

2 Nominal Subprojections and Their Word Orders

2.1 Orders of Demonstrative, (Cardinal) Numeral, Adjective, and Noun

To illustrate why out of the mathematically possible orders of n elements only a subset is ever found, I begin with the more complex case of the attested orders of the four elements Demonstrative, (cardinal) Numeral, Adjective, and Noun (actually DemP, NumP, AP, and Noun), as this is better known from previous work (Greenberg 1963; Cinque 2005; Abels and Neeleman 2009, 2012; and other works since). In Cinque (2005) I claimed that only a subset of the mathematically possible orders of those elements, namely 14 of 24 (factorial 4), are actually attested (those in (1A)), proposing a set of conditions able to derive them without also deriving the 10 unattested ones of (1B).

- | | |
|----------------|-----------------|
| (1) A. | B. |
| a. N A Num Dem | a. *Dem A Num N |
| b. Dem Num A N | b. *Num A Dem N |
| c. Dem N A Num | c. *A Num Dem N |
| d. Dem Num N A | d. *Num Dem A N |
| e. Num N A Dem | e. *A Dem Num N |
| f. N A Dem Num | f. *A Num N Dem |
| g. N Num A Dem | g. *A Dem N Num |
| h. Dem N Num A | h. *Num Dem N A |

- | | |
|----------------|-----------------|
| i. Dem A N Num | i. *Num N Dem A |
| l. N Dem Num A | l. *N Num Dem A |
| m. Num A N Dem | |
| n. N Dem A Num | |
| o. A N Num Dem | |
| p. A N Dem Num | |

There I also stressed the importance of not considering informationally special orders, to the extent that it is possible to recognize them in the relevant sources. I take up that work again because, despite some apparent counterevidence,¹ that claim and that general approach seem to me to be correct and capable of providing the simple principle at the base of the orders that are systematically missing in the subdomains just reviewed (and in all other phrasal domains). There I assumed that the 14 possible orders of Demonstrative, (Cardinal) Numeral, Adjective, and Noun are a function of the way the N(P) heading the nominal extended projection moves, by itself or by pied piping a phrase containing it via the two existing modes of pied piping (the *whose-pictures* type and the *pictures-of-whom* type, modulo NP rather than [_{XP} *wh-*] as the element undergoing movement). As noted in Cinque (2005), to obtain the correct result of ruling in the 14 attested orders while ruling out the 10 unattested ones, no other movement except that of the N(P) (or of phrases containing it) must be allowed. In particular neither AP nor NumP movements by themselves should be allowed to build the canonical order of Determiner phrases. The marked AP movement above demonstratives in languages such as Chinese (Zhang 2015) and Bangla (see Guha 2017), from this point of view, is not directly relevant. Also not relevant are those orders derived by movement to scope positions, as with the movement of English APs to a superlative high position in front of numerals, for example, *The black*(est) two dogs that I've (ever) seen* (Kayne 2008b: fn15, also on Persian; and in this volume, see chapter 4, note 39 on Maltese), and above higher adjectives, reversing the canonical order: *The <hard*(est)>occasional <hard*(est)>worker . . .* (Cinque

2010b: 32). Similarly outside of such a theory is the fronting of APs before the indefinite determiner in English in the presence of a degree word (e.g., *how*, *too*) *ped piper*: <*How big*> *a* <**how big*> *house did John buy?* (Kayne 2007: section 8.3) and in the similar Bavarian constructions discussed in Plank (2003a: section 2.9). On this construction see Zoppi (2020).²

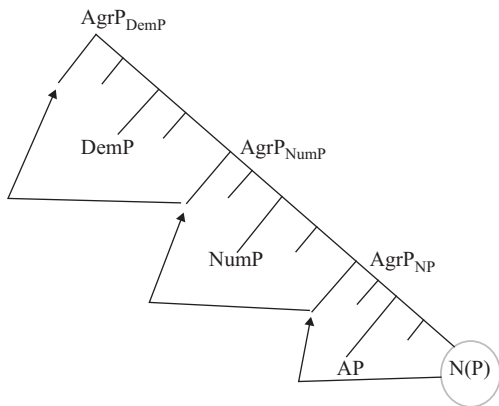
In Cinque (2005) I had assumed that one order, the order Dem Num A N, involved no movement, being the order of Merge. But that was incorrect because certain nominal heads, like Singular/Dual/Plural (PL), . . . (number), Determiner (Det), and Case (K), interspersed at Merge among the prenominal modifiers,³ generally follow the noun in head-final languages while modifiers precede it (DemP NumP AP N PL Det Case).⁴ So I would now take even that order to be derived by moving the heads of the nominal extended projection (N, PL, Det, Case) with the *pictures-of-whom* pied piping. See the discussion in section 3.3.

The fact that more orders are found to the right of a head than to its left (the left-right generalization mentioned in chapter 1) is a consequence of the way the head of a projection moves. For example, illustrating only the case where all modifiers are on the same side of the noun, the leftward movement of the N(P) by itself to a position above the demonstrative or by the *whose-pictures* pied piping mode (whereby the noun drags along stepwise constituents c-commanded by it) gives rise to two orders to the right of the noun ((2a) and (2b), respectively). The leftward movement of the noun via the *pictures-of-whom* pied piping mode (whereby it drags along stepwise constituents c-commanding it) gives rise instead to the single order attested to the left of the noun ((2c)).

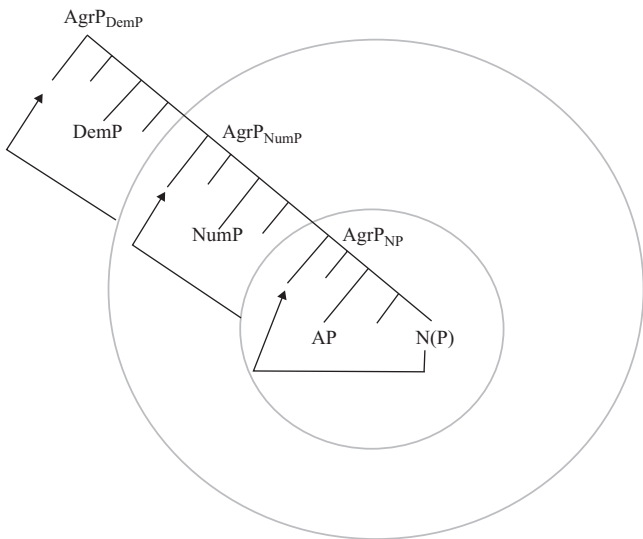
The derivations in (2) are very much simplified. See sections 3.3 and 3.4 for a more detailed discussion of (this part of) the nominal domain. The representation X(P) is meant to underline the undetermined head (X°)/phrasal (XP) status of the core element of the projection (something that projects but also moves to a specifier position) (cf. Chomsky's [1994] bare phrase structure

approach, according to which every nonbranching element is automatically both a phrase and a head, and Kayne’s [2008a] notion of singleton set).

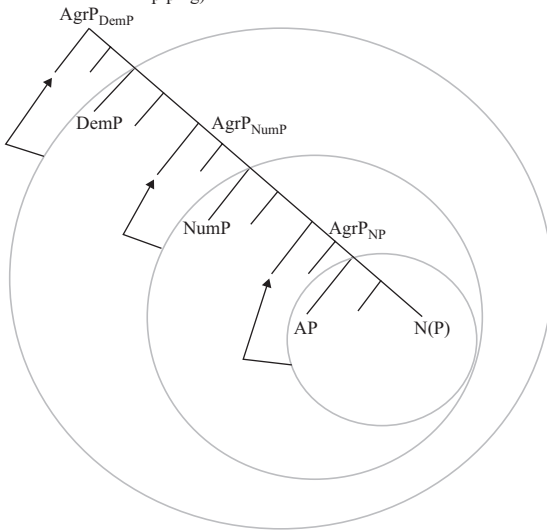
(2) a. N Dem Num A (derived via movement of the N(P) without pied piping)



b. N A Num Dem (derived via movement of the N(P) with the *whose-pictures* pied piping, vacuously in the first movement)



c. Dem Num A N (derived via movement of the N(P) with the *pictures-of-whom* pied piping)



While the movement shown in (2a) could be represented as successive movement from head to head, that in (2b) and (2c) is clearly phrasal, which suggests generalizing phrasal movement to (2a) as well.⁵

An approach allowing the movement of the N(P) in one of the possible derivational options, and only the N(P), appears capable of discriminating between the 14 attested and 10 unattested orders of the 4 elements Dem Num A N (see Cinque 2005, as updated here).

The clausal counterparts of the three derivations in (2) have something in common with the derivations termed “climbing,” “inverted order,” and “English order” in Koopman and Szabolcsi (2000) (cf. also Koopman 2002); “skipping,” “curl/roll-up,” and “straight” in Svenonius (2007); and “stranding” and “pied piping” in Jayaseelan (2010). See chapter 4 for the derivations assumed here.

The same situation is found with nominal phrases comprising three elements, such as those discussed in sections 2.2–2.7. Here too the attested orders are a subset of the mathematically possible ones: 4 of 6 (factorial 3).

2.2 Orders of (Cardinal) Numeral, Classifier, and Noun

As Greenberg (1972: 28) observes, of the six potential orders of N(oun), Num(eral), and Classifier (CLF), only four are attested (cf. (3)) (on the relative rarity of the N CLF Num and CLF Num N orders, mainly concentrated in Northeast India and neighboring regions, see Evans, 2022):

- (3) a. Num CLF N⁶
b. N CLF Num⁷
c. N Num CLF⁸
d. CLF Num N⁹
e. *CLF N Num
f. *Num N CLF

Greenberg's conclusion has been confirmed by subsequent investigations (Adams and Conklin 1973: 1; Conklin 1981: 4–5; Aikhenvald 2000: 104–105; Hall 2015: chapter 5, 2019; Her 2017a, 2017b; Allasonnière-Tang and Her 2020: section 2; Her and Tsai 2020). The alleged instances of the orders in (3)e. and (3)f. pointed out in the literature have been shown in Hall (2015: chapter 5) and Her (2017a, 2017b) to be apparent only, as is the case of Ejagham (also mentioned in Aikhenvald 2000: 105), and of other Niger-Congo languages (Kießling 2018), where the “classifier” is in fact the true syntactic head of the nominal phrase triggering noun class agreement on the numeral.¹⁰ The same can be said for the apparently exceptional case of cardinal ‘one’ in certain Tibeto-Burman and Tai-Kadai languages, which is plausibly an “indefinite article” (Her 2017a: section 2.2) (in this connection, Kayne [2017] is relevant).

2.3 Orders of Multiplier, Base, and Noun

A similar pattern is found with the orders of the noun with multiplier and base (in complex cardinals such as ‘three hundred’). Interestingly, Greenberg notes that the order between a multiplier and a base tends to “harmonize” with the order between a (cardinal) numeral and a classifier (cf. Greenberg 1989: 111), as well as with the order of (cardinal) numeral and noun (see Greenberg’s [1990] Generalization 28). I return to these (partial) correlations later (on the notion of base, also see Kayne [2006a], Comrie [2016], and additional references cited therein).

- (4) a. multiplier base N¹¹
- b. N base multiplier¹²
- c. N multiplier base¹³
- d. base multiplier N¹⁴
- e. *base N multiplier
- f. *multiplier N base

2.4 Orders of Cardinal and Ordinal Morphemes (to Form Ordinal Numerals) and Noun

Ordinal numerals, which give the number position of an item in an ordered sequence, are often composed of a cardinal and an ordinal morpheme. When the two morphemes are realized separately and combine with the noun one observes the same pattern of four possible orders out of six. See (5) (a pattern pointed out in Tatsumi [2020]; also see Tatsumi [2021: Chapter 4] for other strategies for expressing ordinals).

The orders in (5) should not be confused with the relative orders of cardinal numerals and ordinal numerals when these co-occur, as in “the first three pages.” This is clearly seen in Vietnamese (Vietic) and Lakkja (Kam-Tai), where cardinal numerals precede the noun while ordinal numerals (composed of an

ordinal morpheme preceding a cardinal numeral) follow the noun: Num_{card} CLF N A [_{OrdP} Ord Num_{Card}] (Nguyen 2004: 51; and respectively Fan 2019: sections 4.1.8.1 and 4.4.2).

- (5) a. Card Ord N (Maale, Kashmiri,..)¹⁵
 b. N Ord Card (Uab Meto, Tai Lue,..)¹⁶
 c. N Card Ord (Kove, Koromfe,..)¹⁷
 d. Ord Card N (Àhàn,..)¹⁸
 e. *Ord N Card¹⁹
 f. *Card N Ord

In certain languages, perhaps universally, ordinals are actually merged in two distinct positions. The higher position is arguably part of the subprojection headed by the cardinal numeral, following “other” and preceding the cardinal ([‘other’ [ordinal [cardinal]]]). The lower position occurs after the cardinal (outside of the subprojection containing the cardinal). The two ordinals can even co-occur (see Cinque’s [2015: 24n4, 2022c: section 4] examples from Italian, French, and Russian. See, e.g., the Italian example [*gli [ultimi due] primi giorni di scuola*] ‘the last two first days of school’). If only the Head of a (sub)projection can move, as I suggest later, a comparison of Italian and French provides evidence that it is the cardinal that heads the subprojection containing the higher ordinal and ‘other’, because in French the cardinal obligatorily crosses over the ordinal and ‘other’ ([*les [deux, autres premiers t_j] membres*] ‘lit.’ ‘the two other first members’), while it does not in Italian, nor in English, [*gli [altri primi due] membri*] ‘the other first two members’. More complex is the case of Hebrew, which has the overall order Num_{Cardinal} N Adj Num_{Ordinal} Dem (Shlonsky 2004; section 5). If anything, the order that combines the two ordinals in Hebrew is ‘two days last first’ (Ur Shlonsky, pers. comm., August 5, 2021).

2.5 Orders of Degree Adverb, Adjective, and Noun

Consider also the attested and unattested orders of degree adverb (e.g., intensifier), adjective, and noun, (6). Once again, only four of six orders are apparently attested.

In Greenberg's (1963) sample only languages with the orders degree adverb A N (11 languages), N A degree adverb (8 languages), and N degree adverb A (2 languages) are reported as attested (cf. his table 7 and Universal 21). But the order A degree adverb N is also attested, even if rarely. (See the references in note 23.) Dryer (2008: 62) also reports that the order AdjN&AdjDeg is uncommon (unattested in Tibeto-Burman), while the other three orders (AdjN&DegAdj, NAdj&DegAdj, and NAdj&AdjDeg) are quite common (in Tibeto-Burman too).

- (6) a. degree adverb A N (English, Korean²⁰,...)
- b. N A degree adverb (Ichindali, Daai Chin,...)²¹
- c. N degree adverb A (Italian, Apatani,...)²²
- d. A degree adverb N (Sakha, Korlai,...)²³
- e. *A N degree adverb
- f. *degree adverb N A²⁴

2.6 Orders of Measure Phrase, Adjective, and Noun

The same pattern is found when a measure phrase, an adjective, and a noun are combined together. See (7):

- (7) a. measure phrase A N (English, Bulgarian,...)²⁵
- b. N A measure phrase (Italian, Bulgarian,...)²⁶
- c. N measure phrase A (Bosnian,...)²⁷
- d. A measure phrase N (Chinese,...)²⁸
- e. *A N measure phrase
- f. *measure phrase N A

To judge from the possibility of such phrases as *two inches too short a pole* (Peter Svenonius, pers. comm., May 21, 2020), *lipsticks*

two shades too red (for her complexion), or German *Sie haben einen um einen Meter zu tiefen Graben gegraben* literally, ‘they have one of one meter too deep ditch digged’ (Roland Hinterhölzl, pers. comm., November 30, 2022) measure phrases (*two inches, two shades, einen Meter*) appear to modify the degree word (*too, zu*) within the degree phrase, which in turn modifies the AP, which modifies the NP.²⁹

2.7 Orders of Color, Color Adjective, and Noun

Exactly the same pattern is also found when the noun combines with an adjective of color and the noun for ‘color’. In languages like Chinese a particular adjective class can co-occur with the common noun that corresponds to that class; for example, ‘white’/‘black’/‘red’/ . . . with ‘color’, ‘big’/‘small’/‘medium’/ . . . with ‘size’, and so on (an instance of the more general co-occurrence of common noun–proper noun, which is known to at least partially correlate with the head-final and head-initial types; see Greenberg’s [1963] Universal 23 and Cinque [2011] and references cited there).

It could be objected that, unlike Chinese, English and many other languages do not readily allow for the co-occurrence of a color name with the common noun ‘color’. However, there is indirect evidence even in English for a silent, if not overt (for certain speakers), instance of the noun ‘color’, modified by the proper name of a color. So not only are sentences like *What color car did they buy?* possible for all speakers who are asking for a color name. Even phrases like *a red color car* are acceptable to a number of speakers (see Kayne 2005b: 57, note 20, 2007: section 15; and William Snyder, pers. comm., February 20, 2020), though not to all. In other languages the noun ‘color’ is optionally pronounced (in addition to Chinese, see the languages mentioned in (9)). This evidence makes it plausible to assume that the name of a color always co-occurs with an overt or silent common noun

‘color’.³⁰ In other words, adjectives (APs) may turn out not to modify the head noun directly but only as part of a nominal projection headed by the corresponding common noun [_{NP} [_{NP} [_{AP}_{color}] color] N], [_{NP} [_{NP} [_{AP}_{size}] size] N], [_{NP} [_{NP} [_{AP}_{nationality}] nationality] N], and so on to the effect that it is this nominal projection that modifies the head noun directly (see Kayne 2005b: 15). This may be true of numerals and demonstratives as well. Although numerals appear to be categorially adjectives in some languages (or in one language for some numbers, see Corver and Tatsumi 2021: section 2), nominal in others (e.g., Galo—Sino-Tibetan; Post 2007: section 8.2.1), and relatives in still others (Ionin and Matushansky 2018: section 3.4), they possibly also modify nouns via a nominal projection (a phrase headed by an overt “amount/number”, as obligatorily in Korowai and optionally in Cotabato Manobo and Tawala [see (8)] - or a silent one elsewhere [see Zweig 2006; Kayne 2006a, 2007]). And this may carry over to the internal constituents of complex numerals. Greenberg (1990: 287) observes that “multiplicands are often treated like nouns and multipliers . . . like noun modifiers in general. Hence, it is reasonable to equate the multiplicand with the noun and the multiplier with the adjective.”

- (8) a. gol wayafül-anop (Korowai—Papuan [de Vries 2012: 186])
 pig four(lit. index.finger)-amount
 ‘four pigs’
- b. lima kedoo etaw (Cotabato Manobo—Malayo
 -Polynesian [Kerr 1988: 48])
 five number people
 ‘five people’
- c. lawa magou-na wohepali (Tawala—Oceanic [Ezard 1984: 91])
 person number-its four
 ‘four men’

The same may be true of demonstratives if the head of the demonstrative subprojection is actually a silent PLACE/THING/PERSON modified by a locative reinforcer (e.g., [[this HERE PLACE] square]). See Kayne (2004a) and Leu (2008: section 2.2).

This may turn out to be true of every nominal modifier, and thus render otiose the question whether adjectives, for comparative purposes, should be considered a semantic notion rather than a category given that they sometimes appear to be categorially nouns (*a silver musical box*), sometimes categorially an adverb (*the then prime minister*), sometimes categorially a prepositional phrase (*an off-the-cuff remark*), sometimes categorially a particle (*his ex-girlfriend*), and so on. What seems to count is that each class is plausibly merged in all languages in the specifier of a corresponding overt or silent common noun (e.g., MATERIAL, PLACE, TIME), in the same dedicated position of the nominal extended projection (see, e.g., Scott 2002, and also Dryer 2018: section 4.2), which may suggest, as Ian Roberts observed (pers. comm., June 11, 2021), that some “grammatical categories/modifiers” are really positions rather than features.

To go back to the adjective of color, (9) exemplifies the attested and nonattested orders of the noun ‘color’ and of a color adjective across languages. Once again, apparently only four of six orders are found.

- (9) a. A_{color} ‘color’ N (Chinese, Bulgarian,..)³¹
 b. N ‘color’ A_{color} (Niuean, Lao, Vietnamese,..)³²
 c. N A_{color} ‘color’ (Mocho’, Bulgarian,..)³³
 d. ‘color’ A_{color} N (Chinese, Russian,..)³⁴
 e. *‘color’ N A_{color}
 f. * A_{color} N ‘color’

In the context of determining which orders are cross-linguistically possible, or impossible, the question of which specific orders are characteristic of head-final or head-initial languages is not directly relevant. The goal is to arrive at a system that specifies

all the possible/attestable orders, not just those that are more frequent or that conform to a maximal degree to the head-final/head-initial correlations. The latter appears to be a separate (albeit important) question, to which I return.

In sections 2.2 to 2.7 we have considered triplets of nominal elements that give rise to six potential orders, of which only four have apparently turned out to be attested. Each triplet was composed of the noun and a pair of elements arguably belonging to a separate constituent of the nominal extended projection ([[Num CLF] N], [[Multiplier Base] N], [[Card Ord] N], [[Degree Word A] N], [[Measure Phrase A] N], [[A_{color} 'color' N]]). The constituency [[Num CLF] N] is suggested in Greenberg (1972: 28; 1975³⁵), Huang (1982), Lin (1997), Fukui and Takano (2000: section 4), Hsieh (2008: section 2.3.4), Hall (2015), Her (2017b), among others. This constituency is argued for in detail in Brown (2001: 431) for Nias Selatan; in Inglis (2003) for Thai; in Henderson (2006: section 3.2) for Sinhala; in Bale and Coon (2014: section 3) and Bale, Coon, and Arcos López (2019: section 4.1) for Mi'gmaq and Chol; and in Her and Tsai (2020) and Allasonnière-Tang et al. (2021) for Chinese.³⁶ On the constituent [multiplier base] see Kayne (2005b: section 9), He (2015), and Her (2017a, 2017b). The constituent structure assumed here for the remaining cases ([[Card Ord] N], [[degree word A] N], [[measure phrase A] N], and [[A_{color} 'color' N]]) needs no particular argumentation.

The missing orders (those where N comes between the two elements of the pair) could thus be unproblematically seen as a consequence of the overall hierarchical composition. The N (NP) can be linearized to the right or to the left of the constituent modifying it but not inside it. This apparently simple conclusion, carrying over to the order inside the constituent modifying the noun, that the head of the constituent can be linearized to the right or to the left of its modifier, though essentially correct, is nonetheless insufficiently general. While the simple left or right

linearization might seem to work when there are just two elements, it fails when more elements are involved, as in the case of the order of demonstrative, numeral, adjective, and noun that we have discussed in this chapter or in the case to be discussed in section 3.6. What is needed is some principle that may account for the simple and the more complex cases at the same time. One will be suggested in chapter 3.

Notice that if the correct constituencies were different from the ones assumed here, like those proposed for the sequence [numeral classifier noun] by Cheng and Sybesma (1999), Borer (2005: chapter 6), Watanabe (2006), Huang et al. (2009), and Li (2013) (i.e., [Num [CLF [N]]], or for the sequence [multiplier base noun] by Ionin and Matushansky (2006, 2018: chapter 3) (i.e., [Multiplier [Base [N]]]), things would not be as straightforward. More orders than the attested ones would be expected to exist (e.g., *[Num [N] [CLF]], [[CLF N] Num], *[Multiplier [N] [Base]], *[[Base N] Multiplier]). The principle to be suggested in chapter 3 that only the head of a subprojection can move provides an additional argument for the constituencies assumed here, and, in a sense, a novel type of diagnostic for constituency.³⁷

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Toward a Restrictive Theory

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