

## Experimental evidence for the discourse potential of bare nouns in Mandarin

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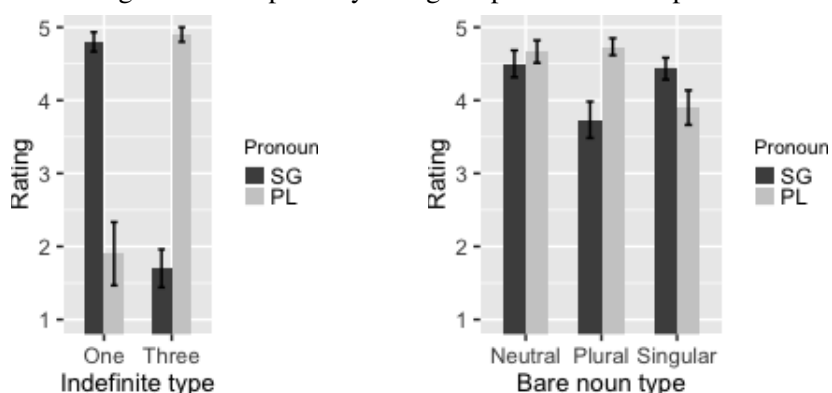
**Introduction** The discourse property of bare nouns without number morphology as compared with that of indefinites has been the focus of linguistic inquiry in recent years. Scholars disagree on whether bare nouns are ‘transparent’, i.e., able to support pronominal anaphora, or ‘opaque’, i.e., unable to do so. Scholars embracing the opaque view often take the opacity to be evidence for the kind-based analysis (Dayal 1999) or the special compositional semantics of bare nouns (Farkas & de Swart 2003), while scholars holding the transparent view either analyze bare nouns as indefinites (Modarresi 2014) or see no connection in the discourse property of bare nouns and their semantics (Chung & Ladusaw 2004). Drawing on evidence from a two-part experimental study on bare nouns in Mandarin, we demonstrate that **bare nouns are transparent, but the transparency is distinct from that of indefinites**. More concretely, the results from an acceptability judgment task indicate that pronominal anaphora in the bare noun condition is highly acceptable on a par with the indefinite condition, thus providing evidence against the opaque view; however, the results from a self-paced task shows that the bare noun condition incurs additional reading time relative to the indefinite condition, indicating an increased processing effort involved in the former. We argue that the results from the experiment are better explained by a theory that attributes the transparency of bare nouns to the result of pragmatic “bridging” (Dayal 2011), or by a theory that invokes presupposition accommodation in pronominal anaphora with bare nouns (Modarresi 2014).

**Methodology** 30 native Mandarin speakers participated in a two-part experiment administrated via Superlab experimental software in a laboratory setting. Mandarin was targeted since its bare nouns are free from any number morphology, unlike most of the languages previously investigated, which have bare plurals. The two tasks were a self-paced moving window reading study (Just, Carpenter & Wooley 1982) and an acceptability rating task, both using a  $2 \times 2$  design. The first factor, NP type, had 4 levels: bare nouns with neutral, singular, or plural number bias (determined in an independent norming study, following Modarresi (2014)’s proposal that number bias plays a role), and indefinites with numerals ‘one’ and ‘three’. The second factor, Pronoun type, had 2 levels: 3rd. person singular and 3rd. person plural. There were 24 total trials. Trial types (presented in a Latin-square design) all had similar structure, as illustrated in (1): The first sentence introduced a context and the NP, the only potential discourse referent. The second sentence continued the discourse and included a pronoun, which was intended to refer back to the NP. (Comprehension questions throughout checked for co-construal relations and attention to discourse coherence between the two sentences.) In the self-paced reading study, participants read the sentences fragment by fragment by pressing the space key, and response times between key presses were recorded. In the rating task, participants judged each two-sentence pair on a Likert scale of 1 to 5 (1: completely unacceptable, 2: unacceptable, 3: marginal, 4: acceptable, 5: perfectly acceptable).

- (1) Women zai bianliidian kanjian-le (yi-ge) xiaotou. Ta/tamen touwan dongxi jiu liuzou-le.  
we in store see-Asp one-Cl THIEF he/they steal things then leave-Asp  
‘We saw a thief/THIEF in a store. He/they stole something and left.’

**Results** All statistical analyses reported in this paper were conducted by linear mixed-effects modeling with lme4 package for the statistical language R (R Core Team 2016). Probabilities were estimated by means of the function summary in the package lmerTest. Response times are log-transformed before being analyzed. The results from the acceptability judgment task are presented in Figure 1, with Figure 1a showing the ratings for

Figure 1: Acceptability ratings of pronominal anaphora



(a) The indefinite condition

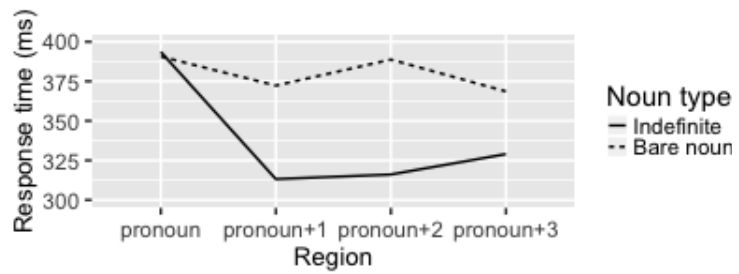
(b) The bare noun condition

indefinites, and 1b showing the ratings

for three types of bare nouns. Generally speaking, when indefinites and bare nouns are paired with appropriate pronouns, they are both highly acceptable (indefinite: mean=4.85; bare noun: mean=4.57). The indefinite condition has a slightly higher mean than the bare noun condition, but this difference does not reach statistical significance ( $\beta=0.25$ ,  $SE=0.19$ ,  $t=1.31$ ,  $p>0.05$ ). The indefinite condition differs from the bare noun condition in being more sensitive to mismatching pronouns. This is expected because the number specification on indefinites is grammatical but the number condition on bare nouns is merely a contextual bias.

The results from the self-paced reading task are presented in Figure 2, which shows that the indefinite condition is processed faster than the bare noun condition in the three regions following the pronoun. Specifically, the differences in the pronoun+1, pronoun+2, and pronoun+3 regions are 59ms, 73ms, and 40ms, respectively. These differences are statistically significant ( $\beta=-0.12$ ,  $SE=0.04$ ,  $t=-2.99$ ,  $p<0.05$ ).

Figure 2: Response times of pronominal anaphora in the indefinite condition and the bare noun condition



**Discussion** The high acceptability of the bare noun condition poses a challenge for the opaque view, which maintains that bare nouns do not support pronominal anaphora due to their inability to introduce discourse referents. At the same time, the increased response time and processing effort in the bare noun condition suggests that bare nouns in Mandarin are not fully transparent, in a way similar to numeral indefinites. The combined findings instead point to what we will term a ‘translucent’ view (a terminology borrowed from Farkas & de Swart 2003), in which pronominal anaphora with bare nouns is licensed, but in a way that is distinct from anaphora reference with indefinites. Dayal (2011) and Modarresi (2014) are representative proponents of this view, though they ascribe to distinct explanations for why bare nouns behave differently in pronominal anaphora.

According to Dayal (2011), bare nouns are event modifiers, which do not introduce discourse referents. However, pronouns can refer to bare nouns via an indirect anaphoric relation, established by applying a function to the events modified by bare nouns. From this point of view, the slow down is due to the anaphoric relations in the bare noun condition being established indirectly. Modarresi (2014) argues that bare nouns in fact do introduce discourse referents but the discourse referents introduced lack number specifications (see Kamp & Reyle 1993). On the other hand, overt pronouns have additional information, arguably a presupposition (Sauerland 2003), about the number specification of the discourse referents they refer to; a singular pronoun not only presupposes a discourse referent but also that it is atomic, while a plural pronoun presupposes a plural discourse referent. When an overt pronoun is used, it triggers an accommodation of the number presupposition in the bare noun condition. From this point of view, the slow down is due to presupposition accommodation.

While the present study does not provide us with sufficient means to decide between different versions of the translucent view, it provides us with novel experimental evidence in support of the translucent analysis of bare nouns in Mandarin and the potential translucency of bare nouns in general, which would otherwise be hard to tease apart from transparency and comparable status with indefinites, if acceptability measure were the only dimension being evaluated. We will close our talk by extending this discussion to ongoing cross-linguistic investigations of bare nouns.

**Selected references** Chung, S. & Ladusaw, W. A. (2004) *Restriction and Saturation*. MIT Press. Dayal, V. (2011). Hindi pseudo-incorporation. *Natural Language and Linguistic Theory* 29: 123–167. Farkas, D. & de Swart, H. 2003. *The semantics of incorporation*. CSLI Publications. Just, M. A., Carpenter, P. A., & Woolley, J. D. (1982). Paradigms and processing in reading comprehension. *Journal of Experimental Psychology: General*, 111, 228 – 238. Modarresi, F. (2014). Bare nouns in Persian: Interpretation, grammar and prosody. Ph.D. dissertation, University of Ottawa & Humboldt-Universitat zu Berlin.