking of accusativity and (at least) specificity are certainly part of the function of *-ra*, many have argued that *-ra* cannot be restricted to those functions as it appears in contexts other than specific direct objects (e.g. Windfuhr 1990, Karimi 1989). For example, *-ra* can be used on adverbials with intransitive verbs (from Karimi 1989, p57), where it can be argued that part of *-ra*'s function involves marking topic or focus.

- (155) hæfte-ye      ayænda-ro      esterahæt      mi-kon-æm  
 week-EZ      coming-RA      relax      Pres-do-1S  
 'As for next week, I will relax'

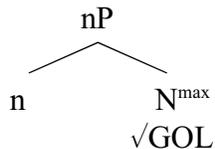
Also, Windfuhr (1990) points to cases where a specific noun is not obliged to take *-ra*, as in (156) (adapted from Windfuhr 1990, p534).

- (156) pa      tu      kæfš      kærd      o      ræft  
 foot      in      shoe      did.3S      and      went-3S  
 'She put her feet in her shoes and left'

While the range of *-ra*'s functions is not completely understood (although see Karimi 1989's comprehensive analysis), I focus here on what seems to be the main function of *-ra*, that of marking specific direct objects. In the remainder of this section, I apply the syntax and semantics discussed in chapter 4 and the preceding sections in chapter 5 to the object noun in (154a), *gol-a-ro* 'flower-PL-RA'.

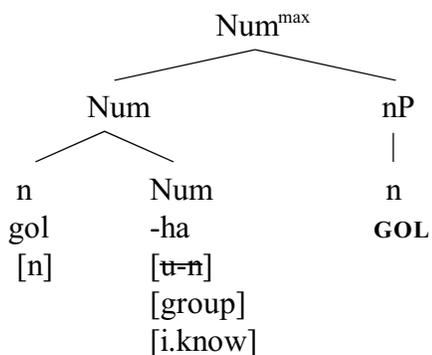
First, the root for *gol* 'flower' is categorized.

(157)

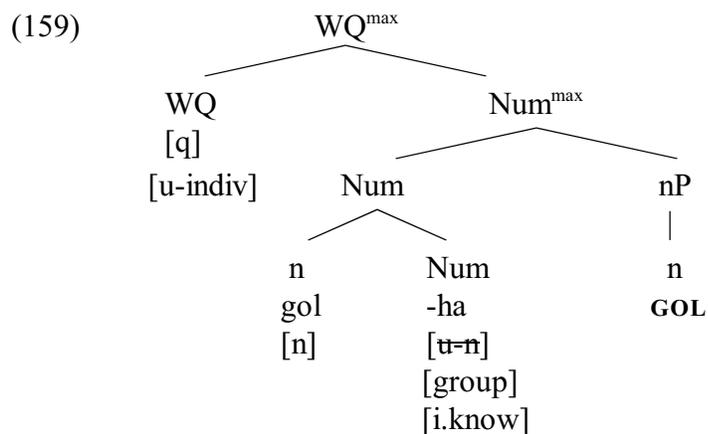


Then nP merges with Num. Recall that *-a*, a variant of *-ha*, is not only [group] but also that an expression with *-ha* is specific. Therefore, Num is featured not only as [group], i.e. plural, and [u-n], meaning it takes a noun complement, but is also has the feature [i.know]. The result, after raising of N to adjoin to the plural suffix, is the structure in (158). The n checks [u-n] on the plural marker.

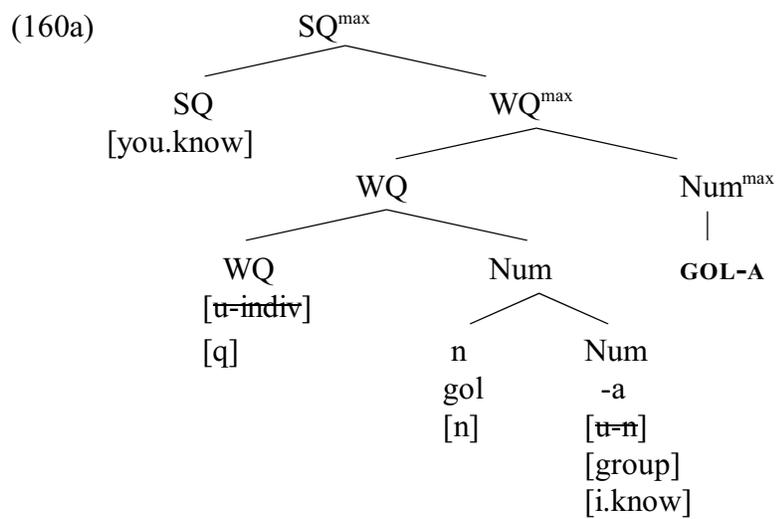
(158)



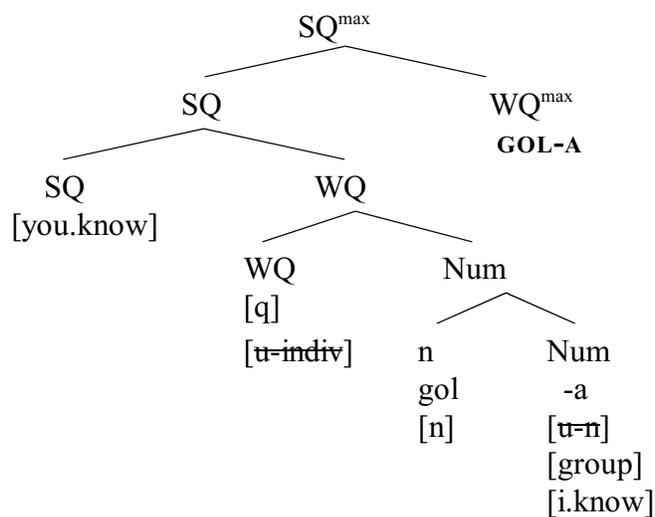
In the next step WQ merges with Num<sup>max</sup>. WQ introduces [q] and [u-indiv]. Merge of WQ and Num<sup>max</sup> is in (159).



Now  $WQ^{\max}$  merges with SQ (160a) and WQ raises to SQ in order for [you-know] to get a Spellout (160b).

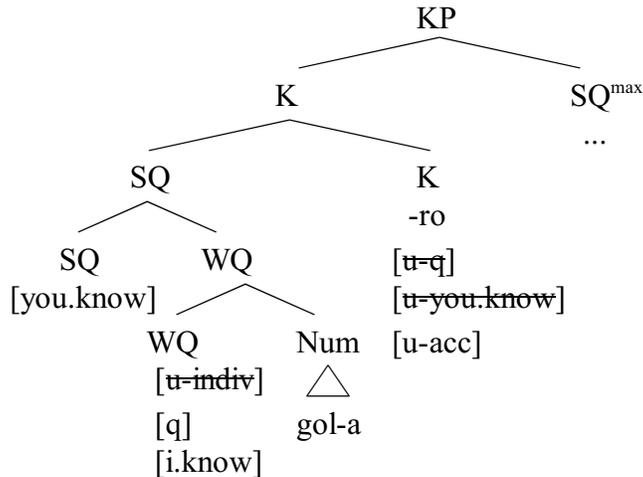


(160b)



Finally, SQ, which contains the overt expression *gol-a* raises to adjoin to the *-ra* suffix. As a case marker, *-ra* subcategorizes for a quantified complement, so it is featured [u-q]. Its case feature is [u-acc], according to standard minimalist assumptions that case is checked under Agree with the head of vP. At the point of the derivation represented by the structure in (161), all of the nominal projections functional features have been checked with the exception of [u-acc], which will be checked when KP merges with the appropriate verbal functional head.

(161)



All relevant features have been checked, except for [u-acc]. The generalized quantifier in WQP has merged with a strong quantifying determiner that gives us an entity, via typeshifting. The SQP merges with K to produce a KP that carries a case feature that must be checked.

The semantics works as previously described. The  $\langle e, t \rangle$ -type noun *gol*, denoting the set of flowers, merges with Num to produce a NumP, which denotes (typically) a subset of the set of flowers. Merge of NumP with SQ produces a generalized quantifier and Merge of WQP with SQ yields another generalized quantifier. Since the resulting SQP is definite, typeshifting is permitted to convert the generalized quantifier into an e-type entity. K, the head of KP, does not change the semantic type of the SQP.

## 5.6 Conclusion

In this chapter, I extended the assumption that the syntax of the functional projections above NP can be seen as constant across languages. There is no need to specify that NPs are parameterized for syntactic or semantic types across languages, such as, in Chierchia's (1998a) terms, arguments in some languages but predicates in others. Also, I have tried to argue that the

heads and phrases are constant across languages. Apparent differences arise depending on how languages spell out functional heads. So while a language may not have an overt form in the WQ position, the syntactic features and their semantic associations are always present. Feature raising not only results in feature checking but also in the fusion of some phrases in some constructions in some languages. Some feature bundles have overt expression, some do not. In some cases, like English *some* and Persian *-i*, there is apparently lexical variability in whether the element spells out. And despite the lack of articles in some languages, evidence was presented that SQP is available. The language learner has evidence, for example, of a SQ position from demonstratives and pronouns. The child must learn, depending on the language, whether a position in SQP must always be filled for an expression to be definite. But as Progovac (1998) argued with regard to DP in Serbo-Croatian, it is possible that the child does not require a lot of evidence for DP, or SQP, if it is part of UG.

## Chapter 6. Conclusion

This dissertation has proposed a set of UG functional features for the heads of phrases above nP. A Minimalist feature-checking syntax assures syntactic composition of nPs with classifiers and/or number marking and provides for the semantic result of Classifier Phrases and Number Phrases as predicates. Classifier Phrase and Number Phrase then merge with determiners that have syntactic features associated with the speaker's pragmatic presuppositions about whether the speaker and/or the addressee can identify a referent. The conclusion is that while the features tend to be associated with heads of particular phrases, not all phrases are always available as suggested in the Cinque (2002) cartographic program. That is, there is some intralanguage and interlanguage variation in how feature bundles spell out.

The features are arranged in a geometry based on the system of Harley and Ritter (2002) wherein the presence of some more-marked features entails the presence of other less-marked features. At the predicate level, the singular/plural distinction in number-marking languages is a more-marked version of a more basic number feature in classifier languages. Classifiers assure that a noun is count; number marking assures not only the count-interpretation of the noun but also specifies whether the noun is singular or plural. The UG nature of the syntactic features for classifiers and number marking, which have semantic interpretations, plays into a common syntax for all languages, regardless of whether a language marks number with classifiers or singular/plural morphology. At the determiner level, the features are associated with pragmatic presuppositions on the part of the speaker. These features indicate whether the speaker presupposes that he and/or the addressee can identify a referent. The features are the components

of what has been traditionally called specificity and definiteness and therefore render (non)specificity and (in)definiteness as derived notions.

Chapter 1 outlined the main goals of the dissertation and some broad theoretical notions, including the assumption of a common syntax of functional projections above nP across languages. Chapter 2 presented details about theoretical assumptions: Distributed Morphology, Minimalist syntax and specific details about the geometry of functional features in the heads of the phrases above nP. Chapter 3 introduced in some detail the semantic and syntactic arguments of two main classes of theories that have been proposed to account for numeral classifiers and number morphology, those of Chierchia (1998a,b) and Borer (2005). This chapter also pointed to empirical shortcomings of these two theories.

Chapter 4 adapted the Harley and Ritter-based (2002) feature geometry for number marking, showing that in number-marking languages the number features are of a more specific kind than in classifier languages. But the overall syntax of phrases and the semantic composition is the same in both types of languages. For the predicate level—nP, NumP and CLP, the syntactic features are associated with semantic functions with the result that NumP and CLP are of type  $\langle e, t \rangle$ , denoting sets. In chapter 5, the feature-based system for functional heads was further adapted and extended to the heads of a Weak Quantifier Phrase and a Strong Quantifier Phrase. The head of WQP contains a quantification feature that selects some x with property P, but the other syntactic features have pragmatic interpretations and identify whether the speaker presupposes that the speaker and addressee are aware of which x with property P is the referent. The analysis of the two levels, the predicate level and the determiner level, provide evidence that the same syntax and semantics is involved in what have been seen as two parameterized language

types: those that allow nP arguments and those that require arguments to be DPs. That is, this dissertation sees nPs as being syntactically and semantically identical across languages.

A number of issues are left to further research. For one, Armenian has been described as not allowing a classifier and number marking to cooccur and if this is the case the feature-based system works very well. However, there is some evidence from informant data suggesting that a classifier and number marker can cooccur in restricted contexts. First, it must be learned how strong the permitted cooccurrence is and what precisely are the conditions that license the cooccurrence of classifiers and number marking. And while I have presented some evidence that languages operate with the same NP denotations, the same functional features and the functional same phrases above NP, it remains to be studied whether, based on the syntax presented here, languages' argument phrases obey the same sorts of constraints such as extraction from specific Strong Quantifier Phrases.

At the least, the proposed system is clear and testable. The feature system is flexible, but further study is required to make sure that is not so flexible that it allows for language types that are not attested.



### **Bibliography**

Abbott, Barbara 2006a. Definiteness and indefiniteness. In Horn, Laurence and Ward, Gregory (eds.), *The Handbook of Pragmatics*, 122-148. Blackwell, Oxford.

Abbott, Barbara 2006b. Unaccommodating presuppositions: a neoGricean view. Draft paper for the Ohio State Workshop on Presupposition Accommodation.

Abbott, Barbara 1996. Doing without a partitive constraint. In Hoeksema, Jacob (ed.), *Partitives: studies on the syntax and semantics of partitive and related constructions*, 25-56. Mouton de Gruyter, Berlin.

Abney, Steven 1987. *The English Noun Phrase in Its Sentential Aspect*. MIT PhD Dissertation.

Adger, David 2006. Combinatorial variability. *Journal of Linguistics* 42, 503-530.

Adger, David 2003. *Core Syntax: A Minimalist Approach*. Oxford University Press, Oxford.

Aikhenvald, Alexandra 2003. *A Grammar of Tariana*. Cambridge University Press, Cambridge.

Aikhenvald, Alexandra 2000. *Classifiers: A Typology of Noun Categorization Devices*. Oxford University Press, Oxford.

Aldridge, Edith, in press. Generative approaches to syntactic ergativity. *Language and Linguistics Compass*.

Alexiadou, Artemis 2001. *Functional Structure in Nominals: Nominalization and Ergativity*. John Benjamins, Amsterdam.

Baker, Mark 2003. *Lexical Categories: Verbs, Nouns and Adjectives*. Cambridge University Press, Cambridge.

Baker, Mark 1988. *Incorporation: A Theory of Grammatical Function Changing*. University of Chicago Press, Chicago.

Baldi, Philip 1990. Indo-European Languages. In Comrie, Bernard (ed.), *The World's Major Languages*, 31-67. Oxford University Press, New York.

Barker, Chris 1998. Partitives, double genitives and anti-uniqueness. *Natural Language and Linguistic Theory* 16, 679-717.

Barwise, Jon and Cooper, Robin 1981. Generalized quantifiers and natural language. *Linguistics and Philosophy* 4, 159-219.

Beaver, David 2001. *Presupposition and Assertion in Dynamic Semantics*. Studies in Logic, Language and Information. CSLI Publications, Stanford.

Bernstein, Judy 1991. DPs in French and Walloon: evidence for parametric variation in nominal head movement. *Probus* 3, 101-126.

Bhattacharya, Tanmoy 2001. Numeral/quantifier-classifier as a complex head. In Cover, Norbert and van Riemsdijk, Henk (eds.), *Semi-Lexical Categories: The Function of Content Words and the Content of Function Words*, 191-222. Mouton de Gruyter, Berlin.

Birner, Betty and Ward, Gregory 1994. Uniqueness, familiarity, and the definite article in English. *BLS* 20, 93-102.

Bobaljik, Jonathan 2001. The implications of rich agreement: why morphology doesn't drive syntax. *WCCFL 20 Proceedings*, 1-14. Megerdooomian, Karine and Bar-el, Lenore Anne (eds.) Cascadilla Press, Somerville.

Bobaljik, Jonathan 1995. *Morpho-Syntax: The Syntax of Verbal Inflection*. MIT PhD dissertation.

Borer, Hagit 2005. *In Name Only*. Oxford University Press, Oxford.

Borer, Hagit 1983. *Parametric Syntax*. Foris, Dordrecht.

Bošković, Željko and Lasnik, Howard (eds.) 2007. *Minimalist Syntax: The Essential Readings*. Blackwell Publishing, Malden.

Borsley, Robert 2005. Against ConjP. *Lingua* 115:4, 461-482.

Bouchard, Denis 2002. *Adjectives, Number and Interfaces: Why Languages Vary*. Elsevier North-Holland, Amsterdam.

Bowers, John 1988. Extended X-bar theory, the ECP, and the left branch condition. In *Proceedings of the West Coast Conference on Formal Linguistics (WCCFL) 7*, Stanford Linguistics Association, Stanford University, 47-62.

Bowers, John 1975. Adjectives and adverbs in English. *Foundations of Language* 13, 529-562.

Boyle, John Andrew 1966. *Grammar of Modern Persian*. Otto Harrassowitz, Wiesbaden.

Brame, Michael 1982. The head-selector theory of lexical specification and the nonexistence of coarse categories. *Linguistic Analysis* 10:4, 321-326.

Brame, Michael 1981. The general theory of binding and fusion. *Linguistic Analysis* 7:3, 277-325.

Brown, Robert 1981. Semantic aspects of some Waris predications. In Franklin, Karl (ed.), *Syntax and Semantics in Papua New Guinea Languages*, 93-123. Summer Institute of Linguistics, Ukarumpa.

Browne, Wayles 1970. More on definiteness markers: interrogatives in Persian. *Linguistic Inquiry* 1, 359-363.

- Brugè, Laura 2002. The positions of demonstratives in the extended nominal projection. In Cinque, Guglielmo (ed.), *Functional Structure in DP and IP: The Cartography of Syntactic Structures*, Volume 1, 15-53. Oxford University Press, Oxford.
- Bunt, Harry. 1985. *Mass Terms and Model Theoretic Semantics*. Cambridge University Press, Cambridge.
- Cann, Ronnie 1993. *Formal Semantics: An Introduction*. Cambridge University Press, Cambridge.
- Cardona, George 1990. Sanskrit. In Comrie, Bernard (ed.), *The World's Major Languages*, 448-469. Oxford University Press, New York.
- Carlson, Greg 2003. Weak indefinites. In Coene, M. and D'Hulst, Y. (eds.), *From NP to DP*. Volume 1, 195-210.
- Carlson, Greg 1977. A unified analysis of the English bare plural. *Linguistics and Philosophy* 1, 413-457.
- Carnie, Andrew 2008. *Constituent Structure*. Oxford University Press, Oxford.
- Cheng, Lisa Lai-Shen and Sybesma, Rint 2005. Classifiers in four varieties of Chinese. In Cinque, Guglielmo and Kayne, Richard (eds.), *The Oxford Handbook of Comparative Syntax*, 259-292. Oxford University Press, Oxford.
- Cheng, Lisa Lai-Shen and Sybesma, Rint 1999. Bare and not-so-bare nouns and the structure of NP. *Linguistic Inquiry* 30:4, 509-542.
- Chierchia, Gennaro 2005. Mass nouns, number marking and semantic variation. *University of Massachusetts Amherst Linguistics Colloquium*.
- Chierchia, Gennaro 1998a. Reference to kinds across languages. *Natural Language Semantics* 6, 339-405.

Chierchia, Gennaro 1998b. Plurality of mass nouns and the notion of “semantic parameter”. In Rothstein, Susan (ed.), *Events and Grammar*, 53-104. Kluwer Academic Publishers, Dordrecht.

Chierchia, Gennaro and McConnell-Ginet, Sally 2000. *Meaning and Grammar*. MIT Press, Cambridge.

Chomsky, Noam 2001. Beyond explanatory adequacy. In *MIT Occasional Papers in Linguistics*, Cambridge. Also in Belletti, Adriana (ed.), *Structures and Beyond: The Cartography of Syntactic Structures*, Volume 2, 104-131. Oxford University Press, Oxford.

Chomsky, Noam 1999. Derivation By Phase. *MIT Occasional Papers in Linguistics* 18, Cambridge. Also in Kenstowicz, Michael (ed.), *Ken Hale: A Life in Language*, 1-52. MIT Press, Cambridge.

Chomsky, Noam 1998. *Minimalist Inquiries*. *MIT Working Papers in Linguistics*, Cambridge. Also in Martin, Roger, Michaels, David and Uriagereka, Juan (eds.), *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*, 89-155. MIT Press Cambridge.

Chomsky, Noam 1995. *The Minimalist Program*. MIT Press, Cambridge.

Chomsky, Noam 1994. *Bare Phrase Structure*. *MIT Occasional Paper in Linguistics*, 5. Cambridge.

Chomsky, Noam 1987. *Generative grammar: its basis, development and prospects*. Kyoto University of Foreign Studies, Kyoto.

Chomsky, Noam 1986. *Knowledge of Language: Its Nature, Origin, and Use*. Praeger, New York.

Chomsky, Noam 1981. *Lectures on Government and Binding*. Foris, Dordrecht.

Chomsky, Noam 1980. On binding. *Linguistic Inquiry* 11:1, 1-46.

Chomsky, Noam 1970. Remarks on nominalization. In Jacobs, Roderick and Rosenbaum, Peter (eds.), *Readings in English Transformational Grammar*, 184-221. Ginn and Co., Waltham.

Chomsky, Noam and Lasnik, Howard. 1995. The theory of principles and parameters. In Chomsky, Noam, *The Minimalist Program*, 13-127. MIT Press, Cambridge.

Christophersen, Paul 1939. *The Articles: A Study of Their Theory and Use in English*. Munksgaard, Copenhagen.

Chung, Sandra 2000. On reference to kinds in Indonesian. *Natural Language Semantics* 8:2, 157-171.

Chung, Sandra and Ladusaw, William 2004. *Restriction and Saturation*. MIT Press, Cambridge.

Cinque, Guglielmo 2002. Mapping functional structure: a project. In Cinque, Guglielmo (ed.), *Functional Structure in DP and IP: The Cartography of Syntactic Structures, Volume 1*, 3-13. Oxford University Press, Oxford.

Cinque, Guglielmo 1999. *Adverbs and Functional Heads: A Cross-Linguistic Perspective*. Oxford University Press, New York.

Cinque, Guglielmo 1994. On the evidence for partial N-movement in the Romance DP. In Cinque, Guglielmo, Koster, Jan, Pollock, Jean-Yves, Rizzi, Luigi and Zanuttini, Raffaella (eds.), *Paths Toward Universal Grammar: Studies in Honor of Richard S. Kayne*, 85-110. Georgetown University Press, Washington, D.C.

Cinque, Guglielmo 1990. *Types of A'-Dependencies*. MIT Press, Cambridge.

Clark, Herbert 1977. Bridging. In Johnson-Laird, P. and Wason, P. (eds.), *Thinking: Readings in Cognitive Science*, 411-420. Cambridge University Press, Cambridge.

Clark, Robin and Roberts, Ian 1993. A computational model of language learning and language change. *Linguistics Inquiry* 24:2, 299-345.

Cornilescu, Alexandra 1992. Remarks on the determiner system of Rumanian: the demonstratives *al* and *cel*. *Probus* 4, 189-260.

Corver, Norbert and van Riemsdijk, Henk 2001. Semi-lexical categories. In Cover, Norbert and van Riemsdijk, Henk (eds.), *Semi-Lexical Categories: The Function of Content Words and the Content of Function Words*, 1-19. Mouton de Gruyter, Berlin.

Craig, Collette Grinevald (ed.) 1986. *Noun Classes and Categorization*. John Benjamins Publishing Co., Amsterdam.

Craig, Collette Grinevald 1977. *The Structure of Jacalteco*. University of Texas Press, Austin.

Croft, William 1994. Semantic universals in classifier systems. *Word* 45, 145-171.

Dasgupta, Probal 2003. Bangla. In Cardona, George and Jain, Dhanesh (eds.), *The Indo-Aryan Languages*, 351-390. Routledge, London.

Delfitto, Denis and Schroten, Jan 1991. Bare plurals and the number affix in DP. *Probus* 3:2, 155-185.

Delong, Howard 1971. *A Profile of Mathematical Logic*. Addison-Wesley Publishing Co., Reading.

Dobrovie-Sorin, Carmen, Bleam, Tonia and Espinal, M. Teresa 2006. Bare nouns, number and types of incorporation. In Vogeleer, Svetlana and Tasmowski, Liliane (eds.), *Non-definiteness and Plurality*, 51-80. John Benjamins Publishing Co., Amsterdam.

Doetjes, Jenny 1997. *Quantifiers and Selection: On the Distribution of Quantifying Expressions in French, Dutch and English*. PhD thesis, Leiden University.

Dornhoff, Larry and Hohn, Franz 1978. *Applied Modern Algebra*. Macmillan Publishing, New York.

Downing, Pamela 1996. *Numeral Classifier Systems: The Case of Japanese*. John Benjamins, Amsterdam.

Downing, Pamela 1986. Japanese numeral classifiers: a semantic, syntactic, and functional profile. In Craig, Collette Grinevald (ed.), *Noun Classes and Categorization: Proceedings of a Symposium on Categorization and Noun Classification*, 345-375. John Benjamins, Amsterdam.

Elbourne, Paul 2008. The interpretation of pronouns. *Language and Linguistic Compass* 2:1, 119-150.

Elwell-Sutton, L.P. 1963. *Elementary Persian Grammar*. Cambridge University Press, Cambridge.

Embick, David and Marantz, Alec 2008. Architecture and blocking. *Linguistic Inquiry* 39:1, 1-53.

Embick, David 2000. Features, syntax, and categories in the Latin perfect. *Linguistic Inquiry* 31:2, 185-230.

Enç, Mürvet 1991. The semantics of specificity. *Linguistic Inquiry* 22:1, 1-25.

Engdahl, Elisabet 1986. *Constituent Questions: The Syntax and Semantics of Questions with Special Reference to Swedish*. D. Reidel Publishing Co., Dordrecht.

Faroughy, A. 1944. *A Concise Persian Grammar*. Orientalia, New York.

Fiengo, Robert and Higginbotham, James 1981. Opacity in NP. *Linguistic Analysis* 7, 395-422.

von Stechow, Kai 2006. What is presupposition accommodation, again? Draft paper for the Ohio State Workshop on Presupposition Accommodation.

von Stechow, Kai 1999. Quantifier domains and pseudo-scope. Manuscript, MIT. Handout of a talk given at the Vilem Mathesius Center in Prague.

Fodor, Janet and Sag, Ivan 1982. Referential and quantificational indefinites. *Linguistics and Philosophy* 5, 355-398.

Forbes, Duncan 1828. *Grammar of the Persian Language*. Wm. H Allen & Co., London.

Fromkin, Victoria, Rodman, Robert and Hyams, Nina 2005. *An Introduction to Language*. Thomson Wadsworth, Boston.

Gamut, L.T.F. 1991. *Logic, Language, and Meaning; Volume 2: Intensional Logic and Logical Grammar*. University of Chicago Press, Chicago.

Gazdar, Gerald 1979. *Pragmatics: Implicature, Presupposition and Logical Form*. Academic Press, New York.

van Geenhoven, V. 1992. Noun incorporation from a semantic point of view. *Proceedings of the 18<sup>th</sup> Annual Meeting of the Berkeley Linguistics Society*, 453-466.

Ghomeshi, Jila 2003. Plural marking, indefiniteness and the noun phrase. *Studia Linguistica* 57:2, 47-74.

Ghomeshi, Jila 1997. Topics in Persian VPs. *Lingua* 102, 133-167.

Gil, David 1995. Universal quantifiers and distributivity. In Bach, Emmon, Jelinek, Eloise, Kratzer, Angelika and Partee, Barbara, *Quantification in Natural Language, Volume I*, 321-362. Kluwer Academic Publishers, Dordrecht.

Gil, David 1994. Summary: numeral classifiers. *Linguist List* 5, 466.

Gil, David 1987. Definiteness, noun phrase configurationality, and the count-mass distinction. In Reuland, Eric and ter Meulen, Alice (eds.), *The Representation of (In)definiteness*, 254-269. MIT Press, Cambridge.

Gillon, Carrie 2007. The semantic core of determiners: evidence from Skwxwu7mesh. Paper presented at the Determiners Workshop, Winnipeg, November 25, 2006.

Gillon, Carrie 2006. *The Semantics of Determiners: Domain Restriction in Skwxwu7mesh*. University of British Columbia PhD dissertation.

Ginzburg, Jonathan and Sag, Ivan 2000. Interrogative investigations: the form, meaning, and use of English interrogatives. CSLI Lecture Notes 123. CSLI Publications, Stanford.

Giusti, Giuliana 1995. A unified structural representation of (abstract) case and article: evidence from German. In Haider, Hubert, Olsen, Susan and Vikner, Sten (eds.), *Studies in Comparative Germanic Syntax*, 77-94. Kluwer Academic Publishers, Dordrecht.

Giusti, Giuliana 1994. Enclitic articles and double definiteness: a comparative analysis of nominal structure in Romance and Germanic. *The Linguistic Review* 11, 241-255.

Givon, Talmy 1978. Definiteness and referentiality. In Greenberg, Joseph (ed), *Universals of Human Language*, volume 4, 291-330. Stanford University Press, Stanford.

Glougie, Jennifer 2000. Blackfoot 'indefinites: bare nouns and non-assertion of existence. In Billerly, Roger and Lillehaugen, Brook (eds), *Proceedings of the 19<sup>th</sup> West Coast Conference of Formal Linguistics*, 125-138. Cascadilla Press, Somerville.

Goddard, Cliff and Wierzbicka, Anna (eds.) 1994. *Semantic and Lexical Universals - Theory and Empirical Findings*. John Benjamins, Amsterdam.

Green, Georgia 1996. *Pragmatics and Natural Language Understanding*. Lawrence Erlbaum Associates, Mahwah.

Greenberg, Joseph 1972. Numeral classifiers and substantive number: problems in the genesis type. In Denning, Keith and Kemmer, Suzanne (eds.) 1990, *On Language: Selected Writings of Joseph H. Greenberg*, 166-198. Stanford University Press, Stanford.

Gribbin, John 2002. *The Scientists*. Random House, New York.

Grice, H.P. 1975. Logic and conversation. In Harnish, Robert (ed.) 1994, *Basic Topics in the Philosophy of Language*, 57-73. Prentice Hall, Englewood Cliffs.

Grimshaw, Jane 1991. *Argument Structure*. MIT Press, Cambridge.

Grimshaw, Jane 1981. Form, function, and the language acquisition device. In Baker, C.L. and McCarthy, John (eds.), *The Logical Problem of Language Acquisition*, 165-182. MIT Press, Cambridge.

Grimshaw, Jane 1979. Complement selection and the lexicon. *Linguistic Inquiry* 10: 279-326.

Groenendijk, Jeroen and Stokhof, Martin 1980. A pragmatic analysis of specificity. In Heny, Frank (ed.), *Ambiguities in Intensional Contexts*, 47-82. Reidel, Dordrecht.

Gupta, Anil 1980. *The Logic of Common Nouns*. Yale University Press, New Haven.

Haegeman, Liliane 1991. *Introduction to Government and Binding Theory*. Blackwell, Oxford.

Halle, Morris and Marantz, Alec 1994. Some key features of distributed morphology. *MIT Working Papers in Linguistics* 21, 275-288.

Halle, Morris and Marantz, Alec 1993. Distributed morphology and the piece of inflection. In Hale, Kenneth and Keyser, Samuel (eds.), *The View From Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*, 111-176. MIT Press, Cambridge.

Harley, Heidi and Noyer, Rolf 1999. Distributed morphology. *Glott International* 4:4, 3-9.

Harley, Heidi and Noyer, Rolf 1998. Formal vs. encyclopedic properties of vocabulary: evidence from nominalizations. Manuscript, University of Pennsylvania.

Harley, Heidi and Ritter, Elizabeth 2002. Person and number in pronouns: a feature-geometric analysis. *Language* 78:3, 482-526.

Hauser, Marc, Chomsky, Noam and Fitch, W. Tecumseh 2002. The faculty of language: what is it, who has it, and how did it evolve? *Science* 298:5598, 1569-1579.

Hawkins, John 1978. *Definiteness and Indefiniteness*. Croom Helm, London.

Heim, Irene 1982. *The Semantics of Definite and Indefinite Noun Phrase*. University of Massachusetts PhD dissertation.

Heim, Irene and Kratzer, Angelika 1998. *Semantics in Generative Grammar*. Blackwell Publishers, Malden.

Hellan, Lars 1981. On semantic scope. In Heny, Frank (ed.), *Ambiguities in Intensional Contexts*, 47-82. Reidel, Dordrecht.

Heycock, Carolina and Zamparelli, Roberto 2003. Coordinated bare definites. *Linguistic Inquiry* 34:3, 443-369.

Higginbotham, James 1987. Indefiniteness and predication. In Reuland, Eric J. and ter Meulen, Alice G.B. (eds.), *The Representation of (In)definiteness*, 43-70. MIT Press, Cambridge.

Higginbotham, James and May, Robert 1981. Questions, quantifiers and crossing. *The Linguistic Review* 1, 41-80.

Hintikka, Jaakko. 1986. The semantics of *a certain*. *Linguistic Inquiry* 17, 331-336.

Hiraiwa, Ken 2001. Multiple agree and the defective intervention constraint in Japanese. MIT Working Papers in Linguistics 40, 67-80.

Hofling, Charles 2000. Itzaj Maya Grammar. University of Utah Press, Salt Lake City.

Hopper, Paul 1986. Some discourse functions of classifiers in Malay. In Craig, Collette Grinevald (ed.), *Noun Classes and Categorization*, 309-325. John Benjamins Publishing Co., Amsterdam.

Hornstein, Norbert, Nunes, Jairo and Grohman, Kleanthes 2005. *Understanding Minimalism*. Cambridge University Press, Cambridge.

Horrocks, Geoffrey and Stavrou, Melita 1987. Bounding theory and Greek syntax: evidence from wh-movement in NP. *Journal of Linguistics* 23, 79-108.

Hurford, James 2003. The interaction between numerals and nouns. In Plank, Frans (ed.), *Noun Phrase Structure in the Languages of Europe: Typology of Language in Europe* 7, 561-620. Mouton de Gruyter, The Hague.

Ijic, Robert 1994. Quantification in Mandarin Chinese: two markers of plurality. *Linguistics* 32, 91-116.

Ioup, Georgette 1977. Specificity and the interpretations of quantifiers. *Linguistics and Philosophy* 1, 233-245.

Ishii, Yasuo 2000. Plurality and definiteness in Japanese. Manuscript, Kanda University of International Studies.

Ido, Shinji 2005. *Tajik*. Lincom GmbH, Muenchen.

Jackendoff, Ray 1977. *X'-Syntax: A Study in of Phrase Structure*. MIT Press, Cambridge.

Jackendoff, Ray 1971. Gapping and related rules. *Linguistic Inquiry* 2:1, 21-36.

Johannessen, Janne 1998. *Coordination*. Oxford University Press, New York.

Kadmon, Nirit 1992. *On Unique and Non-Unique Reference and Asymmetric Quantification*. Garland, New York.

Kamp, Hans 1981. A theory of truth and semantic representation. In Groenendijk, Jeroen, Janssen, Theo and Stokhof, Martin (eds.), *Formal Methods in the Study of Language*, 277-322. Mathematisch Centrum, Amsterdam.

Kandybowicz, Jason 2007. Fusion and PF architecture. *University of Pennsylvania Working Papers in Linguistics*, 13:1, 85-98.

Karimi, Simin 2005. *A Minimalist Approach to Scrambling: Evidence From Persian*. *Studies in Generative Grammar* 76. Mouton de Gruyter, Berlin.

Karimi, Simin 1999. Specificity effect: evidence from Persian. *The Linguistic Review* 16-2, 125-141.

Karimi, Simin 1997. Case and specificity: Persian *Ra* revisited. *Linguistic Analysis* 26 (3-4), 174-194.

Karimi, Simin 1989. *Aspects of Persian Syntax*. University of Washington PhD dissertation, Seattle.

Karimi, Simin and Brame, Michael 1986. A generalization concerning the *ezafe* constructions in Persian. Paper presented at the Western Conference of Linguistics, Canada.

Kayne, Richard 1994. *The Antisymmetry of Syntax*. MIT Press, Cambridge.

Keenan, Edward 2003. The definiteness effect: semantics or pragmatics. *Natural Language Semantics* 11: 187-216.

Keenan, Edward 1996. The semantics of determiners. In Lappin, Shalom (ed.), *The Handbook of Contemporary Semantic Theory*, 41-64. Blackwell, Oxford.

Keenan, Edward 1987. A semantic definition of “indefinite NP”. In Reuland, Eric J. and ter Meulen, Alice G.B. (eds.), *The Representation of (In)definiteness*, 286-317. MIT Press, Cambridge.

Kiss, Katalin E. 1996. Two subject positions in English. *The Linguistic Review* 13, 119-142.

Kobuchi-Philip, Mana 2006. Identity and the domain of quantification for numerals. In Vogeleer, Svetlana and Tasmowski, Liliane (eds.), *Non-definiteness and Plurality*. John Benjamins Publishing Co., Amsterdam.

Koopman, Hilda and Sportiche, Dominique 1991. The position of subjects. *Lingua* 85, 211-258.

Krifka, Manfred 2003. Kind of kind reference: bare plurals - ambiguous or not. University of Washington presentation.

Krifka, Manfred 1995. Common nouns: a contrastive analysis of Chinese and English. In Carlson, Gregory. and Pelletier, Francis Jeffry (eds.), *The Generic Book*, 398-411. University of Chicago Press, Chicago.

Krifka, Manfred, Pelletier, Francis Jeffry, Carlson, Greg N., ter Meulen, Alice, Link, Godehard and Chierchia, Gennaro 1995. Genericity: an introduction. In Carlson, Gregory and Pelletier, Francis Jeffry (eds.), *The Generic Book*, 1-124. University of Chicago Press, Chicago.

Kuno, Susumu and Robinson, Jane 1972. Multiple wh questions. *Linguistic Inquiry* 3:4, 463-487.

Kwon, SongNim and Zribi-Hertz, Anne 2004. Number from a syntactic perspective: why plural marking looks ‘truer’ in French than in Korean. In Bonami, Olivier. and Cabredo Hofherr, Patricia (eds.), *Empirical Issues in Formal Syntax and Semantics* 5, 133-158.

Ladusaw, William 1982. Semantic constraints on the English partitive construction. In Flickinger, Daniel, Macken, Marlys and Wiegand, Mamcy (eds.), *Proceedings of WCCFL 1*, Stanford Linguistics Association, 231-329.

Lambrecht, Knud 1994. *Information Structure and Sentence Form: Topic, Focus, and the Mental Representation of Discourse Referents*. Cambridge University Press, Cambridge.

Lambton, Ann K.S. 1953. *Persian Grammar*. Cambridge University Press, Cambridge.

Lambton, Ann K.S. 1938. *Three Persian Dialects*. The Royal Asiatic Society, London.

Lamontagne, Greg and Travis, Lisa 1987. The syntax of adjacency. *Proceedings of the 6<sup>th</sup> West Coast Conference on Formal Linguistics*, 173-186. CSLI, Stanford.

Lamontagne, Greg and Travis, Lisa 1986. The case filter and the ECP. *McGill Working Papers in Linguistics* 3(2), 51-75.

Landman, Fred 2000. *Events and Plurality*. Kluwer Academic Publishers, Dordrecht.

Landman, Fred 1995. Plurality. In Lappin, Shalom (ed.), *The Handbook of Contemporary Semantic Theory*, 425-458. Blackwell, Oxford.

Landman, Fred 1989a. Groups I. *Linguistics and Philosophy* 12, 559-605.

Landman, Fred 1989b. Groups II. *Linguistics and Philosophy* 12, 773-744.

Langendoen, D. Terrence 1971. Presupposition and assertion in the semantic analysis of nouns and verbs in English. In Steinberg, Danny and Jakobovits, Leon (eds.), *Semantics: An Interdisciplinary Reader in Philosophy, Linguistics and Psychology*, 341-344. Cambridge University Press, Cambridge.

Lasnik, Howard 2008. On the development of case theory: triumphs and challenges. In Freidin, Robert, Otero, Carlos and Zubizarreta, Maria Luisa (eds.), *Foundational Issues in Linguistic Theory*, 17-41. MIT Press, Cambridge.

Lasnik, Howard 2003. *Minimalist Investigations in Linguistic Theory*. Routledge, London.

Lasnik, Howard and Uriagereka, Juan 2005. *A Course in Minimalist Syntax*. Blackwell Publishing, Malden.

Legate, Julie 2008. Morphological and abstract case. *Linguistic Inquiry* 39, 55-101.

Lewis, David 1979. Score keeping in a language game. *Journal of Philosophical Logic* 8, 339-359.

Lewis, David 1975. Adverbs of quantification. In Keenan, Edward (ed.), *Formal Semantics of Natural Language*, 3-15. Cambridge University Press, Cambridge.

Li, Yen-hui Audrey 1999. Plurality in a classifier language. *Journal of East Asian Linguistics* 8, 75-99.

Li, Yen-hui Audrey 1998. Determiner phrases and number phrases. *Linguistic Inquiry* 29:4, 693-702.

Link, Godehard 1983. The logical analysis of plurals and mass terms: a lattice theoretic approach. In Bauerle, Rainer, Schwartz, Christoph and von Stechow, Arnim. (eds.), *Meaning, Use and Interpretation of Language*, 302-323. De Gruyter, Berlin.

Löbel, Elisabeth 1994. KP/DP Syntax: interaction of case-marking with referential and nominal properties. *Theoretical Linguistics* 20, 38-70.

Löbel, Elisabeth 1993. On the parameterization of lexical properties. In Fanselow, Gisbert (ed.), *The Parameterization of Universal Grammar*, 183-200. John Benjamins Publishing Co., Amsterdam.

Löbel, Elisabeth 1989. Q as a functional category. In Bhatt, Christa, Löbel, Elisabeth and Schmidt, Claudia (eds.), *Syntactic Phrase Structure Phenomena*, 133-158. John Benjamins, Philadelphia.

Longobardi, Giuseppe 1994. Reference and proper names: a theory of N-movement in syntax and logical form. *Linguistic Inquiry* 25, 609-665.

Lujan, Marta 2000. Determiners as modified pronouns. *CLS* 36, 259-273. Chicago Linguistic Society.

Lynch, John 1998. *Pacific Languages: An Introduction*. University of Hawaii Press, Honolulu.

Lyons, Christopher 1999. *Definiteness*. Cambridge University Press, Cambridge.

Lyons, John 1977. *Semantics*. Cambridge University Press, Cambridge.

MacDonald, R. Ross 1976. *Indonesian Reference Grammar*. Georgetown University Press, Washington, D.C.

Mahootian, Shahrzad 1997. *Persian*. Routledge, London.

Mahootian, Shahrzad 1993. *A Null Theory of Codeswitching*. Northwestern University PhD dissertation.

Mallory, J.P. and Adams, D.Q. 2006. *The Oxford Introduction to Proto-Indo-European and the Proto-Indo-European World*. Oxford University Press, Oxford.

Manzini, M. Rita and Roussou, Anna 2000. A minimalist theory of A-movement and control. *Lingua* 110, 409-447.

Marantz, Alec 1995. "Cat" as a phrasal idiom: Consequences of late insertion in distributed morphology. Manuscript.

Marantz, Alec 1997. No escape from syntax: Don't try morphological analysis in the privacy of your own lexicon. In Dimitriadis, Alexis, Siegel, Laura, Surek-Clark, Clarissa and Williams, Alexander (eds.), *Pennsylvania Working Papers in Linguistics* 4:2, 201-225. Proceedings of the 21<sup>st</sup> Annual Penn Linguistics Colloquium.

Marantz, Alec 1995. The minimalist program, In Weibelhuth, Gert (ed.), *Government and Binding Theory and the Minimalist Program*, 349-382. Blackwell, Oxford.

Marnita, Rina 1996. *Classifiers in Miningkabau*. MA thesis. Australian National University, Canberra.

Mathesius, Vilem 1928. *A Functional Analysis of Present Day English on a General Linguistic Basis*. Mouton, The Hague.

Matthewson, Lisa 1998. *Determiner Systems and Quantificational Strategies*. Holland Academic Graphics, The Hague.

McDonald, R. Ross 1967. *Indonesian Reference Grammar*. Georgetown University Press, Washington.

Mikkelsen, Line 2005. *Copular Clauses: Specification, Predication and Equation*. John Benjamins, Amsterdam.

Milsark, Gary 1979. *Existential Sentences in English*. Garland, New York.

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

Montler, Timothy 2008. Specific, non-specific, and definite in Klallam determiners. LSA presentation.

Mosel, Ulrike and Hovdhaugen, Even 1992. *Samoan Reference Grammar*. Scandinavian University Press, Oslo.

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

Noyer, Rolf 2006. *Distributed Morphology: Frequently Asked Questions List*.  
<http://www.ling.upenn.edu/~rnoyer/dm/>.

Ogawa, Yoshiki 2001. *A Unified Theory of Verbal and Nominal Projections*. Oxford University Press, Oxford.

Paris, Marie-Claude 1981. *Problemes de syntaxe et de semantique en linguistique chinoise*. College de France, Paris.

Partee, Barbara 1995. Quantificational structures and compositionality. In Bach, Emond, Jelinek, Eloise, Kratzer, Angelika and Partee, Barbara, *Quantification in Natural Language, Volume II*, 541-601. Kluwer Academic Publishers, Dordrecht.

Partee, Barbara 1987. Noun phrase interpretation and type-shifting principles. In Groenendijk, de Jongh, Stokhof, Martin (eds). *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, 115-143. Foris, Dordrecht.

Partee, Barbara, ter Meulen, Alice and Wall, Robert 1993. *Mathematical Methods in Linguistics* (corrected first edition). Kluwer Academic Publishers, Dordrecht.

Payne, John and Huddleston, Rodney 2002. Nouns and noun phrases. In Huddleston, Rodney and Pullum, Geoffrey (eds.), *The Cambridge Grammar of the English Language*, 323-522. Cambridge University Press, Cambridge.

Pereltsvaig, Asya 2006. Small nominals. *Natural Language and Linguistic Theory* 24, 433-500.

Perry, John R. 2005. *A Tajik Reference Grammar*. Brill, Leiden.

Pesetsky, David 2000. Phrasal Movement and Its Kin. MIT Press, Cambridge.

Pesetsky, David 1987. *Wh*-in-situ movement and unselective binding. In Reuland, Eric J. and ter Meulen, Alice G.B. (eds.), *The Representation of (In)definiteness*, 98-129. MIT Press, Cambridge.

Pesetsky, David 1982. *Paths and Categories*. MIT PhD dissertation.

Phillott, D.C. 1919. *Higher Persian Grammar for the Use of Calcutta University Showing Differences Between Afghan and Modern Persian With Notes on Rhetoric*. University Press, Calcutta.

Picallo, M. Carme 1991. Nominals and nominalization in Catalan. *Probus* 3, 279-216.

Po-Ching, Yip and Rimmington, Don 1997. *Chinese: An Essential Grammar*. Routledge, London.

Pollock, Jean-Yves 1989. Verb movement, universal grammar and the structure of IP. *Linguistic Inquiry* 68, 836-840.

Postal, Paul 1969. On so-called "pronouns" in English. In Reibel, David and Schane, Sanford (eds.), *Modern Studies in English: Readings in Transformation Grammar*, 201-224. Prentice-Hall Inc., Englewood Cliffs.

Prince, Ellen 1992. The ZPG letter: subjects, definiteness, and information status. In Mann, William and Thompson, Sandra (eds.), *Discourse Description: Diverse analyses of a fund-raising text*, 295-325. John Benjamins, Philadelphia.

Prince, Ellen 1981. On the inferencing of indefinite-*this* NPs. In Joshi, Aravind, Webber, Bonnie and Sag, Ivan (eds.), *Elements of Discourse Understanding*, 231-250. Cambridge University Press, Cambridge.

Prince, Ellen 1979. On the given/new distinction. In Clyne, Paul, Hanks, William and Hofbauer, Carol (eds.), *Papers From the 15<sup>th</sup> Regional Meeting of the Chicago Linguistic Society*, 267-278.

Progovac, Ljilhana 1998. Determiner phrase in a language without determiners. *Journal of Linguistics* 34, 165-179.

Radford, Andrew 2004. *Minimalist Syntax: Exploring the Structure of English*. Cambridge University Press, Cambridge.

Radford, Andrew 1993. Head-hunting: on the trail of the nominal Janus. In Corbett, Greville, Fraser, Norman and McGlashan, Scott (eds.), *Heads in Grammatical Theory*. Cambridge University Press, Cambridge.

Radford, Andrew 1981. *Transformational Syntax*. Cambridge University Press, Cambridge.

Rebuschi, Georges 2005. Generalizing the asymmetric analysis of coordination to nominal modification. *Lingua* 115:4, 445-459.

Rehg, Kenneth 1981. *Ponapean Reference Grammar*. University of Hawaii Press, Honolulu.

Reinhart, Tanya 1998. WH-in-situ in the Minimalist Program. *Natural Language Semantics* 6, 29-56.

Reinhart, Tanya 1997. Quantifier scope: how labor is divided between QR and choice functions. *Linguistics and Philosophy* 20, 335-397.

Ritter, Elizabeth 1995. On the syntactic category of pronouns and agreement. *Natural Language and Linguistic Theory* 13:3, 405-443.

Ritter, Elizabeth 1992. Cross-linguistic evidence for number phrase. *Canadian Journal of Linguistics* 37:2, 197-218.

Ritter, Elizabeth 1991. Two functional categories in noun phrases: evidence from Modern Hebrew. In Rothstein, Susan (ed.), *Syntax and Semantics 25: Perspectives On Phrase Structure*, 37-62. Academic Press, New York.

Rizzi, Luigi 1997. The fine structure of the left periphery. In Haegman, Liliane (ed.), *Elements of Grammar*, 281-337. Kluwer Academic Publishers, Dordrecht.

Rizzi, Luigi 1990. *Relativized Minimality*. MIT Press, Cambridge.

Roehrs, Dorian 2007. *Complex determiners: a case study of German ein jeder*. LSA presentation.

Rohrbacher, Bernhard 1999. Morphology-driven syntax: a theory of V to I raising and pro-drop. *Linguistik Aktuell/Linguistics Today* 15, John Benjamins.

Rubinchik, Yu 1971. *The Modern Persian Language*. Nauka Publishing House, Central Department of Oriental Literature, Moscow.

Russell, Bertrand 1918. The philosophy of logical atomism. *The Monist* 28, 495-527.

Russell, Bertrand 1905. On denoting. *Mind* 14, 479-493.

Rutkowski, Pawel 2001. Noun/pronoun asymmetries: evidence in support of the DP hypothesis in Polish. 10<sup>th</sup> Postgraduate Linguistics Conference, Manchester.

Saarinen, Esa 1981. Quantifier phrases are (at least) five ways ambiguous in intensional contexts. In Heny, Frank (ed.), *Ambiguities in Intensional Context*, 1-46. Reidel, Dordrecht.

Sag, Ivan and Wasow, Thomas 1999. *Syntactic Theory: A Formal Introduction*. CSLI Publications, Stanford.

Samiian, Vida. 1983. *Structure of Phrasal Categories in Persian: An X-bar Analysis*. PhD dissertation, University of California at Los Angeles.

Samvelian, Pollet 2001. Le statut syntaxique des objets 'nus' en Persan. *Bulletin de la Societe de Linguistique de Paris*, XCVI, fasc 1, 349-388.

Sanches, Mary and Slobin, Linda. 1973. Numeral Classifiers and Plural Marking: An Implicational Universal, 1-22. Working Papers on Language Universals, Stanford University Press, Stanford.

Sapir, Edward 1921. *Language*. Harcourt Brace, New York.

Saul, Janice 1965. Classifiers in Nung. *Lingua* 13, 278-290.

Saul, Janice and Wilson, Nancy 1979. *Nung Grammar*. The University of Texas, Arlington.

Scha, Remko 1981. Distributive, collective and cumulative quantification. In Groenendijk, Jeroen, Janssen, Theo and Stokhof, M. (eds.), *Truth, Interpretation, Information*, 483-512. Foris, Dordrecht.

Schmitt, Cristina and Munn, Alan 2002. The syntax and semantics of bare arguments in Brazilian Portuguese. *Linguistic Variation Yearbook* 2, 185-216. John Benjamins Publishing Co.

Scott, Gary-John 2002. Stacked adjectival modification and the structure of nominal phrases. In Cinque, Guglielmo (ed.), *Functional Structure in DP and IP: The Cartography of Syntactic Structures*, Volume 1, 91-120. Oxford University Press, Oxford.

Selkirk, Elizabeth 1977. Some remarks on noun phrase structure. In Culicover, Peter, Wasow Tom and Akmajian, Adrian, *Formal Syntax*, 285-316. Academic Press, London.

Senft, Gunter 2000. What do we really know about nominal classification systems? In Senft, Gunter (ed.), *Systems of Nominal Classification*, 11-49. Cambridge University Press, Cambridge.

Sharifian, Farzad and Lotfi, Ahmad 2003. 'Rices' and 'Waters': the mass-count distinction in Modern Persian. *Anthropological Linguistics* 45:2, 226-224.

Sigler, Michelle 1997. *Specificity and Agreement in Standard Western Armenian*. MIT PhD dissertation.

Sigurðsson, Halldór 1991. Icelandic case-marked PRO and the licensing of lexical arguments. *Natural Language and Linguistic Theory* 9, 327-363.

Simpson Andrew 2005. Classifiers and DP Structure in Southeast Asia. In Cinque, Guglielmo and Kayne, Richard (eds.), *The Oxford Handbook of Comparative Syntax*, 806-838. Oxford University Press, Oxford.

Singhapreecha, Pornsiri 2000. Thai classifiers and the structure of non-deverbal Thai nominals. *CUNYForum Papers in Linguistics* 20, 116-157. City University of New York, New York.

Soheli-Isfahani, Abulghasem 1976. *Noun Phrase Complementation in Persian*. Dissertation, University of Illinois at Urbana-Champaign.

Sommerstein, Alan 1972. On the so-called 'definite article' in English. *Linguistic Inquiry* 3, 197-205.

Speas, Margaret 2004. Evidentiality, logophoricity and the syntactic representation of pragmatic features. *Lingua* 114, 255-276.

Stalnaker, Robert 1974. Pragmatic presuppositions. In Munitz, Milton and Unger, Peter (eds.), *Semantics and Philosophy*, 197-214. New York University Press, New York.

Stowell, Tim 1991. Determiners in NP and DP. In Leffel, Katherine and Bouchard, Denis (eds.), *Views on Phrase Structure*, 37-56. Kluwer, Dordrecht.

Stowell, Tim 1989. Subjects, specifiers, and X-bar theory. In Baltin, Mark and Kroch, Anthony (eds.), *Alternative Conceptions of Phrase Structure*, 232-262. University of Chicago Press, Chicago.

Strawson, Peter Frederick 1950. On referring. *Mind* 59:235, 320-344.

Stvan, Laurel Smith 2007. The functional range of bare singular count nouns in English. In Stark, Elisabeth, Leiss, Elisabeth and Abraham, Werner (eds.), *Nominal Determination: Typology, Context Constraints, and Historical Emergence* (Studies in Language Companion Series 89), 171-187. John Benjamins, Amsterdam.

Swadesh, Morris 1972. What is glottochronology? In Sherzer, Joel (ed.), *The Origin and Diversification of Languages*, 271-292. Aldine, Atherton, Chicago.

de Swart, Henriette, Winter, Yoad and Zwarts, Joost 2007. Bare nominals and reference to capacities. *Natural Language and Linguistic Theory* 25, 195-222.

Szabolcsi, Anna 1994. The noun phrase: the syntactic structure of Hungarian. In *Syntax and Semantics* 27, Kiefer, Ferenc and Kiss, Katalin (eds.), 179-274. Academic Press, New York.

Szabolcsi, Anna 1987. Functional categories in the noun phrase. In Kenesei, Istvan (ed.), *Approaches to Hungarian*, volume ii, 167-190. The Structure of Hungarian. Szeged.

Szabolcsi, Anna 1984. The possessor that ran away from home. *The Linguistic Review* 3, 89-102.

Szabolcsi, Anna 1981. The possessive construction in Hungarian: a configurational category in a non-configurational language. *Acta Linguistica Scientiarum Academiae Hungaricae*, 31, 261-289.

Szemerényi, Oswald 1980. *Einführung in die vergleichende Sprachwissenschaft*, 2<sup>nd</sup> Edition. Wissenschaftliche Buchgesellschaft, Darmstadt.

Tang, Chih-Chen Jane 2004. Two types of classifier languages: a typological study of classification markets in the Paiwan noun phrase. *Language and Linguistics* 5:2, 377-407.

Tenny, Carol 2006. Evidentiality, experiencers, and the syntax of sentience in Japanese. *Journal of East Asian Linguistics* 15:3, 245-288.

Thráinsson Höskuldur 1996. On the (non)-universality of functional projections. In Abraham, Werner, Epstein, Samuel, David, Thrainsson, Höskuldur and Zwart, C. Jan-Wouter (eds.), *Minimal Ideas*, 253-281. John Benjamins, Amsterdam.

Tonsiulescu, Karen 2006. Kind-referring bare singulars in Hebrew. Workshop on Determiners, University of Manitoba, November 25, 2006.

Tozzer 1977. *A Maya Grammar*. Dover Publications Inc., New York.

Travis, Lisa DeMena 1984. *Parameters and Effects of Word Order Variation*. MIT PhD dissertation.

T'sou, Benjamin 1976. The structure of nominal classifier systems. In Jenner, Philip, Starosta, Stanley and Thompson, Laurence (eds.), *Austroasiatic Studies*, Vol. 2, 1215-1248. University of Hawaii Press, Honolulu.

Vergnaud, Jean-Roger 2008. Letter to Noam Chomsky and Howard Lasnik on "Filters and Control". In Freidin, Robert, Otero, Carlos and Zubizarreta, Maria Luisa (eds.), *Foundational Issues in Linguistic Theory*, 3-15. MIT Press, Cambridge.

Ward, Gregory and Birner, Betty 1995. Definiteness and the English existential. *Language* 71: 722-742.

Wierzbicka, Anna 1996. *Semantics, Primes and Universals*. Oxford University Press, Oxford.

Wiltschko, Martina 1998. On the syntax and semantics of (relative) pronouns and determiners. *Journal of Comparative Germanic Linguistics* 2, 143-181.

Windfuhr, Gernot 1990. Persian. In Comrie, Bernard (ed.), *The World's Major Languages*, 523-546. Oxford University Press, New York.

Winter, Yoad 1997. The scopal semantics of indefinites. *Linguistics and Philosophy* 20, 399-467.

Yang, Rong 2001. *Common Nouns, Classifier and Quantification in Chinese*. Rutgers University PhD dissertation.

Zabbal, Youri 2006. *Testing One, Two, Three: The Syntax and Semantics of Numeral Expressions*. University of Massachusetts dissertation outline presentation.

Zaenen, Annie, Maling, Joan and Thrainsson, Hoskildur 1990. Case and grammatical functions: the Icelandic passive. In Maling, Joan and Zaenen, Annie (eds.), *Syntax and Semantics 24, Modern Icelandic Syntax*, 95-136. Academic Press, New York.

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

Zamparelli, Roberto 1995. *Layers in the Determiner Phrase*. University of Rochester PhD dissertation.

Zavala, Roberto 2000. In Senft, Gunter (ed.), *Systems of Nominal Classification*, 114-146. Cambridge University Press, Cambridge.

Zoerner, Ed 1999. One coordinator for all. *Linguistic Analysis* 29:3-4, 322-341.

Zribi-Hertz, Anne 2002. The DP hypothesis and the syntax of identification. *Recherches linguistiques de Vincennes* 31, 127-142.

Zucchi, Alessandro 1995. The ingredients of definiteness and the definiteness effect. *Natural Language Semantics* 3:1, 33-78.