

How people establish reference in three-party conversation

In conversation, in addition to using previous linguistic context, participants are also expected to make use of information that was previously shared (Clark & Marshall, 1981). In a multiparty conversation, speaker may design their speech based on the knowledge of the most ignorant partner (Yoon & Brown-Schmidt, 2018), or the combined mental states of all the partners (Yoon & Brown-Schmidt, 2019). The present study will focus on how people interpret one of their conversational partners' perspectives in a three-party conversation. Particularly, it will explore whether and how one of the conversational partners' perspectives influences people's interpretation of the other partner.

Method: Sixty Mandarin-speaking subjects participated in the study. They sat in front of a frame with one blocked slot and three unblocked slot (Fig.1). In **non-sharing** condition, Experimenter 1 (E1) and Experimenter 2 (E2) sat at the opposite side to the participants, sharing only three objects in the unblocked grids with the subjects. In **sharing** condition, E1 and the participants sat at the same side, while E2 sat at the opposite side. In **non-competitor** condition the four objects in the display were different, while in **competitor** condition two of them were the same, with one of the pair in the blocked slot. The shared one would be the target and the blocked one would be the competitor. During the test, E1 and E2 alternately instructed the participants to "*point to the ... (the target, e.g. the dog)*".

The analyses focus on the eye movements when E2 gave the instruction. In both sharing and non-sharing conditions, the shared objects were consistent between E2 and the participants. If participants had different target preference between these two conditions, we can conclude that the other participant' knowledge influences people's comprehension.

Results: The eye tracking data to the target and the competitor object were calculated across the interval of the critical noun label (e.g., "dog") processing (200-1200ms after the word onset) for E2's trials. General linear mixed model regression was carried out using R with lmer function. Time, competitor types (competitor vs. non-competitor), sharedness (sharing vs. non-sharing) were entered into the model as fixed effects, participants and items were entered into the model as random effects. The average target advantage score ($P_{\text{target}}/P_{\text{competitor}}$) for each 40ms bin was used as the dependent variable.

A main effect of competitor type was found, $p < 0.01$, due to a larger TA score in the non-competitor condition than in the competitor condition. A main effect of sharedness was found, $p < 0.05$, due to a larger TA score in the non-sharing condition than in the shared condition. An interaction was also found, $p < 0.01$. Post-hoc analyses compared the sharedness effect for each competitor condition. In the non-competitor condition, there was no effect of sharedness, but in the competitor condition, there was an effect of sharedness, $p < 0.001$, showing that the participants had an overall target preference in the non-shared condition where E1 sat at the opposite side of the participants.

Conclusion: As we predicted, even though E2 asked the same questions in the same setup, participants had a larger target preference when E1 sat at the opposite side of the participants. The current results may suggest that participants consider a combined perspective information of all the conversational partners, but it may also indicate that participants are more efficient at referential resolution, because they less switch their perspective-taking when E1 and E2 sat at the same side, or they simply exclude their privileged knowledge before they hear the instruction. Follow-up studies will focus on these questions. Besides, compared to a typical three-party conversation, here E1 and E2 frequently asked questions but hardly communicated with each other. In one of the follow-up studies, we will also explore whether the interactivity between E1 and E2 plays a role.

References

- Clark, H. H., & Marshall, C. M. (1981). Definite reference and mutual knowledge. In A. K. Joshi, B. L. Webber, & I. A. Sag (Eds.), *Elements of discourse understanding* (pp. 10–63). Cambridge, England: Cambridge University Press.
- Yoon, S., & Brown-Schmidt, S. (2018). Aim low: Mechanisms of audience design in multiparty conversation. *Discourse Processes*, 55, 566–592.
- Yoon, S., & Brown-Schmidt, S. (2019). Audience Design in Multiparty Conversation. *Cognitive Science*, 43(8).

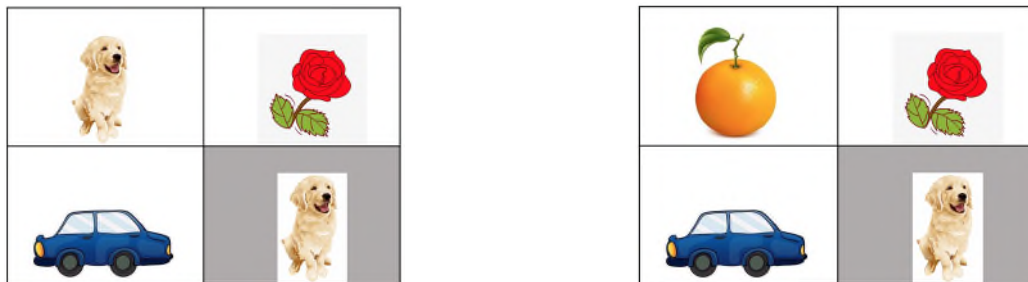


Fig 1. The sample display in COMPETITOR (left) and NON-COMPETITOR (right) conditions. The objects in the grey grids are only visible to the participants, while the objects in the white grids are visible at both sides.