Shared context helps maintain lexical variation

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How does the amount of social and psychological information we share with our interlocutors affect the linguistic features we use? Observations from sign language communities show that there is a relationship between the degree of shared context and lexical variation (e.g., Meir, Israel, Sandler, Padden, & Aronoff, 2012). Iconicity, i.e. form-meaning resemblance, is subjective and depends on one's experience (Occhino, Anible, Wilkinson, & Morford, 2017), and provides the key explanation. Previous theoretical and computational work (Tkachman & Hudson Kam, 2020; Mudd, de Vos, & de Boer, 2022) has proposed that a lack of shared context (i.e., limited context) leads to linguistic alignment because it does not enable the retrieval of meaning from form (i.e., iconicity) when meaning space is not shared. We test this claim by having participants play a communication game about unknown objects in different context conditions. Further, we study what (iconic) strategies individuals align on in the communication game.

Participants (180) recruited on Prolific were assigned to dyads in one of three conditions: a limited context and baseline condition (29 dyads each), and a shared context condition (32 dyads). Stimuli consisted of 12 unfamiliar objects from the NOUN database (Horst & Hout, 2014) and four short videos showing gestural descriptions of each object with different iconic strategies: representing, drawing and two acting strategies (as described in Ortega & Özyürek, 2020). Representing and drawing strategies are iconically motivated by the appearance of the object, while the acting strategy requires understanding an iconic mapping. In phase 1 (training), participants are trained and tested on object-description pairings. In the baseline condition, participants are trained on the same acting description as their partner. In the limited context condition, participants are trained on different acting strategies and in the shared context condition, participants are trained on both acting strategies (see Fig. 1A). In phase 2 (interaction), the dyad plays a communication game over 48 trials where participants alternate as director and matcher. In phase 3 (recall), participants are asked to select the gesture video they would use to successfully communicate with their partner for each object.

We test if dyads in the shared context condition maintain more lexical variation compared to the limited context condition, and find that they do: a linear

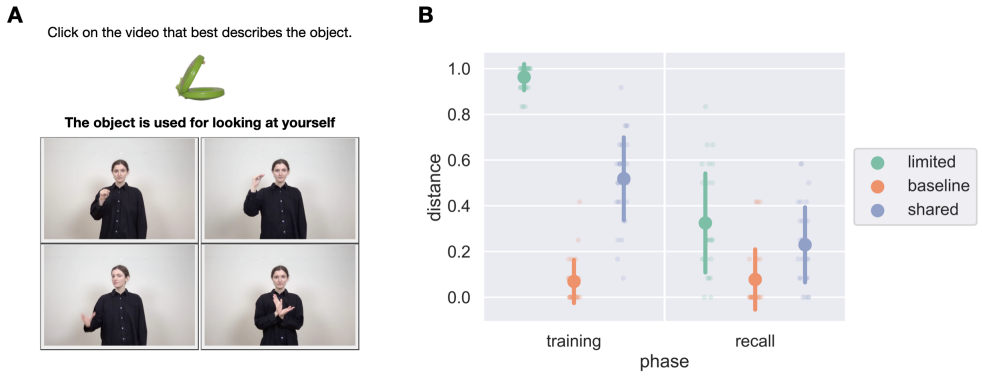

Figure 1. A. An example of experiment phase 1 (training) where participants are trained on object-description pairings. In the limited context condition, one participant would be trained on this acting description ('for looking at yourself') and the other participant would be trained on the other acting description ('for clapping'). In the baseline condition, both participants would be trained on the same acting description. In the shared context condition, participants are trained on both acting descriptions ('for looking at yourself or for clapping'). B. A dot plot showing the mean lexical distance of each condition by phase with error bars showing the standard deviation. Smaller dots show the mean of each dyad. A lexical distance of 0 indicates full alignment. Lexical distance is reduced significantly more over the course of the experiment in the limited context condition compared to the shared context condition ($\chi 2$ (1)=29.55, p<0.001).

mixed-effects model with an interaction between condition and phase explains significantly more of the variance than a model without it ($\chi 2$ (1)=29.55, p<0.001). However, we cannot exclude the possibility that this effect is an artifact of the high degree of lexical variation in the limited context condition in the training phase, as two additional analyses suggest that in both conditions participants decrease lexical variation to the same extent. The theory suggests that lexical variation decreases due to communication error, so we checked error in interaction across dyads and found the interaction phase of the shared context condition (M=0.06) to be much more comparable to the baseline condition (M=0.04) than to the limited context condition (M=0.22). Focusing on communication strategies, we found interesting differences across conditions; in the limited context condition the proportion of non-acting strategies (drawing and representing) increases significantly from the training phase to the recall phase (β=1.31, SE=0.50, p<0.001), likely because their iconicity relates to the physical appearance of the object (shared features for both participants), while in the shared context condition there is no such effect, presumably because participants communicate successfully using the iconic acting strategies, both of which the dyad was trained on. Overall, this work adds support for the link between social structure and linguistic structure (see Lupyan & Dale, 2010).

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