

## 3 Toward a Restrictive Theory of Linear Order

### 3.1 The Role of the Head in Each (Sub)projection

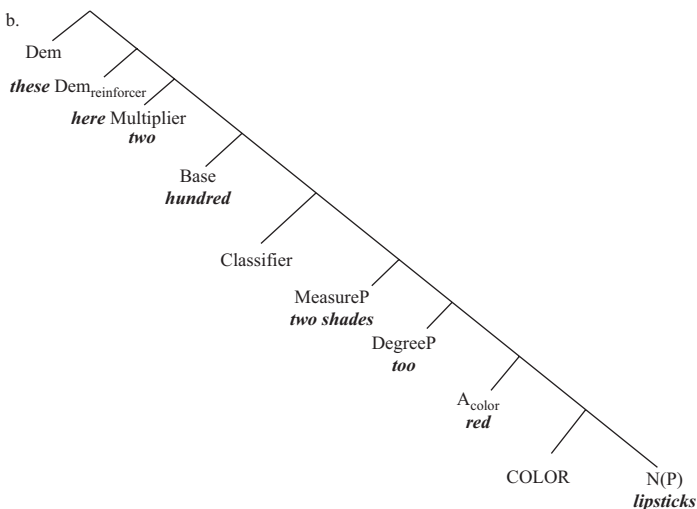
The considerations discussed in chapter 2 prompt me to advance the general hypothesis in (1) as the basis of a more restrictive theory of word order variation discriminating possible from impossible canonical orders.

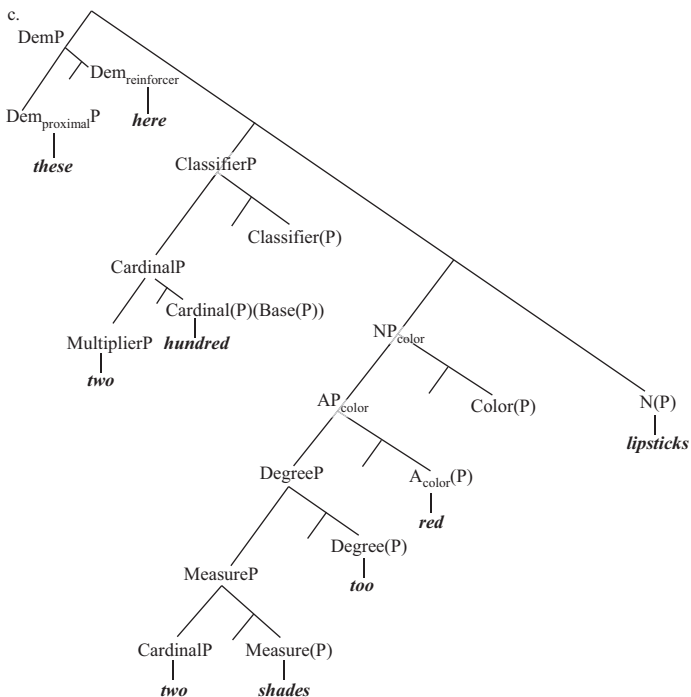
- (1) The Head, and only the Head, of each (sub)projection (N(P), A(P), V(P), . . .) can move within its projection.<sup>1</sup>

The theory proves rather simple once we recognize the complex articulation of the sentence and of the phrases that compose it; that is (again limiting ourselves for the moment to the nominal extended projection) once we recognize that this projection is not a unique downward/rightward spine, as in (2b), but a more highly articulated constituent, similar, to a simplified first approximation, to that in (2c), for the dialectal English phrase in (2a) (the Agreement phrases [AgrPs] on top of each subprojection that are needed to host the movement of its Head are not indicated here—see (5), (14), (15), and (16) below, for more detailed derivations). The overall projection is made up of a number of hierarchically arranged subprojections, within which the constituent heading the subprojection, and only this, can move in one of only three ways: (i) by itself or by pied piping some larger phrase containing it in the

(ii) *whose-pictures* or (iii) *pictures-of-whom* mode. (I address these derivations, and the elements that determine the way in which the Head moves, in sections. 3.2, 3.3, and 3.4)

(2) a. these here two hundred two shades too red lipsticks





If the internal articulation of the nominal projection is essentially as in (2c) rather than as in (2b), and if, given (1), only the Head of each subprojection can move within its subprojection (to the Specifier of the, here missing, associated AgrP), the two untested orders of each of (3)–(7) and (9) of chapter 2 cannot be derived (as the Head would have to move into another subprojection). I return to the other missing labels in (2c).

The factorial numbers stemming from the combinations of  $n$  elements (which when  $n = 8$ , already amount to 40,320 possible orders if no restrictions are introduced) are thus drastically reduced if the combinations are limited to each subprojection and if only the Head of that subprojection can move within it and determine the order inside it.

Consider the addition of a fifth element, the numeral classifier, to the four elements Demonstrative, (cardinal) Numeral, Adjective, and Noun, assuming the latter to have just 14 possible orders, as claimed in chapter 2. As already mentioned, there is evidence that cardinal numerals form a constituent with the classifier (where the classifier is the Head). See note 35 of chapter 2. This means that within the subprojection ClassifierP only the Head, the classifier, will be able to “change place” with respect to the (cardinal) numeral. Factorial 5 (demonstrative, [cardinal] numeral, numeral classifier, adjective, and noun) is 120. But if we assume that only 14 orders of demonstrative, (cardinal) numeral, adjective, and noun are possible, due to the fact that only the Head N(P) can move (in one of the permitted ways), and we multiply this number by 2, due to the possibility for each of the 14 orders to vary according to whether the classifier moves coming to precede or follow the (cardinal) numeral, we get not 120 but just 28 possible orders. This seems correct. See (3), where only 2 of the 28 expected orders are not (yet) documented, no other order being found distinct from those in (3), as far as can be ascertained.<sup>2</sup>

- (3) a. Dem Num CLF A N (Mandarin, Cantonese [Hall 2019: 29fn28])  
a'. Dem CLF Num A N (Upper Necaxa Totonac, Eastern Tamang)<sup>3</sup>  
b. Dem Num CLF N A (Yao<sup>4</sup>, Trukese<sup>5</sup>)  
b'. Dem CLF Num N A (Nêlêmwa, Zuanga)<sup>6</sup>  
c. Dem N Num CLF A (Lahu, Shiwilu)<sup>7</sup>  
c'. Dem N CLF Num A (Hakha Chin—Sino-Tibetan)<sup>8</sup>  
d. N Dem Num CLF A (Stiêng—Austroasiatic)<sup>9</sup>  
d'. N Dem CLF Num A (Kiriwina—Oceanic)<sup>10</sup>  
e. A N Dem Num CLF (Yunnan Bai, Puxi Qiang—Sino-Tibetan)<sup>11</sup>  
e'. A N Dem CLF Num (?)  
f. N A Dem Num CLF (Kayan Lahta, Yao'an Lolo—Sino-Tibetan)<sup>12</sup>  
f'. N A Dem CLF Num (Awara, West Makian—Papuan)<sup>13</sup>  
g. Dem A N Num CLF (Newari, Dulong—Sino-Tibetan [Hall 2019: 29fn28])  
g'. Dem A N CLF Num (Mising, Nyishi—Sino-Tibetan)<sup>14</sup>  
h. Dem N A Num CLF (Burmese, Maru—Sino-Tibetan [Hall 2019: 29fn28])<sup>15</sup>  
h'. Dem N A CLF Num (Kokborok, Apatani - Sino-Tibetan - Hall 2019: 29fn.28)  
i. N Dem A Num CLF (Nias Selatan - Malayo-Polynesian - Brown 2001: §4.10 and §8.5.2)  
i'. N Dem A CLF Num (Tongan<sup>16</sup>, Diola-Fogny<sup>17</sup>)  
l. Num CLF A N Dem (Coast Tsimshian, Tojolabal)<sup>18</sup>  
l'. CLF Num A N Dem (Kavalan, Q'anjob'al)<sup>19</sup>  
m. Num CLF N A Dem (Chrau, Vietnamese - Austroasiatic)<sup>20</sup>

- m'. CLF Num N A Dem (Rongga—Malayo-Polynesian)<sup>21</sup>
- n. N Num CLF A Dem (Kele, Lele - Oceanic)<sup>22</sup>
- n'. N CLF Num A Dem (Buglere, Teribe - Chibchan)<sup>23</sup>
- o. A N Num CLF Dem (?)
- o'. A N CLF Num Dem (Galo, Mising—Sino-Tibetan)<sup>24</sup>
- p. N A Num CLF Dem (Thai, Lao—Tai-Kadai [Nguyen 2004: 143])
- p'. N A CLF Num Dem (Abun, Sudest)<sup>25</sup>

Adding another element by taking Num to be a complex cardinal numeral, composed of a multiplier and a base (see (4) of chapter 2), would yield 720 possible combinations (factorial 6). Yet, if the multiplier and base form a constituent (cf. Kayne 2005b: section 9; He 2015; Her 2017a, 2017b; and Tatsumi 2018, 2021: chapter 2; pace Ionin and Matushansky 2018: chapter 3), and if only the base can move because it is the Head of that constituent, at most 56 (rather than 720) orders are expected to be available (the 28 possibilities of (3) multiplied by the 2 possible orders between base and multiplier in each of the 28 orders).<sup>26</sup>

It is possible that even “simple” numerals are actually “complex,” having either a silent multiplier (typically ‘1’: compare Italian *cento*, without *un(o)* ‘one’, with *duecento*, *trecento* ‘two hundred, three hundred’, etc.; similarly French [Kayne 2020b: section 6] versus English *one hundred*, *two hundred*, *three hundred*, etc.; possibly Italian *dieci*, English *ten* when compared with ‘ten’ in the Papuan languages Adang [Haan 2001: 324] and Savosavo [Wegener 2012: 75] (‘ten one’ = 10, ‘ten two’ = 20, etc.), or in the Austronesian language Mokilese [Harrison 1976: 98] (‘one-ten’ = 10), or in Chajul Ixil (Mayan) *va'l dies* ‘ten’ (lit. one ten) (cf. also *va'l nueeve* ‘nine’, lit. one nine) [Adell 2019: 403])<sup>27</sup>, or a silent base (see Greenberg’s [1990] Generalization 36 “The only numeral expressions deleted are those for 1 and for bases of the system,” and Greenberg [1975, note 2], and Hurford’s [2003:

section 4.2.3] rule of 1-Deletion). Bases like ‘hundred’ in (American) English (“*three sixty-five* for *three hundred sixty-five*” [Stampe 1976: 595]) or *cento* ‘one hundred’ and *mille* ‘one thousand’ in (certain) dates in Italian (*nel mille e due* ‘Lit. in.the thousand and two’ = in 1,200; *nel cinquecento* lit. ‘in.the five hundred’ = in 1,500) can also be silent, leading to ambiguity (cf. Comrie 1997: section 4 for other such cases). This may not be completely general if there are languages whose numerical system does not involve multiplication (Greenberg 1990: 277; Epps et al. 2012: section 3.4; Allasonnière-Tang and Her 2020: section 3.1). If one were to add additive numerals to the complex numeral containing multiplicatives, then one would have to add additional dimensions of variation, as additives are found to follow multiplicatives in some languages, (“((thousand one) nine hundred and five and fifty) = 1,955 in Kinubi [Arabic-based Creole],<sup>28</sup> but to precede them in others (“(two (ten three))” = 32 in Yemba [Harro and Haynes 1991: 31]), and within the additive subprojection higher numbers precede smaller ones in some languages (e.g., English: *twenty one*) while the opposite is true in other languages (e.g., in the Papuan language Ekari: “(one and ten) and sixty” = 71 [Comrie 2016: section 2; cf. Doble 1987: section 7]; and in German (below ‘hundred’): *ein und zwanzig* ‘one and twenty’. Teen numerals (12–19) tend to be “ten-with-unit” in head-initial languages and “unit-ten” in head-final ones (see Polinsky and Magyar 2020: 14) (but see Lehmann 1978a: section 1.3 for an opposing view, exemplified with Sinhala and Irish). Again the number of the possible orders can be kept severely limited if we understand what the overall constituent structure is and which is the Head of each subprojection, the only element that can change place. Ionin and Matushansky (2018: section 5.2) analyze complex additive numerals as coordinations of NPs with backward deletion; for example, *twenty six books* would derive from (*twenty books*) (*and*) (*six books*). While this analysis may be correct for certain languages and/or constructions

(Russian: *Ja delayu dvacet' odin šag* lit. 'I make twenty one step (sing.)'; German: *dreihundertundein Haus/\*Häuser* 'three hundred and one house/houses'; Italian: *le mille e una notte* lit. 'the(pl.) thousand and one night (sing.)'), it is not for other languages and/or constructions (English: *three hundred and one students/\*student*; Italian: *Cento e un modi* lit. 'hundred and one way (pl.)'), where the complex cardinal makes up a constituent that does not involve coordination and backward deletion, as shown by plural rather than singular agreement after 'one'. See Meinunger (2015) and Tatsumi (2019, 2021: chapter 3) for detailed discussion and arguments that both analyses are needed.<sup>29</sup> For further discussion, also see Hurford (2003: section 4.1), where the following constituent structure is given for 230,567: [[[two **hundred**] and **thirty thousand**] [[five **hundred**] and [sixty [seven]]]] (the possible Heads of each subprojection are indicated in boldface), and He (2015: 200) for the complex phrase structure of 5,000,601 in Chinese. On an arguably even more complex structure underlying cardinal numerals, see Wągiel and Caha (2020).<sup>30</sup>

If we were then to add to Demonstrative, Multiplier, Base, CLF, Adjective, and Noun three more elements (a single additive numeral, the DegreeP of (6) of chapter 2, and the common noun corresponding to a certain class of adjectives, say 'color' for adjectives of color, (9) of chapter 2), we would obtain in the absence of any restrictions 362,880 possible combinations of the 9 elements (factorial 9). The adoption of the restriction in (1), on the other hand, yields, once we consider the right constituencies, only 448 possible orders ( $56 \times 2 \times 2 \times 2$ ). I have left aside additional multiplier-base constituents, which may linearize differently from the first one, as in the Kinubi example ('thousand one nine hundred' = 1,900), ordinal numerals ((5) of chapter 2), and measure phrases ((7) of chapter 2) (all of them composed of a Head and a modifier). If added, they would further increase these numbers to several millions were we to ignore the right constituencies and the restriction in (1).



The nominal subprojections considered in this discussion are actually only a subset of those characterizing the nominal extended projection. I have not considered, among others, universal quantifiers, which are of (at least) two types, collective/distributive (*all*) or just distributive (*every*), which are apparently merged in two distinct positions—one above and the other below the definite determiners;<sup>31</sup> indefinite quantifiers (*some/any*), which can even co-occur with universal distributive quantifiers (see Italian *una volta ogni qualche mese* and its English counterpart *once every some months*); multal and paucal modifiers (*many/few*);<sup>32</sup> pronominal adjectives (e.g., ‘same’, ‘next’, ‘usual’, ‘occasional’); nominal classifiers;<sup>33</sup> nor relative clauses.<sup>34</sup>

If we were to consider these additional elements we would have further combinatorial possibilities. What remains to be done is to calculate how many more possible, and impossible, orders the system explored here, if correct, leads one to expect once we reach a precise understanding of the right constituencies. Recognizing the subprojections that make up the maximal extended projection thus drastically reduces the number of combinations, due to the way the Head moves within each subprojection.

Some of the possible orders are very rare, such as some of those involving different types of movement at different layers of embedding. (I return to this question in section 5.3, after the cross-linguistic tendencies underlying the head-initial and head-final types in the nominal extended projection and in the clause are introduced.)

### 3.2 Head-Initial and Head-Final Correlations in the Nominal Extended Projection

So far I have not addressed the question of which orders correlate with the head-initial or head-final character of the language; I have just observed that this is, strictly speaking, an orthogonal issue.<sup>35</sup> Two of the four orders attested (out of six) of each of the

orders in (3)–(7) and (9) of chapter 2 do correlate to some extent with the head-initial and head-final type. So, for example, the World Atlas of Language Structures online gives the correlations in (4) for the order of Degree word and Adjective with object verb (OV) and verb object (VO) languages. Degree words precede the adjective more often in head-final languages than in head-initial ones and conversely the order adjective > degree word is more frequent in head-initial languages than in head-final ones, “cross-category harmony” being here rather weak as the other two correlations are also attested in significant numbers.<sup>36</sup>

- (4) a. OV and degree word-adjective: 114 languages
- b. VO and adjective-degree word: 102 languages
- c. VO and degree word-adjective: 81 languages
- d. OV and adjective-degree word: 63 languages

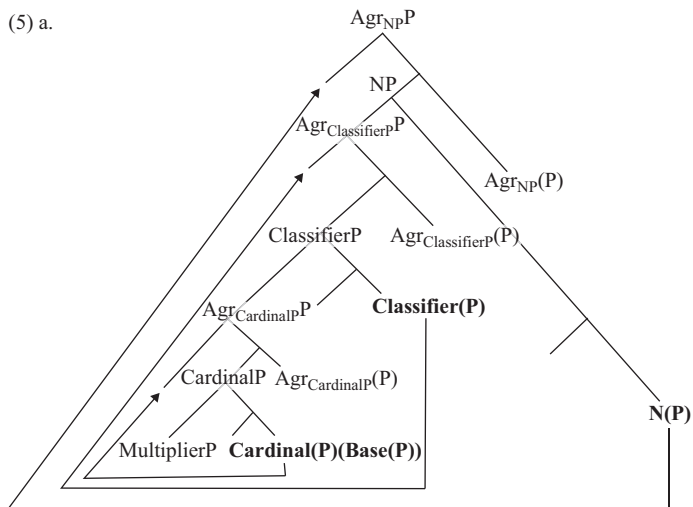
A similar picture appears to hold of the other orders. The order adjective of color > noun ‘color’ > Noun is characteristic of head-final languages, while the order N > noun ‘color’ > adjective of color is characteristic of head-initial languages and is actually a special case of the order proper noun–common noun found in head-final and head-initial languages (see Greenberg’s (1963) Universal 23; Cinque 2011, and references cited therein).

Num CLF N is the order more typically found in head-final nominal phrases, and N CLF Num is found in several head-initial ones, though, as Greenberg (1975: 29) notes, N Num CLF is more frequent than N CLF Num even in head-initial nominal phrases. As mentioned at the beginning of section 2.3, the order of multiplier and base tends to “harmonize” with the order of numeral and noun and with the order of numeral and classifier (noun, classifier, and base being the Heads of the respective subprojections).<sup>37</sup> See the cases of (in this regard, “head-final”) Chinese  $[_{NP} [_{CLFP} \text{Num CLF}] N]$ , in (3a) of chapter 2, and  $[_{NP} [_{CardP} \text{multiplier base}] N]$  in (4a) of chapter 2, that is,  $[_{NP} [_{CLFP} [_{CardP} \text{multiplier base}] CLF] N]$ ,

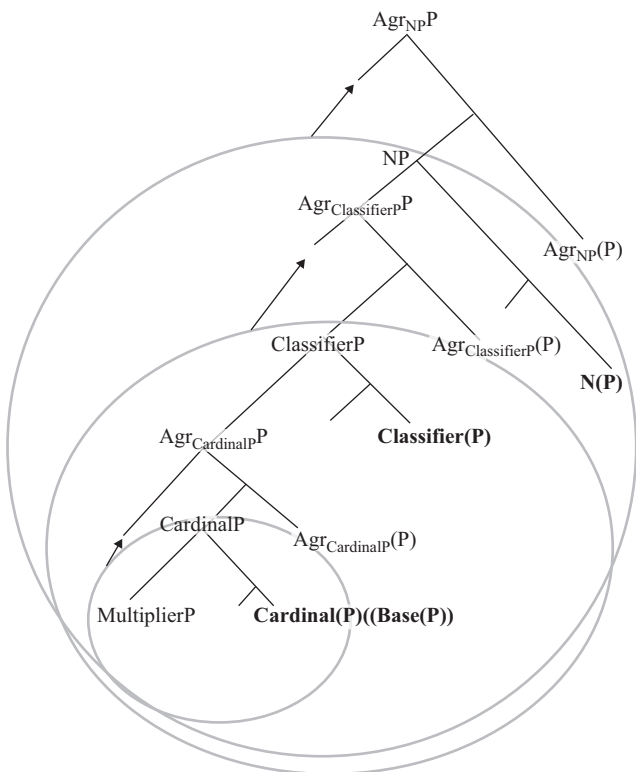
and the cases of head-initial Adang (Papuan), Helong, and Uab Meto (Malayo-Polynesian) [<sub>NP</sub> N [<sub>CLFP</sub> CLF Num]], in (3b) of chapter 2, and [<sub>NP</sub> N [<sub>CardP</sub> base multiplier]], in (4b) of Chapter 2, that is, [<sub>NP</sub> N [<sub>CLFP</sub> CLF [<sub>CardP</sub> base multiplier]]].<sup>38</sup>

In other words the Head of ClassifierP (the classifier), that of CardinalP (the base), and that of NP (the noun), tend to behave in the same way, that is, by moving via the same pied piping mode. See (5a), which shows the ideal case involving movement of all the Heads with the (vacuous) *whose-pictures* pied piping mode (which affects the order of the Heads and the modifiers), and (5b), involving movement of all the Heads with the *pictures-of-whom* pied piping mode (which does not affect the order of the Heads and modifiers).<sup>39</sup> I give the structures in X-bar format, recalling however what said in note 1 of this chapter, that the X-bar heads are actually (minimal) phrases (in (5a) they raise by themselves to Specifier [Spec] positions). Each functional subprojection is dominated by an associated projection, which is there to host the movement of the subprojection Head. I call it for convenience Agr(eement)P. The structure is compatible with Antisymmetry if the subprojections Agr<sub>CardinalP</sub>, selected by Classifier(P), and Agr<sub>ClassifierP</sub> selected by N(P), are merged in specifier position with the complement merged empty and if the Agr Heads are also null. This way the specifiers are in an asymmetric c-command relation with the rest and thus linearize to its left. The Agr Heads are instead irrelevant for linearization because they are null. For simplicity I omitted some of the subprojections of (2c), also ignoring antilocality (Abels 2003: chapter 2; Kayne 2005b: section 5.6). These structures are still simplified (omitting intermediate X-bar projections). See section 3.3 for more detailed representations.

(5) a.



(5) b.



The structure in (5a), is ultimately linearized under the LCA as N Classifier Base Multiplier and (5b) as Multiplier Base Classifier N. It is thus clear that the *whose-pictures* pied piping leads to head-initial orders and the *pictures-of-whom* pied piping to head-final ones.

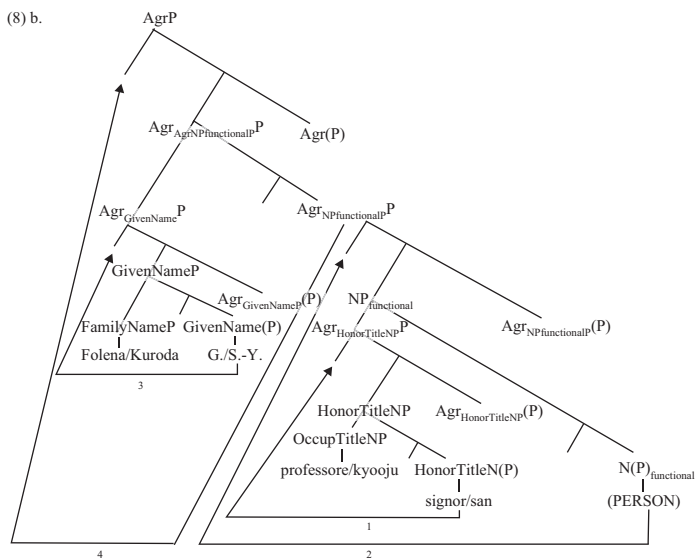
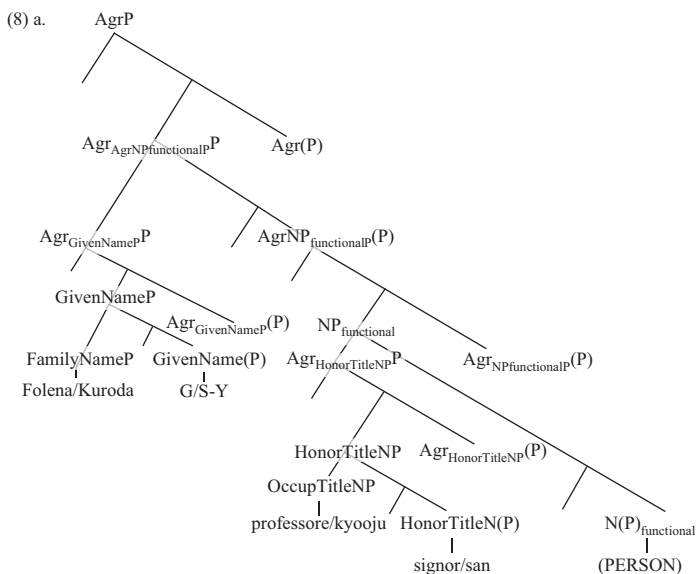
In the *whose-pictures* pied piping mode of (5a) the Head drags along to its Spec,Agr constituents c-commanded by it (here vacuously), while in the *pictures-of-whom* pied piping mode of (5b) what the Head drags along to its Spec,Agr are constituents that c-command it.

Strictly speaking (5a) could also involve movement of the Heads without pied piping, but given that in consistent head-initial languages when the Head and more than one modifier are present we observe a roll-up derivation involving the *whose-pictures* pied piping mode, it seems plausible to generalize this to all cases.

Harmony in the collocation of Demonstrative, Numeral, and Adjective within the nominal extended projection is also fairly strongly obeyed. In the larger sample on which Cinque (in preparation) is based (as of June 2022) cases (6a) and (6b), derived via the consistent application of the same type of movement at all levels, involve many more genera, and languages (with some skewing for the order derived with the *whose-pictures* pied piping, (6a)), than the disharmonic ones involving different, nonuniform, types of movement (those in (6c–p)):

- (6) a. N A Num Dem: 606 languages; 137 genera
- b. Dem Num A N: 425 languages; 110 genera
- c. Dem N A Num: 207 languages; 79 genera
- d. Dem Num N A: 182 languages; 67 genera
- e. Num N A Dem: 226 languages; 47 genera
- f. N Num A Dem: 67 languages; 35 genera
- g. N A Dem Num: 101 languages; 34 genera
- h. Dem N Num A: 47 languages; 29 genera





The Italian order in (7b) is obtained via movement of HonorTitleN(P) to the Spec of Agr<sub>HonorTitleNP</sub>P, movement of N(P)<sub>functional</sub> to the Spec of Agr<sub>NPfunctional</sub>P, movement of GivenName(P) to Spec of Agr<sub>GivenNameP</sub>P, followed by movement of Agr<sub>NPfunctional</sub>P to the Spec of AgrP, as shown in (8b). All movements are of the *whose-pictures* pied piping type, with the effect of reversing the order of Merge of the constituents completely (if order is part of narrow syntax).

The head-final order (7a) is instead obtained via movements of the Heads in the *pictures-of-whom* pied piping mode (not indicated here), which retains the order of Merge (if order is part of narrow syntax).<sup>43</sup>

The N(P) heading the main projection line in (8a) and (8b) may be taken to host the generic noun that accompanies a specific noun, overtly in certain languages and, arguably, covertly in others (see Kayne 2007: section 15). As Hackstein (2010: 8) puts it: “The ordering of the generic and the specific noun is not random. There is a tendency for head-final languages to postpose the generic noun (wallaby—animal), and for head-initial languages to prepose the generic noun (animal—wallaby).”<sup>44</sup> See the case of head-final languages in (9) and that of the head-initial/medial languages in (10) (once again the *pictures-of-whom* pied piping is more typical of head-final languages and the *whose-pictures* pied piping of head-initial/medial ones).<sup>45</sup>

(9) a. lalaŋ abmal (Kunjen—Pama-Nyungan, SOV  
[Sommer 1970: 138])

uncle person  
‘the uncle’

b. hel-t:i k<sup>w</sup>el=ra zunra admi=ra (Sanzhi Dargwa—  
Northeast Caucasian SOV  
[Forker 2020: 406])

that-PL two=add neighbor person=add  
‘and those two neighbors’



- c. c'c'um hinč' (Avar—Northeast Caucasian, SOV  
[Hackstein 2010: 16])  
eagle.Nom bird.Nom  
'an eagle'
- d. arrano hegazti-a (Basque—language isolate, SOV  
[Hackstein 2010: 16])  
eagle.NOM bird.NOM-DET  
'the eagle'
- (10) a. nōk čitam (Chuj—Mayan, VOS [Hopkins 1967:  
147–148]).  
animal pig  
'a pig'
- b. benhe bila ka (San Bartolomé Zoogocho  
Zapotec—Zapotecan, VSO  
[Sonneschein 2005: section 7.4.4])  
person sister PL  
'sisters'
- c. ba:r na? caw ʔu:r (Ko'ho Sre—Mon-Khmer,  
SVO [Olsen 2014: 62])  
two CLF person woman  
'two women'
- d. ø-an ø-aare a-arɔ (Eegimaa—Kwa, SVO  
[Bassene 2012: 22])  
CM-person woman SR-pretty  
'a pretty woman'

This suggests that it is the (overt or silent) generic noun that heads the extended nominal projection.

Less frequent orders are apparently those that combine the two pied pipings modes, yielding cases that are less harmonic; for example, when the base moves with the (vacuous) *whose-pictures* pied piping, the classifier moves with the (vacuous) *whose-pictures* pied piping but the N moves with the *pictures-of-whom* pied piping, giving rise to the order (Heads in boldface) [[**CLF** **Base**

multiplier]] N] of Rongga (see (3d) and (4d) of chapter 2). Also mixed are the cases of Stiêng with movement of the base and the classifier with the *pictures-of-whom* pied piping and movement of the N with the *whose-pictures* pied piping (see (3c) and (4c) of chapter 2), yielding the order [N [[multiplier **Base**] CLF]], and Jingpo with the base moving with the *pictures-of-whom* pied piping and the classifier and the N with the *whose-pictures* pied piping (see (4c) and (3b) of chapter 2), yielding the order [N [CLF [multiplier **Base**]]. I return to the rarest combination among these disharmonic cases in section 5.3.

### 3.3 The Heads of the Maximal Nominal Extended Projection

In the preceding sections I let it be understood that the entire nominal projection is headed just by N(P) (possibly the generic N just discussed taking the lexical N(P) as its first merged specifier), but this is not completely accurate. In many languages in addition to N(P), Case (K(P)), Determiner (D(P)), and singular, dual, . . . , plural Number (PL(P)),<sup>46</sup> *overtly* head a specific subprojection of the overall nominal projection, to the effect that they also move in one of the two pied piping modes ending up to the left of the Noun in rigid head-initial languages (where argument and modifier phrases end up instead to its right) and to the right of the Noun in rigid head-final ones (where arguments and modifier phrases end up to its left). See (11), which is partially illustrated in (12) for head-initial languages and in (13) for head-final ones. On this segregation of Heads and arguments and modifier “phrases” also see Cinque (2017: section 2). Here I present a more accurate picture of the derivations that result in such a segregation.<sup>47</sup>

- (11) a. K(P) D(P) PL(P) N(P) AP NumP DemP QP<sub>univ</sub> (typical  
of rigid head-initial languages)  
b. QP<sub>univ</sub> DemP NumP AP N(P) PL(P) D(P) K(P) (typical  
of rigid head-final languages)

- (12) a. ‘a e ngaahi fale (Tongan—Polynesian,  
VSO/VOS [Ball 2009: 116])<sup>48</sup>  
Case<sub>ABS</sub> DET PL house  
‘the houses’
- b. e te kau tagata (East Uvean—Polynesian,  
VOS/VSO [Livingston 2016: 106])<sup>49</sup>  
Case<sub>ERG</sub> DET PL man  
‘the men’
- (13) a. ham oxorza-lepe-ši (Laz—South Caucasian, SOV  
[Kutscher 2001: 36])  
Dem woman-PL-GEN  
‘of these women’
- b. ?o lam-iti-n (Argobba—Ethio-Semitic,  
SOV [Getahun 2018: 133])<sup>50</sup>  
that cow-DEF-ACC  
‘that cow’

In other languages these Heads may be silent, as are those that head additional nominal projections, such as ClassifierP, ColorP, and others.

Let me sketch the derivation of (consistent) head-initial languages (14) and (consistent) head-final ones (15) for the nominal domain. Section 4.1 will present the parallel derivations for the verbal domain.

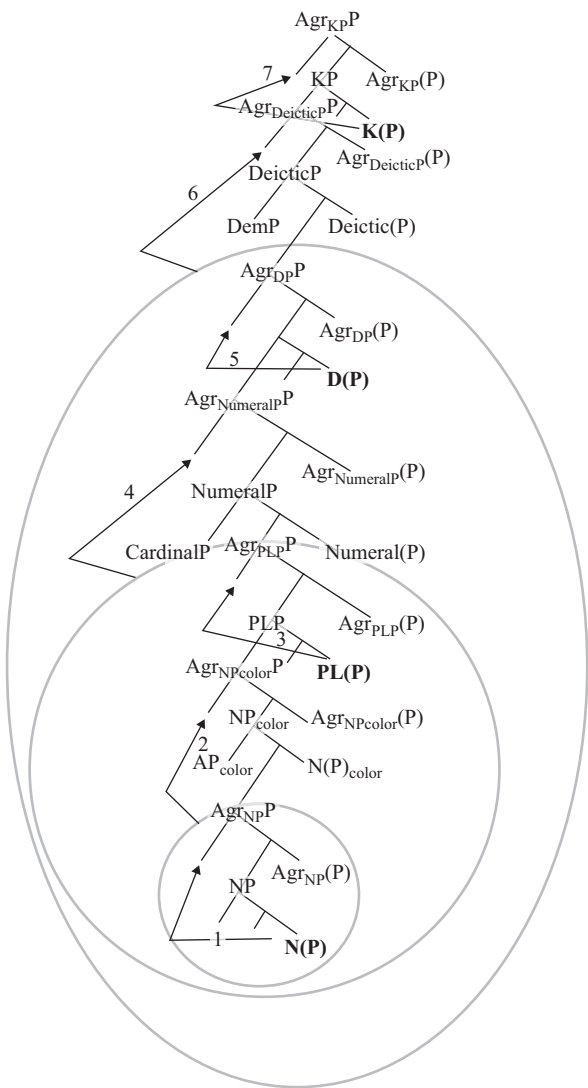
I am assuming that each substantive functional projection (abstracting away from AgrPs) is constituted by a Head that selects its complement in specifier position.<sup>51</sup> This assumption, which is compatible with antisymmetry, rejects the idea that anything is merged below the Head (to its right, if linear order is part of narrow syntax). The reason for that is the already mentioned left-right asymmetry of natural languages (whereby more orders are found to the right of a Head than to its left). The asymmetry can be derived as a consequence of the way in which the Head moves in relation to its dependents, merged above it in the order in which they compose with the Head.

Above each substantive functional projection a corresponding agreement projection is merged to host in its specifier the movement of the Head of the substantive functional projection (which raises by itself or via one of the two pied piping modes). On top of the agreement projection a modifier projection associated with the substantive functional projection is merged (NumeralP containing CardinalP for PL(P); DeicticP containing DemonstrativeP for D(P), much like what happens in the verbal domain, where on top of the AgrP associated with (irrealis) Modal(P) there is an adverbial projection containing the associated modal adverb (*This possibly may qualify as one.*). See section 4.1.

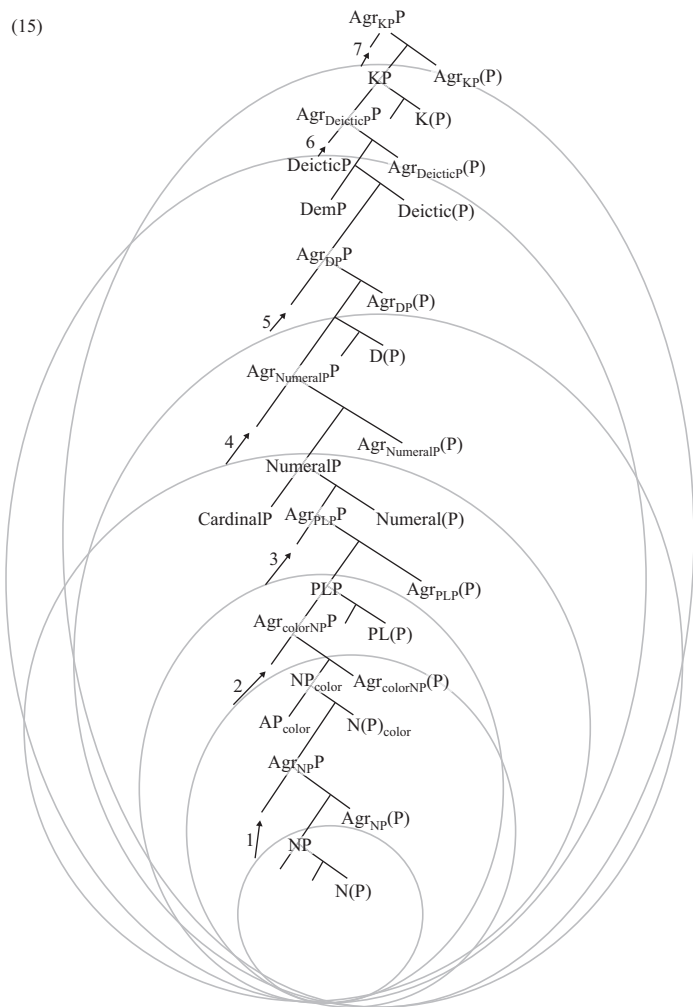
Consider (14) and (15). On top of the N(P) and its agreement projection one, or more, associated modifier projections are merged, represented here by the projection of  $[_{NP}$  ‘color’], which selects in its specifier the corresponding AP ( $[_{AP}$  A<sub>color</sub>]) (should  $[_{NP}$  ‘color’] be spelled out an extra layer would be needed). This will be followed by the merger of the next nominal Head, PL(P), and the subsequent merger above it of an AgreementP to host the movement of the PL(P) Head. The derivation proceeds with the merger of a Numeral(P), the modifier projection associated with PL(P), which selects a CardinalP in its specifier, which has a corresponding AgreementP (I omit here the more articulated substructure seen in (2c) containing a ClassifierP and, inside the CardinalP, a MultiplierP); then D(P), the next nominal Head is merged with its AgreementP and selects a DemonstrativeP in its specifier, and the associated modifier projection, DeicticP, which comes with its AgreementP. Finally the highest nominal Head, K(P), is merged with its AgreementP. To ensure compatibility with Antisymmetry either the complement (as in the nominal Head projections, NP, PLP, DP, KP) or the Head (as in the AgreementPs, and in the associated modifiers projections) will be null and thus uninfluential for linearization under the LCA. The derivation in (14), which involves movement of the nominal Heads N(P), PL(P), D(P), and K(P) with the *whose-pictures* pied piping mode, will give rise under the LCA to the order K D PL N AP

NumP DemP (typical of VOS/VSO languages), and that in (15), which involves movement of the same Heads with the *pictures-of-whom* pied piping mode, to the order DemP NumP AP N PL D K (typical of rigid SOV languages).

(14)



(15)



The preceding derivations of head-initial and head-final structures are couched within traditional X-bar theory, with overt selected complements and modifiers merged in specifier position when the Heads are overt and in complement position when the

Heads are null (to comply with antisymmetry). Perhaps these derivations, with movements of the Heads with pied piping, or without pied piping, “to yield the proper hierarchies” (Chomsky 2004: 110) for the LCA could also be obtained in a Bare Phrase Structure system with a labeling algorithm of the type developed in Chomsky (2013, 2015) and Rizzi (2016). For the LCA to apply properly, which requires asymmetric c-command to yield a linearization, the first-merged (“structural complement”) XP of an overt nominal (verbal, etc.) Head is merged empty, so that the Head can label the resulting XP with its categorial feature, and its Lex (lexical) feature in Rizzi’s (2016: section 4) sense. The next step will then involve the merger of this XP with another XP: DP, AP, CardinalP, DemP, to limit attention to the nominal extended projection. If, as noted in section 2.7, the latter are themselves all modifiers of an N(P) (AP<sub>color</sub> of [<sub>NP</sub> color], AP<sub>size</sub> of [<sub>NP</sub> size], CardinalP of [<sub>NP</sub> Classifier] (itself possibly a modifier of [<sub>NP</sub> amount/number], DemP of [<sub>NP</sub> ..PLACE], and so on), the phrases merged together are two XPs that are “identical in a relevant respect, providing the same label” (Chomsky 2013: 43), say both +N, thus arguably labeling the resulting XP as a +N phrase (also see Rizzi’s [2016: 107–109] labeling convention when the two phrases being merged agree in their categorial feature). What remains to be seen is how best to ensure asymmetric c-command by one of the two merged categorially identical XPs and how to reconcile the successive cyclic movement of the N(P) discussed in the next section with Rizzi’s (2016: 116) Maximality principle, which in theory could provide a rationale for the privileged status of pied piping over lack of pied piping. Problems remain, such as the labeling of the projection created by +V XP and a non-+V one such as AdvP, unless AdvP is also +V (which may be the case if each adverb is paired with a distinct verbal functional Head, as argued in Cinque [1999]). On the possible reconciliation of the LCA with bare phrase structure see Kayne (2008a: section 3), and on a labeling approach to head-initial and

head-final orders, see Moro and Roberts (2021) and their work in progress.

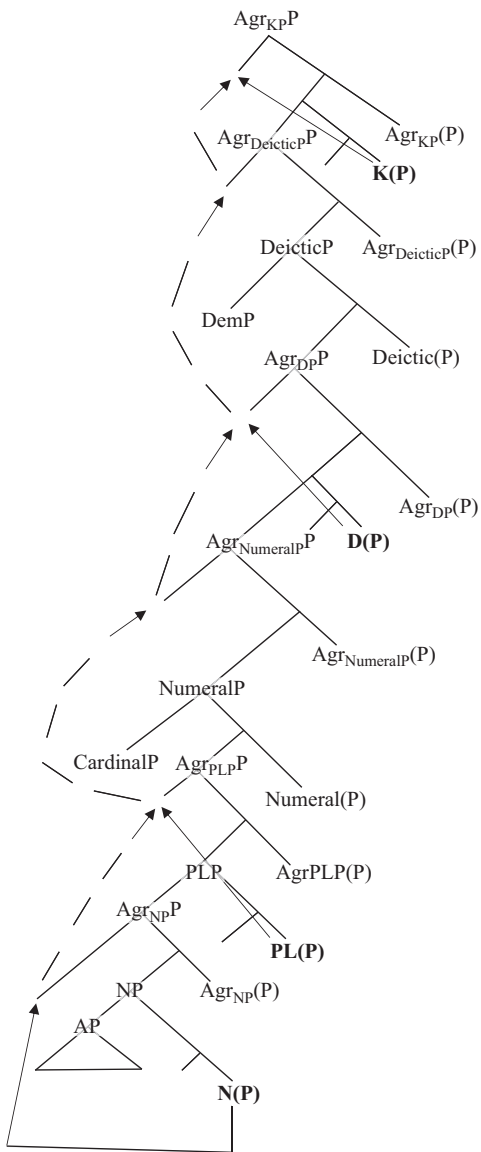
### 3.4 Movement of the N(P) Spanning Over the Entire Nominal Projection

One case that could be interpreted as showing that the N(P) has after all a special status among the nominal Heads is the fact that it can move (at least in some languages) all the way up the entire nominal projection on top of the demonstrative. This is Greenberg's (1963: 52) "less popular" N Dem Num A order found in several Bantu languages and in some Nilo-Saharan, Cushitic, and Chadic languages (with very few languages outside of the African continent).

It is nonetheless possible to retain the uniform articulated structure in (14) and (15) if we consider the possibility that (a silent token of) the Head of each of the subprojections N(P), PL(P), D(P), K(P) raises to its own AgrP (solid lines in (16)) as part of the derivation for head-initial languages, with N(P) (the Head of the extended nominal projection) incorporating successive cyclically PL(P), D(P), and K(P), up to the highest Spec of the entire nominal projection (dashed line in (16)) (alternatively, checking their features in its successive cyclic movement through the various Specs containing the silent Heads moved there):



(16)



This is rendered plausible by the fact that languages with the order N Dem Num A, unlike those with the order N A Num Dem, apparently never show separate K(P), D(P), and PL(P) Heads before the noun (as when each of these moves up with the *whose-pictures* pied piping mode illustrated in (14)). Rather, they display PL, D, and K suffixes on the noun, in this order, if any. As just mentioned, these can either be thought of as being picked up during the raising of the N(P), or as being part of the morphological make-up of the N(P), checked as the N(P) raises successive cyclically through the relevant Specs to which the silent Heads have raised. See, for example, the case of the Eastern Cushitic language Gawwada (Ale) in (17a), with an example of its N Dem Num A order in (17b):<sup>52</sup>

- (17) a. t'rak-o-si [[e] lala-dê-si-si bitam-n-a ]  
(Mekonnen 2010: 49)
man-m-DEF cloth-PL-DEF-ACC buy-FUT-Impf  
.3SGmasc  
'the man who will buy clothes'
- b. orhami-sa kora salah sipapoma  
(Prisecaru 2015: 17)
spears those four long  
'those four long spears'

Similar is the case of Nilo-Saharan languages. In Majang (Sudanic) the noun has the structure stem-(optional number and Case suffixes)=enclitics (Joswig 2019: 146) (see (18a)), and in Gaahmg (Eastern Sudanic) the structure stem-number (followed by definiteness/Case clitics) (see (18b)). The same holds in the Nilotic languages Kipsigis (Kouneli 2019: chapter 5) (see (18c)) and Lopit (Moodie 2019: section 4.8) (see (18d)):

- (18) a. dʒóop sigoj dʒiit-ík dʒéedūwatu-ŋəŋk kodʒutú-ŋəŋk.  
(Majang [Getachew 2014: 198])
people those three-GEN long-DEF black-DEF  
'those three tall black men'

- b. ʔó-gg nìi ásámán ðùìgg=à á ònàgg=à (Gaahmg  
[Stirtz 2012: 303])  
cow-PL these five black=DEF 1sPoss.PL=COP  
'These five black cows are mine.'
- c. làag-óo-chù sómòk chù káràarán (Kipsigis [Kouneli  
2019: 136])<sup>53</sup>  
girl-PL-PROX three PROX beautiful  
'these three beautiful girls'
- d. xìsùj xóná ùnik 1-ò-bwór (Lopit [Moodie  
2019: 100])  
cows.ABS this.F.PL three Subord-3-be.white  
'these three white cows'

Nor is in Bantu languages with the order N Dem Num A the noun preceded by separate number, definiteness, or Case Heads. It is rather preceded by just a class prefix. See, for example, (19):<sup>54</sup>

- (19) a. mí-rí ésó mi-raarú dhí-nddímúwa (Cuwabo  
[Guérois 2015: 154])  
4-tree 4.dem 4-three 4-old  
'these three old trees'
- b. e-itu a-ya ma-kwa a-tatu a-seo (Kikamba  
[Mbuvi 2005: 68])  
C2-girls 2AGR-those 2AGR-mine 2AGR-three  
2AGR-good  
'those three good girls of mine'

Among the few languages outside of the African continent displaying the order N Dem Num A, the noun of the Papuan (Torricelli) language Abu Arapesh (Nekitel 1985: section 3.4.1.1) is only followed by singular/plural suffixes, as in (20a), and the Oceanic language Namakir (Sperlich 1991: section 5.2.1.4.1) has a determiner prefixed to the noun (20b):

- (20) a. aleman ana atena ubahineri (cf. Nekitel 1985: 95)  
man this one big  
'this big man'

- b. na-bokah iŋa laru aŋino ?(ara) ahoh (Sperlich  
1991: 189)  
ART-pig this eight my (REL) good  
'these eight beautiful pigs of mine'

In this class of languages the N(P) moves above demonstratives successive cyclically (by itself) rather than in one of the two pied piping modes.

On the determinants of the pied piping or no pied piping mode see section 4.5.

### Interim Summary

So far we have seen evidence that the extended nominal projection is made up of a number of subprojections, headed the N(P), PL(P), D(P), K(P), a fragment of which was given in (14) and (15). On top of each such subprojection there is an agreement projection in whose specifier the subprojection Head moves, either by itself or via one of the two pied piping modes (recall the possibility that these Heads are actually minimal phrases comprising just an  $X^0$ ). Above the Head's agreement projection there is a specific modifier projection that is paired with the Head: for example, NumeralP with PL(P), DemonstrativeP with D(P) (and in the case of the clause, say, an Adverb<sub>modal</sub>P with ModalP). The variety of orders obtainable are a function of the way each Head raises, yielding a head-initial language if every Head moves with a consistent *whose-pictures* pied piping and a head-final one if it moves in a consistent *pictures-of-whom* pied piping, otherwise yielding a mixed word order language.

### 3.5 A Movement/Internal Merge Account versus a (Partially) Symmetric External Merge Account

Though appealing in its apparent simplicity, a symmetrical Merge of the phrasal modifiers DemP, NumP, and AP, either to the left or to the right of the NP, to derive the 8 "symmetrical" orders of

the 14 attested orders (Abels and Neeleman, 2009, 2012) (see (21)), may not be the best option, quite apart from its abandonment of the LCA and Antisymmetry.

(21)	'direct'	[lgs]	[genera]	'mirror-	[lgs]	[genera]
	order			image	order	
a.	Dem Num A N	425	110	a'. N A Num Dem	606	137
b.	Dem Num N A	182	67	b'. A N Num Dem	31	13
c.	Num A N Dem	51	22	c'. Dem N A Num	207	79
d.	Dem A N Num	46	24	d'. Num N A Dem	226	47

First, one would think that the mirror-image order (21a') would be represented by approximately the same number of languages and genera as the direct order (21a), given that both involve no marked principle in the (partially) symmetric external Merge account of Abels and Neeleman (2009: section 4.2, 2012: section 3). However, as is apparent from the numbers of languages and genera in Dryer's (2018) 576-language sample and in the enlarged, over 2,000-language sample mentioned earlier (with N A Num Dem totalling 606 languages and 137 genera vs. Dem Num A N totalling 425 languages and 110 genera, as reported in (21)), it is clear that they are far from being approximately equal.<sup>55</sup> Under an internal Merge account involving movement of the *whose-pictures* pied piping for the order N A Num Dem and of the *pictures-of-whom* pied piping for the order Dem Num A N the difference in frequency can arguably be attributed to the more marked status of the latter type of pied piping (see sections 5.2 and 5.3 for discussion).

Second, the symmetrical Merge account has to be supplemented with some instances of internal Merge to derive the remaining 6 attested orders (see (22)), which cannot be merged by symmetrical Merge without violating the no-tangling condition<sup>56</sup> or the underlying hierarchical order (Abels 2016a: 185):

- (22) a. N Dem Num A  
 b. Dem N Num A  
 c. N Num A Dem

- d. N Dem A Num
- e. A N Dem Num
- f. N A Dem Num

But once internal Merge is allowed to derive the “nonsymmetrical” orders of (22) it is also available to derive the “symmetrical” ones of (21), thus exposing the redundancy inherent in any account that can derive certain orders both by symmetric external Merge and by internal Merge.<sup>57</sup>

Third, if ellipsis is dependent on movement (Johnson 2001; Ntelitheos 2004; Kayne 2006b, 2012) and if nominal subdeletion is governed by the same principles that derive Greenberg’s Universal 20 (see Cinque 2012, 2021; 2022a: sections 3 and 4), then there is further evidence that movement is crucial in accounting for all the 14 attested orders of demonstrative, numeral, adjective, and noun.

### 3.6 Reason, Manner, Directional PPs in Dutch and Italian

Another consideration that seems to favor a generalized movement approach over a direct symmetric one for the derivation of the possible/attested orders of *n* elements may come from the unmarked order of reason, manner, and directional Prepositional Phrases (PPs) in head-final Dutch and head-initial/-medial Italian.<sup>58</sup>

In Dutch the unmarked preverbal order of these PPs is Reason > Manner > Directional (23a), an order that is retained when the verb moves to second position (23b) (cf. Koster 1974: 612).<sup>59</sup>

- (23) a. Hij is [<sub>PP3</sub> door ‘n stuurfout] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>VP</sub> gestrand]  
 he has [<sub>PP3</sub> by a steering error] [<sub>PP2</sub> with a bang] [<sub>PP1</sub> on the fence] [<sub>VP</sub> got stranded]
- b. Hij strandde [<sub>PP3</sub> door ‘n stuurfout] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek]

he got stranded [<sub>PP3</sub> by a steering error] [<sub>PP2</sub> with a bang] [<sub>PP1</sub> on the fence]  
'He got stranded on the fence with a bang by a steering error'

In Italian the unmarked (postverbal) order of the same PPs is the mirror image of Dutch (VP > Directional > Manner > Reason) with both participial and finite verbs. See (24):<sup>60</sup>

- (24) a. Lui si è incastrato [<sub>PP1</sub> nella recinzione] [<sub>PP2</sub> con un botto] [<sub>PP3</sub> per un errore di manovra]  
he has got stranded [<sub>PP1</sub> on the fence] [<sub>PP2</sub> with a bang] [<sub>PP3</sub> by a steering error]
- b. Lui si incastrò [<sub>PP1</sub> nella recinzione] [<sub>PP2</sub> con un botto] [<sub>PP3</sub> per un errore di manovra]  
he got stranded [<sub>PP1</sub> on the fence] [<sub>PP2</sub> with a bang] [<sub>PP3</sub> by a steering error]  
'He got stranded on the fence with a bang by a steering error'

In Dutch the participial V(P) can also raise above all the PPs in the middlefield, in which case the only order possible is the mirror image of the preverbal order. See (25) (Barbiers 1995: 103):

- (25) a. Hij is [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door een stuurfout]  
he has got stranded [<sub>PP1</sub> on the fence] [<sub>PP2</sub> with a bang] [<sub>PP3</sub> through to a steering error]
- b. \*Hij is [<sub>VP</sub> gestrand] [<sub>PP3</sub> door 'n stuurfout] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek]  
he has got stranded [<sub>PP3</sub> through a steering error] [<sub>PP2</sub> with a bang] [<sub>PP1</sub> on the fence]  
'He got stranded on the fence with a bang due to a steering error'

This seems to suggest, given the basically head-final nature of Dutch (cf. note 58), that the head-initial/-medial order, VP >

PP<sub>Directional</sub> > PP<sub>Manner</sub> > PP<sub>Reason</sub>, with participial verbs raised to the middlefield (cf. (25a)), is a function of the movement of the VP with pied piping of the *whose-pictures* type from the final position, much like the main clause order V2 > PP<sub>Reason</sub> > PP<sub>Manner</sub> > PP<sub>Directional</sub> (23b) is a function of the successive cyclic movement (or movement in one fell swoop) of the VP from a final position to CP without pied piping. The head-final order, PP<sub>Reason</sub> > PP<sub>Manner</sub> > PP<sub>Directional</sub> > VP of (23a) is instead a function of the movement of the VP with the *pictures-of-whom* pied piping. That means, if this is correct, that in the (partially) symmetric external Merge account the mirror-image order of (25a) in Dutch would plausibly involve the roll-up movement of the participle with the *whose-pictures* pied piping mode, while that of Italian (24) (where there is no alternation with the order PP<sub>Reason</sub> > PP<sub>Manner</sub> > PP<sub>Directional</sub> > VP) would involve a direct (scope-complying) merger of the phrases to the right of the participial verb. In such an account, then, the order VP > PP<sub>Directional</sub> > PP<sub>Manner</sub> > PP<sub>Reason</sub> would arise in two different ways, either via internal Merge or via external Merge, again exposing a redundancy. By contrast no such redundancy is present in the antisymmetric internal Merge account assumed here, which generalizes the role of movement.

It may be interesting to consider the entire paradigm of possible and impossible orders given by Barbiers (1995: 103). In addition to the just discussed grammatical alternatives of (23a) and (25a), repeated here as (26a) and (26b), Barbiers provides additional grammatical orders in (27) and ungrammatical ones in (28) and (29):

- (26) a. Hij is [<sub>pp3</sub> door ‘n stuurfout] [<sub>pp2</sub> met een knal]  
           [<sub>pp1</sub> op het hek] [<sub>vp</sub> gestrand]  
           he has [<sub>pp3</sub> through a steering error] [<sub>pp2</sub> with a bang]  
           [<sub>pp1</sub> on the fence] [<sub>vp</sub> got stranded]
- b. Hij is [<sub>vp</sub> gestrand] [<sub>pp1</sub> op het hek] [<sub>pp2</sub> met een knal]  
           [<sub>pp3</sub> door een stuurfout]



he has got stranded [<sub>pp1</sub> on the fence] [<sub>pp2</sub> with a bang]  
[<sub>pp3</sub> through a steering error]  
'He got stranded on the fence with a bang due to a  
steering error'

- (27) a. Hij is [<sub>pp3</sub> door 'n stuurfout] [<sub>pp2</sub> met een knal]  
[<sub>vp</sub> gestrand] [<sub>pp1</sub> op het hek]  
b. Hij is [<sub>pp3</sub> door 'n stuurfout] [<sub>vp</sub> gestrand]  
[<sub>pp1</sub> op het hek] [<sub>pp2</sub> met een knal]  
c. Hij is [<sub>pp3</sub> door 'n stuurfout] [<sub>pp1</sub> op het hek]  
[<sub>vp</sub> gestrand] [<sub>pp2</sub> met een knal]  
d. Hij is [<sub>pp1</sub> op het hek] [<sub>vp</sub> gestrand] [<sub>pp2</sub> met een knal]  
[<sub>pp3</sub> door een stuurfout]  
e. Hij is [<sub>pp2</sub> met een knal] [<sub>pp1</sub> op het hek] [<sub>vp</sub> gestrand]  
[<sub>pp3</sub> door een stuurfout]  
f. Hij is [<sub>pp2</sub> met een knal] [<sub>vp</sub> gestrand] [<sub>pp1</sub> op het hek]  
[<sub>pp3</sub> door een stuurfout]
- (28) a. \*Hij is [<sub>vp</sub> gestrand] [<sub>pp3</sub> door 'n stuurfout]  
[<sub>pp2</sub> met een knal] [<sub>pp1</sub> op het hek]  
b. \*Hij is [<sub>pp3</sub> door 'n stuurfout] [<sub>vp</sub> gestrand]  
[<sub>pp2</sub> met een knal] [<sub>pp1</sub> op het hek]  
c. \*Hij is [<sub>pp2</sub> met een knal] [<sub>vp</sub> gestrand]  
[<sub>pp3</sub> door 'n stuurfout] [<sub>pp1</sub> op het hek]  
d. \*Hij is [<sub>pp1</sub> op het hek] [<sub>vp</sub> gestrand] [<sub>pp3</sub> door 'n  
stuurfout] [<sub>pp2</sub> met een knal]  
e. \*Hij is [<sub>pp1</sub> op het hek] [<sub>pp3</sub> door 'n stuurfout]  
[<sub>vp</sub> gestrand] [<sub>pp2</sub> met een knal]  
f. \*Hij is [<sub>pp1</sub> op het hek] [<sub>pp2</sub> met een knal] [<sub>vp</sub> gestrand]  
[<sub>pp3</sub> door 'n stuurfout]  
g. \*Hij is [<sub>pp2</sub> met een knal] [<sub>pp3</sub> door 'n stuurfout]  
[<sub>vp</sub> gestrand] [<sub>pp1</sub> op het hek]  
h. \*Hij is [<sub>vp</sub> gestrand] [<sub>pp3</sub> door 'n stuurfout] [<sub>pp1</sub> op het  
hek] [<sub>pp2</sub> met een knal]

- i. \*Hij is [<sub>VP</sub> gestrand] [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door 'n stuurfout] [<sub>PP1</sub> op het hek]
  - l. \*Hij is [<sub>VP</sub> gestrand] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door 'n stuurfout]
  - m. \*Hij is [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door 'n stuurfout] [<sub>PP2</sub> met een knal]
- (29) a. \*Hij is [<sub>PP3</sub> door een stuurfout] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand]
- b. \*Hij is [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door een stuurfout] [<sub>PP1</sub> op het hek] [<sub>VP</sub> gestrand]
  - c. \*Hij is [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door een stuurfout] [<sub>VP</sub> gestrand]
  - d. \*Hij is [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door een stuurfout] [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand]
  - e. \*Hij is [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door een stuurfout] [<sub>VP</sub> gestrand]

In the present framework, where word order is a function of movement, the Dutch patterns of grammatical orders ((26) and (27)), and of ungrammatical ones ((28) and (29)) seem to follow from a subset of the set of conditions assumed here, which comprise the axioms and theorems of Antisymmetry (Kayne 1994) and the condition that movement can only involve the Head of the construction (here the VP). Specifically, the (successive cyclic) movement of the participial VP without pied piping above the PPs is disallowed (see (28a) and (28b)).<sup>61</sup>

The grammatical (27a) would involve movement of the VP above the Directional PP, arguably with vacuous *whose-pictures* pied piping, as one can gather from the grammaticality of (27b), where the prenominal order of the Manner and Directional PPs is reversed, due to the roll-up movement induced by the *whose-pictures* pied piping, and the ungrammaticality of (28d), which instead appear to have been derived by movement of the VP

(within a larger phrase containing it) without any *whose-pictures* pied piping.

Example (27c) would involve movement of the larger constituent  $[[_{PP1} \text{ op het hek}] [_{VP} \text{ gestrand}]]$ , containing the VP, above the next higher PP  $[_{PP2} \text{ met een knal}]$ . Example (27d) would involve movement of the larger constituent  $[[[_{PP1} \text{ op het hek}] [_{VP} \text{ gestrand}]] [_{PP2} \text{ met een knal}]]$ , previously obtained as in (27c), above the higher PP<sub>Reason</sub>. Example (27e) would instead involve movement of the larger constituent  $[_{PP2} \text{ met een knal}] [_{PP1} \text{ op het hek}] [_{VP} \text{ gestrand}]$  above the PP<sub>Reason</sub>, and finally (27f) would involve the larger constituent  $[[[_{PP2} \text{ met een knal}] [_{VP} \text{ gestrand}]] [_{PP1} \text{ op het hek}]]$ , partly obtained as in (27a), again above the higher PP<sub>Reason</sub>. As noted, the movement of all these constituents involve the *whose-pictures* pied piping mode, whether vacuously or not, because movement of the same constituents by themselves, successive cyclically or in one fell swoop without the *whose-pictures* pied piping, invariably appears to yield an ungrammatical result. I already mentioned the ungrammaticality of (28a, b, and d). Example (28c) cannot be derived. After raising above the PP<sub>Directional</sub> (PP<sub>1</sub>) the VP would have had to raise past the PP<sub>Reason</sub> (PP<sub>3</sub>) dragging along the PP<sub>Manner</sub> (PP<sub>2</sub>), stranding the PP<sub>Directional</sub> (a nonconstituent). Examples (28e–g) have the wrong order/hierarchy of PPs preverbally (an order/hierarchy that is retained under the *pictures-of-whom* pied piping). Examples (28h, i, l, and m) are ungrammatical as the PPs are in the wrong order/hierarchy of Merge whether the VP has raised with the *whose-pictures* pied piping or by itself without pied piping. The examples in (29) are similarly ill-formed as the PPs are in the wrong order/hierarchy of Merge preverbally. When I said previously that the data in (26)–(29) in Dutch follow from a subset, rather than the full set, of the conditions assumed here, I meant that the movement of the participial VP in Dutch can only proceed with the *whose-pictures* pied piping (like that of Italian), or the more complex pied piping

involving simultaneously the *whose-pictures* and the *pictures-of-whom* pied piping modes found in the nominal extended projection to derive, for example, A N Num Dem, and in relative *wh*-movement (*Aylan, pictures of whose body . . .* [cf. note 5 of chapter 1]). Crucially, however, it cannot proceed exploiting the no pied piping possibility open to the finite verb in V2 contexts.<sup>62</sup>

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# On Linearization

## Toward a Restrictive Theory

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