Social identity modulates inferences about speaker commitment to projective content

In sentences like *Ken didn't hear that the minimum wage is too low*, the content of the complement (CC) (*the minimum wage is too low*) can "project" out of the entailment-cancelling environment, such that the speaker is taken to be committed to the truth of the CC (e.g., Kiparsky & Kiparsky 1970, Karttunen 1971). Recent experimental work has shown that listener beliefs about the truth of the CC – listener CC beliefs – modulate projection (Degen & Tonhauser 2021). Another type of listener beliefs that might influence projection judgments are *perceived speaker beliefs*: listener beliefs about what the speaker believes with respect to the CC. Indirect evidence for this hypothesis comes from Mahler (2020), who found that social information about the speaker influenced projection judgments for utterances similar to the one in Fig. 1: 'liberal' CCs such as *the minimum wage is too low* were more projective when the speaker was affiliated with a Democrat vs. Republican group (the reverse pattern was found for 'conservative' CCs). Building on Mahler (2020), we directly investigate the role of perceived speaker beliefs in projection inferences. In addition to replicating Mahler's (2020) finding, we find evidence that the effect of social information on projection inferences can be partially attributed to perceived speaker beliefs. As in Degen & Tonhauser (2021), listener CC beliefs also influenced projection inferences. The role of listener CC beliefs in the presence of social information suggests that listeners consider their own beliefs about the CC even when those beliefs are potentially misaligned with perceived speaker beliefs – a finding that has implications for the design and interpretation of comprehension experiments. Overall, the findings are in line with contentions that social and semantic-pragmatic domains of meaning are interconnected (e.g., Burnett 2019; Acton 2021; Beltrama & Schwarz 2021).

Experiment The experiment was conducted online via Prolific. Three experimental blocks were presented in the following order: the listener beliefs block, the speaker evaluation block, and the projection block. The blocks are discussed in a different order than the experiment for expositional clarity. In the projection block (block 3), each target sentence consisted of a 3rd person subject, a clause-embedding predicate, and a complement clause, embedded under negation. 24 of the target sentences involved "political" CCs conveying positions on 12 political topics: half of the CCs conveyed liberal positions on the topics (e.g., *the minimum wage is too low*), and the other half conveyed conservative positions on the same topics (e.g., *the minimum wage is too high*). There were also 12 "neutral" CCs about apolitical topics. Each participant saw 18 target sentences, 6 each with conservative, liberal and neutral CCs, with 6 (of 12 total) predicates. A sample trial is illustrated in Fig. 1. Projection was measured by asking participants about the speaker's certainty with respect to the CC, as in Mahler (2020) and Degen & Tonhauser (2021). Participants responded by adjusting a slider labeled from "no" (0) to "yes" (1). On each trial of the speaker evaluation block (block 2), participants saw one of the speaker profiles associated with the political target sentences from the projection block, but the target sentences themselves were not presented. Participants adjusted sliders in response to questions about their impressions of the speaker, including a question about

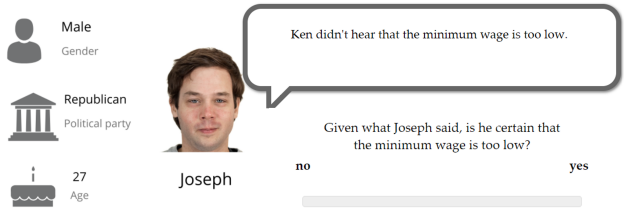
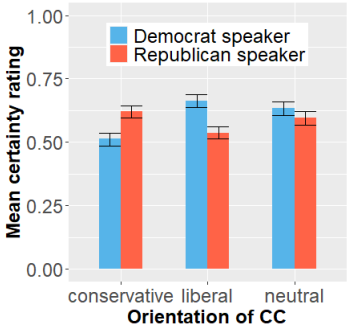


Fig. 1: Example trial in projection block

the speaker's likelihood of believing the CC from the projection block (e.g., *how likely is Joseph to believe that the minimum wage is too low?*). On each trial of the listener beliefs block (block 1), participants were presented with a question about their beliefs with respect to one of the political CCs from the projection block (e.g., *how much do you believe that the minimum wage is too low?*).

Results Data from 212 participants was analyzed using linear mixed-effects models. As illustrated in Fig. 2, certainty ratings for neutral CCs did not differ according to the speaker's political affiliation ($\chi^2(1) = 3.53; p = 0.06$). However, for political items (analyzed in a separate model), certainty ratings were predicted by a significant interaction between the speaker's political affiliation and the CC orientation ($\chi^2(1) = 118.37; p < 0.002$), such that conservative CCs received higher ratings with Republican speakers ($\beta = 0.12, SE = .015$) and liberal CCs received higher ratings with Democrat speakers ($\beta = 0.11, SE = 0.02$). As illustrated in Fig. 3, listener CC belief ratings (from block 1) were a weak but significant predictor of certainty ratings ($\chi^2(1) = 9.958; p < 0.01; \beta = 0.04, SE = 0.01$), while perceived speaker belief ratings were a stronger predictor ($\chi^2(1) = 165.09; p < 0.002; \beta = 0.19, SE = 0.01$). The embedding predicate was also a significant predictor of certainty ratings across all analyses.



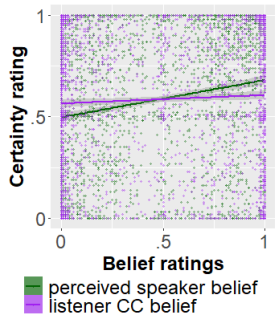


Fig. 2 (left): mean certainty ratings as a function of speaker political affiliation and the orientation of the CC, with 95% confidence intervals. **Fig. 3** (right): individual certainty ratings as a function of perceived speaker belief ratings (green) and listener CC belief ratings (purple) with lines-of-best-fit.

Discussion Our findings replicate the effect of social information on projection found in Mahler (2020), and further suggest that the effect can be partially attributed to listener beliefs. These include perceived speaker beliefs, informed by social information about the speaker, as well as listener beliefs about the CC itself. The role of listener CC beliefs is on one hand consistent with Degen & Tonhauser's (2021) finding. However, it is also somewhat surprising given that listeners' political beliefs (potentially) diverge from the the political beliefs attributed to the speaker. In practice, it seems either that listeners use their own beliefs to "fill in the gaps" when they are not very confident about the speaker's beliefs, or they simply cannot ignore their own beliefs when interpreting someone else's utterance. This has an important implication for the assumptions that researchers make in experimental work on meaning: even when experimental tasks are setup to investigate participants' (a.k.a. listeners') judgments about a speaker's meaning, participants may also consider their own beliefs about what the speaker has said in making that judgment. Moreover, the importance of participants' own beliefs illustrates the multifaceted way in which projection inferences are socially-mediated. These inferences depend not only on social information about the speaker, but also participants' subjective beliefs that shape and are shaped by their social identities.

Selected References Beltrama, A. & F. Schwarz. 2021. Imprecision, personae, and pragmatic reasoning. SALT 31. • Degen, J. & J. Tonhauser. 2021. Prior beliefs modulate projection. Open Mind 5. • Mahler, T. 2020. The social component of the projection behavior of clausal complement contents. LSA Proceedings 5(1).