

## Social meaning and pragmatic reasoning: The case of (im)precision

**Introduction:** A speaker's choice between linguistic alternatives can prompt their hearer to draw pragmatic inferences about facts of the world (e.g. the inference from the utterance of *some* that *all* does not obtain). But such choices can also invite inferences about the properties, ideologies and/or stances of the speaker herself; that is, they can convey **social meaning**. Recently, there has been growing interest in exploring the connections between social meaning (traditionally studied within sociolinguistics; e.g. Eckert 2012) and pragmatic reasoning and processes (Burnett 2019 on sociophonetic variation, Acton 2019 on the definite article, Beltrama & Papafragou 2023 on relevance and informativity). In the present work, we investigate this topic from the perspective of the phenomenon of **numerical imprecision**, i.e. the choice of the level of granularity at which numerical information is reported (e.g. describing a time as *8:03* vs. *around 8 o'clock*). Previous work has shown that the choice of precision level can convey social meaning (Beltrama 2019, Beltrama, Solt & Burnett 2022; the latter henceforth BSB). Speakers who use precise forms are perceived as more intelligent/articulate/confident (status- or competence-related) than those who use approximate forms, but also more pedantic/uptight, while those who use approximate forms are seen as more likeable/friendly/laidback (likeability-related). We extend this research here.

**Present research:** The goal of the present study is to test the following broad **hypothesis: The social meaning of (im)precision is derived via pragmatic reasoning about the needs of the situation, the epistemic state of the speaker, and the reasons for their choice of form.** Specifically, we hypothesize that the competence-related associations of precise forms derive from the inference that the speaker knows the exact value (i.e. has a high knowledge level), something that often is not the case for a speaker who uses an approximation. Conversely, the likeability-related associations of approximate forms are hypothesized to derive from the inference that the speaker, in a situation where high precision is not required, is rounding off to make the information easier to understand (van der Henst et al. 2002). Finally, the association of precise forms with pedantry derives from the inference that the speaker is being more precise than required in the utterance situation, highlighting their knowledge and not engaging in hearer-oriented simplification. This pragmatic view of social meaning leads to the following **predictions:**

Prediction 1: context dependence: The measured social meaning of (im)precision will be modulated by the utterance context, in particular the degree of precision required: the competence-related associations of precise forms will be most pronounced in a situation where high precision is required (e.g. making a police report), whereas the likeability-related associations of approximate forms and pedantry-related disadvantages of precise forms will be most pronounced in contexts where high precision is not required (e.g. a casual chat with friends). BSB found certain contextual effects of this nature, but these were not entirely robust; this may relate to the complexity of the study design (12 conditions), but also to the fact that the tested scenarios could not be directly linked to contextual precision needs. We address this here.

Prediction 2: correlation with motivations: The social meaning of alternative numerical forms will be correlated with the motivation attributed to the speaker for their choice of form. In particular, if the perceived motivation for the use of an approximate form is lack of precise knowledge, this is expected to correlate with lower competence ratings, whereas if it is desire to make the information easier to understand, this is expected to correlate with higher likeability ratings.

**Pretest:** As a first step, 16 scenarios were created in which a speaker asks a question requiring a numerical answer; each had 2 versions, one expected to require a precise answer (HighPr), the second expected to prefer an approximate answer (LowPr). These were tested in an online experiment (Prolific; n=174) in which participants saw the scenario/question and 2 possible answers (precise, approx) and indicated which of the two was more appropriate, or if both were equally appropriate. Based on the results, 6 scenarios were selected that showed the greatest difference between HighPr and LowPr, the precise answer preferred in the former and the approximate answer in the latter. These were used as the basis for the main experiment.

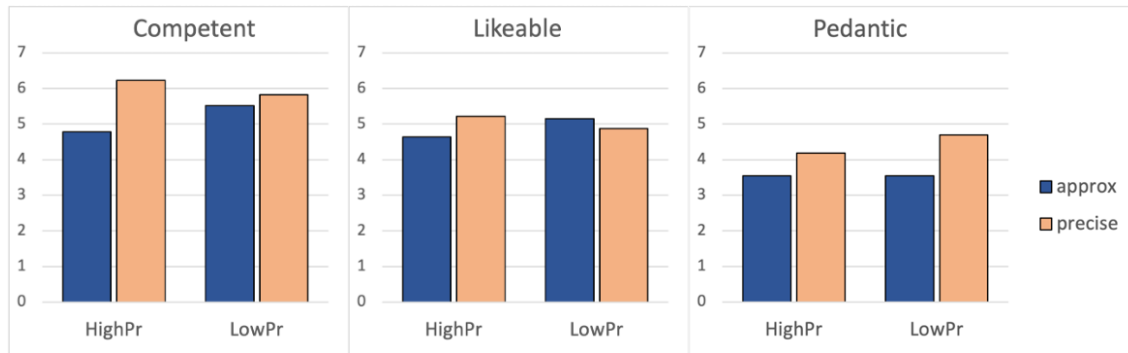


Figure 1. Mean ratings by context and form – selected attributes

**Experiment:** A pre-registered matched guise study (Campbell-Kibler 2007) was conducted, using as stimuli scenarios (selected via the pretest) in which one speaker asks a question and a second speaker answers it with a numerical expression. Two factors were manipulated: *context*, i.e. required precision level (HighPr, LowPr) and *numerical form* (precise, approx). For example:

<p><b>HighPrecision:</b> Jamie's new bicycle was stolen. Fortunately it was insured.</p> <p><i>Insurance agent: "How much did the bicycle cost? I'll start the paperwork right away."</i></p>	<p><b>LowPrecision:</b> Jamie has a new bicycle and is telling a friend about it. The friend is interested and wants to know more.</p> <p><i>Friend: "How much did the bicycle cost? I'd love to get one like it."</i></p>
<p><i>Jamie: "The bicycle cost \$509.55 [precise] / about \$500 [approx]"</i></p>	

The study was executed online via Prolific in a 1-item, fully between-subjects design (n=362 total, ~90/condition, randomly assigned to 1 of 6 scenarios). Participants rated the second speaker on 6 attributes using a 7-point Likert scale: *competent*, *knowledgeable*, *well-prepared* (competence-related), *likeable*, *helpful* (likeability-related) and *pedantic*. They then indicated what motivation they attributed to the second speaker for their choice of form, via free text and multiple choice.

Results are shown in Fig. 1. A linear mixed-effects model was fit to the ratings for each attribute (lmer package in R; Bates et al. 2015), with context, form and their interaction as fixed factors and random intercept for scenario; significance testing was via likelihood ratio. As predicted, for each of the 3 competence-related attributes, a significant main effect of form was found (precise higher;  $p < 0.001$  for all), as well as a significant interaction of context and form (greater effect in HighPr; *competent/well-prepared*  $p < 0.001$ , *knowl.*  $p < 0.05$ ). No main effect of form was found for *likeable* (a departure from BSB), but as predicted there was a significant interaction of context and form ( $p < 0.001$ ), with the relative strength of approximate relative to precise greater in LowPr than HighPr. For *pedantic*, a main effect of form was found (precise higher,  $p < 0.001$ ), with no significant interaction though a numerical difference in the predicted direction. Finally, *helpful* patterned (unexpectedly) with the competence-related attributes. Regarding inferred speaker motivations, "to make the information easier to understand" as a reason for using approximate was correlated significantly with higher ratings on *likeable/helpful*, whereas "speaker didn't have the exact information" was a near-significant predictor of lower ratings on *competent/well-prepared*.

**Conclusions and Future Work:** The observed effects of context and the correlations between inferred speaker motivations and social meaning are largely in line with the stated predictions, thereby supporting the hypothesized pragmatic source of the social meaning of (im)precision. A follow-up experiment (currently in progress) investigates the further role of speaker knowledge, contrasting the above conditions with ones in which the speaker is known to have the exact information at hand (e.g. a receipt for the bicycle purchase), which we predict will reduce the competence associations of precision and increase the likeability associations of approximation. We furthermore pursue modeling these findings in a probabilistic game-theoretic framework in which social meaning derives from inferences about the speaker's decision strategy.