The Position of Adjectives and other Phrasal Modifiers in the Decomposition of DP

Peter Svenonius*

April 19, 2006

1 Introduction

Patterns in adjective ordering have long been noted, and have been characterized in impressionistic semantic terms: 'inherent' properties are expressed closer to the noun (Whorf 1945), or 'objective' properties are (Hetzron 1978). Such characterizations have proven difficult to evaluate, but cross-linguistic examinations regularly show that similar patterns hold across languages to a striking degree (e.g. Sproat and Shih 1991). Cinque (1994) suggests that these orders can be captured in terms of a layered functional structure in the DP: different layers of nominal structure correspond to the attachment sites of different categories of adjective. Scott (2002) and Laenzlinger (2005) expand on Cinque's hierarchy of nominal functional projections with this aim in mind.

At the same time, expansions of DP-internal functional structure have been undertaken on independent grounds, for example by Vangsnes (1999); Zamparelli (2000); Rijkhoff (2002); Borer (2005); Julien (2005) and others.

An important question is to what extent the decomposition of DP motivated by the order of adjectives matches the decomposition of DP motivated on independent grounds. In this article, I examine three different pieces of evidence concerning functional structure in the DP: the relative order of headlike elements such as articles, plural markers, and the noun; the relative order of phrasal modifiers such as demonstratives, numerals, and adjectives; and the semantic arguments for layered structures put forth by Zamparelli (2000), Rijkhoff (2002), and others.

Overall, the independently motivated structures for DP decomposition do not provide the kind of fine-grained differentiation suggested by, for example,

*Thanks to the audience at the Conference on the Syntax and Semantics of Adjectives and Adverbs in Barcelona in 2005, where I was able to present some of this work, in the form of comments on Larson and Yamakido (2005) and Demonte (2005), under the title 'What can decomposition do for you?' Thanks also to the organizers of that event, in particular Louise McNally.

Scott (2002) for adjectival ordering (where, e.g. 'length,' 'height,' 'depth,' and 'width' are all distinguished). However, they do provide a basic framework which, I suggest, goes a long way toward explaining the cross-linguistically valid generalizations that can be made regarding the order of attributive adjectives.

A side issue which is necessarily taken up in the course of this discussion is that of the order of DP-internal elements more broadly. In principle, there are three different factors which can affect word order: the basic hierarchical structure (which I assume is determined by something roughly like function–argument semantics), the order in which the function and the argument linearize when they combine, and movement. The first factor is generally taken to be invariant. Kayne (1994) has proposed essentially that the second factor is invariant as well, leaving movement as the only important factor in word order variation across languages.

To be plausible, this requires several additional assumptions. Consider, for example, the possibility that attributive adjectives attach inside DP in a way different from that of relative clauses. A language might exclusively rely on the relative clause strategy or the attributive strategy for modifying noun phrases, leading to a superficial difference between two languages which is not due to movement, but to facts about the inventories of functional items employed in the two languages, e.g. one has no relative head, or the other has no head that can be used to construct attributive adjectives.

In this paper I outline such a model of cross-linguistic word order variation, concentrating on the noun phrase. Order in the noun phrase is in some ways easier to compare cross-linguistically than order in the clause, because fewer information-structural devices are employed.

The structure of the remainder of this paper is as follows. To identify the functional structure in the noun phrase, I first examine articles and plural markers, which are attested in enough languages to give a good impression of the overall patterns possible. Then I examine some other categories that tend to be realized morphologically in the noun phrase, to give a fuller picture of the basic functional skeleton.

I then turn to the phrasal modifiers in DP, namely demonstratives, numerals, and adjectives, the ordering of which is famously characterized in Greenberg's 1963) *Universal 20*. Finally, the relative order of adjectives is discussed, completing the sketch of the functional structure of the noun phrase.

This sets the stage for the subsequent discussion of word order possibilities cross-linguistically and how to derive them. I argue that the order of adjectives can be understood as derivative of the order of the functional material and the fact that in some languages, the functional heads in the nominal projections form clusters (along lines developed in Svenonius 2005a).

2 Mirror in Nominal morphology

Many languages have articles which express definiteness, specificity or indefiniteness (cf. Dryer 1989b). Another piece of nominal functional structure which

is found in many languages is some overt marker of plurality (sometimes also duality or paucality; see Delfitto and Schroten 1991; Borer 2005). If we compare the relative order of these markers across languages, the order Art > Pl > N emerges as the most plausible underlying hierarchy; some examples of Art-Pl-N order are provided in (1) (the glosses DEF, ART, and INDEF are retained from the original sources).

(1) a. hun-lii-štaan
DEF-PL-*armadillo*
'the armadillos' (Misantla Totonac, from MacKay 1999:312)
b. o bi gotta
ART PL *tree*
'trees' (Galela, from Rijkhoff 2002:110)
c. ha fanga pulu
INDEF PL *cow*
'some cows' (Tongan, Dryer 1989a:875)

In many cases, prenominal articles and plural markers are not strictly adjacent to the noun (cf. Dryer 1989a), permitting e.g. adjectives and numerals to intervene.

Another relatively common order is that in which the article precedes, but the plural marker follows the noun (English is such a language). Some examples are given in (2).

(2) a. he pi' miš̃ ʔaHkš̃
the little boy PL
'the little boys' (Mixe, from Dryer 1989a:875)
b. à-jɤab-c°a
ART-*girl*-PL
'the girls' (Abkhaz, from Rijkhoff 2002:79)
c. in coyō-meh
the coyote-PL
'the coyotes' (Nahuatl, cf. Andrews 1975)

In these cases, the article is often separable from the noun by adjectives and other material, but the plural marker more rarely so; this suggests that N-Pl order may be the result of some kind of cluster formation (for discussion or cluster formation in the derivation of such orders see Svenonius 2005a).

Finally, there are many examples of 'mirror' order (the reverse of Art-Pl-N), in which N precedes Pl and both precede Art. These very often show cluster effects, with the three elements not allowing interruption by adjectives or other phrasal material.

(3) a. dàr-ì-dé
gun-PL-DEF
'the guns' (Kotoko)

b. säw-occ-u
man-PL-DEF
'the men' (Amharic)
c. hest-ar-nir
horse-PL-DEF
'the horses' (Icelandic)

In some cases articles are reported inside plural markers, for example Basque *gizon-a-k* 'man-DET-PL'; but it can be argued that the suffix is not really an article; it is used, for example, on nouns in existential contexts (examples from Hualde and Ortiz de Urbina 2003:120).

(4) a. Zigarro-a nahi dut.
cigarette-DET *want* AUX
'I want a cigarette'
b. Lekuederr-a-k daude Bizkaian.
beautiful.place-DET-PL *are* *Bizkaia*.LOC
'There are beautiful places in Bizkaia'

Thus the Basque suffix *-a* does not satisfy the usual criteria for an article. I will continue to assume that morphemes that consistently mark specificity or definiteness (including those which mark noun phrases as non-specific or indefinite) are articles, hierarchically located above plural markers.

Another source of articles appearing inside plural markers would be movement of N across both. For example, Gungbe exhibits the order N-Art-Pl (two different articles are illustrated here, from Aboh 2004:77).

(5) a. távò lɔ́
table the
'the specific table'
b. távò lɔ́ lɛ́
table the PL
'the specific tables'
c. távò ɖé lɛ́
table DET PL
'some specific tables'

Aboh argues that there is phrasal movement across Art. The projection of N which moves carries with it all modifiers and dependents of N (Aboh 2004:78,90).

(6) a. távò ɖàxó xóxó àtɔ̀n éhé lɔ́ lɛ́
table big *old* *three* DEM *the* PL
'these specific three big old tables'
b. àgásá sín fɛ̀n ɖàxó àtɔ̀n éhé lɔ́ lɛ́
crab POSS *pincer big* *three* DEM *the* PL
'these specific three big crabs' pincers'

Aboh develops a detailed roll-up analysis of the word order here, with the N moving first to the left of the adjective, the N-A sequence moving to the left of the Numeral, the N-A-Num sequence moving to the left of the Demonstrative, and the N-A-Num-Dem sequence crossing the plural marker and the article.

Thus, the order of morphemes cross-linguistically is compatible with the basic hierarchy Article > Plural > Noun, with a cluster-formation rule (essentially like head movement) forming N-Pl and N-Pl-Art clusters in some languages, and more rarely, phrasal movement leading to other orders.

3 Classifiers

Many languages have head-like elements in the DP which are called 'classifiers' (cf. Aikhenvald (2000) for an overview). These show a range of uses, from determiner-like (cf. Cheng and Sybesma 1999 on Chinese) to being involved in enumeration or division of masses (Borer 2005) to being markers of noun class or gender (as in the Bantu languages; such markers are often called 'class markers' rather than classifiers; cf. e.g. Heine 1982). Classifiers often serve two or more of these functions simultaneously and are often furthermore in complementary distribution with determiners or plural markers, making general statements about relative order difficult, but some generalizations emerge.

For example, the most typical classifier sorts nouns into characteristics such as shape (a 'sortal' classifier), and makes them countable or quantifiable (a 'numeral' classifier). Grinevald (2000) in particular argues that it is typical of numeral classifiers that they sort nouns by shape. But a few languages differentiate the two functions, in which case the numeral classifier can be seen to be outside the sortal classifier, as in the Mayan language Akatek as described by Zavala (2000) (exx. here from his pp. 117 and 123).

(7) a. kaa-b' sulan aw-aan
two-INAN SMOOTH *A2-corncob*
'your two corncobs'

b. 'ox-eb' jilan 'aan
three-INAN LONG.3D *corncob*
'three corncobs'

c. kaa-b' b'ilan poon yalixh-taj
two-INAN SMALL.ROUND *plum small*-PL
'two small plums'

Numeral classifiers in this language distinguish human, animal, and inanimate nouns (here only the inanimate one is shown). The sortal classifier distinguishes a dozen or more shapes ('smooth,' 'long three-dimensional,' 'erect,' 'half-circle,' 'round,' 'wide flat,' 'small spherical,' 'separate,' etc.). Note in (7a–b) that the same noun can appear with different classifiers, depending on how the referent is perceived.

As mentioned, a third important type of classifier is the noun classifier, which typically sorts nouns by material qualities or essences (again see Grinevald 2000).

They do not commonly cooccur with sortal or numeral classifiers, but again, Akatek provides an example of cooccurrence. Akatek has a set of fourteen noun classifiers ('man,' 'woman,' 'animal,' 'tree,' 'corn,' 'water,' 'salt,' etc.) alongside the three numeral classifiers and the set of sortal classifiers. All three types are illustrated in (8) (adapted from Zavala 2000:126–127).[1]

(8) a. 'ox-k'on kupan no' wakax
three-ANIM HALF.CIRCLE ANIMAL *cow*
'three cows' (lying down)
b. 'ox-eb' kupan 'ixim paat
three-INAN HALF.CIRCLE CORN *tortilla*
'three (folded) tortillas'
c. 'ox-eb' xoyan 'ixim paat
three-INAN ROUND CORN *tortilla*
'three tortillas'

Noun classifier systems may closely resemble gender systems, in that each noun may be conventionally associated with a single noun classifier. Gender systems are common cross-linguistically (see Corbett 1991 for an overview), and it is sometimes argued that nominal gender corresponds to a functional projection (cf. e.g. Spanish *abuelo* 'grandfather' ∼ *abuela* 'grandmother' or *monje* 'monk' ∼ *monja* 'nun') (cf. Ritter 1993 for references and a dissenting view). If so, it is clear that it is lower than number (cf. e.g. *abuelas* 'grandmothers' etc.).

In general, if a language has plural markers it does not have classifiers, and vice versa (see Borer 2005 ch. 4 for references and discussion). In some languages, there are plural markers for animate nouns but classifiers for inanimates. In Akatek, the numeral classifier for inanimates, *eb'* (cf. (8b–c)), is also used as a separate plural marker for human plurals, and may cooccur not only with numeral classifiers but also with noun classifiers, as in (9a–b) (Zavala 2000:122-123; again, I have isolated noun phrases from sentences in context; see Zavala's paper for original sentences).

(9) a. kaa-wan eb' naj winaj
two-HUMAN PL MAN *man*
'two men'
b. 'ox-wan eb' 'ix 'ix
three-HUMAN PL WOMAN *woman*
'three women'

Nor is Akatek the only language in which a plural marker may cooccur with a numeral classifier. Allan (1977:294) gives the following examples from Yucatec Mayan and Ojibway, respectively. In the Mayan example, the plural marker is optional, but in the Ojibway example, it has a semantic effect.

[1] Zavala gives sentences from which I have isolated just the noun phrases; in each sentence, an existential predicate ('there is') precedes the noun phrase, and an adjectival predicate ('lying down' or 'round') follows.

(10) a. oš tul maak ∼ oš tul maak-oob
three ANIM *person* *three* ANIM *person*-PL
'three people' ∼ 'three people'
b. nĩšw-āttik kĩšikk ∼ nĩšw-āttik kĩšikk-ak
two-STICK *cedar* *two*-STICK *cedar*-PL
'two pieces of cedar' ∼ 'two poles of cedar'

On the basis of these considerations, three levels of classifier can be identified; I will refer to the numeral classifier as UNIT, as this is the unit which is counted (it can be equated with Borer's 2005 #), and to the sortal classifier as SORT (like Borer's *Cl*); and I will refer to the noun classifier as *n*, following the discussion in Marantz (2001) of the nature of nominalizing affixes on roots.

In sum, the following hierarchy of classifier types can be discerned, though it should be stressed that most classifier languages have just one which spans two or more of these properties, as argued by Borer (2005):[2]

(11) UNIT > SORT > *n*

Putting these together with the Art > Pl > N hierarchy from §2, it is relatively clear that Art is above these classifiers, while N is below. The exact position of Pl is partly a matter of guesswork due to the scarcity of clear cooccurrences, but the following seems to be a plausible hypothesis:

(12) Art > UNIT > Pl/SORT > *n* > N

The category Pl/SORT suggests that those cases in which plurals are noted to cooccur with classifiers have involved either UNIT classifiers or noun classifiers, not SORT classifiers. It has repeatedly been argued that classifiers exist to individuate masses for quantification and counting (cf. in particular Borer 2005).

At this juncture I leave these categories and turn to phrasal dependents in the DP, namely demonstratives, numerals, and adjectives.

4 Greenberg's Universal 20

Greenberg's (1963) *Universal 20* is stated as follows:

(13) *Universal 20*: When any or all of the elements (demonstrative, numeral, and descriptive adjective) precede the noun, they are always found in that order. If they follow, the order is either the same or its exact opposite.

Subsequent work has confirmed the essentials of this observation (Hawkins 1983; Dryer 1992; Cinque 2005), though the order N-Dem-Num-A turns out not to be terribly common. The most common orders are apparently the following

[2]It should be noted that Grinevald (2000) argues for an additional type, the genitive classifier, which she argues is function-based (vehicle, edible, artifact, etc.) and is higher than the numeral classifier.

(judging from Hawkins 1983; Cinque 2005, and searches in the *World Atlas of Linguistic Structures*, Haspelmath et al. 2005):

(14) a. Dem Num Adj N
b. Dem Num N Adj
c. Dem N Adj Num
d. N Adj Num Dem
e. Num N Adj Dem

The most common orders are N-initial and N-final ones (273 languages languages in Haspelmath et al. 2005 have N preceding all of Dem, Num, and Adj, while another 191 have N following all three). The other three orders listed in (14) are about equally common (between fifty and seventy-five languages each in Haspelmath et al. 2005). No other orders are at all common.[3] Cinque (2005) notes that N-raising orders are all attested, for example Dem-N-Num-A, in which the N moves across the Num and A.

If we take as the zero hypothesis that the most common order of phrasal elements directly reflects the underlying universal hierarchy, the hierarchy is Dem > Num > Adj > N. The order in (14b) is simply derived by moving N to the left of Adj. The order in (14c) is derived by combining that step with an additional step moving the [N–Adj] sequence across Num. And the order in (14d) involves yet another step, moving [[N–Adj]–Num] across Dem.

4.1 Combining Dem–Num–Adj with Art–Pl–N

How do these orders relate to the order of Art and Pl and N discussed in §2, and to the order of classifiers discussed in §3? I suggest that Dem, Num, and Adj are generally to be thought of as phrasal modifiers of functional projections in the DP. Demonstratives may lexicalize to D elements, and the numeral 'one' in particular often seems to lexicalize as a head. Adjectival elements may also sometimes directly represent heads in the extended projection of N. But in the general case, a demonstrative can be thought of as modifying a DP, while a numeral can be thought of as modifying a PlP, and a typical adjective can be thought of as modifying an NP.

This would give an order something like Dem > Art > Num > Pl > Adj > N. The surface word order, however, is complicated by the facts of cluster formation; specifically, the tendency of heads like Pl to form a morphological cluster with N changes the linear order with respect to phrasal modifiers like adjectives. Despite such complications, a pattern like the expected one can be discerned. For example, in Rijkhoff's (2002) balanced survey of 85 languages,

[3] Haspelmath et al. (2005) give the relative order of the noun and each dependent; thus, it can be determined, for example, that 69 languages have Numeral before Noun, and Noun before both Adjective and Demonstrative; the database itself does not indicate how many of these 69 are Num-N-Adj-Dem and how many are Num-N-Dem-Adj. Independent investigation shows that the former is much more common than the latter. See for example Hawkins (1983:119), who lists seven Num-N-Adj-Dem languages and no Num-N-Dem-Adj ones. For a detailed analysis of this order in Semitic languages see Shlonsky (2004).

six allow Demonstrative to cooccur with an article; in three of those, the order is as given in (15a), and in three others it is as in (15b).

(15) a. Dem–Art–N: Abkhaz, Guaraní, Hungarian
b. Art–N–Dem: Berbice Dutch Creole, Galela, Samoan

A couple of illustrations are given in (16).

(16) a. wəy á-jɣab
that.one ART-*girl*
'that girl' (Abkhaz, Rijkhoff 2002:183)
b. o tahu manèna
ART *house this*
'this house' (Galela, Rijkhoff 2002:184)

Most typically, definite articles are in complementary distribution with demonstratives. According to Rijkhoff, four of the six have a 'stage II' article, in the sense of Greenberg (1978), i.e. not associated with definiteness, but with specificity.[4]

However, Hungarian and Berbice Dutch Creole have definite articles which cooccur with the demonstrative.

(17) a. Az-t a filme-t akarom megnézni.
that-ACC *the film*-ACC *I.want watch*
'I want to watch that film'
b. Azok-ról az emberek-ről beszéltünk.
those-DELAT *the people*-DELAT *we.talked*
'We were talking about those people' (Hungarian)

On the basis of these observations, I conclude that demonstratives are basically higher than articles (cf. also Julien 2005), but in some languages the [Art–N] sequence moves to the left of the demonstrative. It remains to be investigated what drives this movement, but it might be triggered by a requirement for N–Dem adjacency.[5]

Similarly, the order Num > Pl can be discerned in the typological data, in that a numeral is normally further from the noun stem than is plural marking,

[4]Greenberg's four stages of the development of a demonstrative into a gender or noun marker are as follows:

(i) a. Stage 0: Demonstrative
b. Stage I: Definiteness
c. Stage II: Specificity
d. Stage III: Gender/Class or Noun Marker

According to my assumptions this appears to violate Roberts & Roussou's main principle of grammaticization, since at least Noun Class marker must be lower in the hierarchy than the locus of definiteness.

[5]Brugè (2002) argues that demonstratives originate low and move to SpecDP. However, most of her arguments are equally consistent with movement of a phrasal projection of N to the left of the demonstrative. Thanks to Klaus Abels and David Adger for discussion.

and in those cases where it is not, as in Gungbe (discussed above), there are reasons to think that movement has occurred.

The relative position of Adjectives with respect to the Art–Pl–N hierarchy is the most difficult question. Clearly, most adjectives are lower than Art; rare cases of gradable descriptive adjectives higher than articles clearly involve movement (as in *how big a house*, with the *wh*-operator *how*). I will return to the question of the relative order of adjectives and plural markers, but for now will assume that adjectives are ordinarily below the plural. This gives a preliminary hierarchy as follows:

(18) Dem > Art > Num > Pl > Adj > N

The categories which I have assumed are phrasal are interleaved with the categories which I have assumed are heads.[6]

4.2 Combining Dem–Num–Adj with UNIT, SORT, and *n*

Turning to the classifiers, it is clear that the UNIT classifier is below numerals; it is presumably the same category identified by Szabolcsi (1994) as *Num*[ber] or by Julien (2005) as *Card*[inality]. Word order facts suggest that the UNIT classifier is above adjectives (see below). The *n*, on the other hand is above N; it comes close to being a gender or noun class marker (compare also Truswell's 2004 category *Same*). As suggested in §3, SORT can probably be conflated with Pl; it can be compared with Delfitto and Schroten's (1991) treatment of the plural marker, or Borer's (2005) *Cl*[assifier]. This gives an extended hierarchy as in (19):

(19) Dem > Art > Num > UNIT > Pl/SORT > Adj > *n* > N

Muromatsu (2001) argues, in effect, that adjectives can be split into two classes, those which are sensitive to shape and merge above classifiers (here, SORT classifiers and those which are not sensitive to shape and merge below. I will argue below for the same conclusion, and furthermore that adjectives can appear not only above and below Pl/SORT but also above and below *n*. For example, although in general adjectives follow classifiers in Chinese, certain adjectives can precede certain classifiers (examples from Cheng and Sybesma 1999:516).

(20) a. yi zhi da gou
one CL *big dog*
'a big dog'

[6]There are interesting issues regarding head versus phrasal status of these elements; see, for example Bernstein (1993) for arguments that some attribute adjectives are heads, Svenonius (1994) for arguments that most attributive adjectives must be phrases, Sadler and Arnold (1994) for the suggestion that they must have a status in between phrase and head, and Starke (2004) for the claim that the distinction does not exist. I will continue to assume that attributive adjectives, in general, are phrasal, along with numerals (see Ionin and Matushansky 2005) and possibly demonstratives, though it seems likely that at least the latter are often recategorized as heads, if there is indeed a distinction.

b. yi da zhang zhi
one big SHEET *paper*
'a big sheet of paper'

The adjective *da* 'big' in (20b) follows the UNIT classifier *zhi* but precedes *zhang* 'sheet' which would be a SORT classifier. However, most adjectives, even in Chinese, are lower in the hierarchy than most classifiers, as suggested by (19).

Before going into detail regarding the different attachment sites for different classes of adjectives, I turn to some issues regarding word order.

5 Word order

5.1 Suffixal Pl and Art

In many languages, although the individual subhierarchies such as Dem–Num–Adj and Art–Pl–N are respected, the complete hierarchical order is not evident on the surface; for example Norwegian could be characterized as having the order in (21), as illustrated in (22).

(21) Dem – Num – Adj – N-*n*-Pl-Art

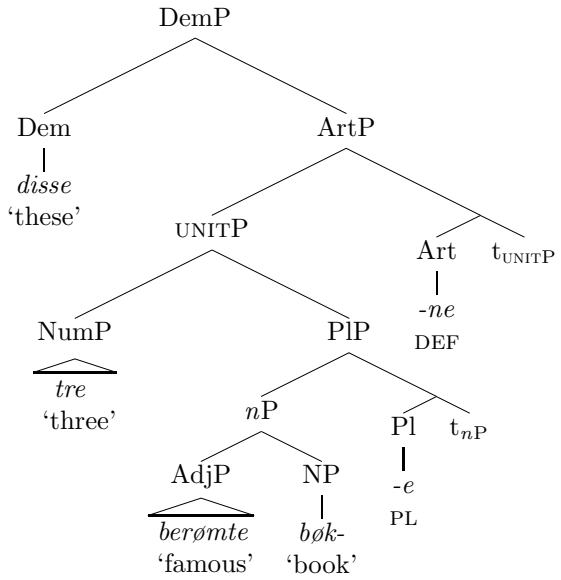
(22) disse tre funksjonelle projek-sjon-e-ne
these three functional project-ion-PL-DEF
'these three functional projections'

I argue that this follows if *n*, Pl and Art are heads, while Num and Adj are phrases, and cluster formation involves movements which ensure that certain heads wind up adjacent.

If phrasal movement can derive N-Pl-Def order, then a Norwegian noun phrase like the one in (23) could have a structure something like that in (24) (see Vangsnes 1999; 2001; Julien 2002; 2005 on Norwegian DP structure).

(23) disse tre berømte bøk-e-ne
these three famous book-PL-DEF
'these three famous books'

(24)



Note that the structure strictly observes the proposed universal hierarchy (leaving out some phonologically empty heads, to keep the tree small). I have represented the demonstrative as a head here, but nothing hinges on it. A pair of phrasal movements ensures that the suffixal Pl and Def (Art) heads are adjacent to N and Pl, respectively, which I take to be the essence of cluster formation (as argued in Svenonius 2005a).

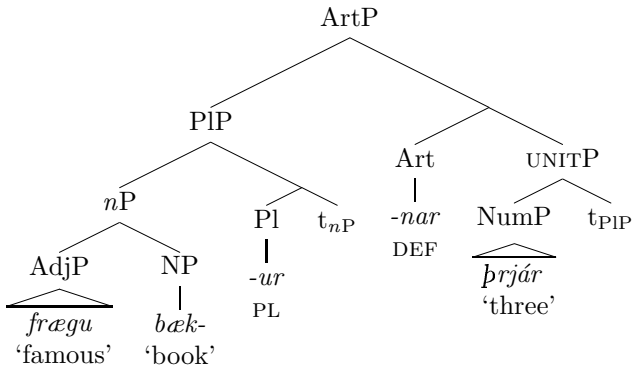
Icelandic provides a clear argument for movement of this type, as an overt demonstrative is in complementary distribution with a suffixal article, and the choice leads to word order differences. An overt demonstrative appears in the base Dem-Num-Adj-N order, as in Norwegian but with no definite suffix, while a definite noun phrase with no demonstrative shows the order Adj-N-Num (Sigurðsson 1992; Vangsnes 1999).

(25) a. þessar þrjár frægu bæk-ur
these three famous book-PL
'three three famous books'

b. frægu bæk-ur-nar þrjár
famous book-PL-DEF *three*
'the three famous books'

This is what would be expected if Pl attracts a large constituent, for checking of the N under adjacency, and Def attracts a relatively small constituent, perhaps even the PlP itself, as illustrated in (26). The fact that the movement (as identified by the reordering of the numeral) only occurs in the presence of the definite suffix suggests that the suffixal head is involved in triggering the movement.

(26)



Prefixal plural morphology would involve movement of NP (or nP) to a position just below the plural morpheme. All else being equal, a noun with prefixal plural morphology should tend to precede adjectives, which would be crossed by the moving NP. Typological data supports this: of 104 languages listed in Haspelmath et al. (2005) as having prefixal plural marking, 80 have NA order, and only 18 have AN order (another 6 are listed as having no dominant order of N and A). This means that 80% of plural-prefixing languages are NA, whereas among plural-suffixing languages, the distribution is much more even (190 are AN and 204 are NA; there are 37 with no dominant order of N and A).

As Cinque (2005) argues, the attested word orders are generally those expected from a movement analysis.[7]

5.2 Classifiers and phrasal dependents in DP

Various surface orders can be observed with respect to classifiers. For example, Simpson (2004) notes the following orders among Southeast Asian languages.

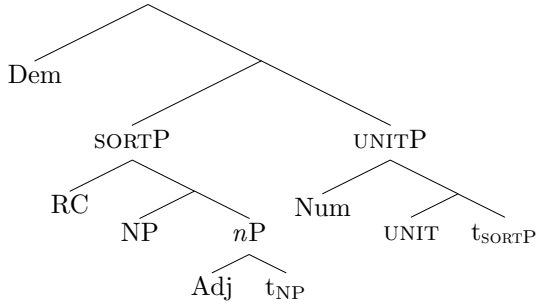
(27)
a. Chinese: Dem – Num – Cl – RC – Adj – N
b. Thai, Khmer: N – Adj – RC – Num – Cl – Dem
c. Burmese: Dem – RC – N – Adj – Num – Cl
d. Hmong, Malay, Vietnamese: Num – Cl – N – Adj – RC – Dem

Simpson argues for an antisymmetric (Kayne 1994) movement analysis; he assumes that the various elements are heads, whereas I am assuming that adjectives and numerals, at least, are phrasal dependents. Modulo these differences, a movement account can be simply characterized in the following terms: Chinese

[7]Though see Abels & Neeleman for a challenge. As noted above, many languages have the order in (14e), namely Num-N-Adj-Dem, which involves an unexpected (Num-Adj-Dem) order of modifiers, given the simplest assumptions about movement (see also Svenonius 2005a). One possibility is that the Num in these cases is actually the head of the noun phrase, and moves to the left to combine with functional material. See for example Babby (1987); Franks (1994); Ionin and Matushansky (2005) on Russian, in which certain numerals determine the case on the accompanying noun and control subject agreement on a verb. Other examples of pattern (26e) may represent head-final structures in which the demonstrative is a head.

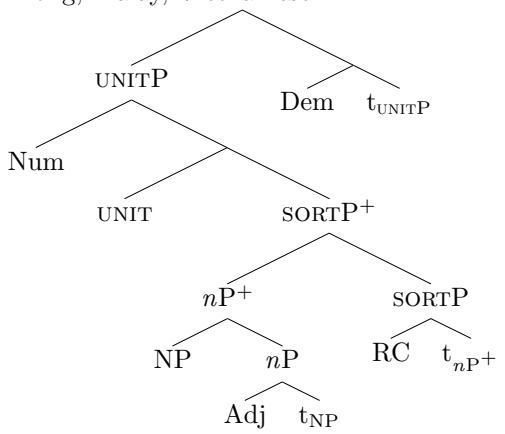
reflects something like the base order.[8] In all of the other languages, N moves to the left of the adjective. If relative clauses are taken to be attached to the left just above adjectives, then the Thai/Khmer pattern (henceforth Thai) and the Hmong/Malay/Vietnamese (henceforth Hmong) also require an additional step of movement of [N Adj] moving to the left of RC. In Burmese and Thai, the [RC N Adj] constituent moves across the Num–Cl sequence. In Thai and Hmong, a constituent containing the numeral moves to the left of the demonstrative. The Burmese pattern is outlined in tree form below, using the labels established above; in particular, the relative clause is taken to attach above SORT, and the classifier is assumed to be located in the head of UNIT.

(28) Burmese:



In the Hmong pattern, I use a convention from Koopman and Szabolcsi (2000) of superscripting a '+' to the node which includes nP and a landing site for roll-up movement, simply in order to have labels for its trace.

(29) Hmong, Malay, Vietnamese:

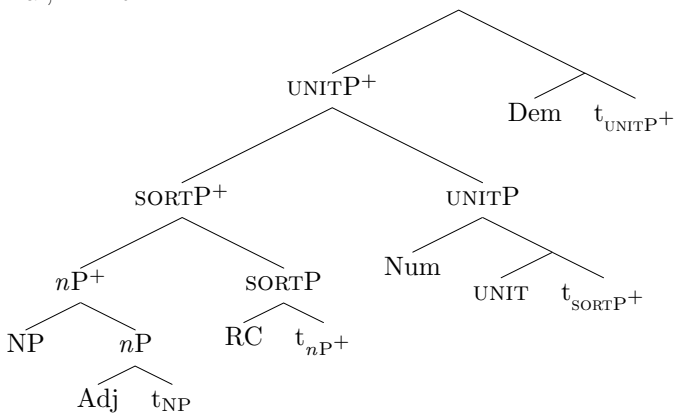


[8] I have added the relative clause position to the Chinese line-up; Simpson does not discuss relative clauses in Chinese. An example, from Zhang (2004), showing the order of modifiers:

(i) na liang ge wo tidao de nianqing ren
that two CL *I mention* DE *young person*
'those two young people I mentioned'

The Thai pattern combines both movements: the fronting of a projection of SORT, as in Burmese, and the fronting of a projection of UNIT, as in Hmong. The order is the equivalent of right-adjoining the phrasal modifiers, except that the *unit* classifier follows the numeral.

(30) Thai, Khmer:



It is typical cross-linguistically of classifier languages that they normally do not separate the numeral and classifier (though it is not universally true; cf. Allan 1977, or example (20b) above). If only maximal projections move, and the numeral is in the specifier of the classifier, then this expected.

Note also that the position of the relative clause must be considered more carefully, and is identified here with SORTP only tentatively and for purposes of illustration.

6 Semantic arguments

The arguments regarding the decomposition of DP have so far been mainly based on observations regarding the order of morphemes and phrasal dependents. Various kinds of additional arguments have been developed as well, including lexical (Borer 2005), cognitive (Rijkhoff 2002), and model-theoretic (Zamparelli 2000). I will not go into great detail here regarding those different models, but briefly outline the major motivations, the main categories postulated, and the relationship to the structures used here.

6.1 Borer 2005

Borer (2005) develops a model of the noun phrase in which the categories D, #, and Cl figure importantly. Each introduces an open value, represented ⟨e⟩. Open values are assigned *range*, either by heads or by specifiers, which restrict their value. The lowest of the three important categories in the DP is ⟨e⟩$_{\text{DIV}}$, Div for 'division' (Borer 2005:59) or 'divided' (Borer 2005:95) of which one

important manifestation is Cl. A noun in which $\langle e \rangle_{DIV}$ is assigned range is a count noun ($\langle e \rangle_{DIV}$ is absent from mass nouns).

Above $\langle e \rangle_{DIV}$ is the category Quantity, or $\langle e \rangle_{\#}$. This allows masses and count entities to be enumerated or quantified. $\langle e \rangle_{\#}$ may be assigned range by a quantifier, and is the level at which numerals and most determiners are introduced. Borer's system explicitly allows heads to assign range to more than one value, and determiners in general are introduced at the $\langle e \rangle_{\#}$ level but then move up to assign range to the next higher level, $\langle e \rangle_{d}$ (d for 'determiner'), the highest important level in an ordinary noun phrase.

$\langle e \rangle_{d}$ can unproblematically be equated with the Article and Demonstrative here. Borer's category $\langle e \rangle_{\#}$ is the level at which numerals are introduced, and so could be equated with the category UNIT. Borer's category $\langle e \rangle_{DIV}$ and its manifestation *Cl*[assifier] are intended to capture properties both of the Asian classifier types and of English-style plurals. Thus, in the model here it is clearly Pl/SORT which is closest to Borer's $\langle e \rangle_{DIV}$.

Borer argues that Chinese classifiers can assign range to both $\langle e \rangle_{DIV}$ and $\langle e \rangle_{\#}$ (moving from the one to the other). Following this, I have suggested that many of the Asian classifiers are properly thought of as conflations of UNIT and SORT (if head-movement is an option, then a typical Asian classifier might move from SORT to UNIT, essentially as Borer suggests).

6.2 Rijkhoff 2002

Rijkhoff (2002) argues at length, on the basis of a typological study, for a layered DP in which the main categories are *Location, Quantity*, and *Quality*. He identifies demonstratives and articles with the category *Location*, and those also represent the outermost layer of the noun phrase here.[9] The intermediate layer, *Quantity*, is associated with numerals and quantifiers, and could be identified here with numerals and the UNIT category. The inner layer, *Quality*, is where adjectives typically reside, and so this would correspond to my SORT and *n*. Grinevald (2000) notes the correlation between noun classifiers and the categories relevant to Rijkhoff's *Quality*.

6.3 Zamparelli 2000

Zamparelli (2000) presents arguments for a compositional approach to nominal semantics in which a projection *Ki*[nd] plays a prominent role. This level is the level at which kinds of the Carlsonian sense (Carlson 1977) are determined. This category will play a role in the discussion in the next section. For present purposes it suffices to say that it cannot be higher than UNIT, nor lower than SORT, so if it is a distinct head it must be between the two.

[9] Rijkhoff also locates relative clauses and possessors in this layer. I have not dealt with possessors at all and have only cursorily mentioned relative clauses. Possessors may move from a thematic position in NP to a licensing position higher up, so their exact position is complicated to determine (cf. Julien 2005 for extensive relevant discussion of Scandinavian possessors). Relative clauses, too, may be attached at different levels under different circumstances.

7 Adjective ordering

Nearly all languages allow attributive adjectives to modify nouns; in fact, in many languages this is their only or primary function (Dixon 2004a). In some languages, attributive modification is limited to a single adjective phrase; additional adjectives must be coordinated, introduced by apposition, or introduced in relative clauses.[10] In other languages, such as English, multiple adjectives are possible, and in such languages there are very clear cross-linguistic tendencies in the ordering of attributive adjectives. By and large, the order of prenominal adjectives tends to be similar cross-linguistically, e.g. size before color. Languages with postnominal adjectives split, with some showing the same order as English (e.g. Irish, Sproat and Shih 1991) and other languages showing the mirror image (e.g. Hebrew, Shlonsky 2004, contra Sproat and Shih 1991). In many cases, there is a preferred ordering and a marked ordering, or two different interpretations for two different orders.[11]

7.1 Fine-grained structure

One approach that has been pursued is to identify individual adjective classes with specific functional heads, which are presumed to exist independently in the functional sequence. For example, Cinque (1994) observes various preferred orders, such as those in (31), and proposes the hierarchy in (32).

(31) a. numerous wonderful big American cars
b. various round black Egyptian masks

(32) $\text{Adj}_{\text{quantification}} > \text{Adj}_{\text{quality}} > \text{Adj}_{\text{size}} > \text{Adj}_{\text{shape}} > \text{Adj}_{\text{color}} > \text{Adj}_{\text{nationality}}$

Scott (2002) expands on this, proposing the fine-grained hierarchy in (33).

(33) Ordinal > Cardinal > Subject Comment > Evidential > Size > Length > Height > Speed > Depth > Width > Temperature > Wetness > Age > Shape > Color > Nationality/Origin > Material

Laenzlinger (2005) suggests that Scott's inventory (with minor refinements) can be organized into five subdivisions, as given in (34).

(34) [QUANTIF Ordinal > Cardinal] >
[SPEAK-ORIENT Subject Comment > Evidential] >
[SCALAR PHYS. PROP. Size > Length > Height > Speed > Depth > Width] >
[MEASURE Weight > Temperature > Wetness > Age] >
[NON-SCALAR PHYS. PROP. Shape > Color > Nationality/Origin > Material]

[10] For example: On Thai, Nung, and Indonesian: Simpson (2004:834, n. 1), contra Sproat and Shih (1991); on Wolof, McLaughlin (2004:254).

[11] Many languages have a kind of augment on each adjective, and it seems that this may yield relatively free ordering: cf. the discussion of Greek (Alexiadou and Wilder 1998), Hawrami (**?**), Chinese (Sproat and Shih 1991; Paul 2005), and other languages. Compare Sproat and Shih's (1991) notion of 'direct' versus 'indirect' modification.

However, there are some concerns regarding these structures. For one thing, the categories are not well-motivated outside of the adjectival ordering phenomenon that they are introduced to describe. That is, they do not carry much explanatory force. Secondly, the actual observed orderings are not as rigid as such an approach would seem to predict. What is desired is an independently motivated hierarchy, with some way to fit adjectives into it in a way that correctly predicts adjective ordering facts.

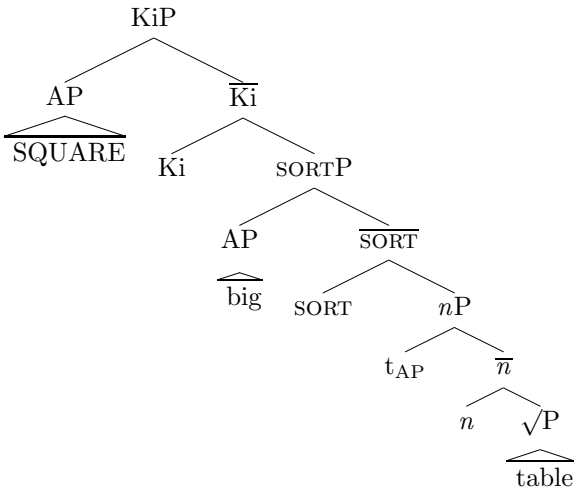
7.2 Focused Adjectives

Steps have been taken in the right direction. Gutiérrez-Rexach and Mallen (2002), Giusti (2002), Truswell (2004), and Demonte (2005), for example, adopt something like Zamparelli's (2000) Kind or Ki head, a level at which 'kind' concepts are formed, and suggest that Focused adjectives are above KiP.

(35) a. big square table; *square big table; SQUARE big table
b. expensive wooden table; *wooden expensive table; WOODEN expensive table
c. tasty French cheese; *French tasty cheese; FRENCH tasty cheese

This is illustrated in the tree below, making some assumptions (discussed below) about attachment sites for different classes of adjectives.

(36)



7.3 Idiomatic adjectives

Similarly, Marantz (2001) argues that the *n* level is the level of lexical idiosyncracy, so that idiomatically combined adjectives must attach below it. Expressions like those in (37) are illustrations; *wild rice* is a species of rice (*zizania palustris*), and need not have the properties conventionally associated with wildness. This contrasts, for example, with *wild tomato*, which has no idiomatic association and so would refer to an uncultivated (or ill-behaved, etc.) tomato.

The idiom persists even when *wild rice* is modified by another adjective, such as *Minnesotan*, so that *Minnesotan wild rice* could be *zizania palustris*, when grown in Minnesota, for example.[12] However, if an adjective is inserted below *wild*, as in *wild Minnesotan rice*, the idiomatic reading is lost, and the rice must be conventionally 'wild' (in the case of rice, this would most likely mean uncultivated).

(37) a. (Minnesotan) wild rice = *zizania palustris* (from Minnesota)
b. wild Minnesotan rice = compositional only; uncultivated rice from Minnesota

Along the same lines, a *nervous system* is a kind of idiom, as is *French toast*; if regularly merged, compositional adjectives can only be merged outside *n*P, but these idiomatic adjectives are merged below, then the regular adjective cannot appear in between the idiomatic adjective and the noun.

(38) a. (artificial) nervous system = system of nerves (which is artificial)
b. nervous artificial system = compositional only

(39) a. (whole-wheat) French toast = fried battered bread breakfast dish (made with whole-wheat bread)
b. French whole-wheat toast = compositional only

Note that under the right circumstances, idioms in general can be disrupted by adjoined material. For example, *ply X's trade* means 'do X's usual work'; it can be applied to activities in which the word *trade* would not be used otherwise, e.g. as in (40).

(40) A team of young filmmakers plied their trade at the aquarium.

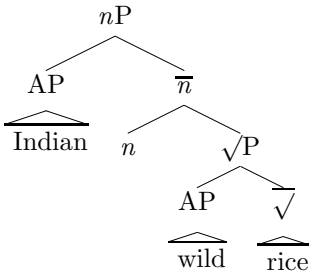
Even apart from the status of the possessive pronoun and the tense on the verb, an idiomatic noun like *trade* here can easily be modified by adjectives.

(41) A team of young filmmaker plied their glamorous trade at the aquarium.

Thus, it is not the case that idioms cannot be interrupted by non-idiomatic material (Nunberg et al. 1994; Svenonius 2005b). Instead, if A can only have an idiomatic meaning in NP when it is merged below *n*, and if non-idiomatic A's must be merged above *n*, then the right results are achieved (in the diagram I depict the root as categoriless, following Marantz; it could also be depicted as category N, as elsewhere in this paper).

[12] A-N idioms can be distinguished from A-N compounds on the basis of stress; see e.g. Liberman and Sproat (1992). Compare the A-N idiom *wild ríce* to the A-N compound *wíld man*.

(42)



7.4 Count adjectives

The easy parts, as it were, have been picked off: focused adjectives off the top, and idiomatic adjectives off the bottom. The resulting situation is a far cry from accounting for the observed tendencies in adjective ordering.

Muromatsu (2001) and Truswell (2004) argue that size-denoting adjectives such as *big* and *tiny* must merge above the head which creates countable entities out of masses (Borer's Cl, Truswell's Div, my SORT). This prevents them from appearing at all with mass nouns, which lack the appropriate kind of SORT.

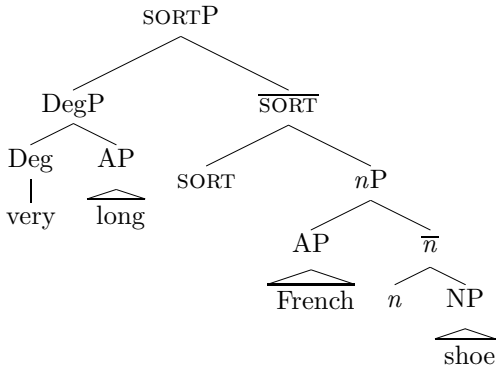
(43) a. red liquid, expensive salt, French mustard;
b. *big liquid, *tiny salt, *long mustard

Dimension adjectives consistently precede color, origin, and material adjectives.

(44) a. a big expensive vase; *?an expensive big vase
b. tiny red hats; *?red tiny hats
c. long French shoes; *?French long shoes

This is explained if color, origin, and material adjectives merge below SORT, for example to nP.

(45)



As for why such adjectives merge low, I suggest the following. Modification of nP is essentially intersective. Therefore only predicates of the same semantic type as nP can modify it. I suggest that this is the type of non-gradable pred-

icates, including the origin reading of *French*, the material reading of *wooden*, the geometric reading of *square*, and so on.

All of these adjectives can also be gradable, through combination with a Degree head (Abney 1987; Corver 1990; Grimshaw 1991; Kennedy 1999; Svenonius and Kennedy 2005). In that case they must be interpreted in terms of a scale, which affects the way they are understood (e.g. *French* meaning 'typical of France' rather than literally 'from France,' etc.).

sortP modification occurs in a different way from *n*P modification; it is crucially subsective, cf. Higginbotham (1985) for example. A DegP, I suggest, can be used for subsective modification of sortP, but not a simple (non-gradable) AP.

Thus I concur with Scott (2002) when he argues that APs in general are permitted to merge in whatever position makes sense for their interpretation. For example, when *French* is an evaluative adjective, as in *a very French attitude*, rather than an origin adjective, the same lexeme *French* might be merged in a higher position.

Where I break with Scott, however, is in the fine-grainedness of the structure supporting the adjectival modification. I have suggested here that the independently motivated layers of the DP provide several different parameters of adjectival meaning (focused, count, subsective, idiomatic), and that gradability provides another parameter of meaning. These factors, combined, should account for the adjectival orderings which are actually observed, and extralinguistic factors should account for the rest. On the account proposed here, it is difficult to see how, for example, length and width could be distinct functional heads. Scott proposes these in order to account for the pattern in (46).

(46) a. a long thin knife
b. *a thin long knife

However, the solution seems too tailored to the example. Consider the examples in (47)–(48), where *thick* is presumably an adjective of width and *lengthy* presumably an adjective of length.

(47) a. a long thick rope
b. a thick long rope

(48) a. a lengthy thin cord
b. a thin lengthy cord

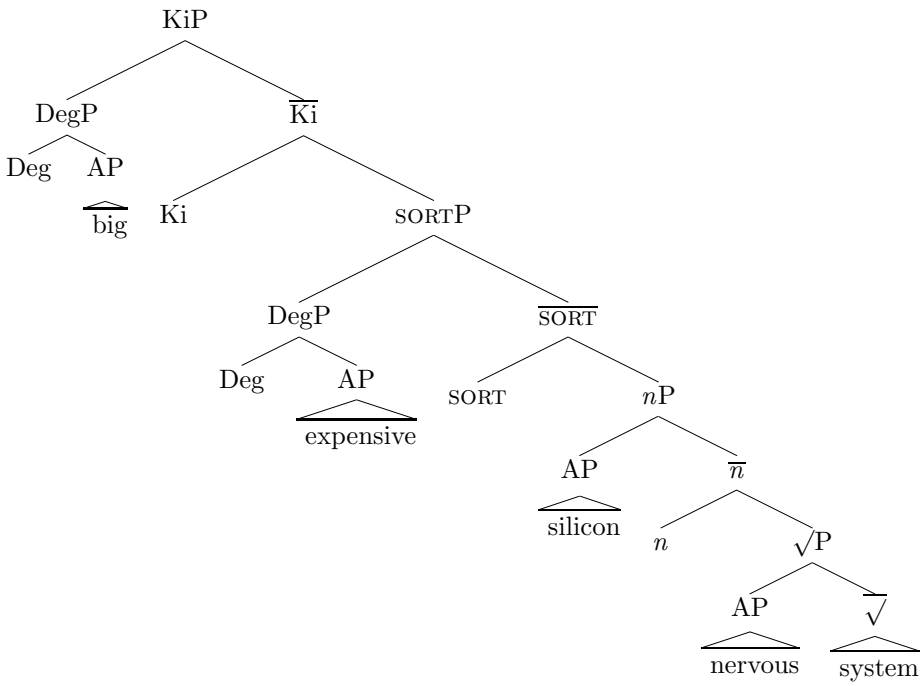
Scott's proposed hierarchy does not seem to admit the necessary flexibility. Even *thin long* is not completely impossible.

(49) a. thin long strands of pasta
b. a thin long charm necklace
c. thin long legs

Suppose, with Kayne (1994), that each head supports at most one specifier. If that is the case, then there cannot be more than one modifier per functional

head in the DP (as suggested by Cinque 1994). This would mean that the possibilities for attachment reduce as more adjectives are added. For example, perhaps *big* can in principle attach to SORTP, but if some other adjective is attached there, then *big*, if introduced, must attach either above or below.

(50)



This would produce rather constrained orders while, I believe, permitting a great deal of the actually observed variation. A language like English does seem to allow multiple instantiations of the same category, e.g. in *brave clever man* ∼ *brave clever man*, discussed by Dixon (1977) (cf. also discussion of this example in Scott 2002). On the view taken here, this would require a language-specific innovation, perhaps the innovation of a particular functional head. Principles of economy might favor fitting adjectives into the independently motivated structure when possible, leading to favored orders but admitting reverse orders when motivated.

8 Conclusion

In conclusion, Cinque's general idea that the fine syntactic structure of the DP can be put to use to constrain adjectival ordering is superior to any alternative thus far available. However, it does not seem necessary to go so far as to introduce dedicated functional heads for each adjective encountered.

The idea advanced here is that Universal Grammar (UG) dictates a structure for argumental noun phrases that necessarily involves a fair amount of functional

structure, following Zamparelli (2000), Baker (2003), Borer (2005) and others. The layers of functional structure represent stages of building referential argumental DPs from the abstract concepts associated with roots. Languages may then (and generally do) invent ways to modify the different layers of structure. A typical modifier for the DP level is a demonstrative, though other kinds of modifiers are possible; Zhang (2004) argues, in effect, that Chinese has a way of modifying the D layer with a relative clause. A demonstrative may be grammaticized as a D head when a reanalysis takes place from the demonstrative being a phrasal adjunct to DP in one generation to being a head of D in another.

Similarly, a language may over time invent a way to modify the *unit*P level, with various quantifiers or numeral phrases. Again, some of these may become grammaticized as heads of *unit*P.

And so on down the line. UG provides the basic ingredients for the category Adjective, and all languages appear to avail themselves of it in one form or another. The adjective turns out to make a particularly suitable modifier for some of the lower levels of the DP, but exactly how this is done varies substantially from language to language. What is most common, judging from Dixon's (2004a) typological survey, is that adjectives expressing dimension, age, value, and color are developed and combined with some functional structure to create *n*P modifiers or SORTP modifiers.

There seem to be at least two ways in which this might occur.[13] If the functional structure takes the adjective as complement, changing its type into that of a modifier of, say, SORTP, then the adjective may be able to apply iteratively within a projection. This is the case, for example, in Jarawara, according to Dixon (2004b), which has only fourteen adjectives but may use more than one in a single DP, with apparently free ordering. Another possibility is that a language might use the nominal structure itself to introduce the adjectival modifier, e.g. by allowing *n* or SORT to take an adjectival specifier. In such cases, a single adjective (of any given type) would be the norm. This seems to be the situation in Wolof, as described by McLaughlin (2004), where an adjective may cooccur with a relative clause, but two adjectives cooccur only if coordinated.[14]

Eventually, a language might innovate ways of modifying each layer of the DP, either with specialty inventories of modificational elements for each layer, or, as in English, with a large class of adjectives being compatible with more than one functional option. The impression of a large class of adjectives comes, then from the fact that there are many roots that can be used as adjectives, and from the fact that the functional heads introducing NP, *n*P, and SORTP modifiers are not morphologically distinct. The impression of strict ordering comes mainly from the fact that SORTP modifiers are strictly ordered before *n*P

[13] See discussion in Truswell (2004), including discussion there of work by Albert Ortmann, which I have not read.

[14] Interesting in this regard is the characterization of Chinese presented in Sproat and Shih (1991), where it is claimed that direct (i.e. without *de*) modification of a noun is possible for exactly one adjective expressing size or quality, and one expressing color or shape, and if the two cooccur it is in strict order: quality/size > shape/color. This would suggest that Chinese provides a position for a single quality or size adjective above SORT, and a position for a single shape or color adjective below SORT. The element *de* makes iteration possible.

modifiers (and both are strictly ordered before NP modifiers), and that iteration within a layer is avoided when possible. Thus, pairs of adjectives will normally be arranged, in English, so that one is a *n*P modifier and the other is a sortP modifier. The one which is the most sensitive to shape, or the one which is the most robustly gradable, will then appear as the sortP modifier.

References

Abney, Steven. 1987. *The English Noun Phrase in its Sentential Aspect*. Ph.D. thesis, MIT, Cambridge, Ma.

Aboh, Enoch Oladé. 2004. *The Morphosyntax of Complement-Head Sequences: Clause Structure and Word Order Patterns in Kwa*. Oxford University Press, Oxford.

Aikhenvald, Alexandra Y. 2000. *Classifiers: A Typology of Noun Categorization Devices*. Oxford University Press, Oxford.

Alexiadou, Artemis and Chris Wilder. 1998. Adjectival modification and multiple determiners. In *Possessors, Predicates and Movement in the Determiner Phrase*, edited by Artemis Alexiadou and Chris Wilder, pp. 303–332. John Benjamins, Amsterdam.

Allan, Keith. 1977. Classifiers. *Language* 53 2: 285–311.

Andrews, J. Richard. 1975. *Introduction to Classical Nahuatl*. University of Texas Press, Austin.

Babby, Leonard H. 1987. Case, pre-quantifiers, and discontinuous agreement in Russian. *Natural Language and Linguistic Theory* 5: 91–138.

Baker, Mark C. 2003. *Verbs, Nouns, and Adjectives: Their Universal Grammar*. No. 102 in Cambridge Studies in Linguistics. Cambridge University Press, Cambridge.

Bernstein, Judy. 1993. *Topics in the Syntax of Nominal Structure across Romance*. Ph.D. thesis, CUNY, New York.

Borer, Hagit. 2005. *In Name Only (Structuring Sense, vol. I)*. Oxford University Press, Oxford.

Brugè, Laura. 2002. The positions of demonstratives in the extended nominal projection. In *Functional Structure in DP and IP: The Cartography of Syntactic Structures*, edited by Guglielmo Cinque, pp. 15–53. Oxford University Press, New York.

Carlson, Gregory Norman. 1977. *Reference to Kinds in English*. Ph.D. thesis, University of Massachusetts at Amherst.

Cheng, Lisa and Rint Sybesma. 1999. Bare and no-so-bare nouns and the structure of NP. *Linguistic Inquiry* 30: 509–542.

Cinque, Guglielmo. 1994. On the evidence for partial N-movement in the Romance DP. In *Paths towards Universal Grammar: Studies in Honor of Richard S. Kayne*, edited by Guglielmo Cinque, Jan Koster, Jean-Yves Pol-

lock, Luigi Rizzi, and Raffaella Zanuttini, pp. 85–110. Georgetown University Press, Washington, DC.

Cinque, Guglielmo. 2005. Deriving Greenberg's Universal 20 and its exceptions. *Linguistic Inquiry* 36 3: 315–332.

Corbett, Greville G. 1991. *Gender*. Cambridge University Press, Cambridge.

Corver, Norbert. 1990. *The Syntax of Left Branch Extractions*. Ph.D. thesis, University of Tilburg.

Delfitto, Denis and Jan Schroten. 1991. Bare plurals and the number affix in DP. *Probus* 3: 155–185.

Demonte, Violeta. 2005. Meaning-form correlations and the order of adjectives in Spanish. Ms. Universidad Autónoma de Madrid.

Dixon, R. M. W. 1977. Where have all the adjectives gone? *Studies in Language* pp. 19–80.

Dixon, R. M. W. 2004a. Adjective classes in typological perspective. In *Adjective Classes: A Cross-Linguistic Typology*, edited by R. M. W. Dixon and Alexandra Y. Aikhenvald, pp. 1–49. Oxford University Press, Oxford.

Dixon, R. M. W. 2004b. *The Jarawara Language of Southern Amazonia*. Oxford University Press, Oxford.

Dryer, Matthew. 1989a. Plural words. *Linguistics* 27: 865–895.

Dryer, Matthew S. 1989b. Article-noun order. *Papers from the Regional Meetings, Chicago Linguistic Society* 25 1: 83–97.

Dryer, Matthew S. 1992. The Greenbergian word order correlations. *Language* 68 1: 81–138.

Franks, Steven. 1994. Parametric properties of numeral phrases in Slavic. *Natural Language and Linguistic Theory* 12 4: 597–674.

Giusti, Giuliana. 2002. The functional structure of noun phrases: A bare phrase structure approach. In *Functional Structure in DP and IP: The Cartography of Syntactic Structures*, edited by Guglielmo Cinque, pp. 54–90. Oxford, New York.

Greenberg, Joseph H. 1963. Some universals of grammar with particular reference to the order of meaningful elements. In *Universals of Language. Report of a Conference Held at Dobbs Ferry, NY, April 13-15, 1961*, edited by Joseph H. Greenberg, pp. 73–113. MIT Press, Cambridge, Ma.

Greenberg, Joseph H. 1978. How does a language acquire gender markers? In *Universals of Human Language*, edited by Joseph H. Greenberg, Charles A. Ferguson, and Edith A. Moravcsik, vol. III, Word Structure, pp. 47–82. Stanford University Press, Stanford, Ca.

Grimshaw, Jane. 1991. Extended projections. Ms. Brandeis University.

Grinevald, Colette. 2000. A morphosyntactic typology of classifiers. In *Systems of Nominal Classification*, edited by Gunter Senft, pp. 50–92. Cambridge University Press, Cambridge.

Gutiérrez-Rexach, J. and E. Mallen. 2002. Toward a unified minimalist analysis of prenominal adjectives. In *Structure Meaning and Acquisition in Spanish. Papers from the 4th Hispanic Linguistics Symposium*, edited by C. Clements, pp. 178–192. Cascadilla, Somerville, Ma.

Haspelmath, Martin, Matthew S. Dryer, David Gil, and Bernard Comrie (eds.) . 2005. *The World Atlas of Language Structures*. Oxford University Press, Oxford.

Hawkins, John A. 1983. *Word Order Universals*. Quantitative analyses of linguistic structure series. Academic Press, New York.

Heine, Bernd. 1982. African noun class systems. In *Apprehension: Das sprachliche Erfassen von Gegenständen*, edited by Hansjakob Seiler and Christian Lehmann, pp. 189–216. Narr, T/"ubingen. I: Bereich und Ordnung der Phänomene.

Hetzron, Robert. 1978. On the relative order of adjectives. In *Language Universals*, edited by Hansjakob Seiler, pp. 165–184. Gunter Narr, Tübingen.

Higginbotham, James. 1985. On semantics. *Linguistic Inquiry* 16 4: 547–593.

Holmberg, Anders and David Odden. 2005. The izafe and NP structure in Hawrami. *Durham Working Papers in Linguistics* 10: 77–94.

Hualde, José Ignacio and Jon Ortiz de Urbina. 2003. *A Grammar of Basque*. Mouton de Gruyter, Berlin.

Ionin, Tania and Ora Matushansky. 2005. 1001 Nights: The syntax and semantics of complex numerals. Ms. USC and CNRS/Université Paris 8.

Julien, Marit. 2002. Determiners and word order in Scandinavian DPs. *Studia Linguistica* 56: 265–315.

Julien, Marit. 2005. *Nominal Phrases from a Scandinavian Perspective*. John Benjamins, Amsterdam.

Kayne, Richard S. 1994. *The Antisymmetry of Syntax*. MIT Press, Cambridge, Ma.

Kennedy, Christopher. 1999. *Projecting the Adjective: The Syntax and Semantics of Gradability and Comparison*. Garland, New York. (1997 UCSC Ph.D. thesis).

Koopman, Hilda and Anna Szabolcsi. 2000. *Verbal Complexes*, vol. 34 of *Current Studies in Linguistics*. MIT Press, Cambridge, Ma.

Laenzlinger, Christopher. 2005. French adjective ordering: Perspectives on DP-internal movement types. *Lingua* 115 5: 645–689.

Larson, Richard and Hiroko Yamakido. 2005. Ezafe and the position of nominal modifiers. Ms. Stony Brook University; presented at the LSA.

Liberman, Mark and Richard Sproat. 1992. The stress and structure of modified noun phrases in English. In *Lexical Matters*, edited by Ivan A. Sag and Anna Szabolcsi, pp. 131–182. CSLI, Stanford, Ca.

MacKay, Carolyn J. 1999. *A Grammar of Misantla Totonac*. University of Utah

Press, Salt Lake City.

Marantz, Alec. 2001. Words. Ms. MIT.

McLaughlin, Fiona. 2004. Is there an adjective class in Wolof? In *Adjective Classes: A Cross-Linguistic Typology*, edited by R. M. W. Dixon and Alexandra Y. Aikhenvald, pp. 242–262. Oxford University Press, Oxford.

Muromatsu, Keiko. 2001. Adjective ordering as the reflection of a hierarchy in the noun system. *Linguistic Variation Yearbook* 1: 181–207.

Nunberg, Geoffrey, Ivan A. Sag, and Thomas Wasow. 1994. Idioms. *Language* 70: 491–538.

Paul, Waltraud. 2005. Adjectival modification in Mandarin Chinse and related issues. *Linguistics* 43 4: 757–793.

Rijkhoff, J. 2002. *The Noun Phrase*. Oxford University Press, Oxford.

Ritter, Elizabeth. 1993. Where's gender? *Linguistic Inquiry* 24 4: 795–803.

Sadler, Louisa and Douglas J. Arnold. 1994. Prenominal adjectives and the phrasal/lexical distinction. *Journal of Linguistics* 30 1: 187–226.

Scott, G.J. 2002. Stacked adjectival modification and the structure of nominal phrases. In *Functional Structure in DP and IP: The Cartography of Syntactic Structures*, edited by Guglielmo Cinque, pp. 91–120. Oxford University Press, New York.

Shlonsky, Ur. 2004. The form of Semitic noun phrases. *Lingua* 114 12.

Sigurðsson, Halldór Ármann. 1992. Aspects of the DP analysis of the Icelandic NP. In *Papers from the Workshop on the Scandinavian Noun Phrase*, edited by Anders Holmberg, Department of General Linguistics, University of Umeå, Report 32, pp. 119–144. Department of General Linguistics, University of Umeå, Umeå.

Simpson, Andrew. 2004. Classifiers and DP structure in Southeast Asia. In *The Oxford Handbook of Comparative Syntax*, edited by Guglielmo Cinque and Richard S. Kayne, pp. 806–838. Oxford, New York.

Sproat, Richard and Chilin Shih. 1991. The cross-linguistic distribution of adjective ordering restrictions. In *Interdisciplinary approaches to language*, edited by C. Georgopoulos and R. Ishihara, pp. 565–593. Kluwer, Dordrecht.

Starke, Michal. 2004. On the inexistence of specifiers and the nature of heads. In *Structures and Beyond: The Cartography of Syntactic Structures, vol. 3*, edited by Adriana Belletti, pp. 252–268. Oxford University Press, New York.

Svenonius, Peter. 1994. The structural location of the attributive adjective. In *The Proceedings of the Twelfth West Coast Conference on Formal Linguistics*, edited by Erin Duncan, Donka Farkas, and Philip Spaelti, pp. 439–454. CSLI, Stanford, Ca.

Svenonius, Peter. 2005a. 1...3–2. Ms. University of Tromsø, available at http://ling.auf.net/lingBuzz/000200.

Svenonius, Peter. 2005b. Extending the extension condition to discontinuous id-

ioms. Ms. University of Tromsø, to appear in *Yearbook of Linguistic Variation 5*.

Svenonius, Peter and Christopher Kennedy. 2005. Northern Norwegian degree questions and the syntax of measurement. Ms. University of Tromsø and University of Chicago, available at http://ling.auf.net/lingBuzz/000198.

Szabolcsi, Anna. 1994. The noun phrase. In *The Syntactic Structure of Hungarian*, edited by Ferenc Kiefer and Katalin É. Kiss, vol. 27 of *Syntax and Semantics*, pp. 179–274. Academic Press, San Diego.

Truswell, Robert. 2004. *Attributive Adjectives and the Nominals they Modify*. Master's thesis, Oxford University.

Vangsnes, Øystein Alexander. 1999. *The Identification of Functional Architecture*. Ph.D. thesis, University of Bergen.

Vangsnes, Øystein Alexander. 2001. On noun phrase architecture, referentiality, and article systems. *Studia Linguistica* 55: 249–299.

Whorf, Benjamin Lee. 1945. Grammatical categories. *Language* 21 1: 1–11.

Zamparelli, Roberto. 2000. *Layers in the Determiner Phrase*. Garland, New York.

Zavala, Roberto. 2000. Multiple classifier systems in Akatek (Mayan). In *Systems of Nominal Classification*, edited by Gunter Senft, pp. 114–146. Cambridge University Press, Cambridge.

Zhang, Niina Ning. 2004. Representing specificity by the internal order of indefinites. Ms. National Chung Cheng University, Taiwan.