Mandarin has subjectivity-based adjective ordering preferences in the presence of *de*

We examine adjective ordering preferences in Mandarin by extending the experimental methodology of Scontras et al. (2017). Scontras et al. used behavioral and corpus data to determine that adjective subjectivity is a robust predictor of English ordering preferences: less subjective adjectives are preferred closer to the modified noun (e.g., *green* is judged less subjective than *small* in *small green vase*). The status of ordering preferences in Mandarin is less clear. Sproat and Shih (1991) claim that the relative order of adjectives is free in the presence of the linking particle *de*, leading to optionality in phrases like *xiao-de lu-de huaping* vs. *lu-de xiao-de huaping* 'small green vase'. We therefore set out to determine (i) whether Mandarin possesses ordering preferences in the presence of *de*, and, if so, (ii) to what extent subjectivity predicts those preferences.

Expt. 1: To determine the status of Mandarin preferences, we replicated Expt. 1: *Ordering preferences* from Scontras et al. using Mandarin translations of the original English materials. In a separate norming study (n=20), we determined that our materials were acceptable with *de* on both adjectives. 32 Mandarin-speaking participants indicated their preferences for pairs of multi-adjective strings formed from 26 adjectives from seven semantic classes, together with ten nouns. The pairs differed on the relative order of the adjectives, and all adjectives appeared with *de*. We used these naturalness ratings to arrive at a single preferred-distance measure for each adjective; values ranged from 0 (preferred closest to the noun) to 1 (preferred farthest from the noun). Fig. 1 summarizes these distance measures by semantic class; there, we see that Mandarin does have stable preferences, as evident in the significant deviation from chance (i.e., from 0.5) in several of the class distance measures.

Expt. 2: To evaluate the role of subjectivity in Mandarin ordering preferences, we first measured adjective subjectivity using a faultless disagreement task (cf. Expt. 1: *Faultless disagreement validation* from Scontras et al.). 35 Mandarin-speaking participants indicated the extent to which two speakers could faultlessly disagree in the evaluation of an adjective property. For example, a trial might have speaker A state the Mandarin equivalent of 'that chair is small.' Speaker B would counter with, 'you're wrong, that chair is not small.' Participants judged whether both speakers could be right (coded as 1), or whether one must be wrong (coded as 0); to the extent that both can be right while disagreeing about a property, the property admits that degree of faultless disagreement, which indexes subjectivity. Fig. 2 plots adjective naturalness ratings against adjective subjectivity scores. In Mandarin, as in English, subjectivity is a reliable predictor of adjective ordering preferences ($r^2 = 0.48$, 95% CI $= [0.26, 0.67]$).

Although the effect is weaker than the effect observed by Scontras et al. for English, our results demonstrate that Mandarin indeed does have stable ordering preferences in the presence of linker (*pace* Sproat and Shih, 1991). Despite using diverging strategies to form modification structures, the two languages share similar adjective ordering preferences, which are predicted by adjective subjectivity.

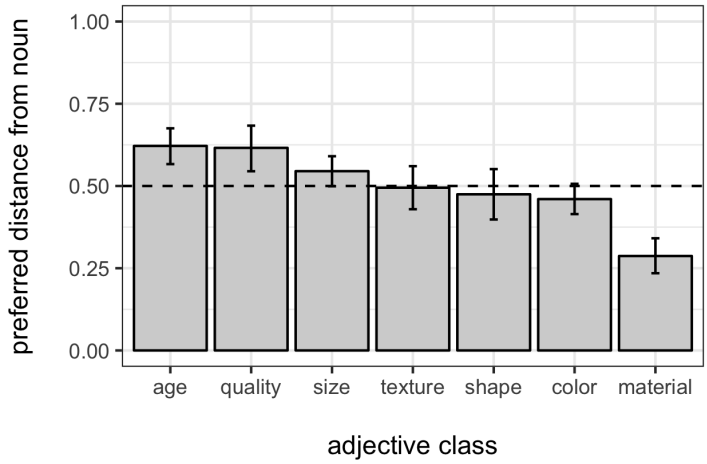

Fig. 1: Naturalness ratings from Expt. 1 grouped by adjective semantic class. Higher values indicate that a class's adjectives are preferred farther from the modified noun; lower values indicate that a class's adjectives are preferred closer. The dashed line indicates chance level, or the absence of stable preferences. Error bars represent bootstrapped 95% confidence intervals drawn from 10,000 samples of the data.

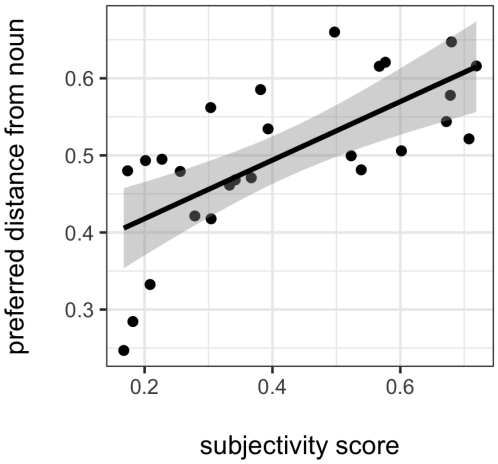

Fig. 2: Ordering preferences (obtained in Expt. 1) plotted against subjectivity scores (obtained in Expt. 2) for each of the 26 adjectives tested. Subjectivity accounts for 48% of the variance in the ordering preferences ($r^2 = 0.48$, 95% CI $= [0.26, 0.67]$).

Scontras, G., J. Degen, and N. D. Goodman (2017). Subjectivity predicts adjective ordering preferences. *Open Mind: Discoveries in Cognitive Science 1*(1), 53–65.

Sproat, R. and C. Shih (1991). The cross-linguistic distribution of adjective ordering restrictions. In C. Georgopoulos and R. Ishihara (Eds.), *Interdisciplinary approaches to language: Essays in honor of S.-Y. Kuroda*, pp. 565–593. Dordrecht: Kluwer Academic Publishers.