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

Stephanie Solt, Roland Mühlenbernd, & Mariya Burelko*

Abstract. On the basis of a speaker's choice between linguistic alternatives, a hearer can draw inferences not only about facts of the world, but also about the social properties of the speaker. The goal of this work is to investigate how such social meanings arise, particularly in the case where the alternatives in question differ in their core logical or semantic meaning. Taking variation in numerical precision level as a case study, we seek to test the broad general hypothesis that social inferences may be derived via pragmatic reasoning about the needs of the situation, the epistemic state of the speaker, and the reasons for their choice of form. We report on two matched guise studies which demonstrate that the social meaning of (im)precision is sensitive to context and (to some extent) speaker knowledge state, and are correlated with inferred reasons for expression choice, findings which support the predictions of the pragmatic view.

Keywords. Social meaning; alternatives; Gricean reasoning; numerical expressions; approximation; matched guise methodology

1. 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 (im)precision, that is, the choice of the level of granularity at which numerical information is reported. For example:

- | | | | |
|-----|----|--|-------------|
| (1) | a. | The train departs at 8:03 . | precise |
| | b. | The train departs at around 8 o'clock . | approximate |

Previous work has shown that the choice of precision level can convey social meaning (Beltrama 2018, Beltrama et al. 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 (solidarity- or likeability-related). The goal of the present research is to shed light on how these inferences arise. In the case of sociophonetic variation such

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as that involving the velar and alveolar realizations of the variable ING, as in *working* vs. *workin'* (Campbell-Kibler 2007, 2011), the usual view is that social meanings are indexically associated with the linguistic forms themselves. But this is less plausible when the alternatives in question differ in their semantic content, as is the case for alternations such as (1).

Focusing on this case study, we seek 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 is not necessarily 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, has chosen to ‘round off’ the reported value to make the information easier for their hearer to understand (Van der Henst et al. 2002, Solt et al. 2017). 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 three predictions:

Prediction 1: context dependence The observed 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.

Prediction 2: sensitivity to available information If it is established in the context that the speaker has the precise information available to consult (for example, in the form of a train schedule in (1)), then the competence-related associations of high precision will be diminished (since simply reading out available information does not demonstrate a high level of knowledge), whereas the likeability-related associations of approximation in low-precision contexts will be strengthened (since it can be more reliably inferred that the speaker is *choosing* to speak approximately for hearer- or situation-based reasons).

Prediction 3: 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 the 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.

We test these predictions in two pre-registered experiments.¹

¹The full preregistration can be found at <https://osf.io/r34vt>.

2. 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 prefer a precise answer (HighPr), the second expected to prefer an approximate answer (LowPr). These were tested in an online experiment in which self-reported native speakers of English with U.S. and U.K. IP addresses ($n=80$) were recruited via Prolific and paid £1.05 for participation. Each participant saw 8 of the 16 scenarios (randomly assigned), each in one of its two versions (also randomly assigned), as well as two possible answers (precise, approximate), and were asked to indicate which of the two answers was more appropriate, or if both were equally appropriate. An additional 8 filler items were included. Based on responses to selected filler items serving as attention checks, 6 participants were excluded, leaving 74 participants for the analysis. The proportion of precise vs. approximate responses was tallied for each scenario/version, and based on the results, 6 scenarios were selected that showed the greatest difference between HighPr and LowPr, the precise answer being preferred in the former and the approximate answer in the latter. These were used as the basis for the main experiments.

3. Experiment 1 – Form and Context. Our first experiment investigated the influence of situational context on the social meaning of precise and imprecise numerical forms, in a partial replication and extension of BSB. The study employed the matched guise methodology common in sociolinguistics (Lambert et al. 1960, Campbell-Kibler 2007), in which participants are exposed to linguistic stimuli in one of multiple versions or ‘guises’ and are asked to evaluate the speaker or writer on their properties or stances.

3.1. PARTICIPANTS. A total of 371 self-reported native speakers of English aged 18-64 with U.S. IP addresses were recruited via Prolific and paid £1.20 for participation.

3.2. DESIGN, MATERIALS, AND PROCEDURE. The materials for the experiment were brief 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 in a 2x2 design: context, i.e. required precision level (HighPr, LowPr) and numerical form (precise, approximate). For example:

LowPr: Jamie has a new bicycle and is telling a friend about it. The friend is interested and wants to know more. <i>Friend:</i> “How much did the bicycle cost? I’d love to get one like it.”	HighPr: Jamie’s new bicycle was stolen. Fortunately it was insured, so Jamie has called the insurance company. <i>Insurance agent:</i> “How much did the bicycle cost? I’ll start the paperwork right away.”
Jamie: “The bicycle cost \$509.55 (precise) / about \$500 (approximate).”	

The study was implemented in a 1-item, fully between subjects design ($n \approx 90$ per condition), where each participant saw one of the six pre-tested scenarios (randomly assigned) in one of its four versions. Participants completed three experimental tasks²:

²A full version of the experiment can be viewed at <https://www.labvanced.com/player.html?id=54649>.

Task 1 Participants rated the second speaker in the scenario on six dimensions of social meaning using a 7-point Likert scale: *competent*, *knowledgeable*, *well-prepared* [competence-related], *likeable*, *helpful* [likeability-related] and *pedantic*. For example:

Based on what they say, Jamie sounds:

not at all competent ○ ○ ○ ○ ○ ○ ○ very competent

Task 2 Participants indicated what they inferred to be the speaker's reason for using a precise [imprecise] numerical expression instead of a more approximate [more precise] alternative, via a free text fill-in-the-blank format. For example:

You might have noticed that the speaker Jamie used the expression \$509.55 [*about* \$500] rather than a less [more] precise expression such as *about* \$500 [\$509.55]. Why do you think Jamie answered that way?

Task 3 The 'reasons for choice' task was repeated in a multiple choice format, using fixed list of potential motivations selected based on prior research on imprecision (Mühlenbernd & Solt 2022):

Although you might have already mentioned this, which of the following, if any, do you think was a reason why Jamie chose to use \$509.55 [*about* \$500] instead of a less [more] precise expression? Check all that apply:

- because it was the appropriate level of detail in the situation
- to give as much information as possible
- to avoid giving too much information
- because the speaker didn't know the exact information
- to avoid saying something that might be false
- to sound smart
- to sound easy-going
- to make the information easier to understand
- because it was easier for the speaker
- none of these

3.3. PREDICTIONS. Below we state the predictions for Task 1 (social meaning ratings). Tasks 2 and 3 and their correlations with the results of Task 1 are discussed in Section 5.

Based on previous findings in the literature (Beltrama 2018, Beltrama et al. 2022), we predict the following main effects of form:

P1-1 **Precise** will be rated higher than **approximate** on the competence-related attributes *competent*, *knowledgeable* and *well-prepared*

P1-2 **Approximate** will be rated higher than **precise** on the likeability-related attributes *likeable* and *helpful*

P1-3 **Precise** will be rated higher than **approximate** on *pedantic*

We furthermore predict the following effects of context, i.e. interactions of form and context:

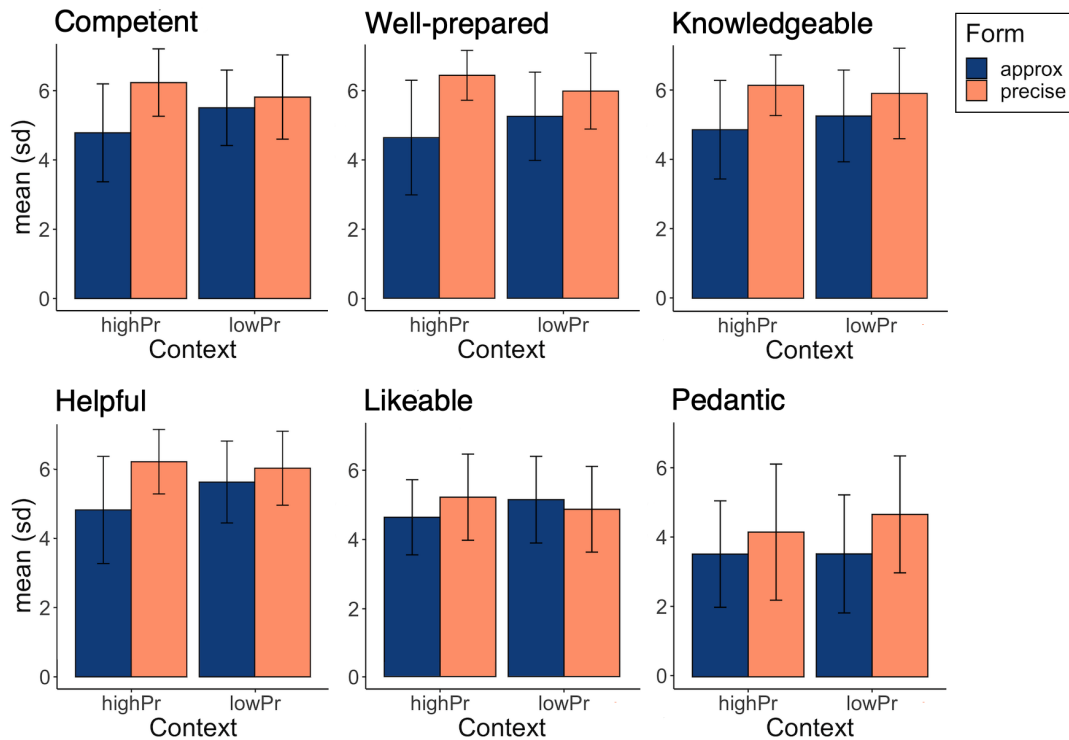


Figure 1: Ratings on social meaning attributes – Experiment 1

- P1-4 The positive difference between **precise** and **approximate** on competence attributes will be greater in **HighPr** than **LowPr**
- P1-5 The positive difference between **approximate** and **precise** on likeability attributes will be greater in **LowPr** than **HighPr**
- P1-6 The positive difference between **precise** and **approximate** on *pedantic* will be greater in **LowPr** than **HighPr**

3.4. RESULTS. All analyses were performed using R Statistical Software (v4.3.2; R Core Team 2021). The results of Task 1 are shown in Figure 1. For each attribute, a linear mixed effects model was fitted to the data using the package *lmerTest* (Kuznetsova et al. 2015), with form, context and their interaction as fixed factors and random intercepts for scenario. Predictors were sum coded.

For each of the three competence-related attributes *competent*, *knowledgeable* and *well-prepared*, a significant main effect of form was found (precise higher; $p < 0.001$ for all), supporting prediction P1-1. Furthermore, there was a significant interaction of context and form (greater effect in HighPr; *competent/well-prepared* $p < 0.001$, *knowledgeable* $p < 0.05$), supporting prediction P1-4. For the likeability-related attributes, no significant advantage for approximate over precise was found, contra prediction P1-2. Rather, for *likeable*, there was no main effect of form, whereas for *helpful*, precise was rated significantly higher than approximate ($p < 0.001$), as with the competence-related attributes. However, in both cases, there was a significant interaction of context and form ($p < 0.001$), with the relative strength of approximate vs. precise greater in LowPr than HighPr, in line with prediction P1-5. Finally, for *pedantic*, a significant main effect of form

was found (precise higher; $p < 0.001$), supporting prediction P1-3; the interaction of form and context is not significant ($p = 0.16$), contra P1-6, though there was a numerical difference in the predicted direction.

3.5. DISCUSSION. Consistent with previous work and our predictions, we find that the choice of numerical precision level carries social meaning: precise speakers are rated higher on competence-related dimensions than approximate ones, but are also found to be more pedantic. Importantly, these effects are sensitive to contextual factors. Specifically, the positive properties attributed to speakers using precise numerical forms are more pronounced in situations where high precision is called for, whereas the perceived positive associations with speaking approximately are more pronounced in low precision contexts. Thus these findings support the view that the social meaning of (im)precision derives at least in part from reasoning about the needs of the context.

The present study replicates and extends the findings of BSB. Notably, the effects of context (i.e. interactions of form and context) found here were more consistent and robust than those observed in the previous work. We attribute this to the fact that the scenarios tested in the present experiment were selected via a pretest that established that their two contextual versions differed in required precision level as intended. The most significant difference between the present results and those of BSB is that we found no overall advantage for the approximate form on likeability-related dimensions. We hypothesize that this might be due to the specific attributes included in the two studies, but also that it may reflect a difference in the structure of the experimental items. Specifically, the present study, in contrast to BSB, employed a question/answer format, such that even an overly precise speaker is providing information that their interlocutor has explicitly asked for. Whether such a factor indeed plays a role would need to be verified; but should this effect be found, it would be further support for the role of contextual appropriateness in deriving (especially) likeability-related associations from speakers' choice of form, consistent with the pragmatic view advocated here.

4. Experiment 2 – Knowledge State. In our second experiment, we assess the effect of established speaker knowledge on the social meaning of (im)precise numerical expressions. In the scenarios tested in Experiment 1, it is left unspecified whether the speaker is responding from memory or is instead consulting information available in the context. In Experiment 2, we modify this by investigating how perceptions of the speaker change when it is known that he or she has a precise information source available, which has been consulted before answering. As discussed in Section 1, on the pragmatic account proposed here, this manipulation is expected to amplify certain effects while diminishing others. Specifically, a precise speaker who is known to be simply reading from some available information source might be seen as less competent than one reporting from memory (since high knowledge is not required) but also less pedantic (since they have a reason for speaking precisely). Conversely, assuming high precision is not necessary, an approximate speaker who is known to have precise information available might be perceived as more likeable (since it can be more reliably inferred that the speaker is choosing to 'round off' for situational reasons rather than speaking approximately due to lack of knowledge).

4.1. PARTICIPANTS. A total of 391 self-reported native speakers of English aged 18-64 with U.S. IP addresses were recruited via Prolific and paid £1.20 for participation.

4.2. MATERIALS, DESIGN, AND PROCEDURE. The materials were modified versions of the same six scenarios tested in Experiment 1, in which it was established that the speaker has access to a source of precise information and has consulted this before answering. As in Experiment 1, two factors were manipulated – form and context – yielding four conditions in total. For example:

LowPr: Jamie has a new bicycle and is telling a friend about it. The friend is interested and wants to know more. Jamie has pulled out the purchased receipt which has more information about the bicycle. <i>Friend:</i> “How much did the bicycle cost? I’d love to get one like it.”	highPr: Jamie’s new bicycle was stolen. Fortunately it was insured, so Jamie has pulled out the purchase receipt and called the insurance company. <i>Insurance agent:</i> “How much did the bicycle cost? I’ll start the paperwork right away.”
Jamie looks at the receipt and then answers: “The bicycle cost \$509.55 (precise) / about \$500 (approximate).”	

The experimental procedure was identical to that in Experiment 1. For the analysis, data from Experiment 2 were combined with those from Experiment 1 to yield 8 conditions in total (2 forms x 2 contexts x 2 knowledge states).

4.3. PREDICTIONS. Based on the hypotheses sketched out above, we formulated four hypotheses for how the new **knowledge** conditions would differ from the original four **base** conditions:

- P2-1 For the three competence-related attributes, the positive difference between **precise** and **approximate** will be smaller in the **knowledge** condition than the **base** condition.
- P2-2 Restricting to the **LowPr** conditions: For *pedantic*, the positive difference between **precise** and **approximate** will be smaller in the **knowledge** condition than the **base** condition.
- P2-3 Restricting to the **LowPr** conditions: For *likeable*, the positive difference between **approximate** and **precise** will be greater in the **knowledge** condition than the **base** condition.
- P2-4 Restricting to the **HighPr** conditions: For *helpful*, there will be a positive difference between **precise** and **approximate** in the **knowledge** condition, and this will be greater than the corresponding difference in the **base** condition.

4.4. RESULTS. As in Experiment 1, these predictions were tested by fitting a linear mixed effects model to the ratings on each attribute, with form (precise/approximate), knowledge state (knowledge/base) and their interaction as fixed effects and random intercepts for scenario. Depending on the prediction, either the full data set was considered (P2-1) or the analysis was restricted to the LowPr (P2-2, P2-3) or HighPr (P2-4) conditions.

Regarding prediction P2-1, on the competence attribute *well-prepared*, a significant main effect of form was again found (precise higher, $p < 0.001$), as well as significant interaction of form and knowledge state (smaller difference in knowledge condition), $p < 0.05$), supporting the prediction. For the attributes *competent* and *knowledgeable*, however, there was again a main effect of form ($p < 0.001$) but no significant interaction of form and knowledge state.

Regarding prediction P2-2, on the attribute *pedantic* in the LowPr conditions, a main effect of form was again found (precise higher, $p < 0.001$). The interaction of form and knowledge state was

not significant, contra the prediction, though there was as predicted a tendency for the difference to be smaller in the knowledge condition ($p=0.12$). Furthermore, there was a significant main effect of knowledge state, in that the speaker (regardless of form) was rated as less *pedantic* in the knowledge condition than the base condition; that is, established speaker knowledge had an effect across forms, and not simply for the precise speaker.

Prediction P2-3 was not supported. In the LowPr contexts, there was no significant effect of form (as in Experiment 1) and no significant interaction of form and knowledge state. Finally, prediction P2-4 was only partially supported: in the HighPr context, there was a significant effect of precision in the knowledge condition, precise rated significantly more likeable approximate ($p<0.001$), but no significant interaction of precision and knowledge state.

4.5. DISCUSSION. In this second experiment, we sought to test the hypothesis that reasoning about a speaker's knowledge state contributes to the derivation of social inferences, by testing scenarios in which it is established that the speaker had precise information available (for example, a purchase receipt) on which to base their response to their interlocutor's question. We found that this modification had some effects on perceptions of the speaker, but these were less consistent and weaker than predicted.

A possible conclusion from this result is that, in contradiction to the predictions of our pragmatic account, reasoning about whether and how a speaker has precise knowledge of the relevant value does not in fact play a significant role in the derivation of social inferences about that speaker. There are however other possible explanations that can be considered. In particular, it might be that the experimental manipulation simply did not work as intended, that is, that participants did not perceive the speakers in the modified scenarios to have a precise information source available. Alternately, the modification to the experimental scenarios might have resulted in other unexpected changes in participants' reasoning, potentially offsetting the predicted effects. We return to this question in Section 5, where we investigate participants' perceptions of the reasons for speakers' expression choice.

5. Choice Motivations. The pragmatic account of the derivation of social meaning proposed in this work holds that hearers draw inferences about the *reasons* for a speaker's choice between alternative linguistic forms, and on this basis derive further social inferences about the properties of the speaker. To explore this, we elicited judgments from participants regarding the motivations they attributed to the speaker in the experimental scenario for their choice of precise or approximate form, and then investigated how these responses correlated with participants' ratings on the six social meaning attributes. We discuss these findings here.

As explained in Section 2, judgments were elicited first via free text (Task 2) and then via a multiple choice checkbox task (Task 3). Since the preregistered predictions were stated relative to the multiple choice Task 3, we focus on these findings here, leaving a full discussion of the results of Task 2 to future work. A summary of the results of Task 3 is presented in Section 5.1, and their correlation with the social meaning ratings from Task 1 discussed in Section 5.2. In Section 5.3, we consider the implications of these findings, including how they shed light on the results of Experiment 2.

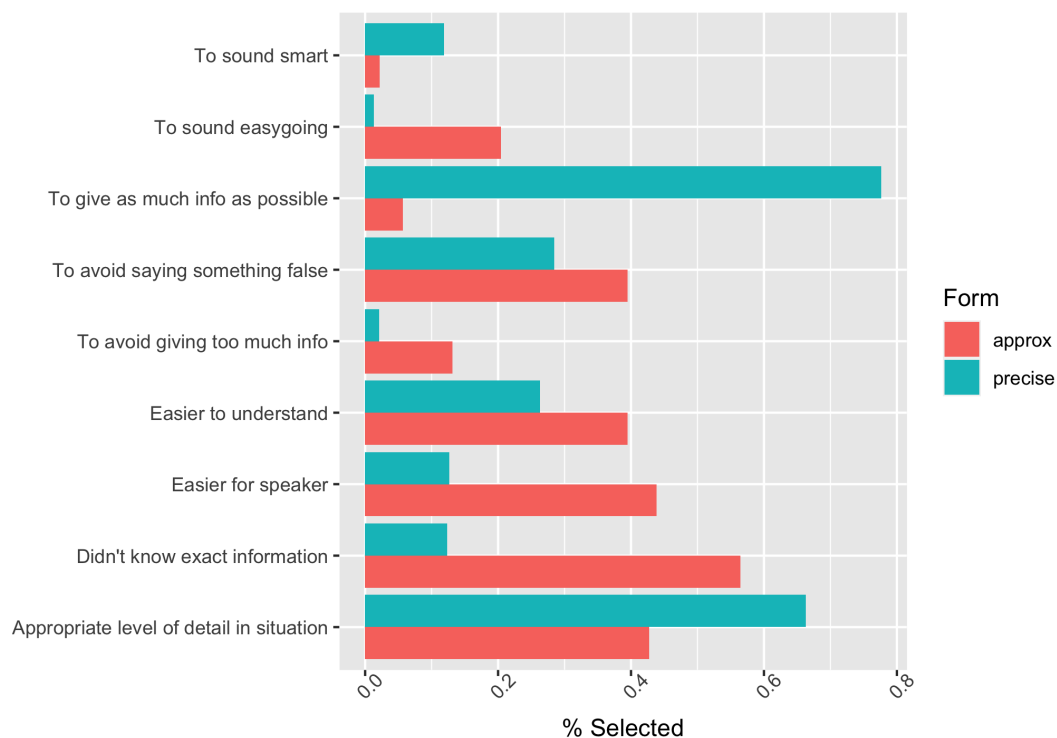


Figure 2: Motivations

5.1. RESULTS - TASK 3. Figure 2 presents the results of Task 3 for the combined data set from Experiments 1 and 2, broken out by form (precise vs. approximate). As seen here, participants attributed a range of motivations to the speaker for their use of a precise or approximate numerical expression instead of its alternative. Furthermore, as expected, the most commonly attributed motivations differed for the two forms. In the case of the precise form, the most frequently selected answers were: “to give as much information as possible” and “because it was the appropriate level of detail in the situation”. For the approximate form, a wider range of motivations were selected, including: “because the speaker didn’t know the exact information”, “because it was easier for the speaker”, “because it was the appropriate level of detail in the situation”, “to make the information easier to understand” and “to avoid saying something that might be false”.

Two predictions were preregistered to serve as basic checks that participants’ responses on this task were sensitive to the properties of the scenario in the expected way.

- P3-1 **Context manipulation:** Restricting to the results of Experiment 1, for the **precise** form, “appropriate level of detail in the situation” will be selected more frequently in the high-precision condition **HighPr** than the low-precision condition **LowPr**, whereas for the the **approximate** form, it will be selected more frequently in **LowPr** than **HighPr**.
- P3-2 **Knowledge state manipulation:** For the **approximate** form, “speaker didn’t know the exact information” will be selected more frequently as a motivation in the original **base** condition than in the **knowledge** condition.

These predictions were tested by fitting a generalized linear mixed effects model to the indicated motivation responses in the relevant data set, with context [P3-1] or knowledge state [P3-2] as a fixed factor and random intercept for scenario. Both predictions were supported ($p < 0.001$), indicating that participants were indeed able to draw context-sensitive inferences regarding the reasons behind speakers' choices between precise and approximate numerical forms.

5.2. MOTIVATIONS AS PREDICTORS OF SOCIAL MEANING RATINGS. From the pragmatic account of social meaning, we derived and preregistered a series of predictions regarding the correlations that would be observed between the *motivation(s)* attributed to the speaker for their choice of form and the *ratings* of the speaker on the six social meaning attributes.

- P4-1 For the **approximate** form in the **base** knowledge state condition, the selection of “speaker didn’t know the exact information” as a motivation will correlate with lower ratings on the competence attributes *competent*, *knowledgeable* and *well-prepared*.
- P4-2 For the **approximate** form in the **base** knowledge state condition, the selection of “to make the information easier to understand” will be correlated with higher ratings on the likeability attributes *likeable* and *helpful*.
- P4-3 For the **precise** form (across contexts and knowledge states), the selection of “to sound smart” will be correlated with lower ratings on *likeable*.
- P4-4 For the **precise** form in the **LowPr** context, the selection of “to give as much information as possible” will be correlated with lower ratings on *likeable* and higher ratings on *pedantic*.

In each case, the prediction was tested by fitting a linear mixed effects model to the relevant subset of the combined data from Experiments 1 and 2, with ratings on the social meaning attribute from Task 1 as the dependent variable, the motivation as a fixed effect and random intercept for scenario.

Regarding prediction P4-1, the effect of “speaker didn’t know the exact information” on the three competence attributes was not significant, contra the prediction. There was however a tendency in the predicted direction for *competent* and *well-prepared* ($p = 0.10$ and $p = 0.13$, respectively). Prediction P4-2 was supported: the approximate speaker was rated as more *likeable* and *helpful* when “to make the information easier to understand” was selected as a reason for the choice ($p < 0.05$ in both cases). Prediction P4-3 was likewise supported: the precise speaker was rated as less *likeable* when “to sound smart” was selected ($p < 0.05$). Finally, prediction P4-4 was not supported: “to give as much information as possible” as a reason for use of the precise form in the LowPr context did not significantly affect ratings on *likeable* or *pedantic*.

5.3. DISCUSSION. Our findings from the third experimental task provide evidence that listeners can derive inferences about the reasons for a speaker’s numerical expression choice in a given situation. Furthermore, these inferred motivations were demonstrated to be predictors for how subjects evaluated those speakers with respect to their social properties. In line with our predictions, when it was inferred that the speaker used an approximate form to make the information easier to understand, this led to a perception of the speaker as more likeable, whereas when the reason was inferred to be lack of knowledge of the precise value, this yielded a tendency towards lower ratings on competence-related dimensions. Similarly, when it was inferred that a speaker chose a precise form “to sound smart” (as opposed, say, in response to the needs of the situation), this lowered likeability perceptions. While the particular pattern of effects we found differed some-

what from the original predictions (especially for prediction P4-4), the overall picture supports the pragmatic hypothesis, according to which social meaning derives from inferences about *why* the speaker made a given linguistic choice.

While space considerations do not allow a full discussion of the results of the free text version of the motivations task (Task 2), we briefly note that these data yield a similar picture, while also identifying additional perceived motivations with predictive value. Very broadly speaking, inferred reasons for choice that relate to the needs of the situation and/or the hearer correlated with more positive evaluations of the speaker, while those that related to the speaker (e.g. what is easier for the speaker or generally preferred by the speaker) led to less positive evaluations. These patterns too are consistent with the pragmatic derivation of social meaning in this case study.

Finally, findings from the exploration of inferred reasons for choice also shed light on the results of Experiment 2, where it was seen that established speaker knowledge had less effect than predicted on social meaning ratings. One possibility raised was that the knowledge state manipulation did not work as desired. We found some support for this from the motivations task: focusing on the approximate form, “speaker didn’t know the exact information” was as predicted selected less frequently in the knowledge condition than in the base condition (per prediction P3-2); but this answer was nonetheless chosen by a sizeable minority of participants in the knowledge condition (base condition: 70%; knowledge condition: 42%). Thus the scenarios tested in Experiment 2 apparently did not fully rule out the possibility that the approximate speaker’s choice was in some way based on lack of precise knowledge. Furthermore, the reasoning behind our predictions was that once lack of knowledge was ruled out as a motivation for the approximate choice, participants would infer that the speaker was rounding for hearer-oriented reasons. Indeed, “to make the information easier to understand” was selected more frequently in the knowledge condition than the original base condition (base: 31%; knowledge: 48%); but so too was “easier for the speaker” (base: 33%; knowledge: 55%), which was not correlated with more positive ratings of the speaker. Thus it seems that participants’ reasoning process did not necessarily follow the (overly) simple path we expected, and correspondingly, the effect of knowledge state on social evaluations was likewise more complex than predicted. In summary, while Experiment 2 did not provide extremely strong evidence for the role of reasoning about speaker knowledge in the derivation of social inferences, neither does it provide compelling evidence against the existence of such an effect.

6. Conclusions. In contrast to a common view in sociolinguistics that social meanings are indexically associated with linguistic forms themselves, our results support the view that for particular types of variation, especially those where alternatives differ in their semantic content, social meanings may derive from pragmatic inferences drawn by the hearer, including reasoning about the needs of the situation, the speaker’s epistemic state, and the reasons for their choice of form. More precisely, our findings show that the properties attributed to speakers who use precise and approximate numerical forms are sensitive to the requirements of the context of utterance (P1-4, P1-5), the inferred knowledge state of the speaker (P2-1 for well-prepared, P4-1), as well as possible reasons for the speaker’s choice of form (P4-2, P4-3). These effects all support the pragmatic account.

While we have focused here on a single case study, namely that of precision level variation, we believe that the pragmatic derivation of social meaning is a more general phenomenon. In fact, Beltrama & Papafragou (2023) find similar effects to those discussed here for utterances in which

speakers either comply with or violate the Gricean maxims of relevance and informativity.

In future work, we plan to investigate in greater depth the link between inferences about a speaker's motivations for a linguistic choice and inferences about the speaker him- or herself. On the basis of these findings, our further goal is to develop a formal probabilistic model that predicts social evaluations of a speaker by connecting linguistic form, context and social meaning via inferences about the speaker's epistemic state and strategy for choosing between alternatives.

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