

JUSTIFYING SILENT ELEMENTS IN SYNTAX:
THE CASE OF A SILENT NUMERAL, A SILENT CLASSIFIER,
AND TWO SILENT NOUNS IN MANDARIN CHINESE*

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Abstract

This paper demonstrates in the Mandarin construction with a numeral (Num), classifier (CL) or measure word (MW), and a noun (N), each can be a silent element (SE). A multiplicative function exists between Num and CL/MW. Num as a multiplier *one* is redundant and can be silent. CL, whose multiplicand value is *one*, is redundant, when Num is overt. Thus, a silent Num YI, whose pronounced counterpart is *yi* ‘one’, can be licensed by an overt CL/MW, which are clitics in Mandarin and require a c-commanding head as host, which must satisfy additional prosodic constraints. A silent general CL, GE, can be licensed by an overt Num. MWs do not have SE counterparts. A silent N TIME is licensed by an overt time MW, while MONEY is licensed by a monetary MW. In both cases, the meaning of the SE is already part of the MW in [Num MW N].

Keywords: silent element, numeral, bare classifier phrase, silent noun

1. Introduction

The concept of phonetically unrealized elements is not new. The well-established null elements such as PRO, *pro*, and cases of ellipsis all involve a piece of syntactic structure that ultimately receives no phonetic realization. However, there is no unified theory to license the different kinds of unpronounced expressions, though some of the well-accepted non-canonical lexical items may suggest a general direction. Expletives *it* and *there*, for example, are motivated by EPP as a ‘last resort’. PRO and *pro* are motivated by the θ -Criterion, but PRO is constrained by the PRO Theorem, and *pro*, by the subject-verb agreement morphology. In short, such elements must be motivated and highly constrained.

Recent works in syntax (e.g., Kayne 2005a, 2005b, 2007, 2008; Leu 2008; Sigurðsson 2004; van Riemsdijk 2002, 2005; inter alia) have proposed that there may be more silent elements (SEs) than has been thought. The significant property of the Kaynian SEs is that they often have a semantic function, much like regular lexical items, evidenced often by the phonological realization of their counterparts in the same language or a related language. An example is HOURS (capitalization indicates

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silence) in English; the motivation of this SE comes in large part from French, where a pronounced counterpart is obligatory, as shown in (1c) (Kayne 2003, 2005b).

- (1) What time is it?
 - a. It is six.
 - b. It is six HOURS.
 - c. Il est six *(heures).

However, some of the SEs proposed in the literature may not be syntactically or semantically justifiable. Her and Tsai (to appear, H&T hereafter), for example, argue against Kayne's proposal that the slang expression in (2), meaning *ten thousand dollars/bucks*, has the underlying form in (3).

- (2) Surface Form: ten grand
- (3) Source Form: ten THOUSAND BUCKS IN grand TOTAL

Kayne's proposal is largely due to his assumption that *grand* does not take the *-s* plural form and that it is never used as a noun besides this monetary sense. H&T demonstrate that this assumption is not correct and also that the surface form in (2) is not semantically equivalent to the surface form in (3), as shown by the self-contradictory sentence in (4b), the putative source form of (3a).

- (4) a. He paid ten grand in subtotal so far. ≠
 - b. He paid ten THOUSAND BUCKS IN grand TOTAL in subtotal so far.

Simpson (2012) also notes that the surface form and the source form may differ in quantification scope. Thus, in (5a), the total bet can only be \$2,000, while it is ambiguous between \$4,000 and \$2,000 in (5b).

- (5) a. I'm going to bet \$2,000 in grand total on two horses. (Simpson 2012)
 - b. I'm going to bet two grand on two horses. (Simpson 2012)

However, Simpson (2012) takes Kayne's SE account to be correct and thus accepts (5) as evidence that some 'meaning adjustment and loss' may exist between the source and the surface. H&T contend that such a position allows the semantic correspondence between the source and the surface to be unconstrained and thus unjustifiable. They conclude that the surface form, the source form with SEs, and the source form with SEs pronounced (if available) must all have the same meaning.

H&T propose a feature-based taxonomy of lexical items, which will be introduced in section 2, and predict that SEs constitute one type of lexical items as an indispensable part of UG. Yet, given the non-canonical nature of SEs, any SE proposed must of course be syntactically and semantically justified. The main goal of this paper is to provide empirical evidence to support the existence of SEs. Specifically, we will demonstrate that a grammar of Mandarin Chinese must recognize a silent numeral (Num), a silent numeral classifier (CL), and two silent nouns (N) in the nominal phrase [Num CL N]. Note that the position occupied by CL can also be occupied by a measure word (MW) instead, and thus the proposed expression should be [Num CL/MW N]. An example is given in (6).

- (6) *san ben/xiang shu*
 3 CL/MW-box book¹
 ‘3 books/boxes of books’

First, as shown in (7) and (8), contrary to what is generally assumed (e.g., Li and Thompson 1981:104, Tang 1990), a classifier in Mandarin does not always co-occur with an overt numeral or demonstrative. The example in (7) fits the general observation, but examples such as (8) are often overlooked.

- (7) *Zhangsan mai-le zhe (yi) ben/xiang shu.*
 Zhangsan buy-ASP this one CL/MW-box book
 ‘Zhangsan bought this book/box of books.’
- (8) *Zhangsan mai-le (yi) ben/xiang shu.*
 Zhangsan buy-ASP one CL/MW-box book
 ‘Zhangsan bought one book/box of books.’

In addition, contra the widely accepted assumption, a classifier is not always required, as shown in (9) (e.g. Her 2012).

- (9) *wu ma huan liu yang*
 5 horse trade 6 goat
 ‘Trading 5 horses for 6 goats.’

The idiom in (9), which refers to a trade that favors the trader only superficially, has the two CLs missing. See (10), which receives exactly the same meaning as (8).

- (10) *wu (pi) ma huan liu (tou) yang*
 5 CL horse trade 6 CL goat
 ‘Trading 5 horses for 6 goats.’

Interestingly, N in [Num CL/MW N] can also be unpronounced when CL/MW denotes time or money, as indicated in (11)-(12).

- (11) *san nian (shijian)*
 3 MW-year time
 ‘3 years (of time)’
- (12) *san kuai (qian)*
 3 MW-dollar money
 ‘3 dollars (of money)’

We shall demonstrate that the silent numeral YI, the silent classifier GE, and the silent nouns TIME and MONEY are SEs in the sense of H&T’s lexical taxonomy, and thus not silence due to deletion. The paper is organized as follows. In section 2, we

¹ Abbreviations used in this paper are as follows: CL: classifier; MW: measure words; DE: marker of modifying phrases, e.g., genitive phrases and relative clauses; ASP: aspect marker; SFP: sentence-final particle; BA: disposal marker.

will discuss the distinction between SEs and deletion by ellipsis and the necessary syntactic and semantic constraints on SEs. Section 3 examines the properties of bare CL/MW phrase, i.e., [CL/MW N], and argues for a silent numeral YI. Section 4 then presents Her’s (2012) observation that CL is in fact not obligatory in Mandarin and the distinction between CL and MW; specifically, the mathematics of CL/MW will be crucial in accounting for a silent CL in [Num N]. Section 5 argues that N can be a silent TIME or MONEY if MW in [Num MW N] denotes time or money, respectively. Section 6 concludes the paper.

2. The Nature of Silent Elements

In this section, we will first depict H&T’s definition of lexical SEs in 2.1. Then, in 2.2 we will demonstrate that such a definition makes it possible to make a clear distinction between base-generated SEs and silence due to ellipsis in derivation.

2.1 A feature-based lexical taxonomy

Lexical items, or LIs, within the current generative syntactic theory, can be seen formally as bundles of features. This view is made explicit in Chomsky (1999:7):

In the simplest case, the entry LI is a once-and-for-all collection (perhaps structured) of (A) phonological, (B) semantic, and (C) formal features. The features of (A) are accessed in the phonological component, ultimately yielding a PF-interface representation; those of (B) are interpreted at LF; and those of (C) are accessible in the course of the narrow-syntactic derivation. Language design is such that (B) and (C) intersect, and are disjoint from (A), though there is some evidence, to which we return, that presence or absence of features of (A) might have an effect on narrow syntactic computation. (Chomsky 1999:7)

Following H&T, we will call the three kinds of features PFF (PF-accessed features), FF (formal features), and LFF (LF-accessed features). An LI must minimally have FF to undergo syntactic computation. Such PFF-less LIs include empty expletives (e.g., Huang *et al* 1998), true empty categories (e.g., Li 2007), and perhaps also some functional heads (e.g., Cinque 2005). Given the existence of expletives, i.e., LIs with PFF and FF but without LFF, e.g., *it* in *it’s raining* and *there* in *there comes a bus*, the existence of SEs, i.e., LIs with LFF and FF but without PFF should come as no surprise. It simply means that UG employs both kinds of non-canonical LIs: those without semantic content, such as expletives, as well as those without phonological content, such SEs. A feature-based taxonomy of LIs thus obtains, as in Table 1.

Table 1. Her and Tsai’s (to appear) Taxonomy of Lexical Items

Type of Lexical Items		PFF	LFF	FF
1	Canonical lexical items	✓	✓	✓
2	Expletives, e.g., <i>it</i> , <i>there</i>	✓	✗	✓
3	SEs, PRO, pro, null light verbs, etc.	✗	✓	✓
4	Empty expletives, true empty category, (some) null functional heads	✗	✗	✓

Thus, the theory of LIs that (Chomsky 1999) implies and we propose in Table 1 allows LIs the full logical possibilities in terms of the absence of LFF and/or PFF. This

seems to be precisely what van Riemsdijk (2002: 163) proposes in the so-called ‘empty light verb’:

Why not assume that the lexicon may contain a number of grammatical formatives that happen to lack phonetic content. This is essentially the same move as the shift from ‘Deletion in COMP’ (cf. Chomsky and Lasnik (1977)) to ‘Empty Operators’ (cf. Chomsky (1982)). ...My point here is that there is nothing to prevent us from attributing a variety of syntactic and semantic properties to such an empty light verb. After all, while phonetically non-null light verbs are semantically bleached, they nevertheless have to be specified for the constructions that they can and cannot occur in. (van Riemsdijk 2002:163)

Though any canonical LI can in principle have a PFF-less counterpart, in reality the number of SEs should be rather small, as suggested by the small number of LFF-less LIs, such as expletives. After all, fundamental to human communication is the sound-meaning pairing, and LFF-less expletives and PFF-less SEs are exceptions that impose extra burden on both communication and acquisition. Thus, for any proposed non-canonical LI to be taken seriously, it must be syntactically and semantically motivated and justified.

The above account therefore dictates an affirmative answer to one of the two questions posed by Simpson (2012): must a source form with SEs be semantically equivalent to the surface form with pronounced counterparts? Indeed, if there is any deviance in meaning between the two forms, the SEs in question would be ‘empirically intractable’ (Zeschel and Stefanowitsch 2008a). For example, Kayne (2005a, chap.10) proposes that color adjectives invariably modify an overt head noun *color*, as in (13a), or its silent counterpart COLOR, as in (13b), which serves as the source form for the surface form in (13c). (13a) is the pronounced counterpart of (13b), with the underline indicating the pronounced counterpart of an SE.

- (13) a. John bought a green color car yesterday.
b. John bought a green COLOR car yesterday.
c. John bought a green car yesterday.

As we have argued earlier, these three forms should all be semantically equivalent. The above three sentences in (13) indeed have the same truth conditions. Thus, the postulation of COLOR is justified semantically. Her and Tsai’s (2014) objection to this SE is therefore purely on syntactic grounds.²

2.2 Sources of silence

The second question raised by Simpson (2012) regarding SEs is: are SEs different from lexical elements whose phonological features are deleted by ellipsis? H&T contend that the silence of syntactically active elements can be due to either base-generated SEs or deletion of base-generated pronounceable LIs. In short, SEs and ellipsis are united as

² An anonymous reviewer points out that SEs with semantic content thus seem to behave like *pros* in some European languages in that they all involve some kind of double encoding, and further notes that it is also not true that all cases of double encoding, including agreement and negative concord, are prone to trigger SEs. We agree, as it is certainly not true in the case of *color* here, as Her and Tsai’s (2014) have demonstrated. It is not clear to us at this time why similar licensing conditions do not necessarily produce SEs. However, explorations of a general theory to predict when exactly SE takes place are beyond the scope of the paper.

elements active in syntax but ultimately unpronounced. Yet, they differ in the source of their silence: the silence of SEs is inherent; the silence due to ellipsis is acquired.

Given that an SE in the Lexical Array is identical to its pronounced counterpart in every way except that it is without the PFF the latter has, the SE's meaning must likewise be recoverable in the surface form. On the other hand, SEs differ from ellipsis in that they start out in the Lexical Array without PFF, while elided elements are canonical lexical elements whose PFF are deleted in derivation (e.g., Baltin 2012), or at Spell-Out (e.g., Chomsky and Lasnik 1993, Merchant 2001). In addition, SEs and ellipsis are also licensed by different conditions. SEs are licensed by other LIs, e.g., COLOR in (14) is allegedly licensed by 'green', which has the feature [+color], and THOUSAND in (15) is allegedly licensed by 'grand TOTAL' in the context of 'BUCKS' (Kayne 2012:79).

(14) John bought a green COLOR car yesterday.

(15) It'll cost you ten THOUSAND BUCKS IN grand TOTAL.

In comparison, major cases of ellipsis, e.g., NP-ellipsis, VP-ellipsis, and sluicing, all involve functional heads (D, T, C), and the deletion of the complement is allowed only when the Spec is filled (e.g., Kayne 2006, Lobeck 1990, Saito *et al.* 2008). Ellipsis thus seems to apply across categories in a similar fashion, but the occurrence of SEs is far less productive. Also, the PF-deleted parts must be recoverable from overt antecedents or information available in the discourse context, which may result in ambiguity when multiple antecedents are available, as in (16). SEs do not require overt antecedents and thus do not produce ambiguity of this kind, though COLOR in (14) may have an antecedent in a weaker sense, i.e., the feature [+color] in *green*.

(16) *Zhangsan xihua ziji de mama Lisi ye shi.*

Zhangsan like self DE mother Lisi also BE

'Zhangsan likes his own mother, Lisi likes his own mother, too.'

'Zhangsan likes his own mother, Lisi likes her (=Zhangsan's mother), too.'

To sum up, SEs and ellipsis are thus *unified* as elements active in syntax but ultimately unpronounced. Yet, the two are *distinguished* as to whether their silence is base-generated.

3. A Silent Numeral ONE

In this section we examine the syntax and semantics of the so-called bare classifier phrase, i.e., [CL/MW N]. In 3.1, we will first document the range of data discovered in the literature and briefly review previous accounts in 3.2. We shall argue, in 3.3, that [CL/MW N] is not derived from [~~y~~ CL/MW N], or phonological reduction of *yi* 'one'. Rather, [CL/MW N] is the surface form of the source form [YI CL/MW N], where YI is an SE, and the syntactic distribution of [CL/MW N] is due to the clitic status of all CL/MWs in Mandarin.

3.1 Properties of [CL/MW N]

The basic word order of CL/MW in Chinese is [Num CL/MW N], as shown in (17) and (18), with or without a demonstrative, respectively.

(17) *ta mai-le zhe san ben shu.*

she buy-ASP this 3 CL book

‘She bought these 3 books.’

- (18) *ta mai-le san ben shu.*
she buy-ASP 3 CL book
‘Zhangsan bought 3 books.’

It is possible for a CL/MW to occur without a number in the form of [CL/MW N], as first observed by Lü (1990)[1944], and it is equally well-recognized that this bare CL/MW can only receive a singular interpretation, as in (19). A numeral that is not *one* cannot be omitted, as in (20).

- (19) *ta mai-le ben shu.*
she buy-ASP CL book
‘She bought a book.’

- (20) *ta mai-le *(lian/san/shi) ben shu.*
she buy-ASP *(two/three/four) CL book

There thus seems to be a missing numeral *one* in [CL/MW N]. This is also observed cross-linguistically, as shown in (21) and (22) with respective examples from Cantonese and Vietnamese.

- (21) *zek gau zungji sek yuk.* (Cheng & Sybesma 1999: 511).
CL dog like eat meat
‘The dog likes to eat meat.’

- (22) *Ông Quang mua được cái nhà.* (Duffield 2001: 102-103)
PRN Quang buy can CL house
‘Quang bought a house.’

In this paper we will focus on Mandarin only, where [CL/MW N] cannot occur in topic, as in (23) and (24), or subject positions, as in (25). Where it is allowed, [CL/MW N] can only receive an indefinite singular reading, as in (26).

- (23) **chang huó ah, xìngkuì xiǎofāngyuán lái*
CL fire TOP fortunately fire brigade come
de jìshì. (Li and Bisang 2012: 337)
ADV fast

‘As for the fire, fortunately, the fire brigade came fast.’

- (24) **ge píngguó ah, wǒ yǐjīng chī le.* (Li and Bisang 2012: 338)
CL apple TOP I already eat SFP
‘The apple, I have already eaten it.’

- (25) Q: Where is the book? (Li and Bisang 2012: 338)
A: **na ben shu, ge xuéshēng mǎi zǒu le.*
that CL book CL student buy away SFP
‘That book, the student has bought it.’

- (26) *Zhangsan kàn-le ben shu.*
Zhangsan read-ASP CL book

‘Zhangsan read a book.’

Cheng and Sybesma (1999) (henceforth C&S) do not accept [CL/MW N] as the object of *ba*-construction, as in (27), but Li and Bisang (2012: 339) indicate that there is no consensus about the grammaticality of [*ba* CL/MW N], as in (28). The fact is that there are plenty well-formed examples found in the literature, e.g., Zhang (2011) and Lü (1990[1944]), among others, as well as on the Internet. See (29)-(31).

(27) **Zhangsan ba wan tang he-wan-le.* (C&S)
Zhangsan BA MW-bowl soup drink-finish-ASP
‘Zhangsan finished a (particular) bowl of soup.’

(28) *??ta ba ge pibao gei diu le.* (Chen 2004, cited in Li and Bisang 2012)
he BA CL bag give lose SFP
‘He lost the bag.’

(29) *Shouwei ba ge cong nanfang lai de xiaotou*
guard BA CL from south come DE thief
fang-pao-le. (Zhang 2011: 28)
release-away-ASP
‘The guard got released a thief who had come from the south.’

(30) *zhi zhe yi ju, ba (yi) ge Jiangping*
only this one utterance ba (one) CL Jiangping
hu-le yi tiao. (Lü (1990[1944]): 164)
scare-ASP one jump
‘Just this one utterance gave Jiangping a fright.’

(31) *ta bei pengyou ba (yi) ge taitai gei pianzou le* (Lü (1990[1944]):164)
he BEI friend BA one CL wife give cheat-away SPF
‘He was cheated by his friend out of his wife.’
‘He suffered from his friend cheating his wife away from him.’

C&S and Li and Bisang (2012) also state that [CL/MW N] cannot appear as the object controller of a secondary predicate, as shown by the contrast between (32) and (33). Huang (1987) points out that such objects must be indefinite and specific. C&S and Li and Bisang (2012) thus conclude that [CL/MW N] must be indefinite and non-specific. This observation, however, is challenged by Zhang (2011) with examples such as (34). This indicates that (33)’s problem is due to some other reason, not due to the fact that [CL/MW N] is the object controller of a secondary predicate. We will discuss (32) and (33) in more detail in 3.2 and offer a comprehensive account for [CL/MW N] in 3.3.

(32) *Zhangsan jiao guo yi ge xuesheng hen congming.*
Zhangsan teach ASP one CL student very intelligent
‘Zhangsan taught one student who was very intelligent.’

(33) **Zhangsan jiao guo ge xuesheng hen congming.*
Zhangsan teach ASP CL student very intelligent

- (34) *Shufen mai-le zhang zhuozi zhi you san*
 Shufen buy-ASP CL table only have three
tiao tui. (Zhang 2011: 28)
 CL leg
 ‘Shufen bought a table which has only three legs.’

3.2 Previous analyses

There are two different views regarding the analysis of [CL/MW N]. The first is via the phonological reduction of the numeral *yi* ‘one’ in [~~ɿ~~ CL/MW N], and the second view sees [CL/MW N] as independent of, and distinct from, [*yi* CL/MW N]. Under the account of phonological reduction, the numeral *yi* is simply suppressed in fast or casual speech, as in (35), and [CL/MW N] is thus syntactically and semantically equivalent in all aspects to [*yi* CL/MW N] (e.g., Lü 1990[1944], Zhang 2011).

- (35) *Zhangsan kan-le (yi) ben shu.*
 Zhangsan read-ASP one CL book
 ‘Zhangsan read a book.’

However, C&S insist that [CL/MW N] and [*yi* CL/MW N] have different distribution. In particular, [CL/MW N] cannot occur as the object of bounded predicates, such as *chi-wan* ‘eat-finish’, as in (36), or *ba*-constructions, as in (27), repeated in (38). In contrast, [*yi* CL/MW N] have no such restrictions, as in (37) and (39).

- (36)**Zhangsan chi-bu-wan ge binggan.*
 Zhangsan eat-not-finish CL cookie

- (37) *Zhangsan chi-bu-wan yi ge binggan.*
 Zhangsan eat-not-finish one CL cookie
 ‘Zhangsan could not finish eating a cookie.’

- (38)**Zhangsan ba wan tang he-wan-le.* (C&S)
 Zhangsan BAMW-bowl soup drink-finish-ASP

- (39) *Zhangsanba yi wan tang he-wan-le.* (C&S)
 ZhangsanBA one MW-bowl soup drink-finish-ASP
 ‘Zhangsan finished drinking a/one bowl of soup.’

Based on Sybesma’s (1992:176-178) claim that the bounded predicate in (36) and (38) forces an indefinite NP to be interpreted as specific, C&S thus conclude that [CL/MW N] can only denote non-specific indefinites. Formally, they propose that [CL/MW N] in Mandarin must be the complement of an empty head Numeral, projecting a NumP layer, as in (40a), which has the effect of undoing the definiteness of the CLP in (40b). The head of NumP head can be either overt or covert.

- (40) a. Indefinite: [_{NumP} Num⁰ [_{CLP} CL⁰ [NP N⁰]]] (Mandarin [CL/MW N])
 b. Definite: [_{CLP} CL⁰ [NP N⁰]] (Cantonese [CL/MW N])

However, Zhang (2011: 18) demonstrates that [CL/MW N] can indeed occur in the contexts of (36) and (38), but only with an indefinite specific reading, and thus not a numeric or quantity reading of *one*. Zhang (2011) thus defends the phonological reduction of *yi* in [CL/MW N], motivated by the fact that [CL/MW N] must receive a singular reading. On a quantity reading, the numeral *yi* ‘one’ must be pronounced, as observed by Yang (2001), Hsieh (2008) and Zhang (2011), as shown in (41) and (42).

(41) *Shufen bu-duo-bu-shao zhenghao mai-le *(yi)*
 Shufen no-more-no-less exactly buy-ASP *(one)
gang xiancai. (Zhang 2011:17 (49))
 MW-jar pickle
 ‘Shufen bought exactly one jar of pickles, no more and no less.’

(42) *liang ge ren shui *(yi) zhang chuang.*
 2 CL person sleep *(one) CL bed
 ‘Two people sleep in one bed.’

Given the quantity reading required of *yi* in (41) and (42), Zhang (2011) contends that on a quantity reading the numeral is the focus and PF deletion in general does not apply to focused elements. However, Li and Rothstein (2012) note that the numeral *yi* ‘one’ in (43b-c) is still obligatory even though it is not the focus. Specifically, in (43b), the MW *ping* ‘bottle’ is the focus, and in (43c), the N *pjiu* ‘beer’ is the focus.

(43) *ta-de jiuliang buxing:* (Li and Rothstein 2012: 19 (31))
 his drinking-ability not good

a. *zuiduo zhi neng he *(yi) ping pjiu,*
 at-most only can drink one MW-bottle beer
liang ping pjiu tai duo le.
 two MW-bottle beer too much SFP
 ‘He can only drink **one** bottle of beer, and two bottles of beer is too much.’

b. *zuiduo zhi neng he *(yi) ping pjiu,*
 at-most only can drink one MW-bottle beer
yi tong pjiu tai duo le.
 one MW-keg beer too much SFP
 ‘He can only drink one **bottle** of beer, and a keg of beer is too much.’

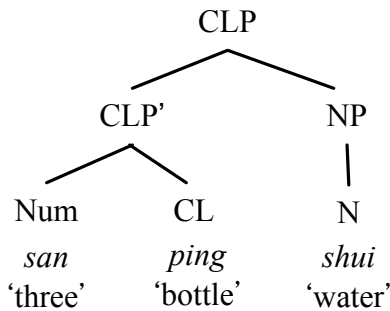
c. *zuiduo zhi neng he *(yi) ping pjiu,*
 at-most only can drink one MW-bottle beer
yi ping baijiu tai duo le.
 one MW-bottle liquor too much SFP
 ‘He can only drink one bottle of **beer**, and one bottle of liquor is too much.’

Li and Rothstein (2012) contend that [Num CL/MW N]’s measure/quantity reading and counting reading correspond to two different syntactic structures. On a measure reading, the numeral is obligatory and an essential part of the complex classifier, as shown by (44) with a left-branding structure in (45). On a counting reading, the numeral is a modifier of the [CL/MW N] constituent, as in (46), and is therefore optional in a right-branching structure, as in (47).

(44) *san ping shui*
 3 MW-bottle water

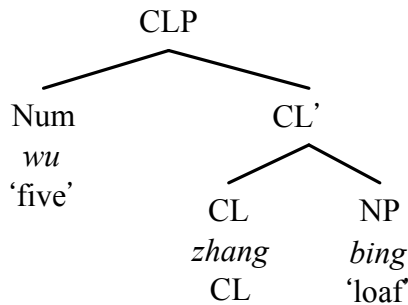
‘three bottles of water’

(45) Measure Reading



(46) wu zhang bing
5 CL loaf
‘five loaves’

(47) Count Reading



Thus, like C&S, Li and Rothstein (2012) see [CL/MW N] as distinct from [*yi* CL N] with respect to distribution, interpretation, and structure. Specifically, [CL/MW N] is non-specific and receives the counting reading only, while [*yi* CL/MW N], as an instance of [Num CL/MW N], is three-way ambiguous among specific, non-specific and measure/quantity readings. However, unlike C&S, they insist that [CL/MW N] projects CLP only, without any empty numeral, claiming that the semantics of [CL/MW N] makes it unnecessary to use *yi* to express the cardinality of one.

3.3 A silent numeral YI and CL/MW as Clitics

The issues discussed in 3.2 essentially boil down to a single question, i.e., whether [CL/MW N] and [Num CL/MW N] have the same syntactic structure or not. A positive answer is preferred for it affords a simpler grammar and is thus the solution we shall pursue. Empirically, the crucial fact is that the syntactic distribution of [CL/MW N] is not as restricted as described by C&S and Li and Rothstein (2012). [CL/MW N] can indeed occur as *ba* objects and as controllers of secondary predicates, as observed by Zhang (2011) and Lü (1990)[1944], which we have demonstrated already in 3.2. We offer one additional illuminating example of *ba*-object, found on the Internet. Note crucially that the [CL/MW N] string, 隻貴婦狗 *zhi guifugou* ‘a poodle’, in (48) is not even the object of *ba*, but merely the possessor of the proper *ba*-object, the hair.

- (48) *wo ba zhi guifugou de mao jian duan.*³
 I BA CL poodle DE hair cut short
 ‘I cut a poodle’s hair short.’

Furthermore, we offer an additional piece of evidence from conjunction, which has not been taken into consideration in previous accounts. Note crucially that the first conjunct in (49a) is allowed to be the reduced [CL/MW N] and that (49a) and (49b) are semantically equivalent. Given the syntactic and semantic equivalence of the conjuncts, (49b) thus indicates that the [CL/MW N] in (49a) is in fact [Num CL/MW N] as underlying form, where Num is null.

- (49) a. *ta mai-le zhang zhuozhi he yi tai diannao.*⁴
 he buy-ASP CL table and one CL computer
 ‘He bought a table and a computer.’
 b. *ta mai-le yi zhang zhuozhi he yi tai diannao.*
 he buy-ASP one CL table and one CL computer
 ‘He bought a table and a computer.’

We take for granted that a focused element must receive stress and thus the silent YI, like other silent elements in syntax, cannot be (part of) the focused element, due to the simple fact that silence cannot receive stress. We therefore need to explain the examples raised by Li and Rothstein (2012), repeated in (50), where they claim that *yi* is the focus in (50a) and thus cannot be silent, but it is not the focus in (50b) and (50c) and still cannot be silent.

- (50) *ta-de jiuliang buxing:* (Li and Rothstein 2012: 19 (31))
 his drinking-ability not good
- a. *zuiduo zhi neng he *(yi) ping pijiu,*
 at-most only can drink one MW-bottle beer
liang ping pijiu tai duo le.
 two MW-bottle beer too much SFP
 ‘He can only drink **one** bottle of beer, and two bottles of beer is too much.’
- b. *zuiduo zhi neng he *(yi) ping pijiu,*
 at-most only can drink one MW-bottle beer
yi tong pijiu tai duo le.
 one MW-keg beer too much SFP
 ‘He can only drink one **bottle** of beer, and a keg of beer is too much.’
- c. *zuiduo zhi neng he *(yi) ping pijiu,*
 at-most only can drink one MW-bottle beer
yi ping baijiu tai duo le.
 one MW-bottle liquor too much SFP
 ‘He can only drink one bottle of **beer**, and one bottle of liquor is too much.’

First of all, we shall quickly point out that in this context of a quantity reading, *yi* can indeed be silent, as in (51) where the stress necessarily falls on *beer*. However, with a subsequent full [Num CL/MW N] phrase serving as the contrast, the full antecedent [Num CL/MW N] receives a contrastive focus, therefore not the individual

³ <https://hk.knowledge.yahoo.com/archive/2009/20090921.html>

⁴ Native speakers’ judgments vary regarding the omission of *yi* in the NP immediately after *han* ‘and’.

Num, CL/MW, or N, as in (52), which is similar to (50) with some slight modifications to illustrate the point.

- (51) *ta-de* *jiuliang* *buxing* *zuiduo* *zhi neng*
 his drinking-ability not good at-most only can
he *ping* *pjiu*.
 drink MW-bottle beer
 ‘He can only drink one **bottle of beer**.’

- (52) *ta-de* *jiuliang* *buxing*:
 his drinking-ability not good
 a. *zuiduo* *zhi neng* *he* *?(yi)* *ping* *pjiu*,
 at-most only can drink one MW-bottle beer
 liang *xiang* *baijiu* *tai duo* *le*.
 two MW-box liquor too much SFP
 ‘He can only drink **one bottle of beer**, and **two boxes of liquor** are too much.’
 b. *zuiduo* *zhi neng* *he* *?(yi)* *ping* *pjiu*,
 at-most only can drink one MW-bottle beer
 laing *tong* *pjiu* *tai duo* *le*.
 two MW-keg beer too much SFP
 ‘He can only drink **one bottle of beer**, and **two kegs of beer** is too much.’
 c. *zuiduo* *zhi neng* *he* *?(yi)* *ping* *pjiu*,
 at-most only can drink one MW-bottle beer
 liang *ping* *baijiu* *tai duo* *le*.
 two MW-bottle liquor too much SFP
 ‘He can only drink **one bottle of beer**, and **two bottles of liquor** are too much.’

Likewise, the numeral *yi* in the previous examples (41) and (42) is part of the entire focused phrase [Num CL/MW N] that receives stress and thus cannot be silent. We therefore propose that formally the surface form [CL/MW N] in Mandarin has an underlying source form [YI CL/MW N], in line with the general [Num CL/MW N] structure. YI is understood as an SE, or specifically a lexical item identical with *yi* but without its phonological features. YI itself cannot be stressed and cannot be part of a [Num CL/MW N] phrase that receives focus and stress.

Next, we need to explain why [YI CL/MW N] does not occur in subject or topic positions, unlike its pronounced counterpart, which can appear in either preverbal or postverbal argument positions. A similar asymmetry is found in the distribution of the plurality-marked N-*men* form, which, on the contrary, is fine in preverbal positions but not in postverbal positions, as in (52).

- (52) a. *bingshi-men hen jingzhong ta*.
 soldier-PL very respect he
 ‘The soldiers respect him very much.’
 b. **ta hen jingzhong bingshi-men*.
 he very respect soldier-PL
 ‘He respects the soldiers very much.’

Tsai and Feng (2006) first reject *-men* as a suffix and see it as a clitic heading its own projection. More importantly, they demonstrate that not all instances of postverbal *N-men* are bad and account for the facts by imposing constraints at the syntax-phonology interface. Inspired by this account, we explore an explanation that lies in the grammatical status of CL/MWs as well as the relevant prosodic constraints. First, we propose, following Yang (2001), that CL/MWs in Mandarin are clitics and thus require a proper host. Clitics are in general much more promiscuous than affixes in selecting their hosts; however, they often do impose grammatical constraints as to the kinds of hosts selected. CL/MW clitics in Mandarin require an adjacent c-commanding head within the same clause as its host. Such heads, except Num, include Dem, P, Asp, and V, as demonstrated in (53)-(56), respectively.

(53) *na ben shu Zhangsan mai-le.* (Dem-CL/MW N)
 that CL book Zhangsan buy-ASP
 ‘That book, Zhangsan bought.’

(54) *Zhangsan lian ben shu dou mei-you.* (P-CL/MW N)
 Zhangsan LIAN CL book all not-have
 ‘Zhangsan doesn’t even have a book.’

(55) *Zhangsan mai-le ben shu.* (Asp-CL/MW N)
 Zhangsan buy-ASP CL book
 ‘Zhangsan bought a book.’

(56) *Zhangsan xiang mai ben shu.* (V-CL/MW N)
 Zhangsan want buy CL book
 ‘Zhangsan wanted to buy a book.’

The reason [CL/MW N] cannot be the subject or topic is therefore straightforward: there is no proper host available at these positions. In addition, we propose that hosts of the [CL/MW N] sequence are limited to three moras, as shown by the well-formed (57) and (58), in contrast with the phonologically ill-formed (59).

(57) *wo kan-le ben shu.*
 I read-ASP CL book
 ‘I read a book.’

(58) *wo zheng kan-zhe ge nuhai.*
 I right now look-ASP CL girl
 ‘I am looking at a girl.’

(59) **wo kan-guo ben shu.*
 I read ASP CL book
 ‘I have the experience of reading a book.’

According to Lin (2007), a heavy syllable bears two moras, while a light syllable has only one mora, and specifically, the neutral tone of an unstressed short syllable bears only one mora. This explains why CL/MW clitics prefer *V-le* and *V-zhe* as hosts than *V-guo*. Given the neutral tone of *-le* and *-zhe*, *V-le* and *V-zhe* contain three moras, whereas *-guo* bears a full falling tone and *V-guo* thus has more than three

moras. In addition, also due to a phonological constraint, a CL/MW that is more than one syllable does not allow the silent YI. See the contrast between the (a) and (b) example in (60) and (61).

- (60) a. *ta mai-le (yi) jin mi.*
 he buy-ASP (one) MW-catty rice
 ‘He bought one catty of rice.’
 b. *ta mai-le *(yi) gongjin mi.*
 he buy-ASP (one) MW-kilo rice
 ‘He bought one kilo of rice.’

- (61) a. *ta mai-le (yi) ke pingguou*
 he buy-ASP (one) CL apple
 ‘He bought one apple.’
 b. *ta mai-le *(yi) da ke pingguou.*
 he buy-ASP (one) big CL apple
 ‘He bought one big apple.’

The clitic status of CL/MW together with a silent numeral *yi* ‘one’ in [Num CL/MW N] account for the full range of data examined for [CL/MW N]. However, we still need to justify the SE approach over a PF-deletion approach. After all, the final result in not pronouncing the numeral *one* is the same under the two approaches, the crucial difference being that an SE is inherently silent and PF-deletion silences a perfectly pronounceable element. First of all, numerals in general, unlike other elements, cannot be deleted due to ellipsis. In (62a) the second instance of the noun *watermelon* can be elided. However, in (62b) the only interpretation of the missing numeral, indicated by the question mark, is *one*, not *five*.

- (62) a. *ta mai-le wu ge xigua wo ye mai-le wu ge xigua.*
 she buy-ASP 5 CL watermelon I also buy-ASP 5 CL watermelon
 ‘She bought 5 watermelons; I bought 5 watermelons, too.’
 b. *ta mai-le wu ge xigua wo ye mai-le ? ge xigua.*
 she buy-ASP 5 CL watermelon I also buy-ASP ? CL watermelon
 ‘She bought 5 watermelons, and I bought one watermelon, too.’

In addition, the phonological weakening or deletion of a syllabic should be in principle not sensitive to the syntactic context. Thus, if the silence of the numeral *yi* in [Num CL/MW N] were indeed due to PF-deletion, then it should be observed elsewhere in other syntactic contexts as well. It is not, as shown in (63).

- (63) a. *ta mai-le *(yi) bai ge xigua.⁵*
 she buy-ASP one hundred CL watermelon
 ‘She bought one hundred watermelons.’
 b. *ta kan-le wo *(yi) yan.*
 she look-ASP I one eye
 ‘She took a glance at me.’

⁵ Note that the grammaticality improves greatly if *bai* ‘hundred’ is changed to *baiwan* ‘million’, indicating again that the silence of *yi* is not due to a robust phonological reduction.

- c. *ta *(yi) xin jingbai shangdi.*
 she one heart worship God
 ‘She worships God wholeheartedly.’

From the examples in (63), we can deduce that YI as an SE is precisely licensed by a pronounceable CL/MW and thus appears in [Num CL/MW (N)] only. The SE account, which is more constrained and does not over-generate, should therefore be preferred over a PF-deletion account. In addition, there may be cross-linguistic evidence for the silent numeral ONE. As mentioned earlier, Cantonese and Vietnamese likewise allow the numeral *one* to be silent in the [Num CL/MW N] context. In Bangla, according to Dayal (2012), the canonical word order is also [Num CL/MW N], as in (64); however, if there is no numeral, the only acceptable order is the reversed [N CL/MW], as in (65), which also must receive a singular reading.

(64) *ek ta boi*
 one CL book
 ‘a book’

(65) *boi ta*
 book CL
 ‘the book’

(66) **ta boi*
 CL book

(67) **boi ek ta*
 book one CL

Thus, it seems that CL/MWs in this language are also clitics, but they require Num as their host. In (66), CL/MW has no pronounced Num as its host and is thus ill-formed. Given that a silent ONE occupying Num cannot be the host, N must be raised to Num to serve as the host for CL/MW, as in (65). When Num is pronounced, N has no motivation to raise, (67) is thus ill-formed. A deletion account cannot explain the reverse word order in (65) and the ill-formed (66).

To conclude, the discussions in section 3 strongly support the postulation of a silent lexical numeral YI, or a PFF-less counterpart of the numeral *yi*, in Mandarin Chinese. In section 4, we shall also see additional support for this account from a mathematical perspective.

4. A Silent General Classifier GE

We now turn to the second element in [Num CL/MW N]. Here we will first make a formal and explicit distinction between classifiers (CLs) and measure words (MWs) in 4.1, as only CLs have a silent counterpart, MWs do not. In 4.2, we then demonstrate how the formal properties of CLs motivate a silent general CL.

4.1 Distinctions between CL and MW

First of all, we must quickly point out that, contrary to common misconception, CL, but not MW, in [Num CL/MW N] can be omitted in Mandarin Chinese.⁶ As

⁶ As pointed out by the anonymous reviewers, the omission of classifiers is definitely not free in general and may be subject to dialectal variation as well as stylistic and even prosodic constraints. This explains why the examples given below are either from the variety spoken in Mainland China or fixed expressions with various degrees of an archaic flavor.

observed by Her (2012), though routinely overlooked by formal linguists, this fact has been duly noted by some pedagogical grammarians.

...因為個體量詞不表量，故可省略，“一個杯子”=“一杯子”...
 ...*Yinwei getiliangci bu biao liang, gu ke shengluo*, “*yi ge beizi*”=“*yi beizi*” ...
 (because classifiers do not express quantity, they can be omitted, “1 CL cup”=’1 cup’...) (Ma 2011)

個體量詞：一張床（一床）、一頭牛（一牛）、一個人（一人），省略後語意不變。*Getiliangci: yi zhang chuang (yi chuang), yi tou niu (yi niu), yi ge ren (yi ren), shengluo hou yuyi bu bian*. (Classifiers: 1 CL bed (1 bed), 1 CL ox (1 ox), 1 CL person (1 person), can be omitted without any change in meaning. (Wang 2004: 113)

In fact, in languages with a less developed classifier system, the use of CL is often optional (Jiang 2006:18). Gil (2013) surveys 140 classifier languages; 62 allow the use of CL to be optional, while CL is obligatory in 78 languages. Consistent with the wide-spread misconception, Chinese is included in the languages with obligatory CL.

Even though such omission in Mandarin is often subject to dialectal variation, genres, and styles, it is in fact rather common, e.g., the classifier 個 *ge* is routinely omitted when referring to people in (semi-)formal speech, as in 三百人 *san-bai ren* ‘300 people’. In a study of a 1.67 million-character corpus of science textbooks, Chu (1994) finds 1731 instances of [Num N]. The two examples in (68) are well-formed in all varieties of Mandarin, while the three examples in (69) are from the Mainland Chinese movie 非誠勿擾 *Fei Cheng Wu Rao* and its sequel.

- (68) a. *liang ren san jiao de bisai*
 2 person 3 foot DE race
 ‘a two-person-three-foot race’
 b. *yi ren yi xin yundong*
 1 person 1 letter campaign
 ‘a 1-person-1-letter campaign’

- (69) a. *deng yi zhenghun guanggao*
 publish 1 seeking- marriage ad
 ‘put out a seeking-marriage ad’
 b. *juan liang qiguan*
 donate 2 organ
 ‘donated a couple of organs’
 c. *bankua-guo san gongsi*
 run-fail-ASP 3 company
 ‘ran and bankrupted 3 companies’

Though CL/MW occur in the same position and share the same structure, MWs, unlike CLs, cannot be omitted without changing the meaning of the phrase. Compare the examples in (70) and (71).

- (70) *wu (zhang) bing er (tiao) yu weibao wuqian (ge) ren.*
 5 CL loaf 2 CL fish feed-full 5000 CL person
 ‘5000 people were fed with 5 loaves and 2 fish.’

- (71) *wu* *(*lan*) *bing er* *(*xiang*) *yu* *weibao* *wuqian* *(*zu*) *ren*.
 5 MW-basket loaf 2 MW-box fish feed-full 5000 MW-group person
 ‘5000 groups of people were fed with 5 baskets of loaves and 2 baskets of fish.’

A mathematical interpretation offered by Her (2012) to the relation between Num and CL/MW as *multiplier* and *multiplicand* is able to unify CL/MW under the notion of multiplicand and yet also distinguish the two in terms of their respective value.

- (72) Her’s (2012) Distinction between classifiers (CLs) and measure words (MWs)
 $[\text{Num } K \text{ N}] = [[\text{Num} \times x] \text{ N}]$, where $K = \text{CL}$ iff $x = 1$, otherwise $K = \text{MW}$.

Given this simple formula, all CLs, e.g., those in (73), share the same exact mathematical value 1 , even though each describes a different semantic aspect of the noun. MW’s value, on the other hand, can be anything except 1 , thus $\neg 1$. The value of MWs thus potentially has an unlimited range of varieties, e.g., *shuang* ‘pair’ in (74a) denotes the numerical value of 2 and *da* ‘dozen’ in (74b) denotes 12, while *xiang* in (74c) denotes the container *box*, a non-numerical value.

- (73) a. *san* *ben shu* $[(3 \times 1) \text{ book}]$
 3 CL book
 ‘3 books’
 b. *wu* *ge laoshi* $[(5 \times 1) \text{ teacher}]$
 5 CL teacher
 ‘5 teachers’
 c. *ba* *ke pingguo* $[(8 \times 1) \text{ apple}]$
 8 CL apple
 ‘8 apples’
- (74) a. *liu* *shuang xie* $[6 \times \text{pair} (=2)] \text{ shoe}$
 6 MW-pair shoe
 ‘6 pairs of shoes’
 b. *liang* *da* *hua* $[2 \times \text{dozen} (=12)] \text{ flower}$
 2 MW-dozen flower
 ‘2 dozens of flowers’
 c. *san* *xiang shu* $[3 \times \text{box}] \text{ book}$ ⁷
 3 MW-box book
 ‘3 boxes books’

This mathematical distinction of 1 versus $\neg 1$ between CL/MW suggests that CL as a multiplicand is redundant, as the multiplicand is vacuous when it has precisely the value of 1 , but it is substantive otherwise. Thus, MW as a multiplicand is an essential part of the final product. This mathematical interpretation of CL/MW thus explains why CL can be optional in $[\text{Num CL N}]$, where CL as 1 is redundant in $[[[n \times 1] \text{ N}]]$. Furthermore, the mathematical analysis also supports the postulation of YI ‘one’ in section 3. Namely, Num can be redundant when it is 1 in $[\text{Num CL/MW N}]$, where Num as 1 is redundant in $[[[1 \times \text{CL/MW}] \text{ N}]]$.

⁷ Here *box* can of course be redundantly seen as 1 box , which, crucially, is not the same as 1 .

4.2 A silent general classifier GE

What then is the underlying structure of [Num N]? There are two possibilities: either there is no CL at all or there is a silent CL. A simple test of conjunction favors a silent CL in [Num N], as in (75).

- (75) a. *wu bing er yu han san ping shui*
 5 loaf 2 fish and 3 MW-bottle water
 ‘5 loaves, two fish, and 3 bottles of water.’
 b. *sanbai ren han yibai pi ma*
 300 person and 100 CL horse
 ‘300 persons and 100 horses’

The silent CL approach for [Num N] has the advantage of maintaining the general word order and structure of [Num CL/MW N]. Yet, there are in turn two possibilities for a silent CL: either a pronounceable CL is elided or there is a silent lexical counterpart of the general classifier *ge*. The disadvantage for the ellipsis account is the total lack of an antecedent in the examples in (75). On the other hand, in contexts where an antecedent CL is available, the second CL in fact cannot be elided, as in (76). This indicates that CLs in general do not undergo ellipsis.⁸

- (76) a. *ta you san ben shu wo you wu *(ben).*
 he has 3 CL book I have 5 CL
 ‘He has 3 books, and I have five.’
 b. *wu ke pingguo zhong you san *(ke) shi wo-de.*
 5 CL apple among has one CL be mine
 ‘Among the 5 apples, three are mine.’

We thus opt for a silent lexical GE, or a PFF-less general classifier *ge*, which can be justified on semantic and syntactic grounds. Consider (77).

- (77) a. *wu ge bing*
 5 CL loaf
 ‘5 cloafs’
 b. *wu GE bing*
 5 CL loaf
 c. *wu bing*
 5 loaf

In (77a), CL *ge* is a canonical lexical item. In (77b), GE is an SE. (77b) thus serves as the source form for (77c), the surface form. With the pronounced counterpart of an SE underlined, (77a) is the pronounced counterpart of (77b). As discussed in section 2, these three forms must share the same syntactic distribution and the same semantic interpretation. We can conclude that GE, like the overt *ge*, is semantically redundant, as its denotation is already part of the noun, i.e., that the entity denoted is discrete and thus the noun must be countable.

⁸ An anonymous reviewer suggests that the ungrammaticality of deleting a classifier in (76) may be due to the ellipsis licensing requirement that a function head be present as the licenser (cf. Lobeck 1990, Saito and Murasugi 1990). However, note that this requirement in fact predicts, incorrectly, that the presence of the functional head Num can license the ellipsis of the classifier in (76).

5. Silent Nouns TIME and MONEY

We now examine the third element in [Num CL/MW N] and propose that N can also be filled by an SE. Specifically, we propose that there are at least two silent nouns in Mandarin, TIME and MONEY, which appear exclusively in [Num CL/MW N] and are respectively licensed by two different sets of MWs. The two silent nouns will be proposed in 5.1 and 5.2 respectively.

5.1 Proposal of a silent noun TIME

Greenberg (1990[1975]) has observed that numeral classifier languages generally express time periods with a numeral and the time period only. This is precisely the case in Mandarin and other Chinese languages.

(78) *san nian*
3 year
'3 years'

Greenberg (1990[1975]:228) states rather loosely that classifier languages in general 'lack a classifier in nouns indicating periods of time'; however, his more specific suggestion is that the correct analysis is not the omission of a classifier. Rather, such terms 'are themselves measures of verbal action so that we have to do with a subtype of the overall classifier or measure phrases'.

There thus seem to be two possible accounts for time expressions like (78). One view sees *nian* 'year' as a noun, the structure is thus [Num GE N], where the silent CL is involved. We shall call this the nominal account. The other sees *nian* 'year' as an MW, the structure is thus [Num MW N], where the N is a silent element. Such terms cannot be CLs, given the simple fact that their value is time, e.g., *year*, and thus not even numerical, let alone the numerical value of *one*. We shall call this the measure account. In what follows, we examine a similar construction in English first, before arguing for the measure account.

Kayne (2005a, chp.10) states that the contrast between (79) and (80) indicates that there is a silent noun YEARS in (81). In fact (80) sounds more natural if *years* is unpronounced, as in (81). The ill-formedness of (82) is therefore expected, because 'newborn' in (82) is incompatible with 'three YEARS.'

- (79) At the age of seven months, John...
(80) (?)At the age of seven years, John...
(81) At the age of seven YEARS, John...
(82) *At the age of seven YEARS, their newborn daughter already weighed 12 pounds.

Yet, Zeschel and Stefanowitsch (2008a, 2008b) contend that the meaning of Kayne's SE source form 'At the age of seven YEARS...' deviates from the meaning of the surface form *At the age of seven...*, as the latter is restricted to a human subject, while the former has not such restriction. Her and Tsai (2014) offer the contrast between (83a) and (83b) to illustrate this point.

- (83) a. At the age of seven years, the boy/tortoise/tree really started to grow.
b. At the age of seven YEARS, the boy/*tortoise/*tree really started to grow.

The SE proposed, YEARS, is thus what Her and Tsai (2014) call an *extrinsic* SE, meaning that it adds or alters the meaning or truth value of the expression it appears in. As we have demonstrated earlier, a valid SE must be an *intrinsic* SE on the one hand, meaning that it does not affect the meaning of the expression it appears in, and also it must be syntactically justifiable on the other hand. Both the silent numeral YI and the silent classifier GE are intrinsic SEs which are also syntactically justifiable.

A simple test helps to determine whether the time unit *nian* ‘year’ is MW or N. If it is N, it can only be a count noun. As such, it should potentially allow an overt CL and complete the [Num CL N] construction. On the other hand, if it is MW, then it should potentially allow an N and also complete the [Num CL N] construction. The facts in (84) and (85) indicate it is MW, not N.

(84) **san ge nian*
3 CL year

(85) *san nian shijian*
3 MW-year time
‘3 years of time’

The time unit *nian* ‘year’ thus lacks properties of Ns and shares properties with CLs. Another test involves the approximate modifier *zuoyou* ‘approximately’, which can occur after Num-CL/MW, i.e., [Num CL/MW *zuoyou-de* N], where the particle *de* is obligatory (Paris and Vinet 2010), as in (86) and (87). Similarly, the numeral *ban* ‘half’ can occur between CL/MW and N, as in (88) and (89).

(86) a. *san ke zuoyou*
3 CL approximately
‘approximately 3’
b. *san ke zuoyou *(de) pingguo*
3 C approximately DE apple
‘approximately 3 apples’

(87) a. *san nian zuoyou*
3 MW-year approximately
‘approximately 3 years’
b. *san nian zuoyou *(de) shijian*
3 MW-year approximately DE time
‘approximately 3 years of time’

(88) a. *san ke ban*
3 CL half
‘3 and half’
b. *san ke ban pingguo*
3 CL half apple
‘3 and half apples’

(89) a. *san nian ban*
3 MW-year half
‘3 and half years’

- b. *san nian ban shijian*
 3 MW-year half time
 ‘3 and half years of time’

In addition, Lü (1980[1999]) observes that the modifier *duo* ‘more’ can immediately follow either the numeral or the classifier. If *duo* comes immediately after Num, then Num should be a round number, e.g., *shi* ‘ten’, *bai* ‘hundred’, and *qian* ‘thousand’, as in (90a). If *duo* follows CL, then it is preferable, though not required, that Num be a numeral whose value is below ten, as in (90b). Again, *nian* ‘year’ in (91) behaves exactly the same as CL/MW in (90).

- (90) a. *shi duo ke pingguo*
 10 more CL apple
 ‘over 10 apples’

- b. *san ge duo xiaoshi*
 3 CL more hour
 ‘over 3 hours’

- (91) a. *sanshi duo nian shijian*
 30 more MW-year time
 ‘over 30 years of time’

- b. *san nian duo shijian*
 3 MW-year more time
 ‘over 3 years of time’

Having established the MW status of *nian* ‘year’, we can then apply the same set of tests described above to all other time units to determine their lexical categories. The results are shown in (92).

(92) Lexical Categories of Time Units

- a. **MW only, licenses TIME:** *miao(zhong)* ‘second’, *fen(zhong)* ‘minute’, *ke(zhong)* ‘quarter’, *tian* ‘day’, *ji* ‘season’, *nian* ‘year’
 b. **N only, requires CL:** *zhongtou* ‘hour’, *libai* ‘week’, *yue* ‘month’, *jijie* ‘season’, *shiji* ‘century’, *niantou* ‘year’
 c. **Both N & MW:** *xiaoshi* ‘hour’, *xingqi* ‘week’

It has been recognized that time units may belong to MWs or Ns (e.g., Lu 1990, Zhang and Wang 2012). More accurately, some function as MWs only, i.e., those in (93), while some function as Ns only, i.e., those in (94). Still, a few of them can function as either MWs or Ns, i.e., those in (95).

- (93) *san (*ge) miao(zhong)/fen(zhong)/ke(zhong)/tian/ji/nian shijian*
 3 CL second(clock)/minute(clock)/quarter(clock)/day/season/year time
 ‘3 seconds/minutes/quarters/days/seasons/years of time’

- (94) *san *(ge) zhongtou/libai/yue/jijie/shiji/niantou*
 3 CL hour/week/month/season/century/year
 ‘3 years/weeks/months/seasons/centuries/years’

- (95) a. *san xiaoshi/xingqi shijian*
 3 MW-hour/week time
 ‘3 hours/weeks of time’
 b. *san ge xiaoshi/xingqi*
 3 CL hour/week
 ‘3 hours/weeks’

The contrast between 年 *nian* and 年頭 *niantou* is most revealing. The former is MW only, while the latter is N only, despite of their similar meaning. Also, 星期 *xingqi* ‘week’ can appear as either MW or N, but the synonymous 禮拜 *libai* only functions as N. The distribution thus does seem somewhat arbitrary.

Having established the fact that some time units do function as MWs, we will now argue that these time measures can also license a silent noun TIME to complete the [Num MW N] construction. Specifically, the surface form in (96a) has (96b) as its underlying source form, and (96c) is the counterpart with the SE pronounced.

- (96) a. *Zhangsan zai niuyue zhu-le san nian.*
 Zhangsan at New York live-ASP 3 MW-year
 ‘Zhangsan has lived in New York for 3 years.’
 b. *Zhangsan zai niuyue zhu-le san nian TIME.*
 Zhangsan at New York live-ASP 3 MW-year TIME
 ‘Zhangsan has lived in New York for 3 years.’
 c. *Zhangsan zai niuyue zhu-le san nian shijian.*
 Zhangsan at New York live-ASP 3 MW-year time
 ‘Zhangsan has lived in New York for 3 years.’

As shown in section 2, these three forms should be equivalent on semantic grounds. They indeed have the same truth condition; all three propositions denoted by the respective sentence must be either all true or all false in all possible worlds. TIME, like the overt *shijian*, is thus semantically redundant, as its denotation is already part of the denotation of the time measure, *nian* ‘year’. Or, in the more technical terms of Kayne (2005a), TIME finds an antecedent in the feature [+time] which characterizes the time measure. In other words, the bare noun TIME is licensed by the overt time measure. TIME thus does not contribute any additional meaning to the source form that contains it. Syntactically, this silent N is also justifiable.

- (97) a. [*san ge yue you san tian*] *guoqu le.*
 3 CL month and 3 MW-day pass SFP
 ‘3 months and 3 days have passed’
 b. [*san ge zhongtou you san fenzhong*] *guoqu le.*
 3 CL hour and 3 MW-minute pass SFP
 ‘3 hours and 3 minutes have passed’
- (98) a. *san ge yue / san tian guoqu le.*
 3 CL month 3 MW-day pass SFP
 ‘3 months/3 days have passed’
 b. *san ge zhongtou/san fenzhong guoqu le.*
 3 CL hour 3 MW-minute pass SFP
 ‘3 hours/3 minutes have passed’

On the surface the two conjoined elements in both examples of (97) are of the form ‘[Num MW] and [Num MW N]’. It thus makes a simpler generalization on conjunction if the two conjuncts are required to be parallel in structure, thus [Num MW N]. Such a view also nicely explains why wherever a time expression of the form [Num MW N] can appear, a [Num MW] variant can also appear, as in (98).

Finally, we note that in [Num MW TIME/*shijian*], it appears that the head noun can be replaced by some other nouns which do not denote the meaning of time, as in (99). However, these are merely apparent counterexamples to the silent TIME, as in such examples not only TIME is present but also a silent possessive marker DE is also present, as in (100), and (101).⁹

(99) *ta hua-le san nian kugong/xinsi/xinshui*
 he spend-ASP 3 MW-year hard work/thoughts/salary
cai wancheng ze jian gongzuo.
 then finish this CL work
 ‘He spent three years of hard work/thoughts/salary to finish this work.’

(100) *ta hua-le san nian TIME/shijian DE/de kugong/xinsi/xinshui*
 he spend-ASP 3 MW-year TIME/time DE/de hard/thought/salary
cai wancheng ze jian gongzuo.
 then finish this C work
 ‘He spent three years of hard work/thoughts/salary to finish this work.’

(101) *zhe san dong dalou (de) sheji fei shi sanbaiwan yuan.*
 this 3 CL building (DE) design expense BE 3-million MW-dollar
 ‘The expense for designing the three buildings is three million dollars.’

5.2 Proposal of a silent noun MONEY

Following the same line of reasoning, we propose that in (102a) there is a silent noun MONEY, as in (102b), licensed by the monetary MW, *kuai* ‘dollar’. Like TIME, this monetary SE also has a pronounced counterpart, *qian*, as in (102c).

(102)a. *sanbai kuai*
 300 MW-dollar
 ‘300 dollars’
 b. *sanbai kuai MONEY*
 300 MW-dollar MONEY
 ‘300 dollars’
 c. *sanbai kuai qian*
 300 MW-dollar money
 ‘300 dollars’

Again, these three forms must be semantically equivalent. Given their identical interpretation, we can conclude that MONEY, like the overt *qian*, is semantically redundant, as its denotation is already part of the denotation of the measure word *kuai*. MONEY is thus an intrinsic SE, which then needs to be justified syntactically. We

⁹ Alternatively, one may argue that *de* here is phonologically reduced. We shall not pursue this issue in this paper.

thus first employ the same set of tests for TIME as an MW to verify *kuai* ‘dollar’ as MW in [Num MW], as shown in (103)-(105).

(103)**sanbai ge kuai*
300 CL dollar

(104) *sanbai kuai zuoyou*
300 MW-dollar approximately
‘approximately 300 dollars’

(105) *sanbai kuai zuoyou *(de) qian*
300 MW-year approximately DE money
‘approximately 300 dollars of money’

In (103), *kuai* cannot co-occur with a general classifier *ge*, indicating that *kuai* is not a noun. In (104), *kuai* can be followed by the approximate modifier *zuoyou* ‘approximately’, which in general appears after [Num CL]. The obligatory *de* in (105) between *zuoyou* ‘approximately’ and the noun again indicates that *kuai* is indeed MW. In (106) is listed the monetary MWs in Mandarin Chinese.

(106) Monetary MWs in Mandarin Chinese

- a. MW only, licenses MONEY: *fen* ‘cent’, *mao* ‘dime’, *jiao* ‘dime’,
yuan ‘dollar’, *kuai* ‘dollar’.
- b. N only, requires CL: *yi* ‘hundred billion’, *zhao* ‘trillion’¹⁰

Thus, our specific proposal is that a monetary measure word, e.g., *kuai*, can license a silent noun MONEY, which, like TIME, is an intrinsic SE in that it does not add and change the meaning of the phrase containing it. This account thus necessarily implies that the class of nouns, pronounced or silent, which monetary MWs subcategorize for must have the feature [+money], as in (107a). Likewise, time MWs subcategorize for a class of nouns that share the feature [+time], as in (107b).

- (107) a. *Zhangsan hua-le san kuai MONEY/qian/meijin/taibi*
Zhangsan spend-ASP 3 MW-dollar MONEY/money/US\$/NT\$
‘Zhangsan spent 3 dollars of MONEY/money/US\$/NT\$.’
- b. *Zhangsan hua-le san tian TIME/shijian/shiguang/guangyin*
Zhangsan spend-ASP 3 MW-day TIME/time/time/time/time
‘Zhangsan spent 3 days of time.’

6. Conclusion

The feature-based lexical taxonomy proposed by Her and Tsai (to appear) predicts the existence of silent elements (SEs), i.e., lexical items with LF, FF but no PFF. As further demonstrated by Her and Tsai (2014), however, there are two kinds of SEs found in recent syntax literature, i.e., intrinsic SEs and extrinsic SEs, the difference being that the latter does, but the former does not, add or change the meaning of the

¹⁰ Both *yi* ‘hundred billion’ and *zhao* ‘trillion’ are of course numeral bases, like *shi* ‘ten’, *bai* ‘hundred’, and *qian* ‘thousand’. Interestingly, only the first two numeral bases, i.e., the two with the highest numerical value, can serve as N in the Mandarin variant spoken in Mainland China. We thank the anonymous reviewer who reminded us of this fact.

phrase that contains the SE. Crucially, language allows only intrinsic SEs. Thus, a valid SE proposed must be both semantically intrinsic and also syntactically justified.

In this paper, we propose that in a Mandarin construction that involves a numeral (Num), a classifier (CL) or measure word (MW), and a noun (N), i.e., [Num CL/MW N], all three elements allow SEs. Specifically, a silent numeral YI, whose pronounced counterpart is *yi* ‘one’, is licensed by an overt CL/MW. GE is a silent CL licensed by an overt Num, whose overt counterpart is the general CL, *ge*. MWs do not have SE counterparts. We have also provided a mathematical motivation for the silent numeral of one and the silent CL; namely, a multiplicative function exists between Num and CL/MW. When Num as a multiplier is of the value one, it is redundant when CL/MW, the multiplicand, is overt and is thus allowed to be silent without affecting the meaning of the phrase containing it. Likewise, unlike MWs, the mathematical value of CLs is precisely one. Thus, a CL acting as a multiplicand is also redundant when Num, the multiplier, is overt. Finally, a silent N TIME is licensed by an overt time MW, while a silent N MONEY is licensed by a monetary MW. In both cases, N is allowed to be silent because its meaning is already part of the MW in [Num MW N].

All the SEs proposed in this paper are thus demonstrated to be semantically intrinsic as well as syntactically justified. Given the fact that the constructions involving these SEs are common among Sinitic languages and also other classifier languages, the solutions proposed here for Mandarin may likely be extended to other classifier languages.

References

- Baltin, Mark. 2012. Deletion versus pro-forms: an overly simple dichotomy? *Natural Language and Linguistic Theory* 30: 381-423.
- Chen, Ching-Perng. 2012. *On the Bare Classifier Phrase in Mandarin Chinese*. MA thesis, Graduate Institute of Linguistics, National Chengchi University.
- Chen, Ping. 2003. Indefinite determiner introducing definite referent: a special use of *yi* ‘one’ + classifier in Chinese. *Lingua* 113:1169-1184.
- Chen, Ping. 2004. Identifiability and definiteness in Chinese. *Linguistics* 42: 1129-1184.
- Cheng, Lisa L.S. and Rint Sybesma. 1999. Bare and not-so-bare nouns and the structure of NP. *Linguistic Inquiry* 30: 509-542.
- Chomsky, Noam, and Howard Lasnik. 1977. Filters and control. *Linguistic Inquiry* 8: 425-504.
- Chomsky, Noam, and Howard Lasnik. 1993. Principles and parameters theory. In J. Jacobs, A. von Stechow, W. Sternefeld, and T. Vennemann (eds.), *Syntax: An Introductory Handbook of Contemporary Research*, Berlin: Walter de Gruyter.
- Chomsky, Noam. 1982. *Some Concepts and Consequences of the Theory of Government and Binding*. Cambridge, MA: MIT Press.
- Chomsky, Noam. 1999. Derivation by phase. Ken Hale: a Life in Language. Cambridge, MA.: MIT Press.
- Chu, F. 1994. Keji hanyu zhong de shuming jieyou [The Num-N construction in Chinese for technology]. *Hanyu Xuexi [Learning Chinese]* 1994 (3): 40-41.
- Cinque, Guglielmo. 2005. Deriving Greenberg’s universal 20 and its exceptions. *Linguistic Inquiry* 36(3): 315-332.
- Dayal, Veneeta. 2012. Bangla classifiers: mediating between kinds and objects. *Italian Journal of Linguistics* 24(2): 195-226.

- Duffield, Nigel. 2001. On certain head-final effects in Vietnamese. In Karine Megerdoomian and Leora Anne Bar-el (eds.), *Proceedings of the 20th West Coast Conference on Formal Linguistics*, 102-114. Somerville, Mass: Cascadilla Press.
- Gil, D., 2013. Numeral classifiers. In Haspelmath, M., Dryer, M.S., Gil, D., Comrie, B. (eds.), *The World Atlas of Language Structures Online*. Max Planck Digital Library, Munich, chp. 55 Available from: <http://wals.info/feature/55> (accessed 2013, June, 25).
- Greenberg, J. H. 1990[1975]. Dynamic aspects of word order in numeral classifier. In K. Denning and Kemmer (eds.), *On Language. Selected writings of Joseph H. Greenberg*, 227-240. Stanford, CA: Stanford University Press. [First published 1974 in *Word Order and Word Order Change*, ed. C. Li, 27-46. Austin, University of Texas Press.]
- Her, One-Soon. 2012. Distinguishing classifiers and measure words: a mathematical perspective and implications. *Lingua* 122.14: 1668-1691.
- Her, One-Soon and Hui-Chin Tsai. 2014. *COLOR* isn't silent, *SHALLOW* isn't DEEP: two case studies of evaluating silent elements. *Language and Linguistics* 15(6): 775-800.
- Her, One-Soon and Hui-Chin Tsai. To appear. On silent elements: a case study of *grand* and its silent entourage. To appear in *Natural Language and Linguistic Theory*. DOI 10.1007/s11049-014-9266-4.
- Hsieh, Miao-Ling. 2008. *The Internal Structure of Noun Phrases in Chinese*. Taipei: Crane.
- Huang, C.-T.J. 1987. Existential sentences in Chinese and (in)definiteness. In Reuland, E.J., ter Meulen, A.G.B. (eds.), *The Representation of (In)definiteness*, MIT Press, Cambridge, MA, 226-253.
- Huang, Chu-Ren, Gao Zhao-Ming, Kathleen Ahrens, and Wei Wen-Jen 1998. Argument structure and empty expletive: a study of three event-evaluative predicates in Chinese. In Benjamin T'sou (ed.), *Studia Linguistica Serica*, 401-413. City University of Hong Kong.
- Jiang, Y. 2006. Hanzang Yuxi Mingliangci Yanjiu 'A study of nominal classifiers in Sino-Tibetan'. PhD Dissertation. The Central University of Nationalities.
- Kayne, Richard S. 2003. Silent years, silent hours. In Lars-Olof Delsing, Cecilia Falk, Gunlög osefsson, and Halldór Á. Sigurðsson (eds.), *Grammar in Focus: Festschrift for Christer Platzack, Vol. 2*, 209-226. Lund: Wallin and Dalhol. Reprinted in Richard S. Kayne. 2005a. *Movement and Silence*, chp. 10, 241-260. Oxford and New York: Oxford University Press.
- Kayne, Richard S. 2005a. *Movement and Silence*. Oxford and New York: Oxford University Press.
- Kayne, Richard S. 2005b. Some notes on comparative Syntax, with special reference to English and French. In G. Cinque and R. Kayne (eds.), *Handbook of Comparative Syntax*, Oxford University Press, New York, 3-69. Reprinted in Kayne 2005a, chp.12, 277-334.
- Kayne, Richard S. 2006. On parameters and on principles of pronunciation. In Hans Broekhuis, Norbert Corver, Riny Huybregts, Ursula Kleinhenz, and Jan Koster (eds.), *Organizing Grammar: Linguistic Studies in Honor of Henk van Riemsdijk*, 289-299. Berlin and New York: Mouton de Gruyter. Reprinted in Richard S. Kayne. 2010. *Comparisons and Contrasts*, chp. 4, 73-81. Oxford and New York: Oxford University Press.
- Kayne, Richard S. 2007. Several, few and many. *Lingua* 117(5): 832-858.

- Kayne, Richard S. 2008. Some preliminary comparative remarks on French and Italian Definite Articles. In R. Freidin, C.P. Otero and M.L. Zubizarreta (ed.), *Foundational Issues in Linguistic Theory. Essays in Honor of Jean-Roger Vergnaud*, 291-321. Cambridge, Mass.: MIT Press, Reprinted in Richard S. Kayne. 2010. *Comparisons and Contrasts*, chp. 1. Oxford and New York: Oxford University Press.
- Kayne, Richard S. 2010. *Comparisons and contrasts*. Oxford and New York: Oxford University Press.
- Kayne, Richard S. 2012. A note on *grand* and its silent entourage. *Studies in Chinese Linguistics* 33(2): 71-85.
- Leu, Thomas. 2008. *The Internal Syntax of Determiners*. PhD dissertation, New York University.
- Li Xu-Ping and Bisang Walter. 2012. Classifiers in Sinitic languages: from individuation to definiteness-marking. *Lingua* 122(4): 335-355.
- Li Xu-Ping and Susan Rothstein. 2012. Measure readings of Mandarin classifier phrases and the particle *de*. *Language and Linguistics* 13(4): 693-741.
- Li, Charles and Sandra Thompson. 1981. *Mandarin Chinese: A functional reference grammar*. Berkeley: University of California Press.
- Li, Y.-H Audrey. 2007. Beyond empty categories. *Bulletin of the Chinese Linguistic Society of Japan (Chuugoku Gogaku)* 254: 74-106.
- Lin, Yen-Hwei. 2007. *The Sounds of Chinese*. Cambridge: Cambridge University Press.
- Lobeck, Anne. 1990. Functional heads as proper governors. *Proceedings of the North East Linguistic Society* 20: 348-362.
- Lu, Jian-Ming. 1990. Tan nian yue ri [Discussion of years, months, and days]. *Lu, Jian-Ming Zixuanji* [Collected Works of Lu Jiang-Ming].111-114. Zhengzhou: Daxiang chubanshe.
- Lü, Shu-Xiang. 1980[1999]. *Xiandai Hanyu Babai Ci* [800 Words in Modern Chinese]. Beijing: Shangwu Yinshuguan.
- Lü, Shu-Xiang. 1990[1944] Ge zi de yingyong fanwei, fu lun danweici qian yi zi de tuolu [Scope of the uses of ge and omission of yi in front of classifiers]. *Lu Shuxiang Wenji* [Collected Works of Lu Shuxiang]. vol.2, 144-175. Beijing: Shangwu Yinshuguan.
- Ma, A. 2011. Hanyu jiaoxue zhong ying zhuyi mingliangci de fenlei wenti. [Nominal classifiers should be properly classified for pedagogical purposes]. *Xiandai Yuwen* [Modern Chinese] 2011.3.
- Merchant, Jason. 2001. *The Syntax of Silence: Sluicing, Islands and the Theory of Ellipsis*. Oxford: Oxford University Press.
- Paris Marie-Claude and Vinet, Marie-Thérèse. 2010. Approximative *zuōyòu* ‘around, about’ in Chinese. *Language and Linguistics* 11(4): 767-801.
- Saito, Mamoru, Lin, T.-H. Jonah, and Keiko Murasugi. 2008. N'-ellipsis and the structure of noun phrases in Chinese and Japanese. *Journal of East Asian Linguistics* 17: 247-271.
- Saito, Mamoru and Keiko Murasugi. 1990. N'-deletion in Japanese: a preliminary study. *Japanese/Korean Linguistics* 1: 258-301.
- Sigurðsson, Halldor Armann. 2004. Meaningful silence, meaningless sounds. *Linguistic Variation Yearbook* 4: 235-259.
- Simpson, Andrew. 2012. The silence of the bucks: a note on Kayne's "Grand and its silent entourage". *Studies in Chinese Linguistics* 33(2): 87-101.

- Sybesma, Rint. 1992. *Causatives and Accomplishments: The Case of Chinese ba*. PhD thesis, HIL/Leiden University.
- Tang, Chih-Chen Jane. 1990. *Chinese Phrase Structure and Extended X'-theory*. PhD thesis, Cornell University.
- Tsai, Wei-Tian and Feng, Shengli. 2006. Shuo “men” de weizhi: cong jufa-yunlu de jiemian tanqi [On syntactic positions of *men*: An interface between prosody and syntax]. *Yueyanxue Luncong [Linguistics Forum]* 32: 46-63.
- Van Riemsdijk, Henk. 2002. The unbearable lightness of GOing. The projection parameter as a pure parameter governing the distribution of elliptic motion verbs in Germanic. *Journal of Comparative Germanic Linguistics* 5: 143-196.
- Van Riemsdijk, Henk C. 2005. Silent nouns and the spurious indefinite article in Dutch. In Mila Vulchanova and Afarli Tor A. (eds.), *Grammar and Beyond: Essays in Honour of Lars Hellan*, 163-178. Oslo: Novus Press.
- Wang, H. 2004. Liangci de fenlei yu duiwai hanyu liangci jiaoxue [Classification of classifiers and teaching classifiers in Chinese as a second language]. *Jinan Xuebao [Journal of Jinan University: Humanities and Social Sciences Edition]*. 2004 (2): 113-116.
- Yang, Rong. 2001. *Common Nouns, Classifiers, and Quantification in Chinese*. PhD thesis, Rutgers University.
- Zeschel, A. and A. Stefanowitsch. 2008a. Elliptical measure noun constructions: a cognitive approach. Paper presented at DGKL/GCLA 3, 3rd International Conference of the German Cognitive Linguistic Association, Leipzig.
- Zeschel, A. and A. Stefanowitsch. 2008b. Reanalyzing generative argumentation: the case of ‘silent nouns’. Paper presented at Language, Communication and Cognition, Brighton.
- Zhang, Guo-Qing and Wang Rui-Min. 2012. Shijian liangci yu mingci de jianlei wenti [The question related to time units functioning as either measure words or nouns]. *Journal of Changzhi University* 29(1): 533-55.
- Zhang, Niina Ning. 2011. The constituency of classifier constructions in Mandarin Chinese. *Taiwan Journal of Linguistics* 9(1): 1-50.