

Modified “Classifier+Noun” constructions in Wu Chinese and its DP structure

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I. Introduction

1.1 The DP/NP debate in classifier languages

Chinese languages represent a particular type of article-less language: there is a generalized classifier system. One of the controversial issues about classifier languages is concerned with whether nominal phrases in those languages have a functional projection of DP or not.

NP proposals *versus* DP proposals:

	NP proposals	DP proposals
Debate 1: denotation of nouns	Chierchia (1998): NP as arguments	Cheng and Sybesma (1999): NP as predicates
Debate 2: existence of DP	Bošković (2010): Classifier languages without DP	A. Li (1999): Mandarin nominals with a D layer
Debate 3: semantic make-up of D⁰	Lyons (1999): Languages without grammaticalized articles have no D head, which encodes “uniqueness”.	Li and Bisang (2012): Definite classifiers can instantiate D ⁰ , which is characterized with “familiarity”

Debate 1: the denotation of nouns in classifier languages

Chierchia (1998): Chinese is an argumental language, whose bare nouns (NPs) are born as arguments without resorting to determiners.

Cheng and Sybesma (1999: 520-521): Classifiers in Cantonese are “comparable to an iota operator” (the definite article in English), which “change predicates into arguments” and “yield the definite interpretation”. They assume that CLP is equivalent to DP.

Debate 2: existence of DP in classifier languages

Bošković (2010:13): “Obligatory numeral classifier systems occur only in NP languages. In other words, if a language has an obligatory classifier system, it does not have DP.”

A. Li (1999): Although Mandarin has no definite article, there is a DP layer in its nominal phrases, where demonstratives, proper names and pronouns can be realized as D head.

Debate 3: D⁰ encoded with uniqueness or familiarity

Lyons (1999:310): Languages lacking grammaticalized definite articles have no syntactic category D.

Li and Bisang (2012): Classifiers in definite “CL+N” are quasi-definite articles, which instantiates the D head syntactically, as realized via Cl-to-D raising. The definiteness expressed by definite “Cl+N” is characterized with the pragmatic notion of “familiarity” and not the semantic notion of “uniqueness”.

1.2 Introduction to classifiers in Wu: counting and beyond

Language to be examined: the *Fuyang* dialect of Wu Chinese—吴语富阳话

- **Wu Chinese** is a southern Chinese language spoken in the Yangtze delta area, including Shanghai, Zhejiang Province and the southern part of Jiangsu Province.
- The Wu variant we use in the current study is the *Fuyang dialect*, the author’s mother tongue, which belongs to the Taihu Lake group of Wu dialects.

Standard use of classifiers (in Chinese languages in general): counting

Wu Chinese as a classifier language: its numerals cannot modify nouns without the presence of classifiers, as in the context [Numeral-Classifier-Noun].

Function of classifiers: “individuation” (Greenberg 1976, Chierchia 1998, Bisang 1999, Cheng and Sybesma 1999, among others) or “atomization” (Rothstein 2010, X.P. Li 2011): it provides a counting unit for the entities denoted by nouns.

1. a. san *(ge) xuesheng [Mandarin] b. loʔ *(kan) faŋtsɿ [Wu]
three CL student six CL house
‘three students’ ‘six houses’

Non-standard use of classifiers: definiteness-marking (in Wu, but not in Mandarin)

In classifier languages, numerals are in need of classifiers but classifiers can be used independent of numerals, as the bare classifier construction [Classifier-Noun].

In Mandarin, [Cl-N] is only possible in lexically governed positions, in which it has an indefinite reading.

2. a. wo jintian mai le [zhi bi]. [Mandarin]
1SG today buy PFV CL pen. ‘I bought a pen today.’
b. * [zhi bi] huai le.
CL pen broken PRF ‘The pen was broken.’

In contrast, in Wu, [Cl-N] is available in all argument positions, regardless of being lexically governed or not. Moreover, [Cl-N] not only has an indefinite reading but also a definite reading: preverbal [Cl-N] with a definite reading and postverbal ones with an indefinite reading.

- c. [kɿ lɔsɿ] ɕiʔniʔtsɿ tɕ^hi ma lə [pən ɕy]. [Wu]
CL teacher yesterday go buy PFV CL book
‘The teacher went to buy a book yesterday.’

1.3 Phenomenon to be examined

In this research, we will go beyond the examples of bare [Cl+N] construction in (2c), as discussed in Li and Bisang (2012), and examine the non-bare [CL+N] construction in Wu.

3. a. ηta [tsəʔ kiu] [Demonstrative] [Wu]
 that CL dog ‘that dog’
 b. ηa [tsəʔ kiu] [Possessor]
 1PL CL dog ‘your dog’
 c. $\text{ci}\text{ɔ}$ kə [tsəʔ kiu] [Adjective/RC]
 small Mod CL dog ‘the small dog’
4. cin san $\text{ts}^{\text{h}}\text{ə}^{\text{?}}\text{l}\text{e}$ kə ηta [tsəʔ kiu] [Multiple occurrence]
 new born Mod that CL dog ‘that newly born dog’

Some basic facts about non-bare [CI+N] in Wu:

- ❖ [CL-N] can be preceded by different elements, such as demonstratives, adjectives, possessors, relative clauses etc.
- ❖ Bare [CI-N] is ambiguous between indefinite and definite readings, as those in (2c), but non-bare [CI-N] is unambiguously definite (singular), as those in (3).
- ❖ Multiple occurrence of those elements before [CI-N] is possible, as in (4).

Nevertheless, in examples of (3), only the counterpart of (3a) is a grammatical construction in Mandarin and the rest are impossible.

5. a. na zhi gou [Demonstrative] [Mandarin]
 that CL dog ‘that dog’
 b. wo de $\text{*}(\text{na})$ zhi gou [Possessor]
 1SG MOD that CL dog ‘that dog of mine’
 c. xiao de $\text{*}(\text{na})$ zhi gou [Adj/RC]
 small MOD that CL dog ‘that small dog’

In other words, in Mandarin, only demonstrative phrases but not [CI-N] can be modified by possessors, adjectives and relatives clauses. (Note: we don’t discuss modified bare nouns here.)

Questions arising from (3) and (5):

- a. Why is it the case that Wu allows [CI-N] to be modified and Mandarin does not? Can we propose a unified syntactic structure for modified [CI-N] in Wu and modified demonstrative phrases in Mandarin?
- b. Are those elements preceding [CI-N] restricted by some ordering constraints if they co-occur? If yes, what does that tell us about their syntactic status?
- c. Why can those elements preceding [CI-N] induce a definite reading? How can non-bare [CI-N] be interpreted in a compositional way?

II. Syntax of non-bare [CI-N]

Question i: Is non-bare [CI-N] a specific indefinite phrase or a definite phrase?

Question ii: What is the maximal projection of classifier in non-bare [CI-N]?

Question iii: What is the syntactic status of those elements preceding [CI-N]?

2.1 Non-bare [CI+N] as a definite expression

- Non-bare [CI-N] refer to entities that are assumed to be known to the interlocutors or are able to be identified in the context.
- It also expresses contrastive meaning, especially when the preceding element is an adjective or a relative clause.

6. a. ηta $\text{ts}\partial^?$ ciutci b. ta $\text{m}\partial\text{ts}\eta$ $\text{k}\partial$ $\text{k}\gamma$ $\text{ci}\partial\text{ku}\epsilon$.
that CL cellphone wear hat Mod CL boy
‘that cellphone’ ‘the boy that wears a hat’

Question 1: Is non-bare [CI-N] a definite or specific indefinite nominal phrase?

Claim 1: Non-bare [CI-N] is a definite expression, but not a specific indefinite phrase.

Reason 1: Possibility of the recovery of numeral ‘one’

[CI-N] always has a singular interpretation. If it is specific indefinite, we would expect to recover the numeral *i?* ‘one’ before [CI-N], as in (7). However, in non-bare [CI-N], it is impossible to have the numeral *i?* ‘one’ before [CI-N], as in (8).

A. Li's (1999) claim on the DP structure in Mandarin:

Although Mandarin has no definite article, there is a DP layer in its nominal phrases, where demonstratives, proper names and pronouns can be realized as D head. The DP structure is schematized: [DP D [NumP Num [CIP Cl [NP N]]]].

Our justification for the DP structure in Wu:

We assume that A. Li's (1999) DP structure [DP D [NumP Num [CIP Cl [NP N]]]] is also applicable to Wu Chinese, but Wu and Mandarin may differ as to which element may embody the D head. We claim:

- (i) In Wu, the D head encodes the head feature [\pm definite] and D⁰ is realized by definite classifiers, via some movement, such as Cl⁰-to-D⁰ raising, as proposed in Li and Bisang (2012) for the structure of bare [Cl-N].¹
- (ii) Demonstratives in Wu are realized as [Spec DP].
- (iii) Elements preceding [Cl-N], such as adjectives, relative clauses and possessors are DP modifiers.

Evidence for argument (i): Cl as D head

Fact 1: when two possessors are coordinated, which is then followed by a classifier, it refers to the singular entity, as in (10a). When what's coordinated are two [Possessor-Cl], the coordinated phrase refers to two separate entities, as in (10b).²

¹ One crucial piece of evidence in support of the DP hypothesis for definite [Cl-N] given by Li and Bisang (2012) is about the use of proper names in Wu. It is shown below:

- i. What about XuPing?
 a. $\zeta u o ? p ^ { h i n } n i n ?$ b. $k \chi \zeta u o ? p ^ { h i n } n i n ?$
 XuPing Q CL XuPing Q

Proper names with or without classifier have the same denotation, i.e. rigid designators. Assuming that both proper name and CL-Proper name are treated as DP, a plausible account for the data in (i) is that: proper name are based generated as N, which may be raised to D position, as in (a), or remain in N position if the D position is lexically filled, such as a definite classifier, as in (b).

² The contrast between singular and plural references also applies to the coordination of adjectives(-classifiers).

- a. [[$h \partial ? k \partial$] [$\zeta i \partial k \partial$]] $t s \partial ?$ $k i u$ $s \eta$ $a l a - k o$.
 black Mod small Mod CL dog COP 1PL-Mod
 'The small black dog is ours.'
 b. [_{DP} [$h \partial ? k \partial$] $t s \partial ?$] $t s \partial ?$ [_{DP} [$\zeta i \partial k \partial$] $t s \partial ?$] $k i u$ $s \eta$ $a l a - k o$.
 black Mod CL and small Mod CL dog COP 1PL-Mod
 'The black (dog) and the small dog are ours.'

10. a. [çiəuaŋ tsə? çiəlo?] pən çy
 XiaoWang and XiaoLu CL book
 ‘Xiao Wang and Xiao Lu’s book’
- b. [_{DP} [çiəuaŋ] pən] tsə? [_{DP} [çiəlo?] pən] çy
 XiaoWang CL and XiaoLu CL book
 ‘Xiao Wang’s ~~(book)~~ and Xiao Lu’s book’

The test in (10) suggests that the classifier is not part of the modifiers and they occupy two different positions. The referentiality of the coordinated phrase suggests that the coordination of [Modifier-CL] in (10b) might be a sort of DP coordination.

Fact 2: in both Wu and Mandarin, Dem-Cl-N implies singularity. In Mandarin, an optional numeral ‘one’ can be inserted between Dem and [Cl-N], as in (11a), but such an insertion is impossible in Wu, as in (11b).³

11. a. na (yi) ben shu [Mandarin]
 that one CL book
- b. ŋta (*i?) pən çy [Wu]
 that one CL book

This indicates that in Mandarin, in Dem-Cl-N, the classifier remains at its base-generated classifier position, i.e. between Num and N, and that in Wu, the classifier is located at a position higher than Num⁰. It is possibly raised from Cl⁰ to D⁰ by crossing the empty Num head, if we assume that Wu has the DP structure: [_{DP} D [_{NumP} Num [_{ClP} Cl [_{NP} N]]]].

Evidence in support of argument (ii): Dems as [Spec DP]

Fact 3: both demonstratives and definite classifiers are able to express definiteness, as shown in (12). However, the demonstrative is the left most element in DP. The ordering restrictions about definite classifier and demonstrative are illustrated in (13).

³ In Mandarin, modifiers can modify [Dem-Cl-N] only but not [Cl-N]. Maybe this is due to the fact that in Mandarin, [Cl-N] is inherently indefinite and Cl⁰-to-D⁰ raising is prohibited in general.

12. a. tsəʔ kiu sɿ ala-ko.
 CL dog be 1PL-MOD 'The dog is ours.'
 b. ŋta san tsəʔ kiu sɿ ala-ko.
 that three CL dog be 1PL-MOD 'These three dogs are ours.'
13. a. ŋta tsəʔ kiu sɿ ala-ko.
 that CL dog be 1PL-MOD 'That dog is ours.'
 b.* tsəʔ ŋta kiu sɿ ala-ko.
 CL that dog be 1PL-MOD

It is plausible to assume from fact 3 that demonstratives, as the leftmost element in the DP domain, to be located in the specifier position of DP, as headed by definite classifiers.

Fact 4: Demonstratives cannot modify a bare noun without the mediation of a classifier, as shown in (14a). This constraint also applies to the coordination fact that demonstratives cannot be coordinated, unless each of the coordinated demonstrative is followed by a classifier, as contrasted between (14b) and (14c).

14. a. ŋta *(tsəʔ) kiu sɿ ala-ko.
 that CL dog be 1PL-MOD 'That dog is ours.'
- b. [[ŋta pən] tsəʔ [kə pən]] ɕy
 that CL and this CL book 'that ~~(book)~~ and this book'
- c. *[ŋta] tsəʔ [kə] pən ɕy
 that and this CL book

According to Giusti (1999, 2002), a FP is licensed by (a) making the specifier visible and/or (b) making the head visible. The realization of a functional head is the last resort. In our case, the D head has to be visible only when we want to express singularity. In other words, [Cl-N] express always definite singular referents, demonstrative phrases can either be singular or plural. This further supports our claim that Cl heads DP and demonstratives are [Spec DP].

III. Semantics of non-bare [CI-N]

Question (i): What is semantic make-up of the definiteness expressed by non-bare [CI-N]?

Question (ii): How can the elements before [CI-N] be interpreted in a compositional way?

3.1 Lack of exhaustiveness/uniqueness

Lyons (1999) makes the claims that

- (i) the D head encodes the semantic property of uniqueness or exclusiveness;
- (ii) in languages without grammaticalized definite articles, there is no D head.

Our discussion in section 2 suggests that the second claim does not seem to be accurate, since definite classifiers are quasi-definite articles, and are able to fill into the D head.

We will now consider his first proposal by asking the question: what is the semantic nature of the D head when it is realized by a definite classifier as in Wu?

We assume that a unified semantics for bare and non-bare [CI-N] is possible. Let's start with the discussion on the use of bare [CI-N] in Wu. Li (2011) and Li and Bisang (2012) argue that uniqueness is neither a necessary nor a sufficient condition to license definite [CI-N].

Case 1: “culturally unique entities” (Löbner 1985) can be expressed by bare nouns or [CI-N].

17. a.	<i>t^hiŋ</i>	<i>z₁</i>	<i>lan</i>	<i>ko.</i>	[Generic]
	sky	be	blue	Part	‘The sky is blue (in general).’
b.	<i>kintsə</i>	<i>pan</i>	<i>t^hiŋ</i>	<i>man lan.</i>	[Episodic]
	today	CL	sky	very blue	‘Today, the sky is very blue.’

The bare noun *t^hiŋ* ‘sky’ in (17a) is used in a generic sentence, and it refers to the unique sky known to all of us. However, *pan t^hiŋ* ‘CL sky’ in (17b) refers to the sky in a particular situation, which is known to the interlocutors. Definite [CI-N] refer to entities that are familiar or identifiable to the addressees in a certain context.⁴

⁴ According to Li (2011) and Li and Bisang (2012), bare [CI-N] have the following three uses: on-the-spot use, familiarity use and bridging use, but it is not possible to have the anaphoric use.

Case 2: definite [CI-N] does not presuppose uniqueness or exclusiveness.

- | | | | | | | |
|--------|------|-------------------------|-----|------|-----------------|----------------------|
| 18. a. | ηta | tsəʔ | kiu | | [Demonstrative] | |
| | that | CL | dog | | ‘that dog’ | |
| b. | çin | sants ^{həʔ} lɛ | kə | tsəʔ | kiu | [Relative clause] |
| | new | born | Mod | CL | dog | ‘the newly born dog’ |

(18a) implies that there is a set of individual dogs, and the use of demonstrative *ηta* ‘that’, accompanying with gesture, helps to identify the relevant entity among others in the context. By uttering (18b), the speaker intends to refer to a particular dog, namely, the newly born one and not others. This requires not that there be just one dog but that there be just one dog that was newly born.

Another observation made by Li and Bisang is that bare [CI-N] is ambiguous between indefinite and definite readings, and that definite [CI-N] is restricted to preverbal positions, which are argued to be (secondary) topic positions in Wu.

Along this line, Li and Bisang propose that definite [CI-N] in Wu is characterized with familiarity in that the entity referred to by definite [CI-N] function as the topic of the sentence and it presupposes to entity referred to to be *familiar* to the interlocutors.

3.2 Compositional semantics

Question: How do the elements preceding [CI-N] perform combine with [CI-N] compositionally? How do they contribute to the definite reading of [CI-N]?

Some mismatching problems for non-bare [CI-N]:

According to Partee (1975), [the [N-RC]] in (19b) is preferred over [[the N]-RC] in (19a) for the modified definite expression in English in terms of compositionality. In other words, the uniqueness requirement of the definite article *the* is relative to the extension of N-RC and not to that of N.



Nevertheless, in our case of non-bare [CI-N] in Wu, we claimed that different modifiers before [CI-N] are treated as DP modifiers. They are parallel to the structure in (19a). The linear order of Modifier-CI-N seems to go contrary to Partee's compositional semantics based on the structure (19b), since those modifiers don't modify the noun but the whole definite phrase [CI-N].

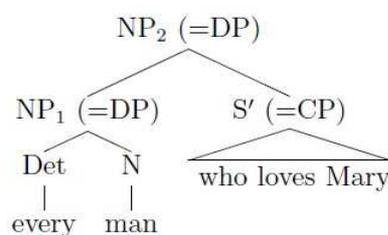
Moreover, the presence of the marker /kə/ after Adj/RC and possessors suggests that those elements preceding [CI-N] are predicative in nature (either being predicate or "predicate modifiers"). However, definite [CI-N] is analyzed as a generalized quantifier in our early study. Therefore, it is quite surprising that [CI-N] can be modified by these predicate modifiers. There seems to be an obvious type mismatch.

Some (? possible) solution:

Bach and Cooper (1978): a compositional semantics for (19a) is possible.

Bach and Cooper argue that noun phrases (DPs in our term) can optionally take an extra property argument, which is saturated by the denotation of a high-adjoined relative clause and intersected with the property contributed by the content of the noun phrase.

20.



- a. $[[NP_1]] = \lambda R \lambda P [(\forall x)[\text{man}(x) \wedge R(x)] \rightarrow P(x)]$
- b. $[[S']] = \lambda z [\text{love}(z, m)]$
- c. $[[NP_2]] = \lambda P [(\forall x)[\text{man}(x) \wedge \text{love}(x, m)] \rightarrow P(x)]$

It is clear from the semantics in (20) that a type-shifting is introduced: the GQ is converted from type $\langle\langle e, t \rangle, t \rangle$ to a function of type $\langle\langle e, t \rangle, \langle e, t \rangle t \rangle$.

Li and Bisang (2012):

In the discussion of bare [CI-N], Li and Bisang (2012) claim that definite [CI-N] is a generalized quantifier and it is lifted from the predicative use of [CI-N]. This lifting operation (Partee 1987) may be seen as the corresponding syntactic operation of raising,

namely, CI-to-D raising. They also propose that a contextual variable C is introduced in the denotation of definite [CI-N], which represents contextual familiarity.

- We, following Chierchia (1998) and Li (2011), assume that bare nouns in classifier languages are kind denoting, as in (21a).
- Indefinite [CI-N] denotes a set of atomic instantiations of the relevant kind, as represented by k (k is a variable over kinds). See the representation in (21b).
- Definiteness is a feature in D , which shifts from the predicate type denoted by [CI-N] to the GQ meaning denoted by the [Det-CI-NP]. See (21c).

21. a. Denotation of bare nouns

$$\|N\| = k$$

b. Indefinite [CI-N]:

$$\|CI-N\| = \|CI\| (\|N\|) = \lambda k \lambda x. INST(x, k) \wedge ATOM(x)$$

c. From indefinite [CI-N] to definite [CI-N]:

$$\begin{aligned} \|CI-N\| &= \lambda R \lambda P. \exists x [P(x) \wedge R(x) \wedge \text{CONTEXTUALLY FAMILIAR}(x)] \\ &\quad (\lambda k \lambda x. INST(x, k) \wedge ATOM(x)) \\ &= \lambda P. \exists x [P(x) \wedge INST(x, k) \wedge ATOM(x) \wedge \text{CONTEXTUALLY FAMILIAR}(x)] \end{aligned}$$

Our arguments:

- ❖ In the syntax part, we already argued that elements preceding [CI-N], such as adjectives, RCs and possessors are DP modifiers. They have the similar structure to (19a).
- ❖ Combining the intuition of Bach and Cooper (1978) and Li and Bisang (2012), we suggest that [CI-N] modifiers, which are DP modifiers, express properties that intersect with the denotation of definite [CI-N] and saturate the contextual variable C .
- ❖ The information expressed by elements preceding [CI-N] is familiar to both the speaker and the hearer. Namely, the information expressed those modifiers is part of the familiarity required by definite classifiers in D^0 position.

22. $\text{ci}\text{ɔ} \quad \text{k}\text{ə} \quad [\text{ts}\text{ə}^? \quad \text{kiu}]$
 small Mod CL dog ‘the small dog’

23. Representing the semantics of non-bare [CI-N]

a. $\|\text{ci}\text{ɔ} \text{k}\text{ə}\| = \lambda x. \text{small}(x)$

b. Semantics of bare [CI-N]

$\|\text{ts}\text{ə}^? \text{-kiu}\|$

$= \lambda P. \exists x [P(x) \wedge \lambda x. \text{INST}(x, \text{DOG}_k) \wedge \text{ATOM}_{\text{animal}}(x)] \wedge \text{Contextually Familiar}(x)]$

c. Semantics of non-bare [CI-N]

$\|\text{ci}\text{ɔ} \text{k}\text{ə} \text{ts}\text{ə}^? \text{kiu}\| = \|\text{ts}\text{ə}^? \text{kiu}\| (\|\text{ci}\text{ɔ} \text{k}\text{ə}\|)$

$= \lambda R \lambda P. \exists x [P(x) \wedge \lambda x. \text{INST}(x, \text{DOG}_k) \wedge \text{ATOM}_{\text{animal}}(x)] \wedge \text{Contextually Familiar}(x)]$

$(\lambda x. \text{new}(x))$

$= \lambda P. \exists x [P(x) \wedge \text{INST}(x, \text{DOG}_k) \wedge \text{ATOM}_{\text{animal}}(x)] \wedge \text{small}(x)]$

IV. Concluding remarks

Debate 1: Bare nouns denote kinds, and classifiers have the function from k to $\langle e, t \rangle$.
 (Chierchia 1998, X.P.Li 2011)

Debate 2: Nominal phrases in Wu has a DP structure, the D head can be realized by definite classifiers via raising and demonstratives are [Spec DP].

Debate 3: The D head encodes the feature “contextual familiarity”. This feature may be explicitly expressed overt materials, such as those elements preceding [CI-N].

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