

## Co-occurrence of non-article determiners as evidence for split DPs and bundled projections

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### 1. Introduction

The distribution of DETERMINERS, elements within nominal expressions that contribute to REFERENCE, has played a central role in theories of nominal syntax. Among determiners, a significant literature has focused on the properties of indefinite and definite ARTICLES, leading to many advances of syntactic theory regarding the structure of nominal phrases (Abney 1987; Longobardi 1994; Giusti 2002; Alexiadou 2014; among many others). Articles, however, are not the only kind of determiners. In this paper, we examine the patterning of NON-ARTICLE DETERMINERS, specifically POSSESSORS, DEMONSTRATIVES, ADNOMINAL PRONOUNS, and ADNOMINAL PROPER NAMES. Although several works have studied the placement of non-article determiners in relation to head nouns and articles (Delsing 1998; Schoorlemmer 1998; Haspelmath 1999; Panagiotidis 2000; Brugè 2002; Allen 2008; Giusti 2015; among others), this paper explores a less-discussed aspect of variation in nominal syntax: the co-occurrence of non-article determiners within a single nominal expression. We present data from a number of languages from different families, with an emphasis on Mandarin Chinese and Bangla, to show that languages vary in both the number and permitted combinations of non-article determiners within a nominal phrase. Cross-linguistic variation in these co-occurrence patterns thus provides a window on the functional structure of nominal expressions, and the nature of parametric variation in nominal syntax.

We first demonstrate that current theories of nominal syntax, which commonly posit a single D(eterminer) Phrase projection to host determiners (articles and non-article alike), are unable to generate the attested determiner co-occurrence patterns. Specifically, although a single DP structure can account for certain co-occurrence patterns between articles and other determiners, they cannot generate co-occurrence among non-article determiners. These patterns thus indicate that languages are not restricted to a single DP projection that hosts all determiners. Rather, some languages distribute features of nominal reference across a more articulated series of projections, a conclusion supported by recent work showing that the semantic subcomponents of “definiteness” are in some languages distributed across multiple syntactic positions in the nominal extended projection (cf. Alexiadou et al. 2007; Syed 2016, 2017; Cheng et al. 2017).

The paper then aims to answer the following question: is a fully articulated series of functional projections present in every language? We show that cross-linguistic variation in determiner co-occurrence restrictions cannot be captured in a principled manner if this is the case. We propose, in short, that languages share a universal, hierarchically arranged inventory of features, but vary in how those features are BUNDLED on functional projections (Giorgi and Pianesi 1997; Bobaljik and Thráinsson 1998; Cowper 2005; Höhn 2017; B. Hsu 2017; among others). We focus on the following syntactic features of nominal reference, with definitions based on Lyons (1999).<sup>1</sup>

- (1) PERSON: the participants of an event relative to the speaker and addressee.
- (2) DEIXIS: a spatial or temporal location relative to the speaker.
- (3) IDENTIFIABILITY: the speaker knows or is in a position to work out the referent of the noun phrase.

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<sup>1</sup> As discussed in more detail by Lyons (1999), identifiability corresponds to the notion of familiarity (Heim 1982), while inclusiveness subsumes the notion of uniqueness/maximality (Kadmon 1990).

- (4) INCLUSIVENESS: reference to the totality of the objects or mass in the context which satisfy the description.
- (5) POSSESSION: an asymmetric relation between the referent of the head noun phrase and another entity.

The number of projections that these features are mapped to varies cross-linguistically. Abstractly, given a hierarchical ordering of features  $[X] > [Y]$ , a language can either instantiate  $[X]$  and  $[Y]$  in a single projection, or instantiate  $[X]$  in a projection that dominates the projection containing  $[Y]$ . We propose that two non-article determiners can co-occur in a language only if the features that they instantiate are found in distinct projections. We propose, based on their attested ordering restrictions, that the feature hierarchy in (6) is universal, whereas the distribution of [POSSESSION] varies cross-linguistically. In anticipation of the data and the languages we will discuss, we suggest that although Deixis and Identifiability are distinct semantic notions (cf. Lyons), they never occur in separate projections. Since we will rely primarily on the placement of demonstratives in the identification of functional structure, we will use [DEIXIS] to represent both features<sup>3</sup>.

- (6) [PERSON] > [DEIXIS] > [INCLUSIVENESS]

In sum, we argue that the range of attested co-occurrence patterns and restrictions are predicted by the interaction of two factors: (a) a universal hierarchy of features, and (b) parametric variation in the bundling of these features on functional projections.

The research report is organized as follows. Section 2 presents a current view of DP structure and the types of determiner co-occurrence patterns that it predicts. Section 3 presents attested patterns of co-occurrence among non-article determiners as evidence for both a hierarchical organization of nominal features and a feature-bundling parameter in their realization. Section 4 discusses the predicted typology for such an approach, and Section 5 concludes the paper.

## 2. Determiners and the DP hypothesis

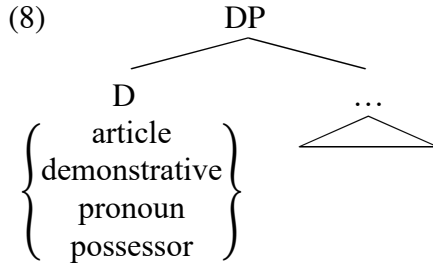
The DP hypothesis, which posits that nominal expressions are headed by a functional D(eterminer) Phrase (Abney 1987; Szabolcsi 1994; Longobardi 1994), has produced many insights into nominal syntax and semantics. This paper revisits two key claims of the standard DP hypothesis: first, that the DP projection is the surface position of articles and other determiners, and second, that it is the single structural position in which the referent(s) or the index of a nominal expression is specified (Longobardi 1994; Giusti 2015; Jenks 2018).

Following previous works, we assume that co-occurrence restrictions between two determiners arise when those determiners compete to fill a unique position. However, languages can vary in whether certain combinations of determiners are permitted; explaining the source of this variation is a significant challenge for current theories of nominal syntax, as we will now illustrate. For example, English determiners cannot co-occur in a prenominal position; this complementary distribution can initially be taken to indicate that these determiners compete to fill a unique D(eterminer) head position (8).

- |        |                   |                             |
|--------|-------------------|-----------------------------|
| (7) a. | *the these people | (article + demonstrative)   |
| b.     | *my these people  | (possessor + demonstrative) |
| c.     | *we these people  | (pronoun + demonstrative)   |
| d.     | *my them people   | (possessor + pronoun)       |

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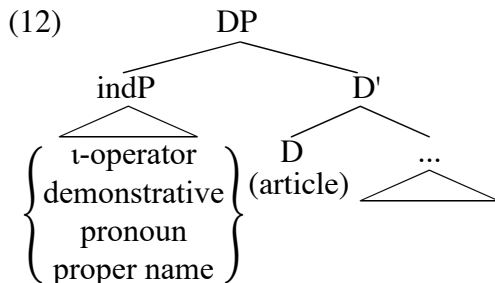
<sup>3</sup> We leave open the possibility that [DEIXIS] could be analyzed as a subfeature or featural dependent (cf. Cowper 2005) of [IDENTIFIABILITY].



Prior works have shown, however, that such a structure incorrectly undergenerates a number of attested patterns, specifically cases in which certain non-article determiners either can or must occur with an article (Delsing 1998, Haspelmath 1999, Vangsnes 1999, Allen 2008, Giusti 2015). For example, demonstratives must occur with a definite article in Hungarian (9), adnominal pronouns must occur with an article in Spanish (10), and Lappräsk Swedish requires possessors to occur with articles (11):

- |      |                                                             |                         |                                               |
|------|-------------------------------------------------------------|-------------------------|-----------------------------------------------|
| (9)  | ez      a      fiú<br>this    the    boy                    | demonstrative + article | ( <i>Hungarian</i> : Giusti 2015)             |
| (10) | vosotros    los profesores<br>you            the professors | pronoun + article       | ( <i>Spanish</i> : Giusti 2015)               |
| (11) | mett    the stór    hús-e<br>my      the big    house-DEF   | possessor + article     | ( <i>Lappräsk Swedish</i> :<br>Vangsnes 1999) |

While such co-occurrence patterns suggest a structural difference between articles and non-article determiners, they remain compatible with a non-articulated DP structure with some additional claims. As a concrete example, we consider Giusti's (2015) approach to nominal structure, based in part on a cross-linguistic study of the distribution of determiners. In brief, articles correspond to heads within the extended projection, while non-article determiners are specifiers. Demonstratives, pronouns, and proper names are classified as INDEXICAL EXPRESSIONS (denoting "person, reference, or deixis"), labeled as *indP* below. Furthermore, although indexical items can potentially be first Merged at different stages of the derivation, they must ultimately move to the highest specifier position of the full nominal expression (cf. Longobardi 1994, Jenks 2018). Finally, Giusti argues that indefinite and definite articles do not themselves contribute to reference, but are simply pronunciations of functional heads within the nominal expression. This proposed DP structure is shown in (12).



With these assumptions in place, cross-linguistic variation in the co-occurrence of articles with other determiners can be explained in terms of parameters on the pronunciation of functional projections; Each functional projection in a language is specified as to whether it requires the pronunciation of its head, its specifier, or both positions (cf. Vangsnes 1999; Giusti 2002;

Alexiadou et al. 2007). For example, complementary distribution between articles and demonstratives (ex. Italian) is generated by the OR parameter setting for demonstratives, while obligatory co-occurrence (ex. Hungarian) is generated by the BOTH setting.<sup>4</sup>

- (13) *Italian: OR parameter with demonstratives*
- |                   |               |                       |
|-------------------|---------------|-----------------------|
| a. queste ragazze | b. le ragazze | c. *queste le ragazze |
| these girls       | the girls     | these the girls       |
- (14) *Hungarian: BOTH parameter with demonstratives*
- |              |            |
|--------------|------------|
| a. ez a fiú  | b. *ez fiú |
| this the boy | this boy   |

Note that this approach must still posit more than one determiner projection for patterns in which articles precede another determiner (ex. Italian *il mio libro* ‘the my book’), under the assumption that specifiers precede heads. The non-article determiner is the specifier of a projection below the one whose head is pronounced as the article.

In the remainder of this paper, we will largely leave aside the status of definite and indefinite articles, and focus on syntactic properties of non-article determiners, which pattern differently in key ways. The key prediction of Giusti’s approach is that co-occurrence of non-article determiners (demonstratives, adnominal pronouns, proper names) within a single nominal expression should not be possible, as each of these are indexical items that compete to fill the highest specifier position.<sup>5</sup> In the next section, we present several co-occurrence patterns with non-article determiners that falsify this prediction. On the basis of these patterns, we argue that a number of features commonly subsumed under “reference” or “indexicality” are in some languages distributed across separate functional projections, in an articulated DP structure.

### 3. Co-occurrence of non-article determiners

#### 3.1. Proper names + (pronouns) + demonstratives

In previous works, restrictions against the co-occurrence of demonstratives and adnominal pronouns (pronouns occurring with a co-referential common noun in the same nominal expression) have been taken to argue that these elements occupy the same structural position. For example, Giusti (2015) takes the language sample in (15) to propose that nominal expressions admit at most one indP. On the basis of the same restriction in Greek, Choi (2014) posits that demonstratives and adnominal pronouns are generated in the same functional projection.

- (15)
- |              |                |                 |
|--------------|----------------|-----------------|
| a. *noi      | questi ragazzi | <i>Italian</i>  |
| b. *nosotros | estos chicos   | <i>Spanish</i>  |
| c. *noi      | acești băieți  | <i>Romanian</i> |
| d. *we       | these boys     | <i>English</i>  |

As noted in the typological studies of Höhn (2016, 2017), however, pronoun-demonstrative co-occurrence is attested in a wide range of languages outside of the Indo-European family.

<sup>4</sup> Even English, in which determiner co-occurrence is otherwise restricted, permits some combinations of adnominal pronouns and articles (ex. *we the people*). Although though speakers disagree about the productivity of such structures, it is potentially a case where English permits the BOTH setting when certain pronouns are in the specifier of the determiner projection.

<sup>5</sup> Giusti (2015) notes that co-occurrence between possessors and other non-article determiners is not excluded by this reasoning, because possessors bear a referential index distinct from that of the full nominal expression. As discussed in Section 4, however, accounting for restrictions on co-occurrence between possessors and other determiners creates new complications for her proposed parameter system.

- (16) dana ben eu age (Amele, Trans-New-Guinea, Papua New  
man big that 3.PL Guinea; Höhn 2017, after Roberts 1987)  
'Those leaders (big men)'
- (17) niya dathin-a dank-a (Kayardild, Tangkic, South Wellesey Islands;  
3.SG.NOM that-NOM man-NOM Höhn 2017, after Evans 1995)  
'Him, that man'
- (18) ahy vehivavy io (Malagasy; Paul and Travis to appear)  
1SG.ACC woman DEM  
'I this woman'

In addition, Höhn (2017) argues that attested variation in the relative order of pronouns, demonstratives, and nouns supports a universal hierarchical relationship between pronouns and demonstratives. Under the assumption that pronouns and demonstratives correspond to functional heads, the attested orders (*Pron – Dem – N*, *N – Dem – Pron*, *Pron – N – Dem*) are consistent with the cross-linguistically robust Final-over-Final Condition (Biberauer, Holmberg, and Roberts 2014; Sheehan et al. 2017) only if the functional projection of adnominal pronouns dominates the projection hosting demonstratives.<sup>6</sup> Similarly, Danon (2011) argues on the basis of agreement patterns that interpretable person features are introduced in the highest nominal projection.

Here, we consider a somewhat more complex pattern in Mandarin Chinese, first discussed by Huang et al. (2009), which provides additional support for a distinct PersP projection, and shows that ADNOMINAL PROPER NAMES can shed further light on nominal structure. Like Kayardild, Mandarin permits pronouns, demonstratives, and head nouns to occur in a fixed *Pron – Dem – N* order (19). In addition, however, demonstratives can be preceded by a proper name (20), or by both a proper name and an adnominal pronoun in that order (21). It is relevant that both proximal (*zhe*) and distal (*na*) demonstratives retain their deictic contrasts in the presence of proper names and third-person pronouns.<sup>7</sup>

- (19) ni-men zhexie haizi (pronoun + demonstrative)  
2-PL these boys  
'You these boys'
- (20) Lisi nage tiancai (proper name + demonstrative)  
Lisi that genius  
'That genius Lisi'
- (21) Zhangsan ta zhege ren (proper name + pronoun + demonstrative)  
Zhangsan 3 this person  
'This person Zhangsan'

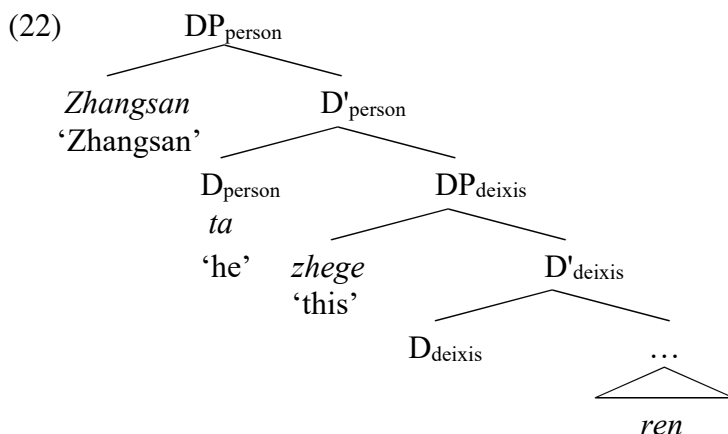
Huang et al. (2009) argue that proper name + pronoun sequences realize the specifier and head of the highest nominal projection. Specifically, they note that in the presence of a proper name, only

<sup>6</sup> In brief, the Final-over-Final Condition is a prohibition against a head-final projection  $\alpha P$  that immediately dominates a head-initial projection  $\beta P$  within the same extended projection:  $*[\beta P [\alpha P \alpha [\gamma P \dots] \beta]]$ . Accounting for this generalization is more difficult if either pronouns or demonstratives can be phrasal specifiers in some languages (see also Höhn 2017, ch. 3), but we will not pursue the issue further.

<sup>7</sup> First- and second- person pronouns appear to occur only with proximal demonstratives (cf. *?wo nage ren* 'I that man', *?nimen naxie haizi* 'you those children'), suggesting a type of concord between (participant) person and (proximal) deixis specifications. See Harbour (2016; Ch. 7) and Höhn (2017; Ch. 7) for discussion of similar effects.

the pronoun can be suffixed with plural marker *–men*, argued by Li (1999) to appear only on head positions. We can thus conclude that demonstratives instantiate a lower projection than pronouns or proper names.

We propose that in languages with pronoun-demonstrative co-occurrence, the syntactic features of [PERSON] and [DEIXIS] are realized in separate nominal functional projections. Furthermore, the projection containing [PERSON] dominates the one containing [DEIXIS]. We assume that demonstratives are phrasal specifiers (Brugè 2002, Giusti 2002, Alexiadou et al. 2007, cf. Kouneli 2019), but leave their category label unspecified. We follow Huang et al.’s (2009) analysis of proper names as specifiers, and propose that the pronoun is the head of that projection in Mandarin.<sup>9</sup> Again, we leave open the possibility that adnominal pronouns may be specifiers in other languages or structures (see also Höhn 2017).<sup>10</sup> The proposed structure for Mandarin (21) is shown in (22) below.



### 3.2. Possessors + demonstratives

Languages also vary in whether possessors can co-occur with demonstratives. Several examples of possessor-demonstrative co-occurrence are given below. Note that this co-occurrence pattern is attested both in languages without articles (ex. Mandarin, Bangla) and those with articles (ex. Fongbe, German, Malax Swedish), indicating that its availability reflects an independent parameter on nominal structure.

- (23) amar oi lal boi (Bangla; Syed 2017)  
 my that red book  
 ‘That red book of mine’

- (24) Wangwu zhexie hao xiaohai (Mandarin)  
 Wangwu these good children  
 ‘These good children of Wangwu’s’

<sup>9</sup> Huang et al. (2009; 316) posit a single DP projection to account for these patterns: proper names occur in Spec, DP; demonstratives are D heads to which pronouns head-adjoin. The key empirical drawback to this structure is that it predicts the availability of both *Dem – Pron – N* and *Pron – Dem – N* orders cross-linguistically, under the assumption that the linearization of complex heads is variable.

<sup>10</sup> Pronouns can appear in different structural positions within a language. For example, non-adnominal pronouns in Mandarin can occur with demonstratives, but only in a post-demonstrative position, ex. *zhege ta* ‘this (aspect of) him’ (Höhn 2017). In this pattern, the pronoun appears to occur in the position typically occupied by head nouns, rather than a determiner projection.

- (25) àsón nyè tòn éló ó lé (Fongbe, Niger-Congo, Benin;  
 crab 1.SG GEN DEM DEF PL Lefebvre 2013)  
 ‘these/those crabs of mine’
- (26) dieses unser Land (German; Plank 1992)  
 this our country  
 ‘This country of ours’
- (27) men anje hest-i (Malax Swedish; Vangsnes 1999)  
 my this horse-DEF  
 ‘This horse of mine’

In this subsection, we first discuss evidence that possessors in these structures cannot be analyzed as adjectives, and further argue that possessors in these co-occurrence patterns occupy distinct functional projections from demonstratives. We return to the attested variability in the relative ordering of possessors with other determiners in Section 4.2. However, we will not be able to address the status of possessors that appear in a low position below the determiner domain (such as English post-nominal possessors, ex. *this pen of hers*), or their relation to higher possessor positions (cf. Larson 2014 for one approach and an overview)

Co-occurrence between possessors and other determiners in languages like Italian has been taken to argue that possessors can in some languages have the same syntactic status as adjectives (Lyons 1986; Giorgi and Longobardi 1991). However, such an analysis is not possible for all of these co-occurrence patterns, based on morphological and distributional differences. For example, Plank (1992) demonstrates that the agreement paradigm on possessors in German resembles that of other determiners, but differs from that of adjectives. In Mandarin, possessors and adjectives have a different distribution; true possessors (not marked with ‘modification’ or ‘relativizing’ *de*) must precede demonstratives, while adjectives must follow them (Y.-Y. Hsu 2013). The reverse orders are ungrammatical (28).

- (28) a. \*hao zhexie xiaohai b. \*zhexie Wangwu xiaohai  
 good these children these Wangwu children

The distribution of possessors in some cases depends on the position of a corresponding [POSSESSION] feature, and cannot simply follow from structural restrictions on genitive case-licensing. This is illustrated in Bangla, which permits DP-internal arguments (possessors, agent, or themes) with genitive case. While the placement of agent genitives is relatively unconstrained relative to demonstratives and numerals, the possessor reading is only available in a pre-demonstrative position (Syed 2017), indicating that [POSSESSION] is uniquely associated with a position higher than demonstratives.

- (29) Sanyal-er oi du To chobi  
 Sanyal-GEN that two CL picture  
 ✓ Agent reading: ‘those two portraits painted by Sanyal’  
 ✓ Possessor reading: ‘those two portraits owned by Sanyal’
- (30) oi Sanyal-er du To chobi  
 that Sanyal-GEN two CL picture  
 ✓ Agent reading: ‘those two portraits painted by Sanyal’  
 \* Possessor reading: ‘those two portraits owned by Sanyal’

- (31)    *oi*     *du*     *To*     *Sanyal-er*     *chobi*  
          that   two   CL     Sanyal-GEN   picture  
       ✓ Agent reading: ‘those two portraits painted by Sanyal’  
       \* Possessor reading: ‘those two portraits owned by Sanyal’

Further evidence that possessors can occupy dedicated functional projections is found in possessor-linker constructions, in which both a non-pronominal possessor and a co-referent ‘linker’ pronoun precede the head noun possessee (32). In the Germanic languages that allow this structure, the pronoun inflects for case assigned to the full nominal expression, while case on the non-pronominal possessor is fixed (accusative or dative, depending on dialect). The agreement patterns support a specifier-head structure for the possessor-linker sequence (Delsing 1998; Strunk 2004).

- (32)    *De’n*             *Jung*             *sien*             *Vadder*     (*Low Saxon*: Strunk 2004)  
          the.M.SG.ACC boy.M.SG.ACC his.M.SG.NOM father.M.SG.NOM  
          ‘the boy’s father’

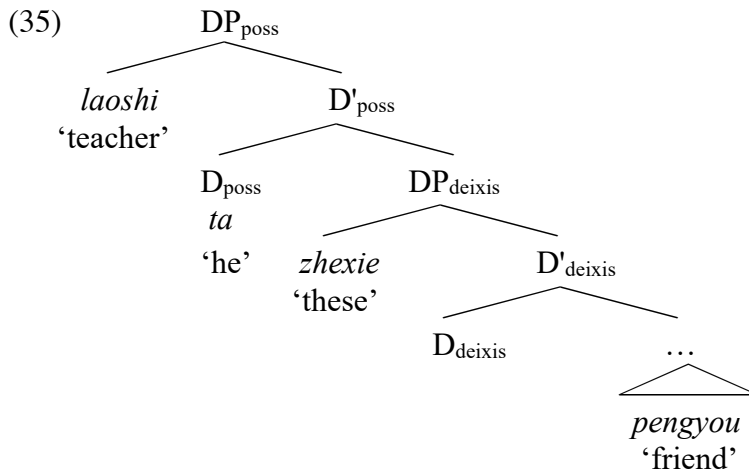
While the pattern appears to have eluded attention in previous works on Mandarin, the language allows a similar possessor-linker structure. Of key interest is the fact that the possessor and linker pronoun can precede demonstratives (33).

- (33)    *wo* *renshi* [*laoshi*     *ta*     *zhexie* *pengyou*]  
          I   know   teacher   3   this.PL   friend  
          ‘I know the teacher’s friend’

This pattern is structurally similar to the proper noun-pronoun construction previously discussed, which we will address in greater detail in Section 3.4. However, a key difference is that in the possessor-linker structure, the presence of *-men* on the pronoun enforces a plural reading of the preceding non-pronominal possessor, rather than the head noun (34). Likewise, the absence of *-men* enforces a singular reading of the non-pronominal possessor (33).

- (34)    *wo*     *renshi* [*laoshi*     *ta-men*     *zhexie* *pengyou*]  
          I     know   teacher   3-PL     this.PL   friend  
          ‘I know these friends of the teachers’

Assuming that the possessor-linker sequence in Mandarin also corresponds to a specifier-head structure, we conclude that possession is realized in a projection that is above the projection realizing deixis (35).





In summary, the above patterns indicate that [POSSESSION] in some languages can occur in a high functional projection distinct from [DEIXIS]. However, languages appear to vary in the relative height of these features, a point to be returned to in Section 4.2.

### 3.3. Components of definiteness: demonstratives and inclusiveness

A recent line of research has questioned the long-held assumptions that “definiteness” has (i) a single semantic characterization, and (ii) is expressed in a single projection of nominal phrase structure. Specifically, it has been shown that languages can use different morphemes or structures to distinguish “strong” definites, which refer to known entities in the discourse context, from “weak” definites, which refer to the maximum set of entities satisfying a domain restriction (Schwarz 2009; Syed 2016, 2017; Cheng et al. 2017; Jenks 2018; among others). Here, we adopt Lyons’ (1999) terminology, and refer to “strong” definites as marking *identifiability*, and “weak” definites as markers of *inclusiveness*, using the following working definitions, repeated from (3), (4):

- (36) IDENTIFIABILITY  
The speaker knows or is in a position to work out the referent of the noun phrase.
- (37) INCLUSIVENESS  
Reference to the totality of the objects or mass in the context which satisfy the description.

In particular, Syed (2016, 2017) and Cheng et al. (2017) argue that identifiability and inclusiveness can be marked in two distinct projections. Here, we present data from Bangla to show that determiners marking deixis and possession can be marked in a distinct projection from inclusiveness.

Consider the following contrast in Bangla, as discussed by Syed (2016, 2017). Nominal expressions with *numeral-classifier-adjective-noun* order receive an indefinite interpretation (38). Preposing of the adjective-noun sequence to the left of the numeral and classifier (39) has been noted to create a type of “definite” reading, though its exact characterization has been debated (Bhattacharya 1999; Chacón 2012; Dayal 2012; Syed 2017).

- (38) du To lal boi (“indefinite”)  
two CL red book  
‘two red books’
- (39) [lal boi]<sub>i</sub> du To t<sub>i</sub> (“definite”)  
red book two CL  
‘the two red books’

Syed (2016, 2017) argues that an articulated DP structure is necessary to explain the observation that demonstratives are compatible with both the non-preposed order (40) and the preposed order (41). Given the intuition that demonstratives themselves introduce a definite interpretation, it appears that preposing and demonstratives indicate two different types of definiteness.

- (40) oi du To [lal boi] (“definite”)  
that two CL red book  
‘those two red books’

- (41) oi [lal boi]<sub>i</sub> du To t<sub>i</sub> (“definite”)  
 that red book two CL  
 ‘those two red books’

Specifically, a straightforward analysis is available if the two semantic components of “definiteness,” identifiability and inclusiveness, are realized in separate functional projections in Bangla. Demonstratives occupy a relatively high functional projection that instantiates the features of deixis and identifiability. Preposing of the adjective-noun sequence is generated by movement to the specifier of a lower functional projection that instantiates inclusiveness. This is shown in (42) below.

- (42) [<sub>DPdeix/iden</sub> oi [<sub>DPinc</sub> [lal boi]<sub>i</sub> [<sub>NumP</sub> du To t<sub>i</sub> ]]]  
 that red book two CL  
 ‘Those two red books’ (*inclusive*)

The semantic compositionality of this structure is illustrated by Dayal (2012) with the following example in the context of a flower shop. The preposed order (43b) suggests that there are *only two types* of red flowers (e.g. roses and carnations), a clear reading of inclusiveness. However, no such implication holds for (43c) – the speaker may be picking out roses and carnations from a larger set of red flowers.<sup>11</sup>

- (43) a. kon phul Ta Sundor?  
 which flower CL beautiful  
 ‘Which of the flowers are beautiful?’  
 b. oi lal phul du To (*inclusive*)  
 that red flower two CL  
 c. oi du To lal phul (*non-inclusive*)  
 that two CL red flower  
 ‘Those two red flowers.’

Lastly, we note that it is possible in Bangla for a possessor to precede both the demonstrative and preposed adjective-noun sequence (44). We thus have evidence for the presence of three functional projections in the Bangla DP-domain.

- (44) amar oi [lal boi]<sub>i</sub> du To [~~lal boi~~]<sub>i</sub>  
 my that red book two CL  
 ‘These two red books of mine’ (*inclusive*)

- (45) [<sub>DPos</sub> amar [<sub>DPdeix/iden</sub> oi [<sub>DPinc</sub> [lal boi]<sub>i</sub> [<sub>NumP</sub> du To t<sub>i</sub> ]]]]  
 my that red book two CL  
 ‘Those two red books of mine’ (*inclusive*)

<sup>11</sup> Dayal specifically proposes that preposing indicates maximality, which is equivalent to inclusiveness in Lyons’ (1999) terminology. The approach is framed contra Bhattacharya (1999), who posits a difference between a deictic reading in (40) and a specific reading in (41). For more detailed discussion, we refer the reader to Dayal (2012) for an alternative account of the pattern in a single DP structure, and to Syed (2017), who offers an explanation of Bhattacharya’s intuition about a deictic reading.

Finally, we note that adnominal pronouns can also occur above demonstratives (46). However, possessors and adnominal pronouns cannot co-occur, suggesting that they compete to fill this highest projection.

- (46) amra ei bangali chatro-ra  
 we these Bengali student-PL  
 “we these Bengali students”

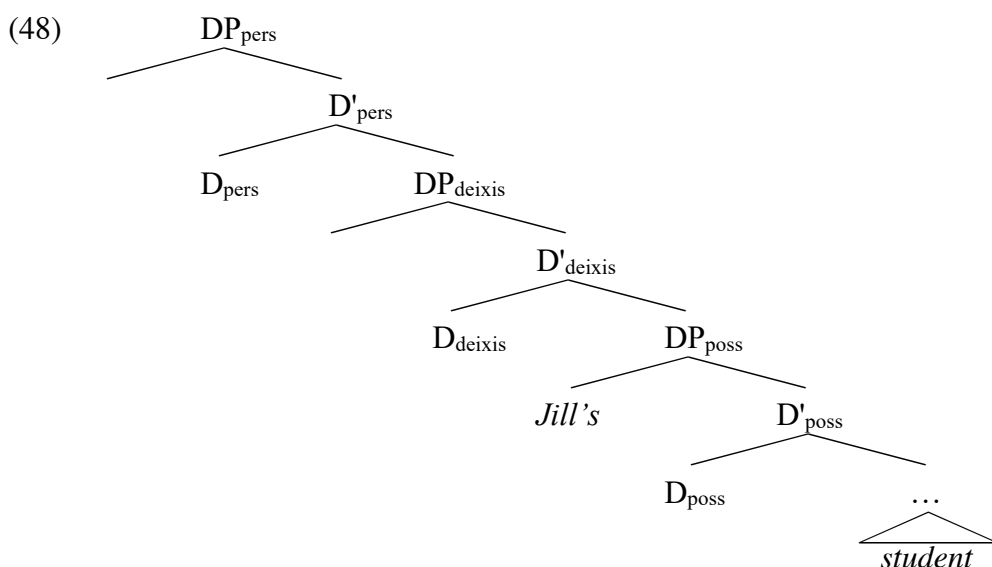
In summary, languages like Bangla show that [INCLUSIVENESS] can be realized in a projection below the projection that realizes [DEIXIS] (and by extension, identifiability). Although we cannot yet explain why languages do not seem to mark inclusiveness with determiner morphemes, the pattern nonetheless suggests the existence of a low determiner projection dedicated to inclusiveness in at least some languages.

### 3.4 Variation in nominal functional structure

On the one hand, the claim that languages have a single DP projection to express all features related to nominal reference clearly does not provide enough structure to account for the attested determiner co-occurrence patterns. On the other hand, if a fully articulated series of projections is present in every language, co-occurrence restrictions cannot be captured in a principled manner. To illustrate the issue, consider how one would account for the restriction against co-occurrence of pre-nominal possessors and other determiners in English (47).

- (47) a. \*these my people (demonstrative + possessor)  
 b. \*them my people (pronoun + possessor)

Suppose for instance that all nominal expressions contain distinct PersonP, DeixP, and PossP projections, as in (48). In the absence of other restrictions, one expects each projection to be able to be filled by a determiner, incorrectly predicting grammatical co-occurrence between possessors, demonstratives, and/or adnominal pronouns in English.



To address this issue, Giusti (2015) suggests that the parameters on the pronunciation of a given functional projection can depend on other projections. For example, it could be specified that in English both the head and specifier of DeixP must be null if PossP is filled, ruling out demonstrative+possessor co-occurrence. The first issue with this approach is that it requires a

proliferation of similar ad hoc statements to rule out other possible combinations of determiners such as adnominal pronouns and demonstratives. The more fundamental problem is that it is an overly indirect way of accounting for the generalization that English allows at most one prenominal determiner.

Here, we will pursue the idea that the source of cross-linguistic variation in determiner co-occurrence lies in the *number of projections* that a language uses to instantiate functional features related to nominal reference. Specifically, we adopt the claim that languages share a universal inventory of features, but differ in how those features are distributed across functional projections (Giorgi and Pianesi 1997; Bobaljik and Thráinsson 1998; Cowper 2005; Höhn 2017; B. Hsu 2017; among others). Two determiners can co-occur in a language only if the features that they instantiate are found in distinct projections. We propose that all languages share the following feature hierarchy.<sup>14</sup> However, we claim that the placement of [POSSESSION] within this hierarchy is variable cross-linguistically.

- (49) *(Partial) hierarchy of upper nominal functional features:*  
[PERSON]>[DEIXIS]>[INCLUSIVENESS]

A key prediction of the proposal is that features can be bundled on a head only if they occupy a contiguous portion of the hierarchy. For example, it should not be possible for a language to have a head that includes [PERSON] and [INCLUSIVENESS] to the exclusion of [DEIXIS]. It is worth noting that our proposal is compatible with the possibility that not all features may be present in a particular language, or in all types of nominal expressions within a language. However, the bundling parameter is crucially still needed to capture variation in the number of determiner projections available in a language, as well as variation in which determiners can appear in a given projection. We will assume in all following examples that all of the features above are present, and assigned default or unspecified values where necessary (for example, English *the house* leaves the proximal vs. distal value of [DEIXIS] unspecified).

We illustrate this approach with determiner co-occurrence patterns in Mandarin and Bangla. Recall from Sections 3.1 and 3.2 that in Mandarin, a demonstrative can be preceded by a possessor or by a proper name. We take this to indicate that [DEIXIS] can be realized in a separate projection from both [POSSESSION] and [PERSON]. Recall that both proper names and non-pronominal possessors can be followed by a co-referent pronoun. This creates potential ambiguity for sequences like (50) and (51), in which the initial proper noun can be interpreted either as a possessor or as co-referential with the head noun.

- (50) Zhangsan<sub>i</sub>      ta<sub>i</sub> zhe-ge      xuesheng<sub>i</sub>  
Zhangsan      3    this-CL      student  
'This student Zhangsan'

- (51) Zhangsan<sub>j</sub>      ta<sub>j</sub> zhe-ge      xuesheng<sub>i</sub>  
Zhangsan      3    this-CL      student  
'This student of Zhangsan's'

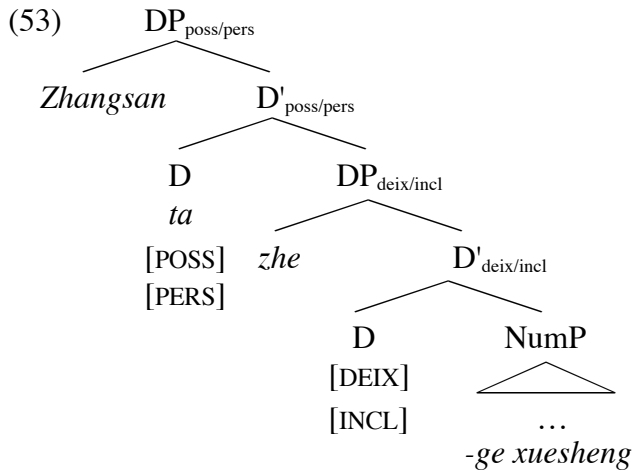
Note, however, that it is not possible for a possessor to co-occur with an adnominal name or pronoun (co-referential with the head noun), even in what appears to be a contextually appropriate context. Example (52) presents a hypothetical example of attempted co-occurrence of a possessor preceding an adnominal name and pronoun. The reverse order (52b) in which an adnominal proper name precedes the possessor is likewise ungrammatical.

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<sup>14</sup> In a similar vein, Larson (1991/2014) proposes that the hierarchy of projections within a nominal expression must reflect a hierarchy of thematic roles akin to those that determine VP structure. Unlike our proposal, however, Larson does not claim that all features related to nominal reference are present within each nominal expression.

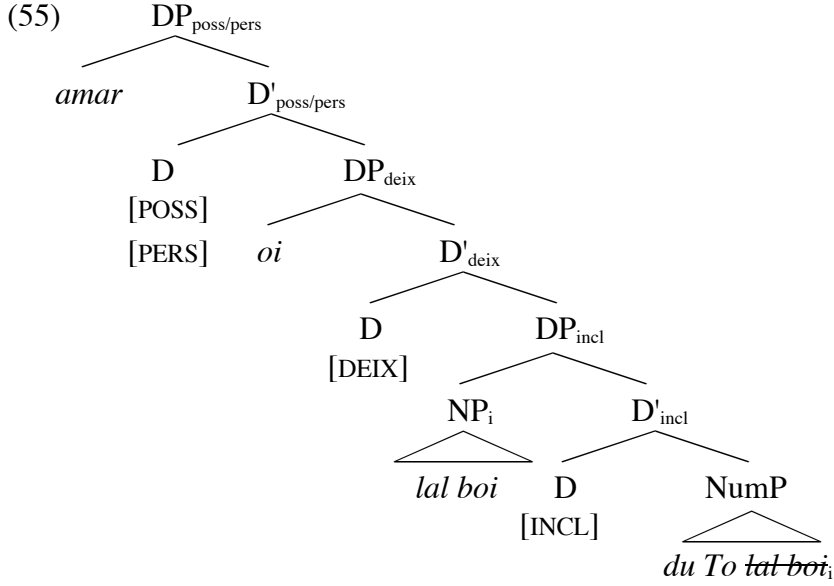
- (52) a. \*Lisi<sub>i</sub> Zhangsan<sub>i</sub> ta<sub>i</sub> zhe-ge xuesheng<sub>i</sub>  
 Lisi Zhangsan he this-CL student  
*Intended*: ‘This student of Lisi’s, Zhangsan’
- b. \*Lisi<sub>i</sub> Zhangsan<sub>j</sub> ta<sub>j</sub> zhe-ge xuesheng<sub>i</sub>  
 Lisi Zhangsan he this-CL student  
*Intended*: ‘Lisi, this student of Zhangsan’s’

We thus propose that [POSSESSION] and [PERSON] are bundled on a single head in Mandarin. Demonstratives, which instantiate [DEIXIS], are realized in a lower projection that also includes [INCLUSIVENESS]. This is illustrated in (53), which predicts co-occurrence in (50)-(51) but not in (52). As we do not have evidence that Mandarin overtly marks [INCLUSIVENESS] with either a determiner or a morpheme, we cannot directly determine whether or not it is realized in the same projection as [DEIXIS]. However, given the dispreference against empty projections in a grammar that permits bundling, we will assume that [INCL] and [DEIXIS] are bundled.



Next, we turn to Bangla, which permits a somewhat more articulated structure. Recall that while demonstratives signal deixis and identifiability, inclusiveness is marked separately by NP movement to a post-demonstrative position. We propose that [DEIXIS] is realized in a projection that dominates the projection that includes [INCLUSIVENESS], which attracts the *adjective + noun* constituent to mark inclusiveness. We have previously shown that both possessors and adnominal pronouns can occur above demonstratives, but not simultaneously. This suggests that [POSSESSION] and [PERSON] are bundled in the highest projection in Bangla (55).

- (54) amar oi [lal boi]<sub>i</sub> du To t<sub>i</sub>  
 my that red book two CL  
 ‘Those two red books of mine’ (*inclusive*)



## 4 Predicted typology

### 4.1 Bundling options in a fixed hierarchy of features

In this section we discuss the typological patterns that are generated by our proposed feature hierarchy and bundling system, and ways in which these can be tested by further typological investigation. We first consider in the abstract the variation that is predicted to arise from a given hierarchy of features. For an inventory of  $n$  features, we predict the existence of languages that distribute them among any number of projections between 1 and  $n$ . In addition, when there are more features than there are projections, languages can vary in the cutoff points in the hierarchy at which features are found on different heads. Concretely, if two features are bundled in the same head, indicated by dashes in the tables below, their exponents cannot co-occur. For instance, in a language where [DEIXIS] and [PERSON] are bundled, demonstratives cannot co-occur with adnominal pronouns or proper names.

We now illustrate the predicted distributions of the hierarchically ordered features [PERSON], [DEIXIS], and [INCLUSIVENESS] in Table 1 below (we return to the distribution of [POSSESSION] in Section 4.2). The left column shows the possible distributions of features on a given number of projections. The key languages that we have discussed which fit these predicted distributions are given in the right column.

<i>(Bundled) feature distribution</i>	<i>Examples found:</i>
<i>One projection</i> a. PERS – DEIX – INCL	English
<i>Two projections</i> b. PERS > DEIX – INCL c. PERS – DEIX > INCL	Mandarin <sup>15</sup> ?
<i>Three projections</i> d. PERS > DEIX > INCL	Bangla

**Table 1:** Bundling options predicted by features: [PERSON]>[DEIXIS]>[INCLUSIVENESS]

Within this predicted typology of four possible structures, we have identified plausible candidates for three of them. The only predicted pattern which we have not found is PERS – DEIX > INCL. This would be a language where demonstratives cannot co-occur with adnominal pronouns or proper names, but either adnominal person or a demonstrative can co-occur with a marker of inclusiveness (either a dedicated morpheme or movement) in a lower projection. We think the existence of such a language is plausible, given existing evidence for IDEN > INCL splits and the bundling of PERSON and DEIXIS in some languages, but must leave this to be confirmed in future work.

We will also illustrate how the predicted typology expands with the inclusion of additional features. Specifically, if we suppose that IDENTIFIABILITY can be instantiated in a projection below DEIXIS, the following patterns in Table 2 are predicted.

<i>(Bundled) feature distribution</i>	<i>Examples found:</i>
<i>One projection</i> a. PERS - DEIX – IDEN – INCL	English
<i>Two projections</i> b. PERS > DEIX – IDEN – INCL c. PERS – DEIX > IDEN – INCL d. PERS – DEIX – IDEN > INCL	Mandarin ? ?
<i>Three projections</i> e. PERS > DEIX – IDEN > INCL f. PERS – DEIX > IDEN > INCL g. PERS > DEIX > IDEN – INCL	Bangla ? ?
<i>Four projections</i> h. PERS > DEIX > IDEN > INCL	?

**Table 2:** Bundling options predicted by features:  
[PERSON]>[DEIXIS]>[IDENTIFIABILITY]>[INCLUSIVENESS]

Note that we have not found any of the patterns which would be languages in which DEIXIS and IDENTIFIABILITY are realized in separate projections (*c, f, g, h*), filled either using separate (phrasal) determiners or by a moved item. The absence of these predicted patterns suggests that the two features are always realized in the same projection, as we have assumed. Although deixis and

<sup>15</sup> We cannot conclusively classify all of the languages that we have discussed in this table. For example, while it clear that Malagasy, Kayardid, and Amele (and other languages with demonstrative + pronoun co-occurrence listed by Höhn 2017) instantiate [PERSON] and [DEIXIS] in separate projections, like Mandarin, we do not have the data to identify the distribution [INCLUSIVENESS] in these languages.

identifiability are not identical semantic notions, this inseparability potentially arises from the observation that adnominal demonstratives only occur in contexts where the identity of the referent is accessible to the listener (Lyons 1999).<sup>16</sup>

Having illustrated the typological patterns predicted by a bundling parameter on the proposed hierarchy of upper nominal features, we turn to other factors that explain variation in determiner co-occurrence patterns; namely, variability in the hierarchical position of [POSSESSION], and the apparent incompatibility between possessors and adnominal pronouns or proper names.

#### 4.2 Variable placement of [POSSESSION], non-local co-occurrence restrictions

The relative ordering of possessors with other elements within nominal expressions can vary across languages. As one illustration, compare the attested ordering relations between adnominal pronouns and demonstratives versus possessors and demonstratives, see (23)-(27). For instance, although languages with prenominal possessors and prenominal demonstratives can exhibit either *Poss – Dem – N* (ex. Bangla) or *Dem – Poss – N* (ex. German) orders, the only prenominal ordering of adnominal pronouns and demonstratives is *Pron – Dem – N* (cf. \**Dem – Pron – N*). It thus appears that languages vary in the hierarchical realization of possession relative to other features of reference.

While it is beyond the scope of this paper to provide a full explanation for the special status of possession, cross-linguistic variation in the features with which [POSSESSION] is bundled can account for variation in whether possession structures imply other features of definiteness. As notably discussed in Lyons (1999: 130-134) and Cheng et al. (2017), languages vary in whether nominal expressions with a possessor require definite interpretations, and possessive structures within a language can similarly differ. For example, prenominal possessors in English require a definite interpretation of the full nominal expression, while postnominal possessors are compatible with either a definite or indefinite reading (56). A similar pattern is observed in Spanish (57).

- (56) a. my book (obligatorily definite)  
       b. a/the book of mine (optionally definite)
- (57) a. mia casa (obligatorily definite)  
       my.FEM house
- b. una/la casa mía (optionally definite)  
           a.FEM/the.FEM house my.FEM

As noted by Lyons (1999: 134), such patterns show that the possession relation itself is not restricted by definiteness. Rather, the association of possession with definiteness arises only when possessors are structurally realized in a D position of some kind: “possessives are never lexically specified as [+def]. The definiteness ... is the consequence of the possessive being in Det position rather than the other way round.” In terms of our analysis, we propose that the prenominal determiner position in English and Spanish has a feature bundle that includes the hierarchically contiguous features [POSSESSION] and [DEIXIS] (which implies identifiability). While the exact nature of the postnominal possessor position in these languages is beyond the scope of our paper (for some approaches see Schoorlemmer 1998; Larson 2014), we assume that it is a position below the D-domain that is not associated with these features.

In this context, the following distinction between Spanish and Portuguese is relevant. Unlike Spanish, Portuguese allows prenominal possessors to co-occur with definite articles and demonstratives, and further allows possessors to co-occur with an indefinite article (Lyons 1999).

<sup>16</sup> According to Lyons (1999:21): “a demonstrative signals that the identity of the referent is immediately accessible to the hearer, without the inferencing often involved in interpreting simple definites. This may be because the work of referent identification is being done for the hearer by the speaker, for example by pointing to the referent.”



- (58)
- a. a                nossa        casa  
      the.FEM    our.FEM    house  
      ‘our house’
  - b. esta            nossa        casa  
      this.FEM    our.FEM    house  
      ‘this house of ours’
  - c. uma            nossa        casa  
      a.FEM        our.FEM    house  
      ‘a house of ours’

We suggest that the difference between Spanish and Portuguese lies in the features with which [POSSESSION] is bundled. In Spanish, [POSSESSION] is bundled on a head that also includes [IDENTIFIABILITY] and [DEIXIS] whereas portuguese realizes [POSSESSION] in a lower projection, though we do not yet know which other features are associated with this position. While our discussion remains speculative, variation in whether [POSSESSION] is bundled with [INCLUSIVENESS] may potentially account for differences in whether possessors are associated with inclusivity readings (Partee 2006; Cheng et al. 2017).

Finally, we illustrate how the variable placement of [POSSESSION] augments the predicted typology from the previous section. Table 3 again shows the possible distributions of [PERSON], [DEIXIS], and [INCLUSIVENESS]: *a, b, c, d*. In addition, it shows each way that [POSSESSION] can be distributed among these projections, assuming that it is always bundled with another feature.

<i>(Bundled) feature distribution</i>	<i>Examples found:</i>
<i>One projection</i> a. PERS – DEIX – INCL i. <b>POSS</b> – PERS – DEIX – INCL	English
<i>Two projections</i> b. PERS > DEIX – INCL i. <b>POSS</b> – PERS > DEIX – INCL ii. PERS > <b>POSS</b> – DEIX – INCL c. PERS – DEIX – IDEN > INCL i. <b>POSS</b> – PERS – DEIX > INCL ii. PERS – DEIX > <b>POSS</b> – INCL	Mandarin ? ? German <sup>18</sup>
<i>Three projections</i> d. PERS > DEIX – IDEN > INCL i. <b>POSS</b> – PERS > DEIX > INCL ii. PERS > <b>POSS</b> – DEIX > INCL iii. PERS > DEIX > <b>POSS</b> – INCL	Bangla ? ?

**Table 3:** Bundling options predicted by features [PERSON], [DEIXIS], [INCLUSIVENESS], and variable placement of [POSSESSION]

<sup>18</sup> Recall from (26) that German permits demonstrative + possessor co-occurrence (Plank 1992), indicating that [DEIXIS] and [POSSESSION] are in separate projections. The impossibility of co-occurrence between pronouns and demonstratives indicates that [PERSON] and [DEIXIS] are bundled. However, we do not know a way to conclusively determine whether [POSSESSION] and [INCLUSIVENESS] are bundled, so this part of the classification is tentative.

Given the data we have, in the absence of a far more extended and sophisticated examination, we cannot confidently conclude whether the yet unattested patterns are impossible. However, it is relevant to note that we have not observed any languages in which an adnominal pronoun or proper name can co-occur with a possessor, even in languages like Mandarin or Bangla that allow these items to co-occur with other determiners. This is interesting because the apparent flexibility in the hierarchical placement of [POSSESSION] predicts that there are many possible structures in which the feature is not bundled with [PERSON], as shown in our typology (*b.ii*, *c.ii*, *d.ii*, *d.iii*). If this observation is found out to be robust cross-linguistically (i.e. if it turns out that no language permits this co-occurrence pattern), it may suggest that the incompatibility between possession and adnominal pronouns or proper names is not due to the corresponding features being bundled, and is instead the result of a separate restriction. More concretely, there is potentially a universal restriction that each nominal expression can contain only a single set of person features – possessors and adnominal pronouns both realize these features (in Giusti’s terminology, possessors and adnominal pronouns introduce separate *indices*), explaining the co-occurrence restriction.

## 5 Conclusion

In this paper, we have shown that cross-linguistic variation in co-occurrence patterns among non-article determiners can provide key insights into nominal syntax. First, we have argued that languages vary in the degree of articulation of the nominal extended projection. This accounts for the fact that languages differ in the number of non-article determiners that can co-occur. Second, we have claimed that the attested patterns provide new evidence for universal hierarchical relations among features related to nominal reference. For certain pairs of features, e.g. [PERSON]>[DEIXIS], determiners that instantiate one feature are always higher in the nominal structure than determiners that instantiate the second one. Other pairs of features are more variable: in particular, [POSSESSION] varies significantly in its structural positions, both within and across languages. Non-article determiner co-occurrence is not currently well-documented in many languages, perhaps due in large part to the ungrammaticality of these structures in the main languages spoken by researchers. We thus encourage linguists to search for them in future investigations of nominal syntax. We conclude the paper with remaining questions that we hope can be resolved in future work.

First, we have shown that ordering restrictions among co-occurring determiners indicate that features related to nominal reference are hierarchically organized. Furthermore, variation in the number of non-article determiners that can co-occur results from different degrees to which these features are bundled on functional heads. However, we have only considered restrictions on LOCAL CO-OCCURRENCE, in which determiners compete to fill a single structural position. It remains to be determined how such an account can extend to NON-LOCAL CO-OCCURRENCE restrictions: cases in which determiner co-occurrence is restricted even when those determiners seem to occupy different positions within an articulated DP (Choi 2014).

Second, although it has been claimed that languages without articles contain less functional structure than languages with articles (Bošković 2005, 2008, et seq.), i.e. the former lack (a) DP, non-article determiner co-occurrence patterns can provide evidence for articulated functional structure even in languages without articles. The same diagnostics also show that languages with articles can vary the amount of projections contained in nominal expressions. While the absence of articles in a language may still be indicative of having less functional structure, we suggest that it cannot be an absence of the determiner projections that we have discussed (see Norris 2018 for a similar discussion).

Finally, further investigation of determiner co-occurrence patterns is needed to clearly identify factors that underly the paths and featural triggers of possessor movement, and variation in the placement of possessors more broadly. Looking further afield, we similarly hope to identify whether there are connections between degrees of articulation and possible movements (B. Hsu *to*

*appear*), such as DP-internal *wh*-movement (Horrocks and Stavrou 1987) or extraction out of DP (Szabolcsi 1994; Gavrusseva 2000). For example, if grammars are subject to an anti-locality restriction that requires phrasal movements to cross more than one projection (Abels 2003; Grohmann 2003; Erlewine 2016), greater degrees of bundling are predicted to result in greater restrictions on DP-internal movement.

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