Imprecision and speaker identity: How social meaning affects pragmatic reasoning

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Recent work at the interface of semantics and sociolinguistics proposed that the linguistic signaling and uptake of social identity traits can be captured via models similar to those used to formalize pragmatic inferences (Acton 2019; Burnett 2019; Burnett and McCready forthcoming) and non-at-issue content (Smith et al. 2010); and provided empirical evidence that listeners reason about the semantic/pragmatic properties of linguistic utterances to draw social inferences about the speaker (Beltrama 2016/2018; Jeong 2018). These findings raise the question of whether reverse effects exist as well, i.e., whether (and how) social meanings can also impact the interpretation of semantic/pragmatic meanings. We provide experimental evidence that (**i**) numerals receive stricter interpretations when uttered by **Nerdy** (vs. **Chill**) speakers; and that (**ii**) this effect is stronger for comprehenders who don't (strongly) identify with the speaker, suggesting that pragmatic reasoning is crucially shaped by social information about both the speaker and the comprehender.

BACKGROUND –Numerical expressions can be associated with varying margins of imprecision: an actual time of "2:57" could be reported precisely as "2:57", or less precisely as "3 o'clock" (Lasersohn 1999 i.a.). This variability introduces an element of indeterminacy in meaning interpretation, making the evaluation of a description contingent on the specific margin of precision tolerated in the context of utterance. Crucially, it also systematically licenses inferences about the social identity of the interlocutor, with highly precise speakers typically associated with clusters of social qualities (i.e.,"educated", "articulate"; Beltrama 2018) and social groups ("Nerd", Bucholtz2001). Imprecision thus offers an ideal testbed to investigate effects of social information on meaning resolution, which allows us to ask: Do expectations generated by the speaker's identity impact how comprehenders set their imprecision standards? And does the comprehender's alignment with the identity categories associated with precise speech matter as well?

METHODS – We test this question with a picture selection task. The stimuli introduced dialogues in which one character asks a question and the other one checks their phone and provides a response containing a quantity expression (time, distance, or price). Participants were then shown two images of a phone: one in which the screen is VISIBLE; and one in which it is turned face down (COVERED). They were instructed to choose the VISIBLE screen if they believed its content fit what the speaker said; or the COVERED otherwise. We adopted a 2x3 design. The first factor manipulated the **Speaker Persona** (between-subjects), which was either *Nerdy* (Fig. 1) – expected to speak more precisely (Bucholtz 2001); or *Chill* (Fig. 2) – expected to speak less precisely. These expectations were ascertained in a norming study. The second factor (within-subjects) manipulated the **Screen Fit** between the content of the visible screen and the character's response, with three levels (Fig. 3): *Match*; *Mismatch*; or *Imp(recise)* – further split between a *Broad* (12-18% over 60 min/100 miles/$) and a *Narrow* (5-11%) imprecision range. Two versions of the study were run merely differing with respect to the *Match* condition: in **Exp1**, the uttered vs. displayed number only matched in their integral part; in **Exp2** they also matched in their decimal part (see Fig. 3). 24 items were distributed in 4 lists; each list contained 6 items in the Match and the Mismatch condition and 12 items in the Imp condition (+ 24 fillers). 144 participants were recruited online on Prolific for each study. After the study subjects was asked to express the rate to which they described themselves as Nerdy or Chill selecting a value between 1 (min) and 10 (max).

HYPOTHESES – We hypothesize that responses uttered by nerdy speakers are held to higher precision standards, thus leading to higher rates of COVERED choices in the Imprecise condition for both studies (**H1**). Moreover, the presence of a perfect match in the Match condition should raise

the threshold of precision in Exp2, raising the rate of COVERED responses in the Imprecise condition overall (**H2**). Finally, we hypothesize that the Persona effect is modulated by respondents' own identity; this could either lead to stronger effects for respondents that socially align with the speaker's persona (Ingroupness hypothesis, **H3A**); or to stronger effects for respondents that do not self-identify with it (Outgroupness hypothesis, **H3B**).

RESULTS – To assess the effectiveness of the task, we fit a mixed-effects logistic regression with Screen Fit (ref: Imp.) as a fixed predictor and by-Subject and by-Item random intercepts: the Match and Mismatch conditions yield the expected ceiling and floor ratings, with the Imprecise condition differing significantly from both (all $ps < .001$; Fig 4). Moreover, the rate of COVERED choices in the Imprecise condition is about +15% higher in Exp2 than in Exp1 ($p < .001$, per posthoc comparison), suggesting a higher standard of precision was adopted for E2 and thus supporting **H2**. To zero in on the Persona effect, we fit a second ME regression on data from the Imprecise condition only with Screen Fit and Imprecision Range as fixed effects (sum coded) and by-Subject and by-Item random intercepts. In both studies, the overall rate of COVERED choices is significantly higher with Nerdy speakers than with Chill ones across different ranges of imprecision (see Fig 5), as shown by a main effect of Persona (Exp1: $\beta = 1.23$, p $<$.05; Exp2: $\beta = 1.02$, p $<$.05); this suggests that participants adopted a stricter standard of precision for Nerdy speakers, supporting **H1**. Finally, splitting the self-ascribed ratings evenly along the median, each participant was classified as either chill/not chill, and as either nerdy/not nerdy. These groups were used to create a new factor **(In/Out)groupness** with level *Ingroup* if the participant's and the speaker's identity match (e.g., a nerdy/chill participant seeing the nerdy/chill character respectively); and *Outgroup* if they don't match (e.g., a non-nerdy participant seeing the nerdy character and vice versa). A third ME model on the Imprecise condition only with (In/Out)groupness and Persona as fixed predictors showed an interaction for both experiments, whose nature suggests that the effect of Speaker Persona on COVERED responses is only present for participants whose identity doesn't match the identity of the interlocutors, as per **H3B** (E1: $\beta = 1.44$, p $<$.01; E2: $\beta = 2.02$, p $<$.01; see Fig 6).

DISCUSSION – The results support two conclusions. First, imprecision resolution is affected by the identity of the speaker: when the speaker evokes the social stereotype of someone who is expected to be precise, comprehenders assign a more stringent interpretation to the numerical expressions that they use. Moreover, this effect is not limited to a particular range of imprecision, but crucially holds across ranges of different size, and across experimental contexts that independently command higher vs. lower imprecision standards (i.e., Exp1 vs. Exp2). Second, this Persona effect is further modulated by participants' own identity: Nerdy speakers command a more precise interpretation only for respondents that do not identify themselves as nerdy, suggesting that the impact of the relevant stereotypes associated with the Persona fundamentally depends on the interplay of the speaker's and the participants' social identities (see Niedzelski 1999 for a similar results on phonological processing). Taken together, these findings suggest that social meanings are more intricately intertwined with pragmatic reasoning than previously thought: not only is the signaling and uptake of social meanings amenable to being formalized through the same reasoning patterns that can be applied to pragmatic inferences (see e.g. Burnett 2019 on *signaling games*); but social meanings are also recruited by comprehenders to resolve the indeterminacy surrounding the interpretation of semantic meanings – here, to calculate the threshold of imprecision that should be assigned to a numeral. The emerging picture is one in which different layers of meanings inform one other in a bi-directional fashion – i.e., semantic information can invite social inferences, and social information can guide meaning interpretation.
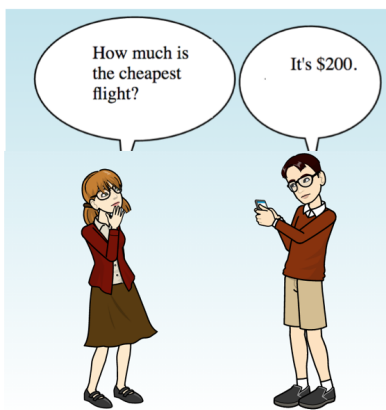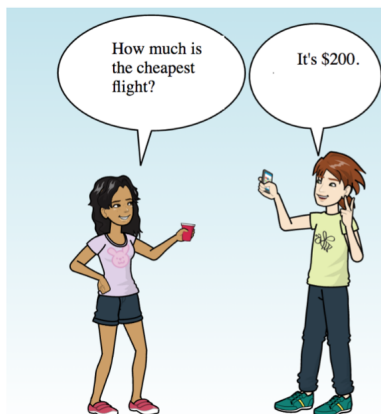
Figure 1: Nerdy characters
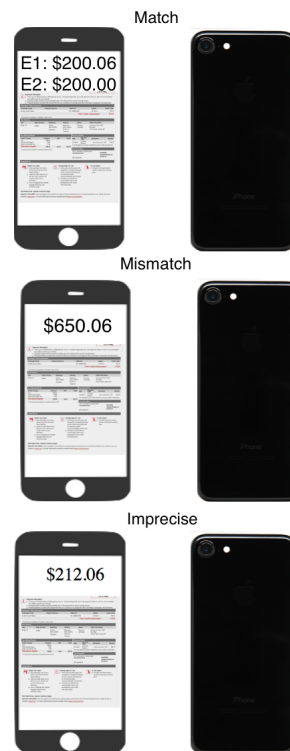

Figure 2: Chill Characters
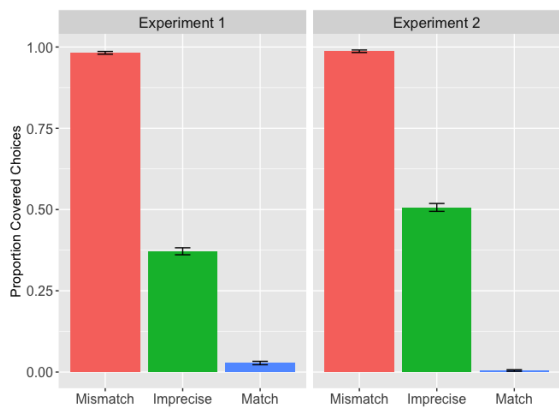

Figure 3: Screen Fit manipulation

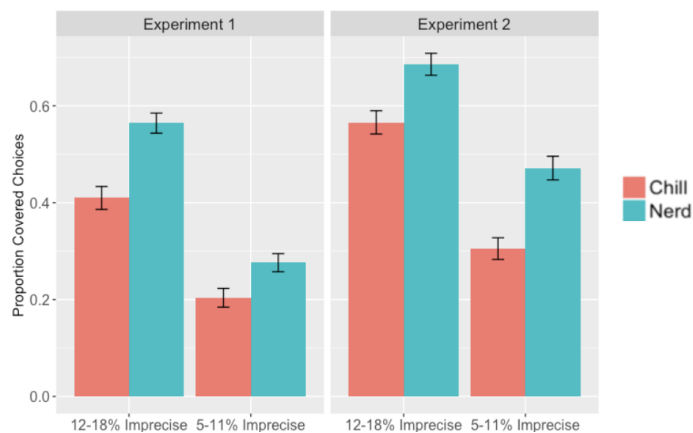Figure 4: Overall COVERED choices by Screen Fit
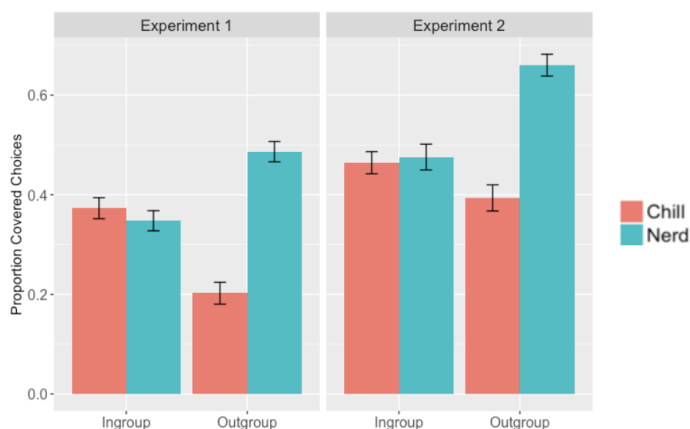

Figure 5: COVERED choices by Persona (Imprecise only)

Figure 6: COVERED choices by Persona and (In/out)groupness (Imprecise only)