

Counting and measure functions of classifiers in a classifier language

I. Introduction: This paper explores the contrast between counting and measure functions of Chinese classifier phrases (CIPs). The count/measure contrast concerns the interpretation of a classifier such as *bottle* in the CIP of *three bottles of water*, which is ambiguous between a concrete container of bottle or an abstract measure unit, equivalent to *bottleful*. Analyses of this contrast in English, Dutch and Hebrew (Doetjes 1997, Chierchia 1998, Landman 2004, Rothstein 2009, Partee and Borschev 2010) have implicitly or explicitly related the contrast to the nominal properties of the classifier *bottle*, which is treated as ambiguous between a relational noun and a measure modifier. **Questions:** In classifier languages, in which the classifier is a functional head and not a lexical head, the question is whether the count/measure contrast shows up at all, and if it does, how is the relation between the counting and the measure uses of the functional head to be accounted for and how does it relate to the traditional distinction between mensural and sortal classifiers (Lyons 1976, Cheng&Sybesma 1998). **We make the following claims:** (i) count and measure uses of CIs have distinctive grammatical properties and must be associated with distinct syntactic structures; (ii) the syntactic/semantic distinction between counting and measure uses of classifier in e.g. Landman 2004, Rothstein 2009 is independent of the nominal properties of the classifiers in English and Dutch; (iii) the counting/measure distinction of classifiers cuts across the sortal/mensural distinction.

II. Classifiers are functional heads in Mandarin Mandarin is a classifier language, i.e. a classifier is obligatory between Num and N. The traditional use of classifier includes only individual classifiers, which modify nouns denoting discrete entities, such as *ben* 'volume' in (1.a). These are assumed to be functional heads. Classifiers like *ping* 'bottle', called 'non-individual CIs', modify nouns denoting homogenous entities or plural discrete entities (1b). Cheng and Sybesma (1998) argue that non-individual classifiers are Ns, which raise to the functional classifier head position. This group includes container CIs and group CIs.

1. a. *yi/san *(ben) shu* b. *yi/liu ping shui*
one/three CI_{volume} book 'one/three book(s)' one/six CI_{bottle} water 'one/six bottle(s) of water'

In English, container CIs are Ns. In contrast, we argue that all the classifiers in Chinese, including individual and non-individual CIs, belong to a category distinctive from nouns and they are functional and head the functional projection of CIPs (also see Tang 1990).

Evidence 1: Like nouns, English CIs are sensitive to the singular/plural distinction. But in Chinese there is no plural marker on CI or on N. As in (1), the Chinese CIP does not show the alternation between *volume of book* and *volumes of book*, or between *bottles of water* and *bottle of water*, as we saw for the English gloss. This suggests that Chinese CIs are not parallel to Ns. **Evidence 2:** like nouns, English CIs can be modified by pre-classifiers adjectives, but Chinese CIs cannot. It is fine to say *an expensive bottle of water* in English, where the bottle of water is expensive, but the Chinese counterpart is out, e.g. **yi anggui ping shui* 'an expensive bottle water'. This indicates that the English CI *bottle* is a noun, but the Chinese CI *ping* 'bottle' is not a noun. Note: the example of *I drank yi da ping shui* does not mean "I drank a big bottle of water", but I drank a big quantity of water from a (possibly small) bottle", so the adj. *da* 'big' still does not modify the CI.

III. Counting/measure uses of classifiers in Mandarin Based on the data of English and Hebrew, Landman (2004) and Rothstein (2009) argue that the counting and the measure readings of container CIPs have two distinctive syntactic structures. On the counting reading, the nominal phrase has the structure of $[[_{\text{NumP}} \text{Num}[_{\text{CIP}} \text{CI}[_{\text{NP}} \text{N}}]]]$, and on the measure reading, it has the structure of $[_{\text{NP}}[_{\text{NumP}} \text{Num}+\text{CI}][_{\text{N}}]]$, with Num+CI analysed as a single constituent.

Claim (1): the ambiguity of counting and measure uses of classifier is observed in general, regardless of the fact whether the CI is borrowed from N (the English case) or base-generated into CI^0 (the Chinese case). (2) shows that the contrast between counting and measure also shows up in individual CIPs, which are

functional heads on Tang's (1990) theory.

2. a. wo kanjian yi ge pingguo cong louti shang gun le xiaqu. [Counting]
 I see one CI apple from stair on run Perf down 'I saw an apple rolling down the stairs.'
 b. wo zai dangao li fang le yi ge pingguo, ban ge zuotian-de, ban-ge shangwu-de.
 I at cake in put Perf one CI apple half CI yesterday-Mod half-CI morning-Mod
 'I put an apple into the cake, half of yesterday's leftover and half of morning's leftover.' [Meas]

Claim (2): Landman's and Rothstein's syntactic analysis is also applicable to the Chinese case, i.e. Chinese CIPs have two distinctive structures on the counting and measure readings.

Evidence (i): when the modifier *duo* 'more' follows the CI, it forces the CI and Num to be analysed as a single constituent and it is preferable to have a measure reading (3.a), when it follows the Num, the counting and the measure readings are equally available for the CIP (3.b). Note that when the verb *chang* 'taste' is used, it is a counting reading, and when the verb *he* 'drink' is used, it is measure.

3. a. ta jinwan he le san ping duo piju. [Measure]
 He tonight drink Perf three CI_{bottle} more beer 'Tonight, he drank more than three bottles of beer.'
 b. ta chang/he le shi duo ping piju. [Counting/Measure]
 He taste/drink Perf ten more CI_{bottle} beer. 'He tasted/drank more than ten bottles of beer.'

Evidence (ii): when the relative clause precedes the whole Num-CI phrase, it is preferable to have a counting reading, (4.a), but when it precedes the head noun (again separating Num +CI into a separate constituent, a measure reading is preferable in (4.b).

4. a. ta he le [RC mama zuo de] yi wan tang. [Counting]
 He drink Perf mum make Mod one CI_{bowl} soup
 b. ta he le yi wan [RC mama zuo de] tang. [Measure]
 He drink Perf one CI_{bowl} mum make Mod soup
 BOTH: 'He drank one bowl of soup that mum made.'

Evidence (iii): on the counting reading, the classifier can modify the noun alone, as in the form of "CI+N", while on the measure reading, the classifier must always be used with the numeral together.

5. a. ta-de bao li fang le ping jiu. [Counting]
 His bag in put Perf CI_{bottle} wine 'His bag lies in a bottle of wine.'
 b.* ta-de wei neng zhuangxia ping jiu. [Measure]
 His stomach can hold CI_{bottle} wine

Semantics of Chinese CIPs: we argue that on the counting reading, the function head of CI take NP as complement, which denotes a set of atomic entities (6), and that on the measure reading, the individual CI is shifted from a functional head to a modifier, as in (7). (7.b) means 'as much apple as one normal sized apple' in the context, where the individual classifier *ge* is embodied as a measure unit.

6. a. $\|ge\|(\|pingguo\|) = \|ge\|(\cup APPLE_k) = \lambda x. x \in \cup APPLE_k$ [Counting]
 7. a. $\|yi ge\| = \|ge\|(\|yi\|) = \lambda P \lambda x. P(x) \wedge MEAS(x) = \langle 1, unit \rangle$ [Measure]
 b. $\|yi ge pingguo\| = \|yi ge\|(\|pingguo\|) = \lambda x. x \in \cup APPLE_k \wedge MEAS(x) = \langle 1, unit \rangle$

IV. Counting/measure uses of classifiers vs. count/mass classifiers The ambiguity between counting and measure functions of classifiers is available for both individual and non-individual CIs. It cross-cuts the lexical distinction between 'sortal' and 'mensural' CIs (Lyons 1976) or between 'count' CIs and 'mass' CIs Cheng & Sybesma (1998). But indeed, there is a tendency for the sortal CIs to have a default counting reading and the true measure words have a default measure reading, while CIs like container and group CIs are equally open for counting and measure readings. We suggest using $[\pm Counting, \pm Measure]$ as parameters to constrain the way how different types of classifiers can be interpreted in a default way.