Mass-count cognition in a classifier language: Evidence from sentence reading and quantity judgments

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Abstract

The fact that Mandarin Chinese differs from mass-count languages with respect to the mass-count syntax has led many studies to argue that mass-count distinction is not linguistically encoded in Mandarin Chinese. As a result, some studies claim that, in classifier languages such as Mandarin Chinese, mass-count distinction is not linguistically specified at the lexical level. In this research, we explore whether Mandarin Chinese speakers disambiguate reference to individuation. We propose to approach this issue by investigating whether the reference to individuation is linguistically specified in the lexicon in Mandarin Chinese. Following Barner and Snedeker (2005), we employed the quantity judgment task to test whether a term can refer to an individuated entity without the pragmatic context. The results indicated that in Mandarin Chinese, although number specification is not obligatorily expressed, the lexical item itself can entail individuation. In other words, the conceptual apparatus of individuation, rather than the linguistic device, plays a dominant role in disambiguating reference to (non)-individuable entities, contra Barner and Snedeker (2005). In this study, we also compared the individuation in the bare noun context versus that in the generic predicate condition. The higher frequency of selecting the individual in the bare noun context validates that individuability is coded at the lexical level.

Keywords
individuation, quantity, count nouns, mass nouns, linguistic apparatus, conceptual apparatus

1. Introduction

Ontogolically, entities are divided into two basic categories: objects and substance. The distinction between objects and substance is made in our conceptual system. As many researches have pointed out, such a differentiation is reflected in the way we think about kinds of objects and kinds of stuff. For instance, Prasada, Ferenz, and Haskell (2002) proposed that the difference lies in how one thinks about the entity's structure. Object construals require thinking of the structure as being non-arbitrary, whereas substance construals require thinking of the structure as being arbitrary. Their findings indicated that regularity of structure, repetition of structure, and the existence of structure-dependent function provided reasons to think of structure as being non-arbitrary. The three factors biased participants towards object construals. Their research addressed how the ontological categories are represented in our conceptual system. Another question that bears on this ontological differentiation is whether and how it is encoded in language. English is labeled a 'mass-count language' since the substance-object distinction is represented in syntax. Mandarin Chinese, unlike English, is a language where most nouns do not have overt markings regarding plurality. Chinese nouns can be combined with classifiers and thus it is tagged a "classifier language". The fact that Mandarin Chinese differs from mass-count languages with respect to the mass-count syntax has led many studies to argue that mass-count distinction is not linguistically encoded in Mandarin Chinese. As a result, some studies claim that, in classifier languages such as Mandarin Chinese, whether terms individuate may HEAVILY rely on non-linguistic clues (Barner and Snedeker 2005: p. 59). In this research, we explore whether Mandarin Chinese distinguishes count nouns from mass nouns. We propose to approach this issue by unpacking it into three questions. First, we investigate whether the distinction is encoded in the lexicon in Mandarin Chinese. Second, we examine whether this semantic distinction is determined at the phrasal (syntactic) level. Third, we scrutinize whether the presence of the classifier contributed to the mass-count distinction in Mandarin Chinese.

The paper is organized as follows: Section two offers a typological description of language in terms of mass-count distinction. Section three reviews the analysis put forth by Barner and Snedeker (2005). Additionally, we explicates the motivation to conduct quantity judgment task to probe into Mandarin Chinese nouns relating to mass-count distinction. Section four provides the three competing views of mass-count division relating to Mandarin Chinese. Section five presents two quantity judgment tasks and one picture-matching task we employed to explore the semantics of Mandarin Chinese bare nouns. Section six provides the general discussion and conclusion.

2. A language typology in terms of mass-count distinction

2.1. Mass-count language

Mass-count languages refer to the languages where semantic mass-count distinction is reflected in morphosyntax. English and other Indo-European languages are classified as mass-count language. In these languages, syntactic clues entail the reference to individuated entities. Specifically, words used directly with number words (e.g., one dog) or plural morphology (e.g., dogs) all profile countable, discrete things. In all languages that have count syntax, there are also mass nouns (Allan 1980). Words used in mass syntax, unlike count nouns, cannot appear directly with number words or plural morphology. Also, the mass and the count differ with respect to their co-occurrence with quantifiers: namely, tables can co-occur with many but not much and wood can be combined with much but not many. Many studies have claimed that this difference between mass and count relating to their syntactic behaviors corresponds to a semantic distinction, whereby count nouns denote individuals but mass nouns do not (Quine 1960; Bloom 1999; Gordon 1988; Link 1983; Landman 1991; Wisniewski et al. 1996). That is, count nouns refer to things that have "atomic structure", with "minimal parts" that can be counted. Mass nouns refer to homogenous things that do not have "atomic structure". As Wisniewski et al. (1996) emphasized, speakers conceptualize the referents of count nouns as distinct, countable, individuated things and those of mass nouns as nondistinct, uncountable, unindividuated stuff. Therefore, according to Wisniewski et al. (1996), count nouns individuate but mass nouns do not.

2.2. Classifier language

Many previous studies have taken it that classifier languages like Mandarin lack syntactic structures that serve to signal the different semantics of mass and count and thus all nouns in these languages are syntactically mass nouns (Allan 1980; Chierchia 1994, 1998; Krifka, 1995). Three main pieces of evidence have been cited to support this argument. First, Mandarin Chinese nouns cannot co-occur directly with number words, but require the presence of classifiers so as to count. Classifiers encode the physical characteristics of the things the nouns denote. Second, unlike mass-count languages, in Mandarin Chinese, the use of the plural marker "men" is not obligatory and is very restricted. Third, unlike mass-count languages, Mandarin Chinese does not display the distinction between the two categories of nouns regarding the choice of the quantifier such as many and much. Given these characteristics of Mandarin Chinese, some literature has claimed that all Mandarin Chinese nouns are actually

mass nouns since they pattern with mass nouns in mass-count language.

3. An overview of Barner and Snedeker findings

3.1. The analysis of Barner and Snedeker (2005)

Barner and Snedeker (2005) note that linguistic device of individuation is distinct from conceptual apparatus to individuate. Adopting Macnamara 1986, Barner and Snedeker clarify that our conceptual apparatus is performed via the lexical concept that enables us to identify a single dog from two discrete dogs in the real world. They further claimed that the use of conceptual individuation must be licensed by linguistic device. Specifically, "linguistic device" refers to the context of count/mass syntax that offers a grammatical +*individual* feature (p. 59). As a result, the grammatical +*individual* feature should only be licit when used with a lexical root that supplies a principle of conceptual individuation. For instance, the lexical concept DOG supplies a principle of individuation that allows two dogs to be identified as discrete individuals. This conceptual principle is licit in the context of count phrases such as *those dogs*. However, in the context of a mass noun phrase such as *there is dog on the road,* the principle cannot be accessed linguistically such that DOG quantifies non-numerically. Relating to the concepts such as FUN, since it lacks a principle of conceptual individuation, it cannot co-occur with count syntax and thus it cannot be assigned the grammatical +*individual* feature. However, Barner and Snedeker stress that there are some lexical items such as FURNITURE the principle of conceptual individuation of which is available via the lexical specification of the +*individual* feature. Hence, although FURNITURE cannot co-occur with count syntax, the lexical root entails reference to individuation. Relating to why FURNITURE cannot appear with count syntax, Barner and Snedeker explicate that the linguistic individuation feature can only realized once within a single noun phrase construction, therefore, prohibiting the co-occurrence of lexical and phrasal features.

In order to verify their hypothesis, Barner and Snedeker conducted quantity judgment tasks. In their quantity judgment tasks, they showed two photos of two characters and asked *which of the two characters had more X* (e.g. *who had more mail?*) (p. 49). One character had a single large object while the other character had three small objects of the same kind. The three objects had a smaller combined volume and surface area than the large object, allowing responses based on number to be distinguished from those based on volume. In their experiments, three categories of words were tested: object-mass (*furniture*, *clothing*, *silverware*), count nouns (*shoes*, *candles*, *cups*), and substance-mass nouns (*ketchup*, *butter*, *mustard*). The results indicated that adults participants based their quantity judgment on the number of individuals significantly more for count nouns and object-mass nouns, compared to

substance-mass nouns (p. 50). They concluded that the conceptual apparatus associated with the principle of individuation is distinct from the linguistic feature that licenses its direct expression in language. In the case of object-mass terms such as *furniture*, the relevant concept supplies a principle of individuation that is available via lexical rather than syntactic specification of the individuate feature. That is why terms like *furniture* invite the participants to judge by number even though it is considered to be a "mass noun" in English. As to substance-mass terms, their lexical concepts lack the principle of individuation and thus they should be unable to occur with the individuate feature. Therefore, they lead the participants to base their judgment on volume rather than number.

Under Barner and Snedeker's proposal, for most lexical items, the reference to individuate is hinges on two factors: the linguistic +*individual* feature and the principle of individuation. When the lexical concept provides a principle of individuation, the linguistic +*individual* feature can be assigned in the count syntax context. Once the +*individual* feature is assigned, the conceptual principle is licensed and then the lexical item entails reference to individuate. In view of this approach, the immediate question raised is whether the same licensing condition holds of classifier languages such as Mandarin Chinese. According to Barner and Snedeker, the reference of individuation is HEAVILY dependent on pragmatics in classifier languages. Assuming that number specification is not obligatorily expressed in classifier languages, Barner and Snedeker claim that determining whether a term individuate mainly reply on NON-LINGUISTIC clues when the speaker intends to disambiguate reference.

In the following sections, we point out that, in terms of methodology, the study of Barner and Snedeker is not without problems. Additionally, we propose to investigate whether a term cannot individuate in Mandarin Chinese since the linguistic +*individual* feature is not always available due to the optional presence of the classifier.

3.2. Why quantity judgment task in Mandarin Chinese

As we have pinpointed in the preceding section, Barner and Snedeker (2005) is not without problems methodologically. To begin with, in presenting the photos for "count nouns", the question given actually offered a clue with respect to individuation. Specifically, due to the plural marker –*s* suffixed to the test noun, questions such as *who has more shoes?* signified to the participants that the experimental object in the photos was something "individuable". Therefore, due to the indication of the plural morphology, the participants were biased toward number. Such a test failed to support their claim that, the reference to individuation hinges on a licensing condition: namely

the conceptual apparatus must be accessed via the grammatical +*individual* feature provided by the context of count syntax.

Although the quantity judgment task is not adequate to employ how reference to individuation is disambiguated in English, it can be conducted in Mandarin Chinese. The reason why we take it to be more appropriate to perform this task in Mandarin Chinese is that the problems raised with English in performing this quantification judgment task can be avoided in Mandarin Chinese: Mandarin Chinese nouns will not provide any clue since plural morphology is not required. Thus, the participants will not be biased by the plural marker –*s*. By replicating the quantity judgment task in Mandarin Chinese, we can probe into how Mandarin Chinese speakers disambiguate reference to (non)-individuable entities.

4. Three Hypotheses

In this section, we provide the three views of Mandarin Chinese nouns relating to whether the entailment of individuation is profiled in the lexicon. The first holds that it is not coded within Mandarin Chinese lexical items. The second view, contrasting with the first position, proposes that the disambiguation of reference does originate in Mandarin Chinese lexicon. The last but not the least, another view takes it that the lexicon is underspecified regarding the distinction, but the division is encoded at the phrasal (syntactic) level. The three proposals are presented as follows.

4.1. Inherently plural hypothesis

Chierchia (1998) follows the insight of Krifka (1995) that common nouns in Mandarin Chinese are names of kinds. Chierchia provides the theory of plurality, which inherits the basic insights from Link (1983). Link holds the position that the domain of individuals has an internal structure. Chierchia proposes that all Mandarin Chinese nouns are mass nouns and mass nouns refer to sets of atoms or individuals, and are "inherently plural". According to Chierchia, even terms like *hope* and *joy* denote sets of atoms. Chierchia rejects the position that mass nouns are treated as a mereological whole or has an extension "drawn from a domain of substance". The denotations of mass and count terms are considered essentially identical. The only difference is that mass nouns come out of the lexicon with plurality built in. Chierchia emphasizes a common semantics for mass nouns and plural count nouns. Chierchia points out that previous studies have distinguished the two categories by taking into consideration mass terms such as *water* or *rice*, which have vague minimal parts. According to Chierchia, we should focus on mass nouns like *furniture* the minimal parts of which are no more vaguely determined than tables and chairs. Examples like *furniture* can help us individuate the right relationship between mass and plural. Chierchia emphasizes that

the denotation of *furniture* is definitely all the pieces of *furniture*; hence, Chierchia contends that mass nouns possess an inherent plural meaning.

4.2. A lexicalist view

Another view regarding mass-count distinction holds that the two categories distinguish themselves with respect to their reference in the lexicon. In other words, mass-count differentiation is encoded at the lexical level; the division between these two categories is not profiled syntactically but lexically. For instance, Quine (1960) claims that count nouns possess built-in modes of dividing their references, and thus signal reference to individuated entities. Regarding mass nouns, they have the property of cumulative reference. For example, given a mass noun such as *water*, it is true that "if *a* is water and *b* is water, then *a* and *b* taken together are water. Relating to count nouns, it does not follow that "if *a* is a horse and *b* is a horse, then *a* and *b* taken together are a horse". Cheng (1973) offers another criterion concerning the distinction between mass and count. According to Cheng, a property of a mass noun is that any part or portion of something that is denoted by a mass noun is denoted by the same mass noun. This is termed "diversity of reference". Thus, a portion of water divided in two is still water, whereas a dog divided in two is neither two dogs nor one. The diversity of reference pertaining to mass nouns has been taken to be a good reason to believe that no mass nouns refer to isolated, discrete individuals and this property has distinguished mass nouns from count nouns.

4.3. A distributed morphology approach

The third view is the *underspecification* hypothesis (in line with the assumptions of Distributed Morphology—(Marantz 1984; Harley and Noye 1998), suggesting that all nouns are underspecified regarding countabilitiy. The mass-count distinction is derivable when the nominal roots are inserted into syntax. The feature for individuation should thus be determined at the syntactic (phrasal) level rather than at the lexical level (Barner and Snedeker 2005). They propose that the status of a noun as mass or count is not lexically determined. For most lexical items, the entailment of reference to individuals is created by use in a count noun context. In a word, the count context serves as a linguistic feature and in turn determines individuation. By contrast, mass syntax fails to individuate because mass syntax does not contribute the linguistic feature relating to individuation. Only some certain terms used in mass syntax denote individuated entities due to lexical features, for instance, *furniture* or *silverware*.

5. Quantity Judgment and Picture-Matching Tasks in Mandarin Chinese

In our replication, we used the Mandarin Chinese nouns we selected by classifier

and measure word and asked the participants to perform a quantity judgment task.

5.1. Experiment 1: Classifier nouns versus non-classifier nouns

In this study we defined terms as count nouns that can co-occur with classifiers and those as mass nouns that can only be combined with measure words. As Tai and Wang (1994) explicate, a classifier categorizes a class of nouns by picking out some salient conceptual properties, either physically or functionally based, which are permanently associated with entities named by the class of nouns. By contrast, measure words do not encode the physical features of entities and thus do not categorize; they denote the quantity of the entity named by the noun. That is to say, the distinction between the classifier and the measure word has a cognitive basis since classifiers refer to "inherent" and "permanent" properties of entities while measure words refer to "contingent" and "temporal" properties. For instance, classifiers such as *gen* and *zhi* always denote objects that have a long shape and *li* always denotes objects that are roundish. On the other hand, entities that are not solid or do not have rigid shapes are restricted to co-occur with measure words.

Method

Participants

The participants were twenty students from Ming-Zhi College of industry and technology. They were voluntary to take part in this experiment.

Material and Procedure

They were shown pairs of pictures and were asked to choose which picture of each pair had more of the entity referred to by the test noun (e.g. *Na yi ge tu de huocai bijiao dou*? 'Which picture has more matchsticks?'). As in the task performed by Barner and Snedeker (2005), one picture had a single large item while the other picture had three small items of the same kind. The items presented in the larger number had a smaller combined volume and surface area than the large, single item, allowing responses based on number to be distinguished from those based on volume. There are totally thirty-nine test nouns. Twenty of them defined as count nouns are those that can co-occur with three types of classifiers: (i) *gen*, which encodes an entity with a long, rigid shape, (ii) *kuai*, which denotes a piece of thing, and (iii) *ke,* which profiles roundish entities. The nouns that co-occur with *gen* included *tangchi* 'spoon', *huocai* 'matchstick' and *tieding* 'nail'. Those which can be preceded by *kuai* included *niupai* 'steak', *dangao* 'cake' and *xiangzao* 'soap'. Still there were nouns that can combine with *ke* such as *yuwan* 'fish ball', *jiaonang* 'capsule', and *digua 'sweet potato*'. As to the other nineteen nouns that can only appear with measure words and

thus are defined as mass nouns, we selected terms such as *chaofan* 'fired rice', *luwei* 'salted food', *shala* 'salad', *jitang* 'chicken soup', and *jiyou* 'lubricant'. All the items are shown in Table 1 and the trials are presented as in (1a) and (1b) in Figure 1. In addition to these thirty-nine pairs of pictures of the test nouns, we added another forty pictures as fillers and the questions given for the fillers were totally irrelevant to the task.

+/- classifier		items
+classifier	*gen*	*tangchi* 'spoon', *huocai* 'matchstick', *tieding* 'nail', *fajia* 'hair pin', *dianxiangan* 'lamppost', *binbang* 'ice bar', *daosui* 'spike of rice'
	kuai	*niupai* 'steak', *dangao* 'cake', *xibing* 'wedding cake', *zhaopai* 'signboard', *gaobing* 'cake', *xiangzao* 'soap'
	ke	*yuwan* 'fish ball', *jiaonang* 'capsule', *longyan* 'longan', *digua* 'sweet potato', *baozi* 'steamed bun", *huozhong* 'tinder', *fangtang* 'cube sugar'
-classifier		*chaofan* 'fried rice', *luwei* 'salted food', *shala* 'salad', *jitang* 'chicken soup', *jiyou* 'lubricant', *guozhi* 'juice', *mijiu* 'rice wine', *yaofen* 'powder medicine', *muxie* 'saw dust', *meiyou* 'kerosene', *jiangliao* 'sauce', *chuyu* 'leftovers', *shuangshenfen* 'baby powder', *meixu* 'cotton', *yanliao* 'color', *youqi* 'paint', *buping* 'tonic', *xiaocai* 'side dish', *shangchan* 'game'

Table. 1. The nouns that can be preceded by classifiers and the nouns that can take measure words only

1a. *Na yi-ge tu de tangchi bijiao dou?*
(Which picture has more spoons?)

1b. *Na yi-ge tu de shala bijiao dou?*
(Which picture has more salad?)

Fig. 1. In (1a), the two pictures showed the entities denoted by the term *tangchi* 'spoon" that can be preceded by the classifier *gen*. In (1b), the two pictures displayed the entities denoted by the term *shala* that can only take a measure word.

Results and Analysis

The data were subjected to One-way ANOVA. As shown in Fig. 2, the participants based their quantity judgments on the number of individuated, countable units more

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for the count nouns (85%), compared to the mass nouns (26.25%), $p<0.05$. In other words, even though the classifier nouns were not embedded in the context of count syntax, they still disambiguated the reference to (non)-/individuable entities.
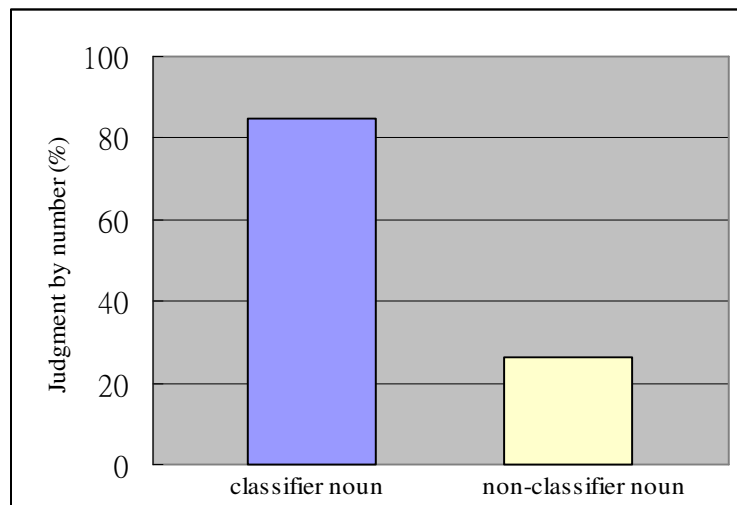
Fig. 2. The percentages of the number- and volume-based judgments relating to classifier and non-classifier nouns

However, there are some of the target nouns that are classified as count but do not display an apparent effect. They are *dangao* 'cake' and *niupai* 'steak'. We take it that although these terms can be preceded by classifiers, they are more like substance since they are homogeneous, compared to others such as *tangchi* 'spoon' or *dianxiangan* 'lamppost'. Thus, in our conceptual system, they tend to be assimilated to "mass nouns".

5.2. Experiment 2: Cohesiveness

Since in the previous section, we found that some terms lead the participants to the volume-based judgment, even though they can be preceded by classifiers. It appears that when the term denotes an entity that is structurally less cohesive, it results in a judgment based on volume. According to Prasada et al. (2002), "cohesiveness" refers to an entity that is structurally more regular and more dependent. Thus, in this section, we propose to detect whether the judgment differs with respect to the cohesiveness of the entities denoted by the terms that take the same classifier.

Method
Participants
The participants were twenty students from National Taipei College of Business. They

were voluntary to take part in this experiment.

Material and Procedure

The procedure was identical to that of the first quantity judgment task. Regarding the test items, we divided the nouns that take the same classifier into two groups: the highly cohesive and the lowly cohesive. For instance, among all the target nouns that can be preceded by the classifier *gen*, we divide them into two groups. The first group refers to the highly cohesive group, in which the nouns refer to entities that are structurally more rigid and more regular. The highly cohesive items are *tangchi* 'spoon', *fajia* 'hair pin' and *dianxiangan* 'lamppost'. The other group refers to the lowly cohesive group, in which the nouns denote entities that have a comparatively lower interdependency and regularity relating to the infrastructure. This group includes *douya* 'bean sprout', *shengz*i 'rope', *huanggua* 'cucumber'. All the highly cohesive and the lowly cohesive nouns are presented in Table 2.

classifier	Highly cohesive	Lowly cohesive
gen	*tangchi* 'spoon', *fajia* 'hair pin', *dianxiangan* 'lamppost'	*douya* 'bean sprout', *shengz*i 'rope', *huanggua* 'cucumber'
kuai	*zhuangtou* 'brick', *jimu* 'brick', *citie* 'magnetic'	*niupai* 'steak', *dangao* 'cake', *xiangzao* 'soap'
ke	*huozhong* 'tinder', *yachi* 'tooth', *zidang* 'bullet'	*ruantang* 'jelly drop', *ludang* 'salted egg', *qiaokeli* 'chocolate'

Table. 2. The classifiers nouns are divided into the highly cohesive group and the lowly cohesive group.

Results and Analysis

The data were subjected to One-way ANOVA. It was shown that the participants chose number for the highly cohesive entities (94.14%), compared to the lowly cohesive entities (60.81%), $p<0.05$. The findings indicated that the judgment is biased toward number when the term denotes an entity with a highly cohesive structure. It is suggested that, given that the context of count syntax is not present, whether the referent has a more regular structure in our conception plays an active role in individuation.
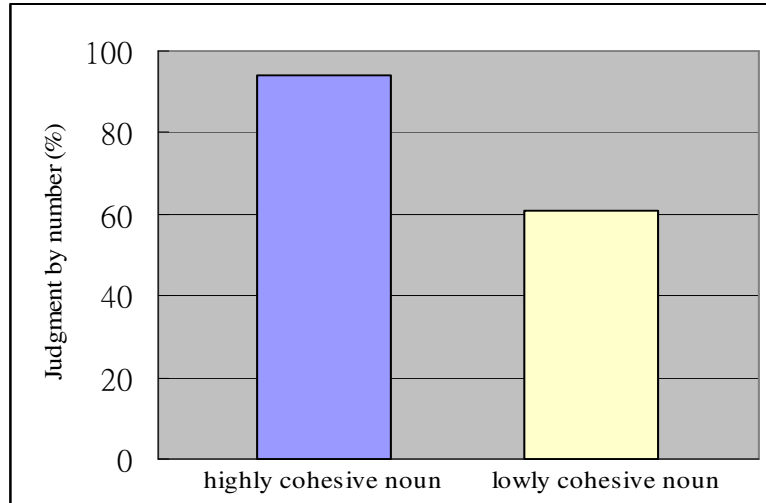
Figure. 3. The percentages of the number- or volume-based judgment relating to the highly and the lowly cohesive entities

5.3. Experiment 3: Individuation in the bare noun context versus the generic-predicate context

In the third experiment, we conducted a picture-matching task. We investigated whether, in the bare context, a classifier noun led to the judgment by NUMBER. By contrast, we observed whether the same noun appearing with a generic predicate have any effect on the judgment. The contrast between the bare context and the sentential context denoting a generic reading can reveal whether the (non-)/individuability at the lexical level in Chinese.

Method
Participants
The participants were thirty-nine students from National Taipei College of Business. They were volunteered to take part in this task.

Material and Procedure
In this picture-matching task, we examined individuation in the classifier noun in the bare context compared with that in the classifier noun co-occurring with the generic predicate. We hypothesized that bare nouns tend to be encoded as non-individuated when it takes the predicate referring to a generic reading. In contrast with the sentential context, we hypothesized that a classifier noun codes individuation when it does not take the predicate denoting an inherent meaning. We conducted tasks where two pictures were provided: one picture depicting an individual object and the other a number of objects (namely, the plural counterpart). Participants read sentences

containing a bare classifier noun co-occurring with a generic predicate as in (1) versus classifier nouns which do not take any predicate as in (2). :

   (1) Qiubang shi jinshu huoshi mutou zuo   de.
       Bat   be metal   or   wood make DE.
       'Bats are made of metal or wood'
   (2) Qiubang
       Bat
       'Bat(s)'

Results and Analysis

The data were subjected to One-way ANOVA. The statistics showed that in the generic condition (1), participants picked the one-object picture at the frequency of 15.54%, whereas in the bare condition (2), the frequency of choosing the one-object picture was 57.54% ($p<0.05$). The results indicated that Chinese classifier noun encoded individuals. The results are validated by the non-individuation in the classifier noun when it is assigned an unbounded reading by the generic predicate. Witness the figure 4 as follows:
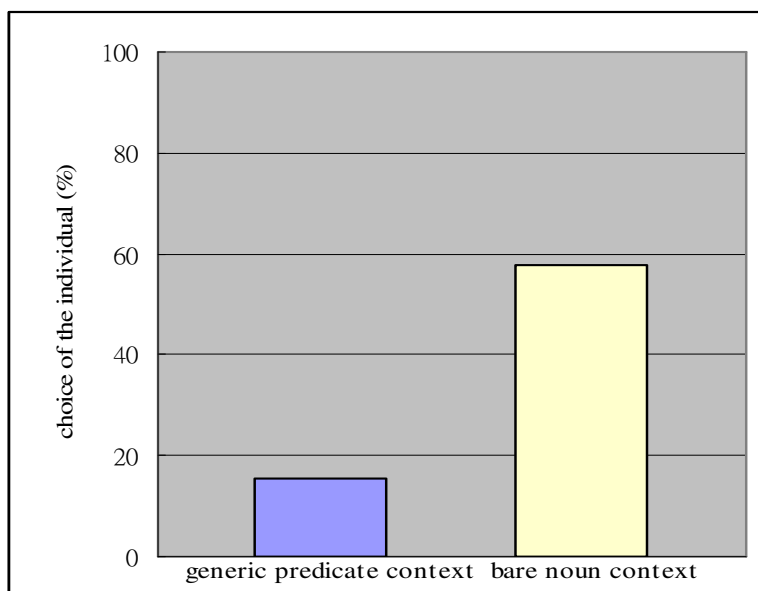
Figure. 4. The percentages of the individual or non-individual judgment in the bare noun context versus the generic predicate context

6. General discussion and conclusion

6.1. Lexicalist marking of count and mass in Mandarin Chinese

    In this section, we sum up the results of the three quantity judgment tasks. First, in

the first quantity judgment task, the conceptual and linguistic distinctions between count and mass affected the judgment: count nouns that can take classifiers are counted by number while mass nouns that cannot are counted by volume. In the second task, although cohesiveness is no specified in the linguistic system, high cohesiveness terms and low cohesiveness terms are distinguished in the judgment. The high cohesiveness terms are counted by number whereas the low cohesiveness terms are counted by volume. Based on these two experiments, quantity judgment appears to be solidly based on conceptual distinctions, which MAY or MAY NOT be specified in language. Linguistically, if the representation were to match the conceptual distinction, the lexicalist markings of count and mass seem to be on the right track. More specifically, Mandarin Chinese nouns can disambiguate reference to (non)-/individuable entities, even if there is not any clue from either the context of count syntax or the pragmatic context, contra the prediction of Barner and Snedeker (2005). Regarding the inherently plural hypothesis, it is hard to see whether Mandarin Chinese mass nouns are inherently plural, since they behave differently from count plurals. Concerning the distributed morphology approach, our findings showed that Mandarin Chinese bare nouns are NOT underspecified with mass or count, since bare nouns are already distinguished in terms of reference to individuable or non-individuable entities.

6.2. Linguistic device and conceptual apparatus

In this paper, we pointed out that it is not completely adequate to employ quantity judgment task to probe into how mass-count distinction is coded in English. On the contrary, the quantity judgment task can help inspect whether and how mass and count is distinguished in Mandarin Chinese, since Mandarin Chinese nouns are not obligatorily specified with any plural marker. Our findings indicated that in Mandarin Chinese, the conceptual apparatus of individuation does not have to be licensed via count syntax as Barner and Snedeker claim for English. In addition, according to the licensing condition offered by Barner and Snedeker, they predict that in a classifier language such as Chinese, the disambiguation of reference heavily relies on pragmatic factors since count syntax is not always available. However, as demonstrated by our experiments, this prediction for Mandarin Chinese is not borne out. The nouns that can take classifiers in a bare context can contribute to individuation. Thus, we take it that Mandarin Chinese nouns are distinguishable with respect to mass-count distinction and this distinction does not necessarily hinge on linguistic device of individuation. Last but not least, the sentential context should not be ruled out in the discussion of mass-count in the nominal domain. Specifically, the reference of the sentence, either tempo-spatially bounded or tempo-spatially unbounded, also plays a

key role in individuation of entities.

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