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ARGUMENT DETERMINER PHRASES
AND NUMBER PHRASES

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Since Pollock 1989 and Abney 1987, many studies have been undertaken to determine what functional categories are projected within a clausal or a nominal structure. With respect to nominal expressions, it has been argued and widely accepted that a nominal expression should be represented as a Determiner Phrase (DP) headed by a Determiner (D). This is especially true when the nominal expression is an argument, in contrast to a nominal predicate, which is generally represented by a Noun Phrase (NP) (see Stowell 1989 for some complications with respect to nominal predicates). A D heading a DP, in English for example, can be the definite article *the*. Questions arise about whether an argument nominal is always expressed by a DP even in languages without clear counterparts of English-type articles, such as Chinese. Indeed, more general questions are whether the categorial projection DP exists at all in languages such as Chinese, and, if the projection exists, what evidence supports its existence. Another equally important question is whether there are intermediate projections between DP and NP. This question can be made clearer if we compare nominal structure with clausal structure. If we equate DP with CP (both functioning as arguments) and NP with VP (both functioning as predicates), what is the nominal structure that might be equivalent to IP at the clausal level? An IP can occur without a dominating CP (as in exceptional-Case-marking or raising cases); can an

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intermediate structure between DP and NP occur without a dominating DP?

In this squib I attempt to answer these questions, drawing mainly on data concerning the distribution and interpretation of Chinese number expressions of the form [Number + Classifier + Noun] ([Num + Cl + N]), typical examples of indefinite nominal expressions in Chinese.¹ I will show that the distribution and interpretation possibilities of such expressions support the existence of a DP projection in Chinese and at the same time force us to recognize the existence of a category other than DP in argument position: a Number Phrase (NumP)² (without a dominating DP). The claim that a D is present in DP and absent in NumP will be further supported by the differing behavior of DP and NumP with respect to referential possibilities, binding possibilities, and scope properties.

1 Quantity versus Nonquantity Number Expressions

It has often been noted that, in Mandarin Chinese, indefinite nominal expressions generally are disallowed in subject or topic position (see Chao 1968, Li and Thompson 1981, Lee 1986, Shyu 1995, Tsai 1994, 1996, Xu 1996, among many others, for the distribution of indefinite nominal expressions).

- (1) *Sange xuesheng zai xuexiao shoushang le.³
 three + CL student at school hurt PAR
 'Three students were hurt at school.'
- (2) *Sange xuesheng, wo zhidao zai xuexiao
 three + CL student I know at school
 shoushang le.
 hurt PAR
 'Three students, I know (they) were hurt at school.'

These sentences need the existential marker *you* 'have, exist' before the number expression to become acceptable.

- (3) You sange xuesheng zai xuexiao shoushang le.
 have three + CL student at school hurt PAR
 'There are three students hurt at school.'

¹ Bare nouns can also receive an indefinite interpretation in postverbal position. I do not consider bare nouns here. See Cheng and Sybesma 1996 and Li 1997 for relevant discussions.

² Various authors, writing from different perspectives, have argued for the existence of a Number projection within DP (see, e.g., Ritter 1995 and references cited there).

³ These sentences improve if they are answers to *how many* questions, as noted by Y. S. Chuang (personal communication). This is expected, since a Number projection is a possible structure here and the sentences therefore should be acceptable. The question is why the traditional literature marks such sentences as unacceptable. Perhaps it is because such examples are often cited out of context, and because such sentences are not acceptable unless there is a clear linguistic quantity interpretation context.

- (4) You sange xuesheng, wo zhidao zai xuexiao
 have three + CL student I know at school
 shou Shang le.
 hurt PAR
 ‘There are three students, I know (they) were hurt at school.’

However, there are many counterexamples to this generalization (see, e.g., Tsai 1996, Li 1996). In the following examples, an ‘indefinite’ nominal can occur in subject or topic position:

- (5) Liangzhang chuang(, wo tingshuo,) ji le wuge
 two + CL bed I hear-say squeeze ASP five + CL
 ren. Na shizai shi tai ji le.
 people that really be too squishy PAR
 ‘Two beds(, I heard,) were crowded with five people. That was really too squishy.’
- (6) Sange baomu jiu zhaogu ni yige xiaohai a?
 three + CL babysitter only care you one child PAR
 ‘Three babysitters took care of you, only one child?’
- (7) Liang sange laoshi jiu ba na qun ye xiaohai
 two three + CL teacher then BA that group wild children
 kongzhi zhu le.
 control hold PAR
 ‘Two or three teachers (sufficed to have) controlled that group of wild kids.’
- (8) Sanzhi gunzi gou ni da ta ma?
 three + CL sticks enough you hit him Q
 ‘Are three sticks enough for you to hit him (with)?’
- (9) Wuge xiaohai chibuwan shiwan fan.
 five + CL child eat + not + finish ten + bowl rice
 ‘Five children cannot finish ten bowls of rice.’

Such counterexamples all share a common property: the interpretation of such ‘indefinite’ nominals in fact concerns quantity, rather than (the existence of) some individuals. (5) concerns the capacity of two beds to accommodate five people; (6), the number of babysitters taking care of you, one single child; (7), the number of teachers that it took to control a group of wild kids; (8), the number of sticks that suffice for you to hit him; and (9), the capacity of a certain number of children to finish a certain amount of rice. There are linguistic clues to such a quantity interpretation. (6) and (7) have the adverb *jiu* ‘then’, which essentially denotes the condition sufficient for completing a task. *Gou* ‘enough’ in (8) expresses the adequacy of an amount. (9) contains the potential verb form indicating capacity. (5) is essentially an accommodation type of sentence such as the following English examples, with a quantity expression in the object position:

- (10) That bed sleeps three small children.
 (11) This big sofa seated five adults yesterday.
 (12) That hotel suite accommodated 100 guests.

Again, the nominals in these sentences, which have a ‘‘quantity’’ interpretation, contrast with the number expressions in (1)–(2), which mainly are about the existence of some individuals (being hurt at school). (1)–(2) disallow number expressions in subject or topic position whereas (5)–(9) allow them. Such contrasts in distribution and interpretation and other contrasts along the same lines led me to suggest elsewhere (Li 1996) that number expressions should be recognized as having two different interpretations: a quantity interpretation or a nonquantity indefinite individual-denoting interpretation.⁴ The facts indicate that quantity-denoting number expressions can occur in the topic and subject positions, whereas individual-denoting number expressions cannot. Such distributional differences can be shown to follow from an important structural difference between the two types of number expression, as illustrated below.

2 Distributional Differences

Nonquantity indefinite individual-denoting expressions are related to entities in the discourse/world but quantity number expressions are not. If we adopt the widely accepted notion that D relates a nominal expression to entities in the discourse/world, it is possible to claim that the structural representations of quantity and indefinite individual-denoting expressions differ minimally, in the following manner:

- (13) a. [NumP san ge xuesheng]
 three CL student
 b. [DP D [NumP san ge xuesheng]]
 three CL student

In (13b) D is projected (even though not lexically filled); in (13a) D is not projected at all. The interpretations of such structures differ: (13a) essentially denotes a quantity (Num being the head),⁵ and (13b) denotes individuals because of the presence of the D projection.

In addition to capturing the difference in interpretation between quantity- and individual-denoting expressions, this structural difference captures their distributional difference. D is generally taken to be the locus for expressing (in)definiteness. Since the NumP in (13a) does not have a D, the issue of (in)definiteness is irrelevant and the prohibition against an indefinite nominal in subject or topic position in Chinese is not relevant in the cases of NumPs. (5)–(9), which have

⁴ *Individual-denoting* is in contrast to *quantity-denoting*.

⁵ Not only is Num interpreted; the N inside the NumP needs to be interpreted as well. In other words, in the quantity expression ‘three students’ the noun ‘students’ still needs to be interpreted, and therefore ‘three students’ cannot be equivalent to ‘three children’, for instance. In terms of selectional properties, just as the N within a DP must be considered when the DP is selected (the subject in *Three children have been singing* cannot be replaced by *three desks*), so the N within a NumP must be considered when the NumP is selected.

the structure in (13a), therefore are not true counterexamples to the generalization in question. This intuition can be expressed syntactically by the well-formedness condition on the empty D in (13b). Longobardi (1994) argues that a null D, like other empty categories, must be properly governed. He shows that, because of this requirement, indefinite nominal expressions can occur only in lexically governed positions.⁶ Following Longobardi, we would expect that topic position in Chinese does not allow indefinite expressions because topic position does not have a lexical governor. Furthermore, we may assume with Aoun et al. (1987) that since subjects in Chinese generally occupy [Spec, IP] and are not lexically governed, indefinite nominals cannot occur in subject position. On the other hand, object of V or P is a lexically governed position;⁷ here an indefinite is acceptable. In other words, expressions with the structure in (13b) cannot occur in topic or subject position but can occur in object-of-V/P position, whereas expressions with the structure in (13a) do not contain an empty category and can occur in any position. In brief, the contrast illustrated in (1)–(2) and (5)–(9) follows from Longobardi's analysis and the structural difference illustrated in (13a–b).⁸

3 Reference and Scope Properties

3.1 Cooccurrence with *dou* 'all' and *you* 'exist, have'

Further evidence supports the distinction between (13a) and (13b). The distinction between DP, an individual-denoting expression, and NumP, a quantity-denoting expression, would lead us to predict that a DP, but not a NumP, can occur with operators ranging over individuals. This is true. Chinese has at least two such operators; *dou* 'all', which ranges over an entire set of individuals to derive a universal expression, and *you* 'exist, have' which asserts the existence of individuals (an existential expression). The number expression occurring with *dou* and *you* must be interpreted as denoting individuals, rather than quantity. That is, the number expressions in the following sentences are like (13b), rather than (13a).

⁶ The default interpretation of a null D is an existential operator, according to Longobardi (1994).

⁷ The prohibition against preposition stranding thus cannot be reduced to the requirement of lexical government.

⁸ Alternatively, the unacceptability of (1)–(2) may be accounted for by the failure of the indefinite nominals to be bound by an operator such as existential closure (Diesing 1992). In this case the acceptability of (5)–(9) is left unaccounted for, however. Note that not all of these examples contain a generic operator. Note also that an indefinite bare noun cannot occur in these patterns at all. In fact, an indefinite bare noun simply cannot occur in subject or topic position (see Li 1996).

(14) Sange xuesheng dou lai zher le.⁹
 three +CL student all come here PAR
 'Three students all came here.'

(15) You sange xuesheng lai zher le.
 have three +CL student come here ASP
 'There are three students that came here.'

(14) must be interpreted in the sense that each of the three individuals came here, and (15) must be interpreted in terms of the existence of three individuals who came here. Moreover, even though adding *you* or *dou* saves the unacceptable (1)–(2), adding one of them to (5)–(9) either changes the meaning (from quantity- to individual-denoting) or simply makes them unacceptable (when the individual-denoting option is unavailable because of the context). To illustrate briefly with (6), (8), and (9):

(16) *You sange baomu jiu zhaogu ni yige
 have three +CL babysitter only care you one
 xiaohai a?
 child PAR

(17) a. *You sanzhi gunzi gou ni da ta ma?
 have three +CL sticks enough you hit him Q
 b. *Sanzhi gunzi dou gou ni da ta ma?
 three +CL sticks all enough you hit him Q

(18) Wuge xiaohai dou chibuwan shiwan fan.
 five +CL child all eat + not + finish ten + bowl rice
 'Each of the five children cannot finish ten bowls of rice.'

(16) and (17) are not acceptable because *jiu* in (16) and *gou* in (17) require a quantity interpretation. (18) is acceptable only with an individual-denoting interpretation, rather than a quantity-denoting interpretation.

3.2 Coreference and Binding

As an individual-denoting expression, a DP can refer to entities in the discourse/world and can bear a referential index. On the other hand, as a quantity-denoting expression, a NumP does not have a D projection and is not expected to have a referential index. This amounts to saying that a DP can enter into a coreferential relation with a following nominal but a NumP cannot. Again, this is true, as illustrated by the contrast between the unacceptability of (19a) with a quantity expression and the acceptability of (19b–c) with an indefinite individual-denoting expression.

⁹The requirement of lexical government is satisfied here because the number expression is in the specifier of a projection headed by *dou* (see Li 1992).

- (19) a. Sange ren_i taibudong zhejia gangqin.
 three + CL people lift + not + move this + CL piano
 *Tamen_i de liliang tai xiao.¹⁰
 their DE strength too small
 'Three people cannot lift up this piano. Their strength is too weak.'
- b. Ta mingtian hui kandao sange ren_i, hai hui
 he tomorrow will see three + CL people and will
 gen tamen_i zuo pengyou.
 with them make friends
 'He will meet three people tomorrow and will make friends with them.'
- c. You sange ren_i hui lai. Tamen_i hai hui
 have three + CL people will come they still will
 dai liwu lai.
 bring present come
 'There are three people coming and they will bring presents.'

Moreover, a quantity-denoting expression does not seem to bind a pronoun either, even though an individual-denoting expression can. Such a contrast can also be accounted for by assuming that a pronoun is a DP, as is commonly accepted, and that what binds a DP must also be a DP.

- (20) a. *Sange ren_i chibuwan ni gei
 three + CL men eat + not + finish you give
 tamen_i de wuwan fan.¹¹
 them DE five + bowl rice
 'Three men cannot finish five bowls of rice you gave to them.'
- b. You sange ren_i chibuwan ni gei
 have three + CL men eat + not + finish you give
 tamen_i de wuwan fan.
 them DE five + bowl rice
 'There are three men unable to finish five bowls of rice you gave to them.'

¹⁰ The acceptability of sentences like (i), where 'they' seems to refer to the group of three people, need not provide a counterexample because the pronoun can refer independently to a group of people that happens to consist of three members.

(i) Sange ren chi-de-wan wuwan fan de. Tamen duzi
 three people eat-can-finish five-bowl rice DE they stomach
 e-si le.
 hungry-death PAR
 'Three people can finish five bowls of rice. They are very hungry.'

¹¹ The sentence can be acceptable under the interpretation that *them* refers to a particular group of people that may consist of three members.

- (21) a. *Sange ren_i taibudong ni gei
 three + CL people lift + not + move you give
 tamen_i de gangqin.
 them DE piano
 ‘Three people cannot lift up a piano you gave to them.’
- b. You sange ren_i taibudong ni gei
 have three + CL people lift + not + move you give
 tamen_i de gangqin.
 them DE piano
 ‘There are three people who cannot lift up the piano
 you gave to them.’

Similarly, binding of a reflexive is not possible (Peter Cole, personal communication). Note the contrast between (22a) and (22b): in (22a) the number expression, though the closest c-commanding element, is not an antecedent of the reflexive, whereas in (22b) the embedded subject is a possible binder.

- (22) a. Zhangsan_i zhidao sange ren_j yiding
 Zhangsan know three people certainly
 ban-de-dong ziji_{i/*j} de gangqin.
 move-able-move self’s DE piano
 ‘Zhangsan knows that three people certainly can move
 self’s piano.’
- b. Zhangsan_i zhidao Lisi_j yiding
 Zhangsan know Lisi certainly
 ban-de-dong ziji_{i/j} de gangqin.
 move-able-move self’s DE piano
 ‘Zhangsan knows that Lisi certainly can move self’s
 piano.’

3.3 Scope Interaction

Quantity-denoting number expressions are not quantificational expressions quantifying over individuals. It is not surprising that such expressions do not interact with other quantificational expressions with respect to scope. Thus, sentence (9), repeated here, has only the interpretation that five children cannot finish, among them, 10 bowls of rice.

- (9) Wuge xiaohai chibuwan shiwan fan.
 five + CL child eat + not + finish ten + bowl rice
 ‘Five children cannot finish ten bowls of rice.’

The sentence cannot mean that there are 50 bowls of rice altogether (the first nominal having the wide scope interpretation). It thereby contrasts with (23a–b), which do have the 50-bowl interpretation, following the general scope principle in Chinese that a c-commanding quantificational expression has scope over a lower one in canonical sentences (e.g., Huang 1982, Aoun and Li 1993).

- (23) a. You wuge xiaohai chibuwan shiwan fan.
 have five + CL child eat + not + finish ten + bowl rice
 'Five children cannot finish ten bowls of rice.'
- b. Wuge xiaohai dou chibuwan shiwan fan.
 five + CL child all eat + not + finish ten + bowl rice
 'None of the five children can finish ten bowls of rice.'

Similarly, (24) allows a 50-bowl interpretation because the number expression is in a lexically governed position and can be a quantificational expression, rather than a quantity-denoting expression.

- (24) Wo rang wuge xuesheng chi shiwan fan.
 I let five + CL student eat ten + bowl rice
 'I let five students eat ten bowls of rice.'

4 An Intermediate Category

So far I have shown that a number expression of the form [Num + Cl + N] in Chinese can be analyzed as a quantity-denoting expression represented by a NumP (13a) or an individual-denoting expression represented by a DP containing an empty D (13b) (with the default existential interpretation). The correctness of distinguishing between (13a) and (13b) provides support for the existence in Chinese of a DP category and of an independent NumP that is not immediately dominated by a D. The difference between (13a) and (13b) also accounts for the differing behavior of the two types of number expressions with respect to cooccurrence with *dou* 'all' and *you* 'have', coreference and binding possibilities, and scope interaction. Even though a DP and a NumP may behave differently, they do share one important similarity: both can occur in argument positions and be assigned thematic roles. This is not surprising if we again make an analogy with clausal structures. Even though it is normally a CP that functions as a clausal argument, in some cases (such as exceptional-Case-marking cases) an IP can function as a clausal argument as well.¹² In the same spirit, a NumP can be an argument, just as a DP can.

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¹² The current theory separates IP into several different functional categories (see Pollock 1989). Correspondingly, it is possible that a nominal expression contains more projections than DP, NumP, and NP—for example, Classifier Phrase.

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