

Cooccurrence of nonarticle determiners as evidence for split DPs and bundled projections*

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Abstract:

This research report examines cross-linguistic variation in cooccurrence among nonarticle determiners (demonstratives, proper names, pronouns, possessors) and its implications for understanding nominal (DP) structure and its variation. We present data from several language families, and show that languages vary in both the number and permitted combinations of nonarticle determiners within a nominal phrase. These patterns provide new evidence that the primary semantic components of nominal reference, PERSON, DEIXIS, and INCLUSIVENESS, correspond to syntactic features in a universal hierarchy. Languages vary in how these features are bundled on functional heads; nonarticle determiners can cooccur only if their corresponding features are on separate heads.

Keywords: determiner phrases, determiners, definiteness, pronouns, demonstratives, possessors, functional projections, head bundling

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 in our understanding of 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 NONARTICLE DETERMINERS, specifically POSSESSORS, DEMONSTRATIVES, ADNOMINAL PRONOUNS,

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and ADNOMINAL PROPER NAMES. Although several works have studied the placement of nonarticle 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: the cooccurrence of nonarticle 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 nonarticle determiners within a nominal phrase. Cross-linguistic variation in these cooccurrence 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 nonarticles), are unable to generate the attested determiner cooccurrence patterns. Specifically, although a single DP structure can account for certain cooccurrence patterns between articles and other determiners, they cannot generate cooccurrence among nonarticle 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 first show that cross-linguistic variation in determiner cooccurrence restrictions cannot be captured in a principled manner if this is the case. We then 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 & Pianesi 1997, Bobaljik & 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 1999.¹

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

- (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.
- (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 nonarticle determiners can cooccur 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 1999), their corresponding features never occur in separate projections. Since we will rely primarily on the placement of demonstratives to identify functional structure, we will use [DEIXIS] to represent both features.³

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

³ We leave open the possibility that [DEIXIS] could be analyzed as a subfeature or featural dependent of [IDENTIFIABILITY]. See Cowper 2005 for discussion of hierarchical organization among bundled features.

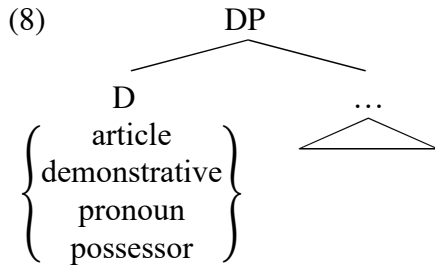
In sum, we argue that the range of attested cooccurrence patterns and restrictions are predicted by two factors: (a) a universal hierarchy of features, and (b) parametric variation in the bundling of these features on functional projections.

The research report is organized as follows. Section 2 presents a current view of DP structure and the types of determiner cooccurrence patterns that it predicts. Section 3 presents attested patterns of cooccurrence among nonarticle 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 of our approach, and Section 5 concludes the paper.

2. DETERMINERS AND THE DP HYPOTHESIS. In this section, we will first review aspects of the standard DP hypothesis, which posits that nominal expressions are headed by a functional D(eterminer) Phrase (Abney 1987, Szabolcsi 1994, Longobardi 1994). Throughout the paper, we will present empirical challenges to two of its key claims: first, that the DP projection is the surface position of all determiners, and second, that it is the single structural position in which the referent or the index of a nominal expression is specified (Longobardi 1994, Giusti 2015, Jenks 2018).

Following previous works, we assume that cooccurrence restrictions between two determiners arise when those determiners compete to fill a unique position. However, languages vary in whether certain combinations of determiners are permitted. As we will now illustrate, explaining the source of this variation is a significant challenge for current theories of nominal syntax. For example, English determiners cannot cooccur 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, as shown in 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)

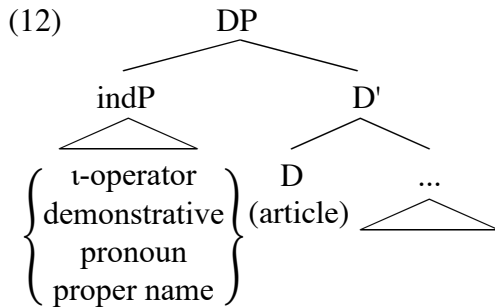


Prior works have shown, however, that such a structure undergenerates a number of attested patterns. Specifically, it does not account for cases in which a particular nonarticle determiner either can or must occur with an article (Delsing 1998, Haspelmath 1999, Vangsnes 1999, Allen 2008, Giusti 2015). For example, as shown in 9-11 below, demonstratives must occur with a definite article in Hungarian, adnominal pronouns must occur with an article in Spanish, and Lappträsk Swedish requires possessors to occur with articles.

- (9) Hungarian (Giusti 2005)
- | | | | |
|------|-----|-----|---------------------------|
| ez | a | fiú | (demonstrative + article) |
| this | the | boy | |
- (10) Spanish (Giusti 2015)
- | | | |
|----------|----------------|---------------------|
| vosotros | los profesores | (pronoun + article) |
| you | the professors | |
- (11) Lappträsk Swedish (Vangsnes 1999)
- | | | | |
|------|----------|-----------|-----------------------|
| mett | the stór | hús-e | (possessor + article) |
| my | the big | house-DEF | |

While such cooccurrence patterns suggest a structural difference between articles and nonarticle determiners, they remain compatible with a nonarticulated 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 are realizations of heads within the extended projection, while nonarticle determiners are specifiers. Demonstratives, adnominal pronouns, and proper names are classified as INDEXICAL EXPRESSIONS (denoting 'person, reference, or deixis'), labeled as as indP below. Furthermore,

although indexical items can 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 cooccurrence 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 (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 cooccurrence (ex. Hungarian) is generated by the BOTH setting.⁴

(13) Italian: OR parameter with demonstratives

- | | | |
|-------------------|---------------|-----------------------|
| a. queste ragazze | b. le ragazze | c. *queste le ragazze |
| these girls | the girls | these the girls |

⁴ Even English, in which determiner cooccurrence 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.

(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 nonarticle determiner must be analyzed as 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 nonarticle determiners, which pattern differently in key ways. The key prediction of Giusti’s approach is that the cooccurrence of nonarticle 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.⁵ In the next section, we present several cooccurrence patterns with nonarticle 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. COOCCURRENCE OF NONARTICLE DETERMINERS

3.1. PROPER NAMES + (PRONOUNS) + DEMONSTRATIVES. In previous works, restrictions against the cooccurrence of demonstratives and adnominal pronouns (pronouns occurring with a coreferential common noun in the same nominal expression) have been taken to indicate 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.

⁵ Giusti (2015) notes that cooccurrence between possessors and other nonarticle 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 cooccurrence between possessors and other determiners creates new complications for her proposed parameter system.

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

As noted in the typological studies of Höhn 2016, 2017, however, pronoun-demonstrative cooccurrence is attested in many languages outside of the Indo-European family.

- (16) Amele (Trans-New-Guinea, Papua New Guinea; Höhn 2017, after Roberts 1987)

dana ben eu age
 man big that 3.PL
 ‘those leaders (big men)’

- (17) Kayardild (Tangkic, South Wellesey Islands; Höhn 2017, after Evans 1995)

niya dathin-a dank-a
 3.SG.NOM that-NOM man-NOM
 ‘he that man’

- (18) Malagasy (Austronesian, Madagascar; Paul & Travis 2019)

ahy vehivavy io
 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 et al. 2014, Sheehan et al. 2017) only if the functional projection of adnominal pronouns dominates the

projection hosting demonstratives.⁶ 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 in 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, as shown in 19. In addition, however, demonstratives can be preceded by a proper name, as in 20, or by both a proper name and an adnominal pronoun in that order, as in 21.⁷ 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.⁸

- (19) ni-men zhe-xie haizi (pronoun + demonstrative)
 2-PL this-CL boys
 ‘you these boys’

- (20) Lisi na-ge tiancai (proper name + demonstrative)
 Lisi that-CL genius
 ‘that genius Lisi’

⁶ In brief, the Final-over-Final Condition is a prohibition against a head-final projection αP that immediately dominates a head-initial projection βP 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.

⁷ Demonstratives in Mandarin typically occur with a classifier in the same nominal expression. It is important to note that classifiers occur in a lower projection than demonstratives, despite their bound appearance in these examples. This is seen in structures in which a numeral intervenes between the two items (ex. *nimen zhe liang-ge haizi* lit. ‘you this two-CL child’), indicating that classifiers are below NumP, itself below the DP-domain.

⁸ 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.

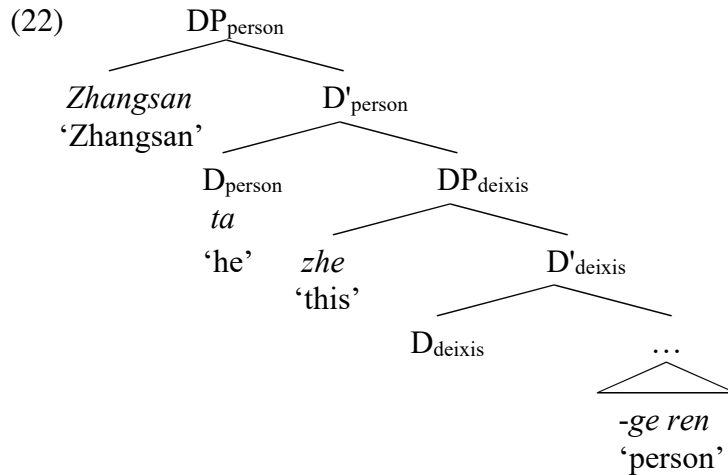
- (21) Zhangsan ta zhe-ge ren (proper name + pronoun + demonstrative)
 Zhangsan 3 this-CL person
 ‘this person Zhangsan’

Huang and colleagues (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 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 occur in a lower projection than pronouns or proper names.

We propose that in languages with pronoun-demonstrative cooccurrence, the syntactic features of [PERSON] and [DEIXIS] are found 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 and colleagues’ (2009) analysis of proper names as specifiers, and propose that the pronoun is the head of that projection in Mandarin.¹⁰ Again, we leave open the possibility that adnominal pronouns may be specifiers in other languages or structures (see also Höhn 2017).¹¹ The proposed structure for Mandarin 21 is shown in 22 below.

¹⁰ Huang and colleagues (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 incorrectly 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.

¹¹ Pronouns can also appear in different structural positions within a language. For example, nonadnominal pronouns in Mandarin can occur with demonstratives, but only in a postdemonstrative 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.



3.2. POSSESSORS + DEMONSTRATIVES. Languages also vary in whether possessors can cooccur with demonstratives. Several examples of possessor-demonstrative cooccurrence are given below. Note that this cooccurrence 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) Bangla (Syed 2017)
- | | | | |
|------|------|-----|------|
| amar | oi | lal | boi |
| my | that | red | book |
- ‘that red book of mine’

- (24) Mandarin
- | | | | |
|--------|---------|------|----------|
| Wangwu | zhe-xie | hao | xiaohai |
| Wangwu | this-CL | good | children |
- ‘these good children of Wangwu’s’

- (25) Fongbe (Niger-Congo, Benin; Lefebvre 2013)
- | | | | | | |
|------|------|-----|-----|-----|----|
| àsón | nyè | tòn | éló | ó | lé |
| crab | 1.SG | GEN | DEM | DEF | PL |
- ‘these/those crabs of mine’

- (26) German (Plank 1992)
 dieses unser Land
 this our country
 ‘this country of ours’
- (27) Malax Swedish (Vangsnes 1999)
 men anje hest-i
 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 cooccurrence 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 postnominal possessors, ex. *this pen of hers*), or their relation to higher possessor positions (see Larson 2014 for one approach and an overview).

Cooccurrence between possessors and other determiners in languages like Italian has been taken to argue that possessors in some languages have the same syntactic status as adjectives (Lyons 1986, Giorgi & Longobardi 1991). However, such an analysis is not possible for all of these 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 in 28 are ungrammatical.

- (28) a. *hao zhe-xie xiaohai b. *zhe-xie Wangwu xiaohai
 good this-CL children this-CL 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 in relation to demonstratives and numerals is relatively unconstrained, the possessor reading is only available for predemonstrative genitives (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 nonpronominal possessor and a coreferent ‘linker’ pronoun precede the head noun possessee. In Germanic languages that allow this structure, the pronoun inflects for the case assigned to the full nominal expression, while case on the nonpronominal possessor is fixed (accusative or dative, depending on dialect), as shown in 32. The agreement patterns and ordering restriction support a specifier-head structure for the possessor-linker sequence (Delsing 1998, Strunk 2004).

(32) Low Saxon (Strunk 2004)

De'n Jung sien Vadder
 the.M.SG.ACC boy.M.SG.ACC his.M.SG.NOM father.M.SG.NOM
 'the boy's father'

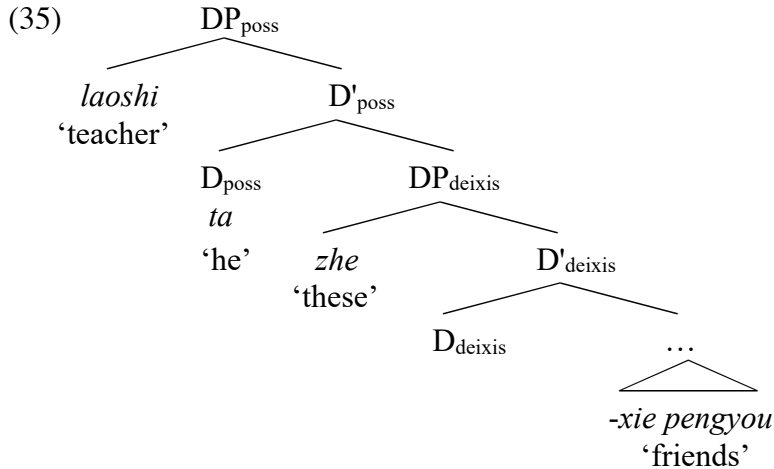
While the pattern appears to have eluded attention in previous works on Mandarin, the language allows a similar possessor-linker structure. Of key interest is the fact that the possessor and linker pronoun can precede demonstratives, as seen in 33.

(33) wo renshi [laoshi ta zhe-xie pengyou]
 I know teacher 3 this-CL friend
 'I know these friends of the teacher.'

This pattern is structurally similar to the adnominal proper noun-pronoun construction previously discussed, which we 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 in 34 enforces a plural reading of the preceding nonpronominal possessor, rather than the head noun. Likewise, the absence of *-men* in 33 enforces a singular reading of the nonpronominal possessor.

(34) wo renshi [laoshi ta-men zhe-xie pengyou]
 I know teacher 3-PL this-CL 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, as shown in 35.



In summary, the patterns above indicate that [POSSESSION] in some languages occurs in a high functional projection distinct from [DEIXIS]. However, languages vary in the relative height of these features, a point 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, 2013, Syed 2016, 2017, Cheng et al. 2017, Jenks 2018, among others). Here, we adopt the terminology of Lyons 1999, and refer to strong definites as markers of 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 distinct projections. Here, we present data from Bangla to show that determiners marking deixis and possession can be marked in a separate projection from inclusiveness.

Consider the following contrast in Bangla, as discussed in Syed 2016, 2017. Nominal expressions with numeral-classifier-adjective-noun order receive an indefinite interpretation, as in 38. Preposing of the adjective-noun sequence to the left of the numeral and classifier, as in 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
two CL red book
‘two red books’ (‘indefinite’)

- (39) [lal boi]_i du To t_i
red book two CL
‘the two red books’ (‘definite’)

Syed (2016, 2017) argues that an articulated DP structure is necessary to explain the observation that demonstratives are compatible with both the nonpreposed 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. Note that the label NumP in these examples represents the projection that hosts numerals. The inclusiveness interpretation is available only in 41 where the NP is preposed, but not in 40.

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

- (41) oi $[_{NP} \text{lal boi}]_i$ $[_{NumP} \text{du To } t_i]$
 that red book two CL
 ‘those two red books’ (‘definite’)

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. Because inclusiveness is a subtype of definiteness, expressed with articles in many languages (Schwarz 2009, 2013), we assume that its projection is above NumP. See Simpson & Syed 2016 for further arguments that nominal-internal phrasal movements in Bangla must cross NumP, which also has phasal properties. The proposed structure is in 42 below.

- (42) $[_{DP_{deix/iden}} oi$ $[_{DP_{inc}} [_{NP} \text{lal boi}]_i$ $[_{NumP} \text{du To } t_i]]]$
 that red book two CL
 ‘those two red books’ (inclusive)

The semantic compositionality of this structure is illustrated in 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.¹³

¹³ Dayal specifically proposes that preposing indicates maximality, which is equivalent to inclusiveness in the terminology of Lyons 1999. The approach is framed contra Bhattacharya 1999, which 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, which offers an explanation of Bhattacharya’s intuition about a deictic reading.

- (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 (noninclusive)
 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, as in 44. We thus have evidence for the presence of three functional projections in the Bangla DP-domain.

- (44) amar oi [lal boi]_i du To [~~lal boi~~]_i
 my that red book two CL
 ‘these two red books of mine’ (inclusive)

- (45) [DP_{poss} amar [DP_{deix/iden} oi [DP_{inc} [lal boi]_i [NumP du To t_i]]]]
 my that red book two CL
 ‘those two red books of mine’ (inclusive)

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

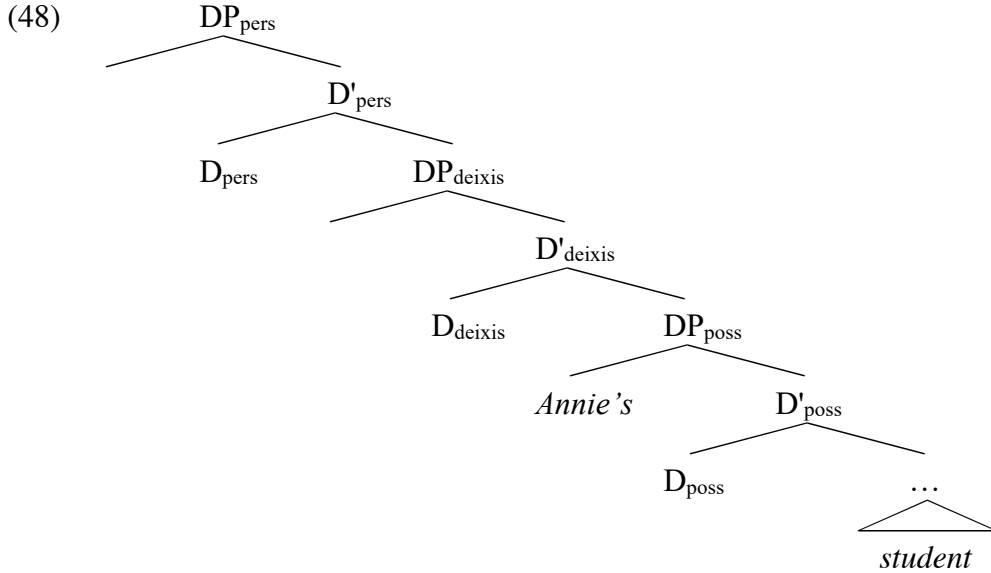
- (46) amra ei bangali chatro-ra
 we this Bengali student-PL
 ‘we these Bengali students’

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 the relative rarity of languages that express inclusiveness with dedicated determiners (see Schwarz 2013 for a summary of attested cases), 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 cooccurrence patterns. On the other hand, if a fully articulated series of projections is present in every language, cooccurrence restrictions cannot be captured in a principled manner. To illustrate the issue, consider how one would account for the restriction against the cooccurrence of prenominal possessors and other determiners in English.

- (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 filled by a determiner, incorrectly predicting grammatical cooccurrence 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 properties of other projections. For example, it could be specified that in English both the head and specifier of DP_{deixis} must be null if DP_{poss} is filled, ruling out demonstrative+possessor cooccurrence. 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 pursue the idea that the source of cross-linguistic variation in determiner cooccurrence 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 & Pianesi 1997, Bobaljik & Thráinsson 1998, Cowper 2005, Höhn 2017, B. Hsu 2017, among others). Two determiners can cooccur in a language only if the features that they instantiate are found in distinct projections. We propose that all languages share the feature hierarchy in 49.¹⁶ However, we claim that the placement of [POSSESSION] within this hierarchy is variable cross-linguistically.

¹⁶ 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.

(49) (Partial) hierarchy of upper nominal functional features:

[PERSON]>[DEIXIS]>[INCLUSIVENESS]

A key aspect 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 are 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 in 49 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 cooccurrence 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 nonpronominal possessors can be followed by a coreferential 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 coreferential with the head noun.

(50) Zhangsan_i ta_i zhe-ge xuesheng_i
 Zhangsan 3 this-CL student
 ‘this student Zhangsan’

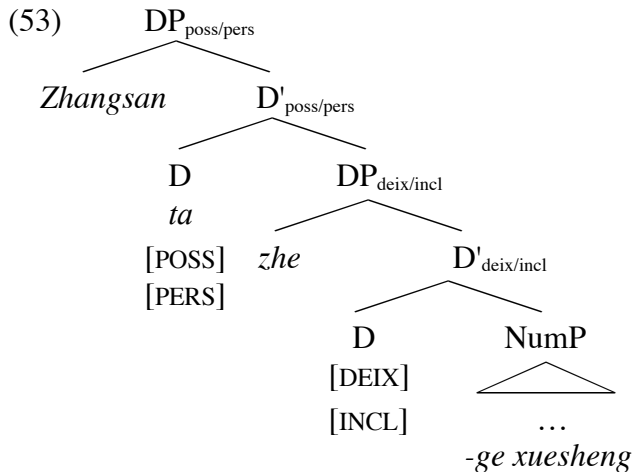
(51) Zhangsan_j ta_j zhe-ge xuesheng_i
 Zhangsan 3 this-CL student
 ‘this student of Zhangsan’s’

However, it is not possible for a possessor to cooccur with an adnominal name or pronoun, even in what appears to be an appropriate scenario. Example 52a presents a hypothetical example of attempted cooccurrence 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.

- (52) a. *Lisi_i Zhangsan_i ta_i zhe-ge xuesheng_i
 Lisi Zhangsan 3 this-CL student
 Intended: ‘this student of Lisi’s, Zhangsan’

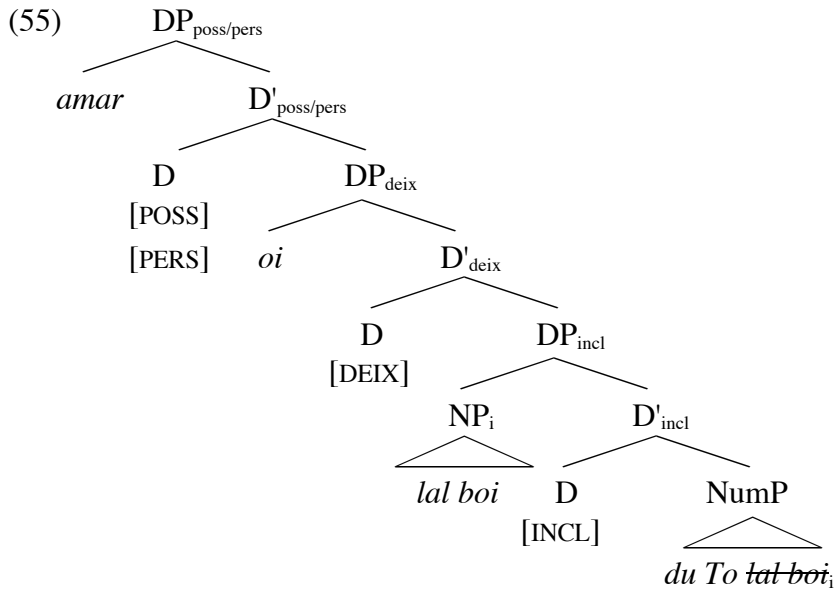
- b. *Lisi_i Zhangsan_j ta_j zhe-ge xuesheng_i
 Lisi Zhangsan 3 this-CL student
 Intended: ‘Lisi, this student of Zhangsan’s’

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 generates the patterns in 50 and 51, but not 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 [INCLUSIVENESS] 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 postdemonstrative 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, as shown in 55.

- (54) amar oi [lal boi]_i du To t_i
 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 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 cooccur. For instance, in a language where [DEIXIS] and [PERSON] are bundled, demonstratives cannot cooccur 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 ¹⁷ ?
<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 that we have not found is PERS – DEIX > INCL. This would be a language where demonstratives cannot cooccur with adnominal pronouns or proper names, but either adnominal person or a demonstrative can cooccur with a marker of inclusiveness (either a dedicated morpheme or movement) in a lower projection. We think the

¹⁷ We cannot conclusively classify all of the languages that we have discussed in this table. For example, while it is clear that Malagasy, Kayardid, and Amele (and other languages with demonstrative + pronoun cooccurrence 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.

existence of such a language is plausible, given existing evidence for IDEN > INCL splits and the bundling of [PERSON] and [DEIXIS] in some languages. However, we 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 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).¹⁸

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 cooccurrence 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], NONLOCAL COOCCURRENCE RESTRICTIONS. The relative ordering of possessors with other elements within nominal expressions varies across languages. As one illustration, compare the attested ordering relations between adnominal pronouns and demonstratives in 16-18 versus possessors and demonstratives in 23-27. 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 differ in whether nominal expressions with a possessor require definite interpretations, and possessive structures within a language can similarly differ. As shown in 56, 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. A similar pattern is observed in Spanish, shown in 57.

¹⁸ 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’.

- (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 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 in 58 between Spanish and Portuguese is relevant. Unlike Spanish, Portuguese allows prenominal possessors to cooccur with definite articles and demonstratives, and further allows possessors to cooccur with an indefinite article (Lyons 1999).

- (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. Although our discussion remains speculative, variation in whether [POSSESSION] is bundled with [INCLUSIVENESS] may account for differences in whether possessors are associated with inclusiveness 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. POSS – PERS – DEIX – INCL	English
<i>Two projections</i> b. PERS > DEIX – INCL i. POSS – PERS > DEIX – INCL ii. PERS > POSS – DEIX – INCL c. PERS – DEIX – IDEN > INCL i. POSS – PERS – DEIX > INCL ii. PERS – DEIX > POSS – INCL	Mandarin ? ? German ¹⁹
<i>Three projections</i> d. PERS > DEIX – IDEN > INCL i. POSS – PERS > DEIX > INCL ii. PERS > POSS – DEIX > INCL iii. PERS > DEIX > POSS – INCL	Bangla ? ?

TABLE 3. Bundling options predicted by features [PERSON], [DEIXIS], [INCLUSIVENESS], and variable placement of [POSSESSION]

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 cooccur with a possessor, even in languages like Mandarin or Bangla that allow these items to cooccur 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*,

¹⁹ Recall from 26 that German permits demonstrative + possessor co-occurrence (Plank 1992), indicating that [DEIXIS] and [POSSESSION] are in separate projections. The impossibility of cooccurrence 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.

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 cooccurrence pattern), it may suggest that the incompatibility between possession and adnominal pronouns or proper names is not due to the corresponding features being bundled, but 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. The cooccurrence restriction arises from the fact that person features are found on both possessors and adnominal pronouns (in Giusti's terminology, possessors and adnominal pronouns introduce separate indices).

5. CONCLUSION. In this paper, we have shown that cross-linguistic variation in cooccurrence patterns among nonarticle determiners provides 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 nonarticle determiners that can cooccur. 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, such as [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. Nonarticle determiner cooccurrence 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 cooccurring determiners indicate that features related to nominal reference are hierarchically organized. Furthermore, variation in the number of nonarticle determiners that can cooccur results from different degrees to which these features are bundled on functional heads. However, we have only considered restrictions on LOCAL COOCCURRENCE, in which determiners compete to fill a single structural position. It remains to be determined how such an account can extend to NONLOCAL COOCCURRENCE restrictions, cases in which determiner cooccurrence 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.), such that the former lack a DP projection, nonarticle determiner cooccurrence patterns can provide evidence for articulated functional structure even in languages without articles. The same diagnostics also show that languages with articles vary the number of projections contained in their nominal expressions. Although the absence of articles in a language may still be indicative of having less functional structure, we claim 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 cooccurrence 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 2020), such as DP-internal *wh*-movement (Horrocks & Stavrou 1987) and focus movement (Syed 2017), or extraction out of DP (Szabolcsi 1994, Gavruseva 2000). For example, if grammars are subject to an anti-locality restriction that requires phrasal movements to cross a particular type or projection or number of projections (Abels 2003, Grohmann 2003, Erlewine 2016), greater degrees of bundling are predicted to result in stricter restrictions on DP-internal movement.

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