

# Positions of Mandarin classifiers in and out of compounds: implications for distinctness, selection, and projection

Brian Hsu and Yiwen Peng

## 1. Introduction

The patterning of classifiers in Mandarin Chinese has played a key role in approaches to nominal syntax and semantics (Tang 1990, Cheng and Sybesma 1999, Li 1999, Hsu 2013, Zhang 2013, a.o.). While much of the existing literature focuses on properties of *pre-nominal classifiers*, which occur between numerals and head nouns (1), we focus in this paper on the relation between pre-nominal classifiers and *noun-classifier compounds* (henceforth N-Cl compounds) like (2), which has received less attention in the generative literature, with the exception of Zhang (2013). For presentational clarity, in all subsequent examples pre-nominal and compound-internal classifiers are shown in bold text.

- (1) zheli you [san **di** shui] (2) zheli you [shui-**di**  
here have three CL.DROP water here have water-CL.DROP  
'there are three drops of water here.' 'there are water drops here.'

Our investigation leads us to several claims about the structure of nominal expressions. In Section 2, we review and adopt Zhang's (2013) argument that N-Cl compounds are generated by head movement of the noun. However, we depart from her claim that this movement targets a projection that occurs only in compounds; we instead propose that N-Cl compounds involve movement to a head of the same type of Classifier Phrase (CIP) projection that hosts pre-nominal classifiers, based on the observation that classifiers in both structures participate in identical s-selectional relations involving delimitability.

We then turn to a puzzle involving the distribution of classifiers in Mandarin. First, we discuss structures like (3), in which N-Cl compounds are preceded by a pre-nominal classifier, in relation to the fact that the same combinations of classifiers cannot occur in a pre-nominal position (4). If all classifiers are Cl heads with the same selectional properties, why is Cl co-occurrence only grammatical in (3)?

- (3) san {**chuan** /**zhong** /**tong**} shui-**di**  
three CL.STRING /CL.KIND /CL.BUCKET water-CL.DROP  
'three {strings/kinds/buckets} of water drops'  
(4) \*san {**chuan** /**zhong** /**tong**} **di** shui  
three CL.STRING /CL.KIND /CL.BUCKET CL.DROP water  
*Intended:* 'three {strings/kinds/buckets} of drops of water'

More generally, one must explain why the distribution of N-Cl compounds resembles that of simplex nouns, but not pre-nominal Cl+N sequences, which is at first unexpected if all classifiers are Cl heads.

While the patterns at first glance seem to support a lexicalist approach to compounds, we argue that they are more parsimoniously accounted for in a theory where compounds are generated in the syntactic

---

\* Brian Hsu, University of North Carolina at Chapel Hill, hsub@email.unc.edu. Yiwen Peng, University of North Carolina at Chapel Hill, yiweny@email.unc.edu. For their helpful comments on this work, we thank Misha Becker, Audrey Li, Elliott Moreton, Andrew Simpson, Caitlin Smith, Jennifer Smith, J. Michael Terry, and Danfeng Wu.

derivation. We propose that key properties of pre-nominal and compound-internal classifiers are predicted by the interaction of general principles of the structure of phases (Chomsky 2000, et seq.). In Section 3.1, we show that the distributional difference between pre-nominal and compound-internal classifiers is captured by *phase extension* (Den Dikken 2007), the claim that head movement of a phase head extends its phase domain to include the target projection. In brief, assuming that the highest projection of the head noun is a phase head (Simpson and Park 2019), N-to-CI movement extends its phase boundary from NP to CIP. The distributional similarity of N-CI compounds to simplex Ns follows from the fact that both constituents correspond to an NP phase. In Section 3.2, we propose an account of the classifier co-occurrence pattern in (3). We claim that nominal expressions in Mandarin can contain multiple CIP projections (see also Liao and Wang 2011), contra the common assumption that all classifiers occupy a single position. The restriction of classifier co-occurrence to expressions that contain an N-CI compound is explained by phase extension in conjunction with Richards' (2010) *distinctness condition*, which bans the linearization of sufficiently similar items within a phase. CIP recursion with head-adjacent pre-nominal classifiers violates distinctness, while the violation is obviated by the head movement that generates N-CI compounds, which places the two CIPs in separate phases.

## 2. Pre-nominal and compound-internal classifiers in Mandarin

### 2.1. The structure of noun-classifier compounds

N-CI compounds in Mandarin consist of a noun immediately followed by a classifier. As shown in examples (5)-(9), N-CI compounds can be formed with most types of classifiers; we adopt the classifications of Zhang (2013), and refer the reader to that work for their definitions. N-CI compounds can be productively formed with classifiers belonging to any of the types below, though with somewhat less productivity with *individual* classifiers.<sup>1</sup> Classifiers of each type can occur either in an N-CI compound (examples in a.), or as a pre-nominal classifier with the same head noun (examples in b.), with no difference in the type of object that the full expression refers to.<sup>2</sup>

(5) Individual classifier

a. hua-**duo**  
flower-CL.FLOWER  
'flower'

b. san      **duo**      hua  
three   CL.FLOWER   flower  
'three flowers'

(6) Individuating classifier

a. shui-**tan**  
water-CL.PUDDLE  
'water puddle'

b. san      **tan**      shui  
three   CL.PUDDLE   water  
'three puddles of water'

(7) Collective classifier

a. yang-**qun**  
sheep-CL.GROUP  
'sheep flock'

b. san      **qun**      yang  
three   CL.GROUP   sheep  
'three flocks of sheep'

(8) Partitive classifier

a. xigua-**pian**  
watermelon-CL.SLICE  
'watermelon slice'

b. san      **pian**      xigua  
three   CL.SLICE   watermelon  
'three slices of watermelon'

<sup>1</sup> The relative resistance of individual classifiers to occurring in compounds (ex. ?*ren-ge* 'person'-CL.HUMAN) is perhaps due to the fact that they do not themselves denote an entity distinct from the 'natural unit' of the noun.

<sup>2</sup> Standard measure classifiers (ex. *gongjin* 'kilogram') and container measure classifiers (ex. *bei* 'cup') pattern differently. Standard measure items cannot occur in compounds (ex. \**xigua-gongjin*, lit. 'watermelon-kilogram'), while compound-internal container measure items seem to pattern as nouns. For instance, while *bei* has a measurement reading as a pre-nominal classifier (ex. *yi bei kafei* lit. 'one cup coffee,'), it loses this reading in a compound (ex. *kafei-bei* lit. 'coffee-cup', a container that need not have coffee in it). Intuitively, it seems that these classifier types cannot occur in N-CI compounds because measure items must occur in a counting structure, whereas N-CI compounds can occur in the absence of counting. See Peng (2021) for additional discussion.

## (9) Kind classifier

- a. shu-**zhong**  
tree-CL.KIND  
'tree species'
- b. san      **zhong**      shu  
three    CL.KIND    tree  
'three species of trees'

Despite the surface similarity between N-Cl compounds and noun-noun compounds, there are reasons to analyze the second member of the compounds above as classifiers rather than nouns. First, many classifiers cannot occur in the distributional contexts that characterize nouns. For example, none of the classifiers in (5)-(9) can occur in the context in (10a), which otherwise freely admits nouns (10b).

- (10) a. \*zheli    you    {**duo**    /**tan**    /**qun**    /**pian**    /**zhong**}  
here    have    CL.FLOWER CL.PUDDLE CL.GROUP CL.SLICE CL.KIND  
*Intended:* 'There are {flowers/puddles/groups/slices/species} here.'
- b. zheli    you    {hua    /shui    /yang    /xigua    /shu}  
here    have    flower /water /sheep /watermelon /tree  
'There is/are {flowers/water/sheep/watermelons/trees} here.'

More significantly, compound-internal classifiers participate in the same s-selectional relations as their pre-nominal counterparts. We adopt Zhang's (2013) proposal that the key selectional restrictions in the nominal domain should be stated in terms of *delimitability features*. In brief, delimitability refers to the ability of a classifier or noun to be characterized in terms of size (ex. big, small), shape (ex. round, triangle), or boundary (ex. part, whole). In Mandarin, [ $\pm$ DEL(IMITABLE)] features occur on both nouns and classifiers, and participate in two types of semantic-selection relations (Grimshaw 1979). First, classifiers can s-select delimitability properties of nouns that they occur with; shown below with the notation [SEL[ $\pm$ DEL]], following Peng (2021). For example, individuating classifiers like *kuai* 'piece' s-select a [-DEL] noun like *mutou* 'wood,' and cannot combine with a [+DEL] noun like *shu* 'tree' (11). In contrast, collective classifiers like *pai* 'row' s-select a [+DEL] noun like *shu* 'tree,' and cannot combine with [-DEL] nouns like *mutou* 'wood' (12).

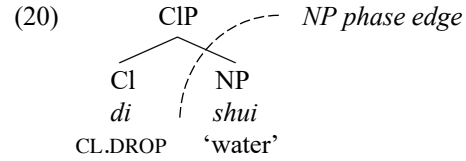
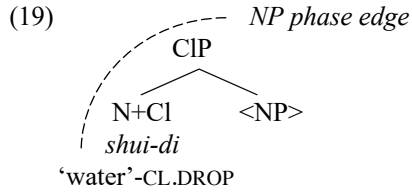
- (11) a. \*      [SEL[-DEL]] [+DEL]  
yi **kuai**      shu  
one CL.PIECE tree
- b.      [SEL[-DEL]] [-DEL]  
yi **kuai**      mutou  
one CL.PIECE wood  
'a piece of wood'
- (12) a.      [SEL[+DEL]] [+DEL]  
yi **pai**      shu  
one CL.ROW tree  
'a row of trees'
- b. \*      [SEL[+DEL]] [-DEL]  
yi **pai**      mutou  
one CL.ROW wood

Crucially, these classifiers show the same s-selectional relations in compounds; individuating classifiers do not combine with [+DEL] nouns (13) and collective classifiers do not combine with [-DEL] nouns (14).

- (13) a. \*shu-**kuai**  
tree-CL.PIECE
- b. mutou-**kuai**  
wood-CL.PIECE  
'wood piece'
- (14) a. shu-**pai**  
tree-CL.ROW  
'row of trees'
- b. \*mutou-**pai**  
wood-CL.ROW

In addition to the s-selectional features above, classifiers themselves can have inherent [ $\pm$ DEL] features (see Section 3.3 for individual classifiers as an exception). This explains restrictions on size adjectives like *da* 'big,' which must precede a [+DEL] item. For instance, *da* cannot occur with *shui* 'water' alone





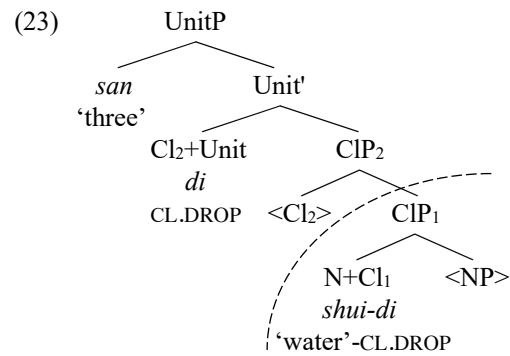
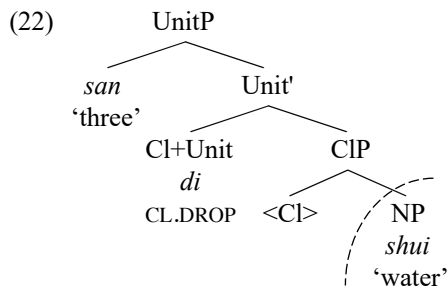
We claim that phase extension explains why N-Cl compounds share the same distribution as non-compound nouns. Even though N-Cl compounds contain more projections than simplex nouns, both items correspond to the same type of constituent, an NP phase. In contrast, pre-nominal Cls are subject to selectional restrictions and well-formedness requirements that hold of the higher phase (presumably DP), giving rise to the distinct distributional properties of non-compound CIPs from N-Cl compounds.

### 3.2. The distinctness condition and classifier co-occurrence restrictions

Like simplex nouns, N-Cl compounds cannot directly follow a number or quantifier. In this subsection, we present the two basic patterns that arise when N-Cl compounds occur in a counting structure, and their implications. First, all N-Cl compounds can be preceded by the default classifier *ge* or a reduplicated classifier identical to the compound-internal one, as shown in (21). In this pattern, the counted entity is always identical to the entity denoted by the N-Cl compound. In other words, these pre-nominal classifiers have no effect on the delimitability readings of the full expression. They are expletive-like in that they seem to occur only to fill a position that licenses the numeral or quantifier.

- (21) san        {**ge**                    /**di**        }    shui-**di**  
          three    CL.DEFAULT    /CL.DROP    water-CL.DROP  
          ‘three water drops’

To account for this, we propose that numerals are specifiers of a projection UnitP, which dominates the CIP projection(s) where classifiers are first merged.<sup>3</sup> In Mandarin, the specifier position of UnitP is licensed only if the Unit head is filled by a head-moved Cl, as consistent with a common pattern in which the specifier of a functional projection must be licensed by head movement (Den Dikken 2007, Hsu 2021). This analysis of pre-nominal classifiers is shown in (22) with a non-compound noun. We propose that classifier co-occurrence arises from a *recursive CIP* structure in which the noun moves to the lower Cl<sub>1</sub> and the higher classifier Cl<sub>2</sub> licenses the numeral by moving to Unit, as shown in (23).<sup>4</sup>



This analysis, with recursion of the same type of projection, is supported by the previous observations that all classifiers participate in the same s-selectional relations, and that the higher Cl<sub>2</sub> need not provide an independent delimitability reading from the compound-internal Cl<sub>1</sub> in examples like (21). Finally,

<sup>3</sup> While the UnitP label is adopted from Hsu (2012) and Zhang (2013), our proposal differs from theirs in that we propose that classifiers are not first merged in this position, but moved there from a lower projection.

<sup>4</sup> We put aside the question of why N-Cl compounds cannot move as a complex head to Unit, obviating the need for a second Cl to be Merged.

our account captures in structural terms the fact that classifiers in languages like Mandarin, which are obligatory in the presence of numerals, have two separate functions: they specify delimitability properties of the nominal expression, and they license counting elements. Cl heads carry inherent and s-selectional delimitability features, which can be observed independently of counting in N-Cl compounds. The ability to license counting arises from a distinct process: head movement of Cl to a higher Unit head.

In addition to the expletive pattern above, N-Cl compounds in counting structures can be preceded by a classifier of any other class (24), as long as s-selectional properties related to delimitability are satisfied. For example, the classifiers *chuan* ‘row,’ *zhong* ‘kind,’ and *tong* ‘bucket’ are compatible with the [+DEL] compound-internal classifier *di* ‘drop.’ This is particularly important in relation to the fact that all sequences of pre-nominal classifiers are ungrammatical (25), regardless of the semantic classes that they belong to (individual, individuating, partitive, collective, etc.) and their selectional restrictions.

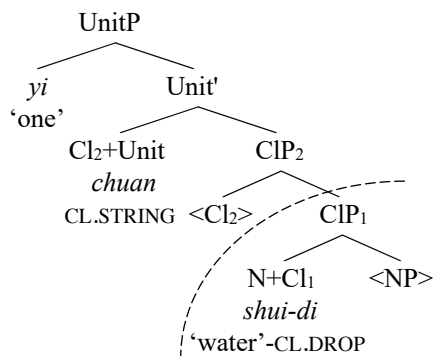
(24) san        {**chuan**     /**zhong**     /**tong**}                shui-**di**  
 three        CL.STRING /CL.KIND     /CL.BUCKET        water-CL.DROP  
 ‘three {strings of/kinds of/buckets} of waterdrops.’

(25) \*san        {**chuan**     /**zhong**     /**tong**}                **di**    shui  
 three        CL.STRING /CL.KIND     /CL.BUCKET        CL.DROP water  
*Intended:* ‘three {strings/kinds/buckets} of drops of water’

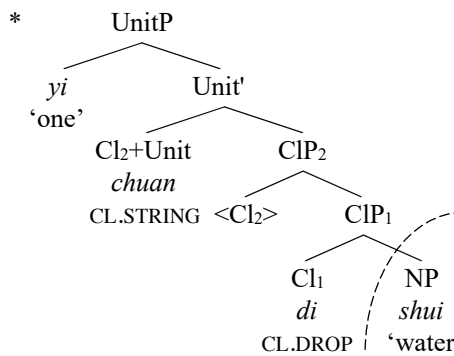
Crucially, the fact that these pre-nominal classifiers can co-occur with N-Cl compounds shows that the ungrammaticality of pre-nominal classifier sequences like (25) arises from a *structural restriction*, rather than a semantic incompatibility related to delimitability or numerability readings. If all classifiers are instantiations of CIP, and recursion is possible in compounds, what explains this restriction? We claim that the pattern is best explained by phase extension in tandem with Richards’ (2010) distinctness condition. In brief, assuming that syntactic structure is spelled out in phases (Chomsky 2000, et seq.), distinctness is a ban on the co-occurrence of sufficiently similar items within the same phase. We claim that the relevant feature for evaluating distinctness in the Mandarin pattern is the category feature [Cl], present on all types of classifier heads.

We account for the co-occurrence of pre-nominal classifiers with N-Cl compounds as follows. When the first Cl is Merged, N-to-Cl movement occurs, extending the NP phase to this CIP. In counting structures, a higher Cl head (an expletive or substantive classifier) is merged, which then moves to Unit. Crucially, even though the full structure in (26) includes two Cl heads, they do not violate distinctness because they occur in separate phases (the NP phase boundary is shown by the dotted line in the figures below). We briefly note that our analysis finds further support from the separate classifier co-occurrence pattern discussed in Liao and Wang (2011), in which two Cls are separated by a DP phase boundary.

(26) *No distinctness violation: Cl<sub>1</sub> and Cl<sub>2</sub> in different phases*



(27) *Distinctness violation: Cl<sub>1</sub> and Cl<sub>2</sub> in the same phase*

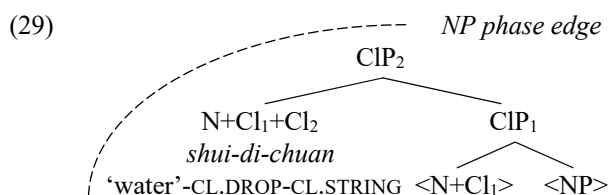


Ungrammatical sequences of pre-nominal classifiers are correctly filtered out by the distinctness condition, even when they contain the same projections as the grammatical co-occurrence structures

with N-Cl compounds. As shown in (27), in the absence of movement that extends the NP phase to the lower Cl<sub>1</sub>, the grammar attempts to linearize both Cl heads in the same phase, thus violating distinctness.<sup>5</sup>

While we have focused on N-Cl compounds with one classifier, multiple classifiers can occur in one compound (28), as long as their selectional requirements are satisfied. Such structures can be generated in our analysis as the result of successive head movement to two Cl heads, as shown in (29). Although such structures contain multiple [Cl] features in one extended NP phase, there is substantial evidence that distinctness does not evaluate feature co-occurrence within complex heads (Keine and Bhatt 2016: p. 1475, but see De Clercq and Vanden Wyngaerd 2019 for negation as a counterexample).

- (28) a. **mu-pian-dui**  
 wood-CL.SLICE-CL.PILE  
 ‘pile of wood slices’
- b. **shui-di-chuan**  
 water-CL.DROP-CL.STRING  
 ‘string of water drops’



### 3.3. Alternative approaches

We now turn to differences between our analysis and that of Zhang (2013), which also proposes a head-movement analysis of N-Cl compounds. In her account, however, compound-internal classifiers realize the functional head Delimitability, as distinct from the projection that hosts pre-nominal classifiers (Unit, in her terms). For example, her analysis represents a pre-nominal classifier followed by an N-Cl compound with the structure in (30), in contrast to our proposal in (26).<sup>6</sup>

- (30) [UnitP Unit [DelP N+Del [ ... <N> ... ] ] ]  
*chuan* *shui-di*  
 CL.STRING ‘water’-CL.DROP

Although Zhang’s analysis correctly predicts that pre-nominal classifiers and N-Cl compounds can co-occur, and that N-Cl compounds can occur without counting, we argue that our proposal yields a more parsimonious account of these patterns. Because pre-nominal and compound-internal classifiers have the same delimitability properties, they are better analyzed as being the same type of head, Cl. Second, in order to rule out the possibility of pre-nominal classifiers occurring separately in Unit and Del, as in (25), Zhang’s analysis has to stipulate that DelP must trigger head movement. In our analysis, the observed pattern is predicted by two general principles, the distinctness condition and phase extension.

Finally, we adopt Peng’s (2021) argument that delimitability is not the *category-defining* feature of classifiers, even though it occurs on most classifier types. The issue is that one type of classifier, the individual classifier, patterns as if it lacks a [±DEL] feature, given its unique patterning with delimitive adjectives, which s-select a [+DEL] item. As shown below, adjectives like *da* can precede a [+DEL] noun like *yang* ‘sheep’ (31b), but not the [-DEL] kind classifier *zhong* ‘kind’ (31a). However, in similar structures with an individual classifier *zhi* ‘CL.ANIMAL,’ changes in adjective placement result in no difference in grammaticality or meaning. The fact that delimitive adjectives can only “skip” individual classifiers is accounted for if these classifiers lack a [±DEL] feature. The upshot is that no pattern suggests the existence of a feature that occurs only on compound-internal but not pre-nominal classifiers.

<sup>5</sup> It is important to emphasize that while N-to-Cl movement obviates potential distinctness violations, it occurs independently of whether multiple Cls are present. This differs, for example, from the German verb incorporation pattern discussed by Keine and Bhatt (2016), argued to be a last resort operation triggered to satisfy distinctness.

<sup>6</sup> We abstract away from several aspects of Zhang’s analysis that are not crucial to this discussion, such as her proposal that only some types of classifiers are Unit heads, whereas others are specifiers of a higher projection.

