

## Pragmatic violations affect social inferences about the speaker

**Andrea Beltrama**, University of Pennsylvania, US, [beltrama@sas.upenn.edu](mailto:beltrama@sas.upenn.edu)

**Anna Papafragou**, University of Pennsylvania, US, [anna4@sas.upenn.edu](mailto:anna4@sas.upenn.edu)

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Listeners systematically extract two types of information from linguistic utterances: information about the world, and information about the speaker – i.e., their social background and personality. While both varieties of content have been widely investigated across different approaches to the study of language, research in pragmatics has mostly focused on the former kind. Here we ask how listeners reason about a speaker’s conversational choices to form an impression about their personality. In three experiments, we show that a speaker’s adherence to, or violation of, the pragmatic principles of Relevance and Informativeness, as well as the reasons underlying these violations, affect the evaluation of the speaker’s personality along the core social dimensions of Warmth and Competence. These findings highlight the value of enriching work in pragmatics with insights from sociolinguistics and social psychology about how people reason about human speech to draw inferences about the identity and personality of their interlocutors.

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## 1. Introduction

By virtue of being conventionally associated with meanings, words enable us to represent the world around us. Nevertheless, a key fact about human communication is that the meanings exchanged by interlocutors do not stop at the conventional content of the expressions deployed by the speaker. In fact, research across linguistics, psychology and philosophy has extensively shown that listeners systematically go beyond the semantic meaning that they extract from an utterance by drawing inferences of different kinds, with two varieties having received special attention: (i) *pragmatic* inferences, which allow listeners to fine-tune the descriptive message of an utterance by reasoning about the interlocutors' intentions (Grice, 1957; Horn, 1984; Levinson, 2000; Sperber & Wilson, 1995, see 2.1 for further details); and (ii) *social* inferences, which allow listeners to gather information about the speaker themselves – their demographic background, interpersonal attitudes and personality (Campbell-Kibler, 2010; Eckert, 2008; Eckert & Labov, 2017; Podesva, 2011, see 2.2).

In this article we integrate the study of these two domains by asking whether, and how, social inferences about speaker personality can be computed on the basis of the same communicative principles that typically inform pragmatic inferences. Specifically, we show that a speaker's adherence to, or violation of, pragmatic principles, as well as the reasons underlying these violations, affect the evaluation of the speaker's personality along two key dimensions of social evaluation, Warmth and Competence. We argue, on the basis of these findings, that pragmatic reasoning and social evaluation jointly underlie the processes that allow listeners to go beyond the conventional meaning of utterances in communication.

## 2. Background

### 2.1 Pragmatic inferences in linguistic communication

The *descriptive* function of language is inextricably linked to words' conventional meaning, which allows them to represent entities from the outside world. By assembling such words into linguistic utterances, humans can exchange information about the state of reality, and thus describe what happens around them – fulfilling a function that is very much central to linguistic communication. It is now widely acknowledged, however, that the meaning conveyed by linguistic utterances crucially includes information that is external to the conventional meaning of the words, and must be inferred on the basis of the situation. For example, an answer “She goes to Cleveland every weekend” to the question “Is Gail dating anyone these days?” is likely to convey that Gail is dating someone in Cleveland, even though its conventional content merely describes Gail's traveling habits on weekends (Grice, 1975). Inferences of this sort, typically referred to as pragmatic inferences, have been a primary object of investigation in the study of communication. Although different frameworks have modeled this inferential process in different ways, such frameworks by-and-large share two crucial tenets originally introduced by

Grice's theory of communication (Grice, 1957, 1975). First, they presume that communication is *intentional* – for these inferences to be drawn, the listener must assume that the speaker wants to communicate that particular message, and that the speaker wants the listener to recognize their intention to communicate such a message. Second, they assume that communication is a *cooperative* enterprise – the interlocutors must be working jointly to achieve the purpose of attaining an effective exchange of information.

Within this framework, the notion of cooperative communication is further decomposed into four basic maxims: specifically, cooperative speakers are expected to speak truthfully; provide as much information as is required; make a contribution that is relevant to the conversation topic; and avoid obscure, ambiguous or prolix formulations. It is precisely by reasoning about the speaker's behavior with respect to these maxims that pragmatic inferences are ultimately drawn: for instance, the inference that Gail is dating someone can be drawn by positing that speaker was following Relevance – that is, that they wanted to address the interlocutor's inquiry about Gail's sentimental state.

Building on or amending Grice's insights, a variety of approaches have striven to capture how inferential processes give rise to pragmatic meanings (Carston, 1998; Goodman & Frank, 2016; Horn, 1984; Levinson, 2000; Sperber & Wilson, 1995, among others),<sup>1</sup> and much experimental work has explored the cognitive processes whereby such meanings are computed by interlocutors (Barner et al., 2011; Bott & Noveck, 2004; Breheny, 2019; Degen & Tanenhaus, 2015; Grodner et al., 2010; Huang & Snedeker, 2009a, 2009b, 2018; Nieuwland et al., 2010; Noveck, 2001; Papafragou & Musolino, 2003; Skordos & Papafragou, 2016).

## 2.2 From pragmatic to social inferences

Although the descriptive dimension is central to linguistic communication, utterances do much more than merely represent states of affairs; they also, and crucially, convey information about language users themselves. For instance, they systematically open a window onto the speaker's mental states – their thoughts, attitudes and emotions with respect to what is being said and the broader conversational context (Kaplan, 1999; Potts, 2007; Sperber & Wilson, 1995). Furthermore, and most relevantly for present purposes, linguistic utterances reveal, or *index*, aspects of the identity and personality of the speaker – their demographic background, ideology and identity; in virtue of this, they allow interlocutors to draw *social* inferences, aimed at zeroing in on who speakers are, or come across as, based on the way they speak. Social inferences have been a central object of investigation in sociolinguistics and linguistic anthropology, whose primary goal is to investigate language's ability to reflect and reshape the social context in which interlocutors operate. Research in this area has shown that social

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<sup>1</sup> See Chierchia (2017) for a different approach.

inferences are ubiquitous in linguistic communication and arise from a variety of linguistic cues – from the particular linguistic variety speakers use (Lambert et al., 1960; Woolard, 1984) to the more specific properties that characterize their speech at the phonological and morpho-syntactic level (Campbell-Kibler, 2007; Eckert, 2008; Labov, 1963; Levon, 2014; Podesva, 2011; Silverstein, 2003, among others). This work additionally showed that social inferences come with different temporal profiles (Campbell-Kibler, 2011; Eckert, 2008; Gumperz, 1977; Moore & Podesva, 2009; Ochs, 1992): some of them involve an assessment of the speaker’s attitude, feelings and dispositions in the here-and-now of the conversation – e.g., how considerate towards the interlocutor, engaged in a topic or conciliatory vs. adversarial a speaker is perceived as at a given point of the conversational exchange;<sup>2</sup> others target the more durable features of the speaker above and beyond the specific interactional context – i.e., they concern the broader personality, identity and ideological traits of the speaker (e.g., how conservative/liberal, likable, laid-back, educated etc. they are as a person).

Social inferences differ from pragmatic ones in two fundamental ways. First, as mentioned above, they target the speaker’s identity, rather than the descriptive content of the utterance or the speaker’s mental state. Second, contrary to inferences targeting other dimensions of language use, they can be computed without presuming intentionality. Recall that inferring that Sue is seeing someone in Cleveland upon hearing the utterance “Sue goes to Cleveland every weekend” requires that the speaker intended for this inference to be drawn. However, listeners are able (and likely) to draw social inferences from a speaker’s linguistic behavior regardless of whether the speaker meant to produce a particular impression or not (see Acton, 2022; Beltrama, 2020; Eckert, 2019, for further discussion). Even though pragmatic and social inferences have typically been studied independently of one another, leading scholars in the study of linguistic communication have argued that the two kinds of inferences should jointly be seen as part and parcel of language’s ability to convey meaning at different levels (Clark, 1992; Eckert, 2019; Eckert & Labov, 2017; Ochs, 1992; Silverstein, 1985). Especially prominent, in this perspective, is work exploring the link between a speaker’s pragmatic behavior and *politeness* inferences, a variety of social inferences that listeners draw about the type of interpersonal relationship that a speaker aims to establish with the interlocutor – e.g., how respectful, tactful, rude or threatening towards the interlocutor the speaker comes across as depending on the amount and type of information communicated. In foundational contributions to this topic, Lakoff (1974) and Brown and Levinson (1987) suggest that politeness inferences often arise as the result of a violation of one or more Gricean maxims. For example, uttering seemingly irrelevant (“It’s cold in here”) or verbose utterances (“Would you mind closing the window?”) in lieu of more

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<sup>2</sup> These temporary dispositions are often referred to as *stances* in the sociolinguistics and discourse analysis literature. See Kiesling (2016) and Moore and Podesva (2009) for further discussion.

pragmatically appropriate, yet potentially disruptive commands (“Shut the window!”) can be strategically used by speakers to mitigate the tone of a request, and accordingly lead listeners to perceive the speaker as being especially tactful and polite – as also pointed out by Grice (1975) himself (see also Blum-Kulka, 1987; Brummernhenrich & Jucks, 2015; Kulka & Olshtain, 1984, for related proposals). These and other cases led to the development of influential frameworks aiming to derive politeness inferences via mechanisms similar to those generating pragmatic inferences – i.e., via reasoning on the basis of the Cooperative Principle, often supplemented by a set of additional postulates specific to politeness.<sup>3</sup> These include, among other, the Politeness Principle (Lakoff, 1974); Politeness Maxims: (Leech, 1983); Positive and Negative Face: (Brown & Levinson, 1987).<sup>4</sup>

### 2.3 Pragmatic behavior and person perception

As discussed above, foundational work on social inferences in pragmatics has by-and-large focused on politeness; yet, humans’ ability to draw social inferences about other people extends much beyond politeness considerations – and much beyond language. In particular, work in social psychology has unveiled the mechanisms behind *person perception*, showing that people are able to form an impression of someone’s personality and identity from just about any aspect of their behavior – their choices, appearances, and preferences.<sup>5</sup> Especially influential in this line of research is the idea that social perception can be mapped onto a common underlying trait space which consists of two core, orthogonal dimensions: (a) the evaluation of someone’s intentions and disposition towards others, most commonly known as *Warmth*, or a socially good/bad dimension (e.g., considerateness, likability, friendliness); and (b) the evaluation of someone’s individual skills and ability to achieve goals, commonly known as *Competence*, or an intellectually good/bad dimension (e.g., knowledgeability, capability, assertiveness: Fiske et al., 2002; Fiske et al., 2007;

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<sup>3</sup> Other work supporting a more integrated view of pragmatic and social inferences focuses on social inferences from linguistic forms that are likely to require pragmatic reasoning to be interpreted in a particular context. Relevant examples include demonstratives (Acton & Potts, 2014; Lakoff, 1974); intensifiers (Beltrama & Staum Casasanto, 2017, 2021); modals (Glass, 2015; Karawani & Waldon, 2017); numerals words (Beltrama, 2018; Beltrama et al., 2022); determiners (Acton, 2019); and rising intonational contours (Jeong, 2021). This body of work examines the social qualities associated – at least to a certain extent – with specific lexical items or devices, and hence differs from work on politeness that focuses on mechanisms that generate social inferences from broad kinds of pragmatic-conversational choices.

<sup>4</sup> See Culpeper (2009), Jary (1998), Leech (2014), and Terkourafi (2003, 2015) for critical rethinking of these accounts; and see Bonnefon et al. (2009), Jeong (2021), Mazzarella et al. (2018), and Yoon et al. (2020) for recent implementations of politeness inferences within post- and neo-Gricean frameworks.

<sup>5</sup> It is important to note that person perception has also been investigated in sociolinguistic frameworks (in particular, “Third Wave” sociolinguistics: Campbell-Kibler, 2011; Eckert, 2008; Hall-Lew et al., 2021). Yet, this work has largely focused on specific properties of sounds and (to a lesser extent) morpho-syntactic constructions, to the exclusion of speakers’ broader patterns of conversational behavior. It thus presents limited overlap with pragmatics, except for the points of convergence discussed above.

Fiske et al., 1999; Goodwin et al., 2014; Judd et al., 2005; Stoler et al., 2020). Research in this tradition has suggested that patterns of human action and behavior – and the social groups that are stereotypically associated with them – can be typically categorized within one of the four different possible combinations of these two dimensions (see Fiske, 2018).

While person perception has been investigated with respect to many domains of human behavior, it has received little attention in pragmatics, where the focus has been largely on inferences targeting the descriptive message of an utterance to the exclusion of the social aspect (see 2.1); or limited to politeness considerations, anchored to the here-and-now of the conversation, to the exclusion of speakers' broader range of personality traits (see 2.2; see also Kinzler, 2021 on the limited work focused on linguistic communication in social psychology). Yet, communication represents a domain of human activity that is deeply intertwined with the social context in which people operate; in fact, as Sperber and Wilson (1997) put it, “communication is a paradigm case of social interaction, and any theory of communication is a theory of the most ubiquitous social phenomenon” (Sperber & Wilson, 1997, p. 145). Two important considerations follow from this. First, no understanding of conversation as a domain of human activity can be complete without considering the full extent of these social ramifications; second, pragmatic approaches to the study of conversation would have much to gain from investigating how people reason about someone's conversational choices in light of the Gricean maxims to judge and evaluate their interlocutor's personality – above and beyond politeness considerations. Shedding light on this issue, in turn, would help us attain a more comprehensive understanding of how listeners extract different kinds of information from linguistic utterances, a goal that is very much central to pragmatics as a discipline, while opening up a novel testing ground for exploring impression formation across different domains of human behavior.

### **3. Current study: Pragmatic maxims and social evaluation**

In a series of experiments, we ask how someone's conversational choices – specifically, their adherence to or violation of pragmatic maxims – affect how they are evaluated along the two foundational social dimensions of Warmth and Competence (see 2.3). We focus on two maxims central to the Gricean project, as well as their interaction: (a) *Relevance*, i.e., the expectation that a speaker should provide a contribution that is pertinent to the topic of the conversation (or Question under Discussion; see Roberts, 1996/2012); (b) *Informativeness*, i.e., the expectation that the speaker should provide an appropriate amount of information – not too little, and not too much. Our general hypothesis is that violations of these two maxims – by means of entailing a breach of conversational cooperativeness – should have social costs for the speaker along both target dimensions. Specifically, they should lead to a penalty along Warmth by virtue of disrupting or ignoring the interlocutor's quest for information, thus making the speaker come across as not positively disposed towards their conversational partner. Additionally, they should lead to a

penalty along Competence by virtue of highlighting the speaker as an unskilled conversational agent – one who lacks the ability to successfully engage with the task of exchanging information in an effective manner.

Crucially, however, we also predict that listeners' reasoning, and therefore the precise effect of someone's conversational choices on the perception of Warmth and Competence, should be modulated by the particular *reason* motivating the speaker's behavior. This is because, although social inferences are especially likely to be triggered by a speaker's move away from Grice's Cooperative Principle (see also Culpeper, 2009), reasoning about why one or more maxims were violated by the speaker should affect listeners' perception of the speaker. In particular, maxim violations in the Gricean framework are often explained in terms of the speaker's *inability*: for instance, someone might fail to be informative because of lack of knowledge (Bergen & Grodner, 2012; Breheny et al., 2013; Carston, 1998; Goodman & Stuhlmüller, 2013; Grice, 1975; Kampa & Papafragou, 2019). But when the speaker is knowledgeable, maxim violations can still arise when the speaker is *unwilling* to make an appropriate conversational contribution. As Grice himself noted, in some cases, a speaker may violate a maxim in an effort to reconcile pragmatic injunctions with other social priorities – e.g., face considerations – as extensively observed in the politeness literature (see 2.2). But in other, less-discussed cases, maxim violations may arise from speaker preferences that are selfish or opaque. For example, we routinely witness conversations in which speakers might over-describe or under-describe things with no benefit to the interlocutor; mislead the interlocutor; or fail to address the interlocutor's questions or concerns with no obvious motivation other than self-interest. Even though these cases have typically been construed as instances of communication breakdowns marginal to pragmatic theory (but see Culpeper, 2009; Geurts, 2010; Sperber & Wilson, 1995, for a different take), such forms of uncooperative behavior emerge as important test cases to better understand how listeners draw social inferences from a speaker's pragmatic behavior, and how such inferences are different from those drawn in contexts in which maxim violations are motivated by other, more obvious reasons.

In support of this idea, recent work has shown that under-informative speakers are considered less helpful and are dispreferred as future information sources compared to adequately informative ones (Fairchild et al., 2020; Fairchild & Papafragou, 2018; Gweon et al., 2018); however, these inferences only go through in situations in which this behavior can be attributed to unwillingness, as opposed to inability, to produce an adequately informative description (e.g., when under-informative sentences are uttered by native vs. non-native speakers). These results, in turn, resonate with the observation that unwillingness is penalized more heavily compared to inability during intentional action understanding in both humans and other primates (Behne et al., 2005; Call et al., 2004; Canteloup & Meunier, 2017; Phillips et al., 2009). Following and generalizing this line of thought, we hypothesize that the social costs linked to pragmatic

violations could be mitigated when these violations are driven by reasons that highlight the speaker's commitment to remaining at least partially cooperative (i.e., *inability* as opposed to *unwillingness*) – for example, those in which a speaker provides an overt justification for the violation, as opposed to not doing so.

Our experiments proceed as follows. In Experiment 1, we test the hypothesis that a speaker who fails to observe either Relevance or Informativeness should appear less well disposed towards the interlocutor (hence receiving lower Warmth ratings), as well as less capable (hence receiving lower Competence ratings) compared to a speaker who obeys the maxims. In Experiment 2, we test the prediction that the social impact of pragmatic violations should be affected by whether such violations can be ascribed to the speaker's unwillingness vs. inability to produce a more felicitous utterance. We predict that pragmatic violations should be more detrimental to social evaluation when they are driven by unwillingness as opposed to inability – especially with respect to the Warmth dimension. In Experiment 3, we test the hypothesis that the social penalty for irrelevant speakers can be mitigated if the speaker provides a reason to justify the decision to veer off the conversational topic. Throughout, we additionally assess whether these hypotheses uniformly hold across social traits that target the momentary, here-and-now of the speaker's behavior in the conversational exchange vs. their more durable, permanent identity traits and personality (see 2.1).

## 4. Experiment 1

Experiment 1 investigated whether the social perception of a speaker is modulated by their adherence to or violation of Relevance and Informativeness. Critically, the speaker was always presented as knowledgeable, so that any failures to provide a relevant and/or informative conversational contribution had to be attributed to unwillingness to behave in a pragmatically appropriate way. Of interest was whether the speaker's perceived Competence or Warmth would be affected by this type of uncooperative conversational behavior.

### 4.1 Methods

#### 4.1.1 Participants

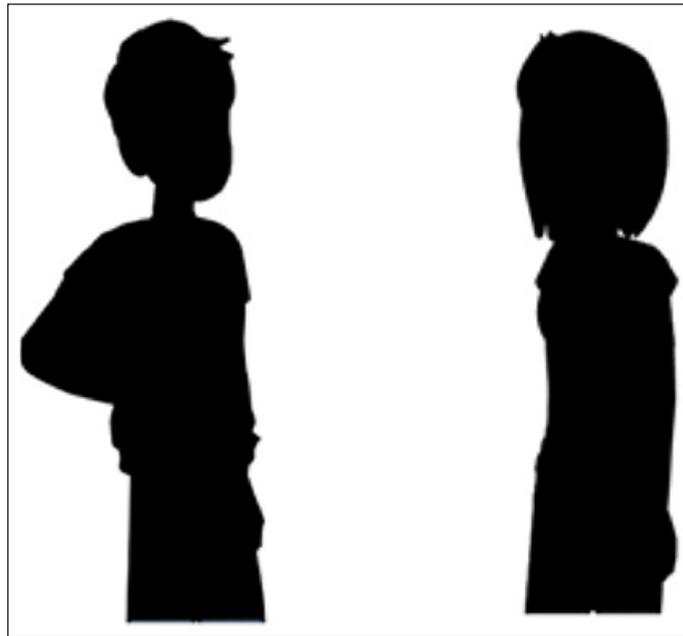
One hundred native speakers of English were recruited on Prolific.<sup>6</sup> Of these, 14 participants were excluded for recording a comprehension score below 95% (see 4.1.2 for further details); responses from the remaining 86 participants were retained for the analysis (Age range: 19–71; Age median: 35; Self-declared female = 53; Self-declared male = 33). Individuals who participated in this and all subsequent experiments provided informed consent in compliance with the University of Pennsylvania Institutional Review Board.

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<sup>6</sup> In this experiment and all the following ones, participants were screened for first language using the “First Language = English” screening feature in Prolific.

#### 4.1.2 Materials and Procedure

The experiment was implemented via Penn Controller Ibex (Schwarz & Zehr, 2021)<sup>7</sup> and administered online. The study consisted of a series of short conversations between two characters, introduced by the following text on the screen: “In this study, you will see some conversations between two people. After the conversation, you’ll be asked several questions about one of these people.” Next, participants saw two conversational partners in the form of two silhouettes of a stereotypically male and female character respectively, facing one another (see **Figure 1**).



**Figure 1:** Silhouettes of the two characters.

The characters would then proceed to engage in a conversation, with each of their utterances presented in a speech bubble. For the test items, two factors, Relevance and Informativeness, were crossed in a  $2 \times 2$  within-subjects design. Each conversation was introduced by a short context sentence presenting the two characters. In each conversation, one character expressed the desire to carry out a particular activity, and mentioned several possible options to achieve this goal.

The other character always responded by claiming to be familiar with the topic, and then continued the conversation in one of two ways: either by elaborating on one of the options mentioned by the conversational partner, thus sticking to the conversational topic, corresponding to the +*Relevance* level of the Relevance manipulation; or by changing the conversational topic

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<sup>7</sup> <https://www.pcibex.net>.

altogether, corresponding to the *-Relevance* level, and thus leading to a pragmatic violation. Furthermore, the character's response either consisted of a detailed, two-sentence description (*High Informativeness* level of the Informativeness manipulation), or a short, one-sentence statement (*Low Informativeness*), resulting in an utterance that contained only a subset of the words uttered in the *High Informativeness* condition.

(1) illustrates a test item, in which the two characters are named John and Kim. Kim opened the conversation by expressing the desire to go on either a skiing vacation or a Caribbean vacation and mentioned possible destinations. John responded by telling Kim that he had been to all these places. Subsequently, he went on to mention that he had recently been to Zermatt, Switzerland, regardless of what interests Kim had expressed in the previous utterance. As a result, John's utterance could be construed as being on topic, and therefore as being pragmatically compliant, when Kim had said that she intended to go skiing (*+Relevance*); or as leading to a clear topic shift, and therefore to a violation, when Kim had said that she intended to go on a Caribbean vacation (*-Relevance*). Furthermore, John's response offered a detailed discussion about his own experience as a tourist in that skiing destination, resulting in an utterance that was adequately informative in light of Kim's need (*High Informativeness*); or simply mentioned the trip to Zermatt without adding any more information (*Low Informativeness*). Crucially, the fact that John's final utterance was always introduced by John saying "I've been to all these places" made it clear that John was able to address Kim's comment about the vacation destinations she was considering. As a result, in cases where his responses were irrelevant or low in informativeness, it was obvious that he had deliberately chosen to violate a maxim for no other apparent reason – that is, he was unwilling to cooperate.

(1) Experiment 1 test item:

a. *+Relevance*:

**Kim:** I'd like to go on a skiing vacation, but I don't know where to go. I'm thinking Austria, Switzerland or Italy.

**John (*Low Informativeness*):** I've been to all these places. Let's see... I recently went to Zermatt, Switzerland.

**John (*High Informativeness*):** I've been to all these places. Let's see... I recently went to Zermatt, Switzerland. It has the best slopes and views of all skiing places I've been to.

b. *-Relevance*:

**Kim:** I'd like to go on a Caribbean vacation, but I don't know where to go. I'm thinking Antigua, Barbados or Bahamas.

**John (*Low Informativeness*):** I've been to all these places. Let's see... I recently went to Zermatt, Switzerland.

**John (*High Informativeness*):** I've been to all these places. Let's see... I recently went to Zermatt, Switzerland. It has the best slopes and views of all skiing places I've been to.

Sixteen sets of test items were created. These items were distributed into four lists with a Latin Square design, so that every subject was tested on only one version for a given item. The gender of the two characters was counterbalanced such that, in half of the conversations within each list, a female character opened the conversation and a male character responded, and in the other half a male character opened the conversation and a female character responded. The conversation was presented incrementally on the screen: each utterance was shown for 7 seconds and then replaced by the subsequent utterance. After the conversation ended, the silhouettes of the characters were removed from the screen and participants were presented with four questions targeting the social evaluation of the responding character: two questions assessed Competence, and the other two Warmth. For each social dimension, the questions covered both the character's conversational behavior in the here-and-now of the exchange ("in this conversation") and the more durable aspects of their personality ("as a person"). For each dimension, we chose two attributes that could serve as windows into the "intellectually good/bad" vs. "socially good/bad" distinction typically used to characterize the opposition between Competence and Warmth in the literature on person perception (see 2.3).<sup>8</sup>

**Competence questions:**

- i. How knowledgeable do you think John is in this conversation? (Here-and-now)
- ii. How competent do you think John is as a person? (Durable)

**Warmth questions:**

- i. How considerate towards Kim do you think John is in this conversation? (Here-and-now)
- ii. How likable do you think John is as a person? (Durable)

Responses consisted of a rating between 1 (lowest value) and 7 (highest value); participants could enter their response by choosing from a radio button on the screen. The questions were presented incrementally; after a rating was entered for one question, the subsequent question would appear. The order of the questions was the following: Competence i; Warmth i; Competence ii; Warmth ii.

We also created sixteen filler items, also consisting of conversations between two characters represented with a silhouette. The filler items were intermixed with the test items. In all the filler items, one person asked a question and another person, either presented as a native speaker of English or as a non-native speaker of English with a strong accent, responded. The response was

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<sup>8</sup> Note that the term "competent" is mentioned in one of the Competence questions, but "warm" is not used in the Warmth questions. However, both "likable" and "considerate", as well as the qualities that they express, squarely fall within the domain of Warmth as discussed in the social psychology literature (see 2.3). We therefore take these to be indicative of this dimension in the same way in which the two competence traits are indicative of Competence.

always relevant. The gender of the characters, as well as the status of the respondent as a native vs. non-native speaker, was counterbalanced. The filler items were followed by four evaluation questions asking participants to rate how precise, smart, thoughtful and nice “as a person” the responding character was; moreover, each filler was followed by a True/False comprehension question aimed to assess whether participants had paid attention to the exchange. Data from participants whose comprehension accuracy was below 95% – that is, who failed more than one comprehension check among the sixteen ones included in the study – were excluded from the analysis. A link to a full list of the experimental and filler items (and comprehension checks), for this study and the subsequent ones, is provided in the supplementary materials.

## 4.2 Results

For statistical analysis, we fit separate linear mixed-effects models on the Competence and the Warmth ratings. In each model, the fixed effect predictors included Relevance, Informativeness, Type of Trait and their interaction; the random effects minimally included random intercepts for subjects and items, as well as random slopes whenever the resulting model could converge and turned out to fit the data better than the simpler model. All predictors were sum coded before data analysis, with *+Relevance*, *High Informativeness* and *Here-and-now* Trait coded as 1, *-Relevance*, *Low Informativeness* and *Durable* Trait coded as -1.

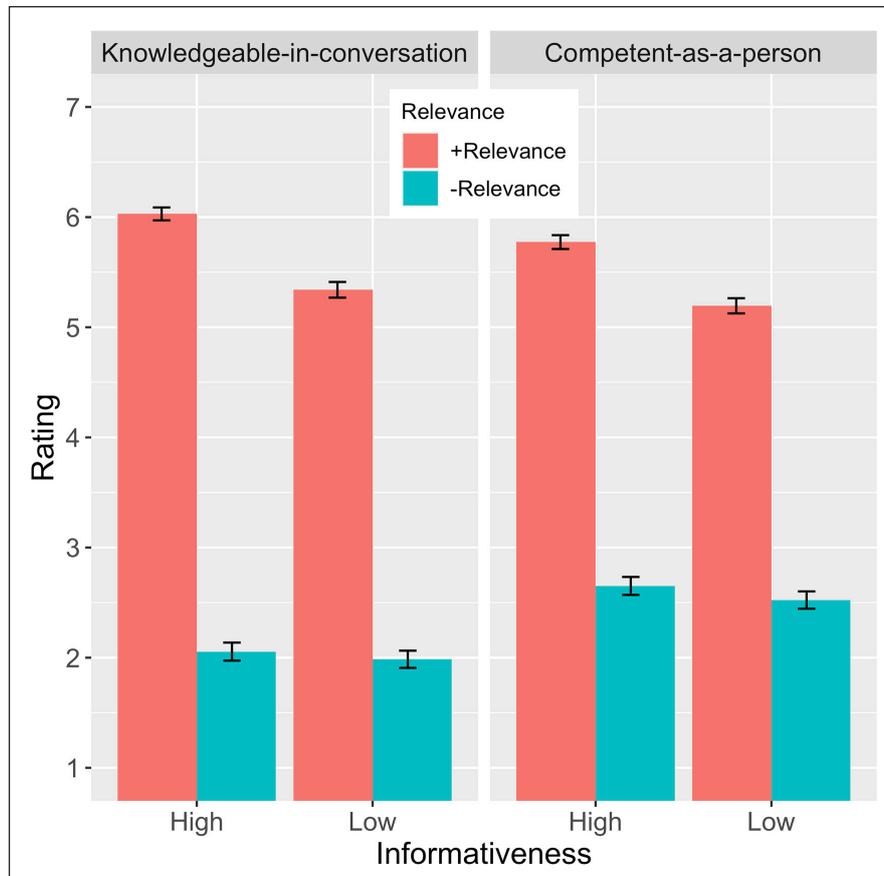
### 4.2.1 Competence traits

The mean ratings for the two Competence traits are plotted in **Figure 2**.

A mixed effects model with Relevance, Informativeness and Trait Type and their interaction as fixed effects, random intercepts for subjects and items, and random slopes for Relevance and Informativeness was fit on participants' evaluations of Competence.<sup>9</sup> The following main effects were found: Relevance ( $\beta = 1.61$ ,  $se = 0.08$ ,  $p < 0.0001$ ), such that *+Relevance* responses led to higher Competence ratings than *-Relevance* ones ( $M = 5.58$ ,  $SD = 1.26$  vs.  $M = 2.30$ ,  $SD = 1.51$ ); Informativeness ( $\beta = 0.20$ ,  $se = 0.05$ ,  $p < 0.001$ ), such that *High Informativeness* responses led to higher ratings than *Low Informativeness* ones ( $M = 4.12$ ,  $SD = 2.13$  vs.  $M = 3.76$ ,  $SD = 2.05$ ); and Trait ( $\beta = 0.09$ ,  $se = 0.02$ ,  $p < 0.0001$ ), such that *Competent-as-a-person* ratings were higher than *Knowledgeable-in-conversation* ones ( $M = 4.03$ ,  $SD = 1.99$  vs.  $M = 3.85$ ,  $SD = 2.19$ ).

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<sup>9</sup> This model was a better fit than the model with only Relevance and Informativeness as fixed effects and same random effects structure ( $\chi^2(4) = 111.39$ ,  $p < 0.0001$ ). This model was also a better fit than the models with the same fixed effects structure and random slopes for Relevance only ( $\chi^2(6) = 61.19$ ,  $p < 0.0001$ ), Informativeness only ( $\chi^2(6) = 485.26$ ,  $p < 0.0001$ ), and the intercepts only model ( $\chi^2(10) = 489.44$ ,  $p < 0.0001$ ). Model comparison for this and all the other models reported in the article was carried out with the `anova()` function in R.



**Figure 2:** Exp. 1: Mean ratings for the two Competence traits by Relevance, Informativeness and Trait.

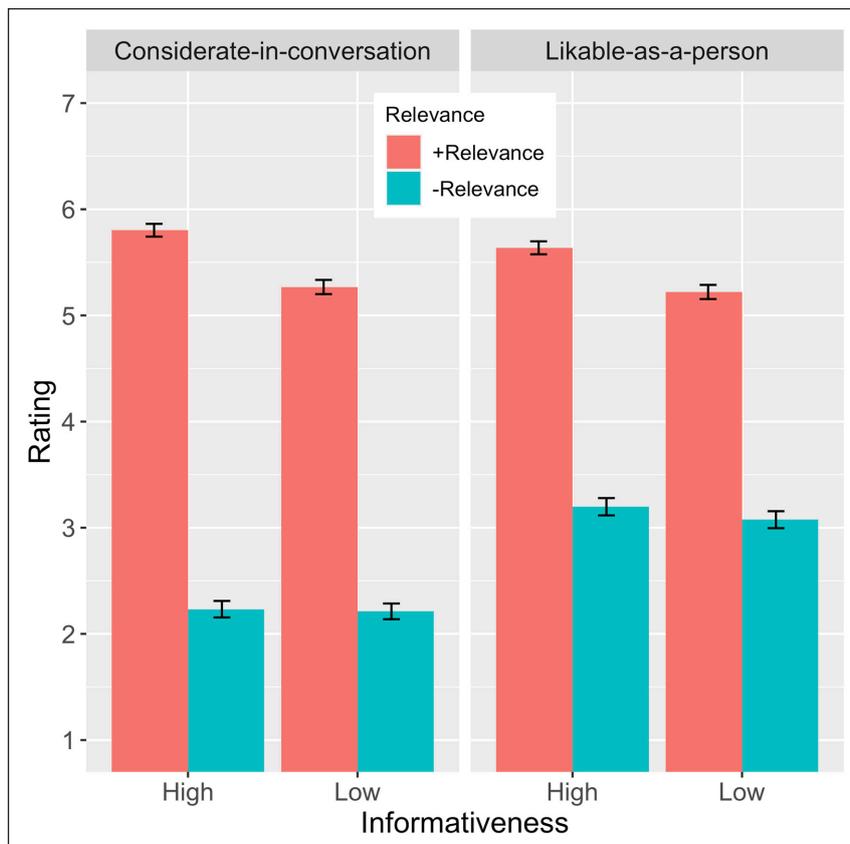
These main effects were further qualified by two interactions. First, we found an interaction between Relevance and Informativeness ( $\beta = 0.11$ ,  $se = 0.02$ ,  $p < 0.0001$ ). A posthoc comparison with a Tukey adjustment for multiple comparisons<sup>10</sup> showed that the speaker received higher ratings when producing more as opposed to less informative utterances when Relevance was obeyed ( $M = 5.90$ ,  $SD = 1.13$  vs.  $M = 5.26$ ,  $SD = 1.29$ ;  $t(31) = 6.15$ ,  $p < 0.0001$ ); no difference was found in the speaker's perceived Competence between more and less informative utterances when Relevance was violated ( $M = 2.35$ ,  $SD = 1.54$  vs.  $M = 2.15$ ,  $SD = 1.47$ ;  $t(31) = 1.71$ ,  $p = 0.09$ ). Second, we found an interaction between Relevance and Trait ( $\beta = -0.19$ ,  $se = 0.02$ ,  $p < 0.0001$ ). A posthoc comparison showed that, when Relevance was disobeyed, speakers were rated higher on the *Competent-as-a-person* than on the *Knowledgeable-in-conversation* trait ( $M = 2.58$ ,  $SD = 1.48$  vs.  $M = 2.02$ ,  $SD = 1.48$ ;  $t(2450) = 10.00$ ;  $p < 0.0001$ ); but when Relevance was obeyed,

<sup>10</sup> For this and all other interactions reported in the article, posthoc comparisons were carried out via the R function *emmeans*, part of the “emmeans” package.

speakers were rated higher on the *Knowledgeable-in-conversation* than on the *Competent-as-a-person* attribute ( $M = 5.68, SD = 1.25$  vs.  $M = 5.48, SD = 1.25$ ;  $t(2450) = -3.53$ ;  $p < 0.001$ ). No interactions between Informativeness and Trait ( $\beta = 0.00, se = 0.02, p = 0.74$ ) or between Relevance, Informativeness and Trait ( $\beta = 0.02, se = 0.02, p = 0.29$ ) were found.

#### 4.2.2 Warmth traits

The mean ratings for the two Warmth traits are plotted in **Figure 3**.



**Figure 3:** Exp. 1: Mean ratings for the two Warmth traits by Relevance, Informativeness and Trait.

A mixed effects model with Relevance, Informativeness and Trait Type and their interaction as fixed effects and random intercepts and slopes for Relevance and Informativeness for subjects and items was fit on participants' evaluations of Warmth.<sup>11</sup> The model showed a main effect of

<sup>11</sup> This model was a better fit than the model with only Relevance and Informativeness as fixed effects and same random effects structure ( $\chi^2(4) = 284.99, p < 0.0001$ ). This model was also a better fit than the models with same fixed effects structure and only random slopes for Relevance ( $\chi^2(6) = 83.99, p < 0.0001$ ), Informativeness only ( $\chi^2(6) = 522.78, p < 0.0001$ ), as well as the intercepts only model ( $\chi^2(10) = 579.9, p < 0.0001$ ).

Relevance ( $\beta = 1.38, se = 0.07, p < 0.0001$ ), such that *+Relevance* responses led to higher Warmth ratings than *-Relevance* ones ( $M = 5.48, SD = 1.20$  vs.  $M = 2.67, SD = 1.52$ ); a main effect of Informativeness ( $\beta = 0.14, se = 0.04, p < 0.001$ ), such that *High Informativeness* responses led to higher ratings than *Low Informativeness* ones ( $M = 4.21, SD = 2.02$  vs.  $M = 3.94, SD = 1.88$ ); and a main effect of Trait ( $\beta = 0.20, se = 0.02, p < 0.0001$ ), such that *Likable-as-a-person* ratings were higher than *Considerate-in-conversation* ones ( $M = 4.28, SD = 2.11$  vs.  $M = 3.87, SD = 1.77$ ). In addition, we found an interaction between Relevance and Informativeness ( $\beta = 0.08, se = 0.01, p < 0.0001$ ). A posthoc comparison showed that, when Relevance was obeyed, the speaker received higher ratings when producing more informative than less informative utterances ( $M = 5.71, SD = 1.13$  vs.  $M = 5.24, SD = 1.23; t(30) = 4.59; p < 0.0001$ ); no difference was found in the speaker's evaluation between more and less informative utterances when Relevance was violated ( $M = 2.71, SD = 1.55$  vs.  $M = 2.64, SD = 1.49; t(30) = 1.17, p = 0.25$ ). We also found an interaction between Relevance and Trait Type ( $\beta = 0.25, se = 0.01, p < 0.0001$ ). A posthoc comparison showed that, when Relevance was disobeyed, speakers were rated higher on *Likable-as-a-person* than on *Considerate-in-conversation* ( $M = 3.13, SD = 1.49$  vs.  $M = 2.12, SD = 1.40; t(2450) = 17.19; p < 0.0001$ ); but when Relevance was obeyed, speakers were rated higher on the *Considerate-in-conversation* attribute than on the *Likable-as-a-person* one ( $M = 5.53, SD = 1.21$  vs.  $M = 5.42, SD = 1.20; t(2450) = 1.99; p < 0.05$ ). No interaction between Informativeness and Trait ( $\beta = 0.00, se = 0.01, p = 0.90$ ) and between Relevance, Informativeness and Trait was found ( $\beta = 0.02, se = 0.01, p = 0.14$ ).

### 4.3 Discussion

In Experiment 1, we investigated whether the social evaluation of a speaker is modulated by the speaker's adherence to the principles of Relevance and Informativeness in conversation. We focused on contexts in which the speaker was able to obey these principles, as made clear by their explicit claim that they had been to the locations mentioned by the interlocutor. It follows that any violations should have been ascribed to unwillingness to provide a more cooperative utterance.

Our findings suggest the following. On a general level, as hypothesized, obeying or violating basic conversational principles carried important social consequences. In particular, failure to observe Relevance brought about a hefty social penalty across both Warmth and Competence traits; and failure to provide an adequately informative utterance also had social costs along both these dimensions. At the same time, the effect of Informativeness on social evaluation appeared to be subordinate to the effect of Relevance: less informative utterances led to a penalty along both Competence and Warmth when the speaker was being relevant; but no difference between more and less informative utterances was observed when Relevance was violated. Finally, while traits of Competence and Warmth behaved by-and-large consistently with respect to these effects, we found an additional, subtle difference within each pair of attributes. As suggested by

the interaction between Trait and Relevance, across Competence and Warmth the penalty for disobeying Relevance and the benefit of obeying Relevance were stronger for the temporary, in-the-conversation attribute than for the durable, person-level one: this suggests that violations of basic principles such as the expectation that the speaker stays on the conversational topic impact the speaker evaluation more deeply when this evaluation directly targets the speaker's conversational behavior, as opposed to their more general personality traits.

Taken together, these findings comport with and extend earlier observations that violations of conversational maxims have wide-ranging consequences not only on a descriptive, but also on a social plane (see 2.1). Yet, they also raise the question as to how these effects are modulated by the motivations behind a speaker's conversational choices – and in particular, by the fact that the speaker was in the epistemic position of providing an adequate contribution from a pragmatic standpoint, and yet chose not to do so. We addressed this issue in Experiment 2.

## 5. Experiment 2

Since all pragmatic violations in Experiment 1 occurred in a context in which the speaker was unwilling to be cooperative, it is not possible to tease out whether, or to what extent, the observed social penalties were due to the fact that the speaker failed to address the listener's conversational needs, or, more broadly, deliberately chose not to be cooperative. This question is especially important in light of the fact that whether a pragmatic violation can be presumed to be due to speaker unwillingness vs. inability has important social consequences (Fairchild et al., 2020; Fairchild & Papafragou, 2018, see also 2.1). In Experiment 2, we aimed to shed light on this issue. We tested social inferences from pragmatic violations in a situation in which the speaker was *unable* – as opposed to *unwilling* – to be more cooperative, partly replicating and extending Experiment 1. We predicted that the social costs for pragmatic violations found in Experiment 1 would be mitigated in a situation in which the speaker was unable to provide a pragmatically appropriate contribution.

### 5.1 Methods

#### 5.1.1 Participants

One hundred participants were recruited on Prolific. Participants were compensated \$3.00 for participating (average hourly rate: \$8.22 per hour). Of these, 7 participants were excluded for recording a comprehension score below 95%; responses from the remaining 93 participants were retained for the analysis (Age range: 18–61; Age median: 30; Self-declared female = 56; Self-declared male = 34; Self-declared non-binary = 3).

#### 5.1.2 Materials and procedure

Experiment 2 was partly modeled after Experiment 1 but test items contained exclusively conversations with irrelevant responses (as in the *–Relevance* condition in Experiment 1). We

manipulated the Reason behind violating conversational expectations in these responses: in the *Unwillingness* condition, irrelevant utterances were produced by speakers who were familiar with the issue raised by the interlocutor but nevertheless decided not to address it (just as in the *-Relevance* condition in Experiment 1); in the *Inability* condition, irrelevant utterances were produced by speakers who were unfamiliar with the conversational topic, and therefore not in an epistemic position to provide a relevant contribution. The Informativeness manipulation from Experiment 1 was retained, yielding a  $2 \times 2$  within-subjects design crossing Reason and Informativeness.

(2) shows a sample test item (the scenario is a version of that shown for Experiment 1 in (1)). In the *Unwillingness* condition (as in the *-Relevance* condition in the previous experiment), the phrase “I’ve been to all those places” signals John’s acquaintance with the topic, but also his unwillingness to cooperate. In the *Inability* condition, the phrase “I’ve never been to any of those places” suggests that John’s failure to appropriately address his interlocutor’s concern was due to lack of relevant Knowledge. As a consequence, in the *Inability* condition, John’s comments about skiing, while evidently suboptimal, can now be construed as an alternative to saying nothing at all, and thus as signaling his intention to cooperate with Kim to the best of his abilities. The key phrase determining the contrast between the *Unwillingness* and *Inability* conditions has been highlighted in boldface for the reader’s convenience.

(2) Experiment 2 test item:

a. *Unwillingness*:

**Kim:** I’d like to go on a Caribbean vacation, but I don’t know where to go. I’m thinking Antigua, Barbados or Bahamas.

**John (Low Informativeness):** **I’ve been to all these places.** Let’s see... I recently went to Zermatt, Switzerland.

**John (High Informativeness):** **I’ve been to all these places.** Let’s see... I recently went to Zermatt, Switzerland. It has the best slopes and views of all skiing places I’ve been to.

b. *Inability*:

**Kim:** I’d like to go on a Caribbean vacation, but I don’t know where to go. I’m thinking Antigua, Barbados or Bahamas.

**John (Low Informativeness):** **I’ve never been to any of these places.** Let’s see... I recently went to Zermatt, Switzerland.

**John (High Informativeness):** **I’ve never been to any of these places.** Let’s see... I recently went to Zermatt, Switzerland. It has the best slopes and views of all skiing places I’ve been to.

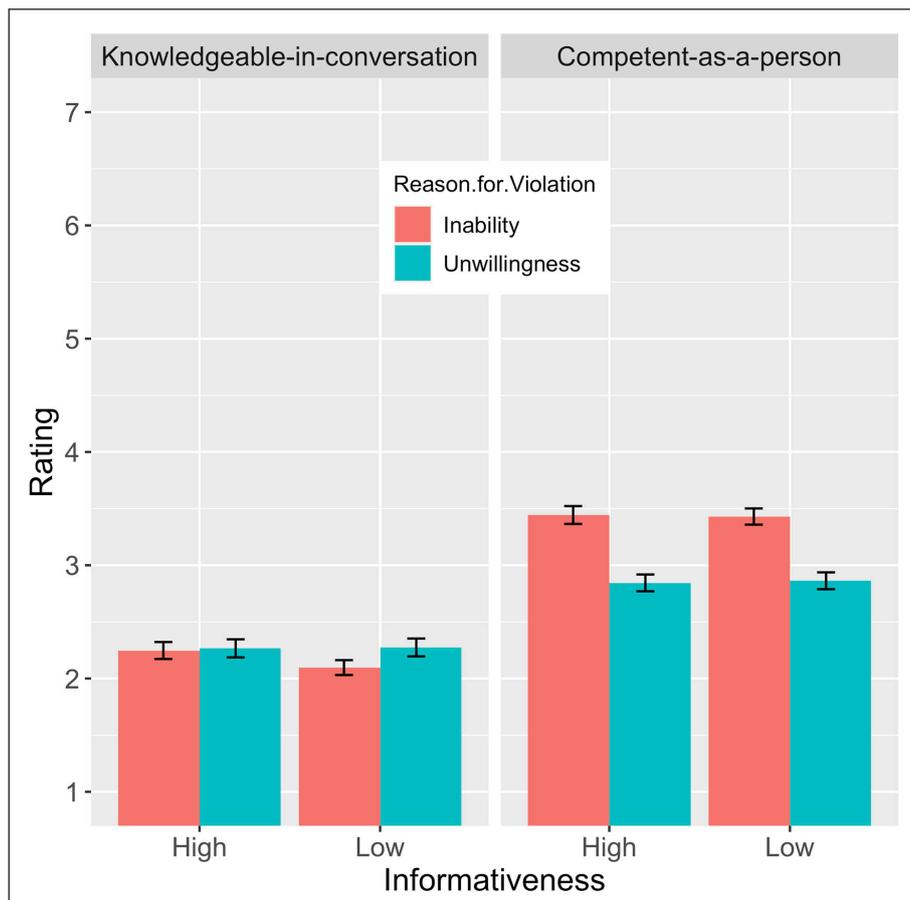
The same sixteen stories used in Experiment 1 were used to produce sixteen sets of test items, distributed into four lists with a Latin Square Design. The rest of the materials and procedure, including the evaluation questions and fillers, were identical to Experiment 1.

## 5.2 Results

For statistical analysis, we once again fit separate linear mixed-effects models on the Competence and the Warmth ratings. In each model, the fixed effect predictors included Reason for Violation, Informativeness and Trait and their interaction; the random effects minimally included random intercepts for subjects and items, as well as random slopes whenever the resulting model could converge and turned out to fit the data better than models with a simpler random effects structure. All predictors were sum coded before the data analysis, with *Inability*, *High Informativeness* and the *in-conversation* Trait coded as 1, and *Unwillingness*, *Low Informativeness*, and the *as-a-person* Trait coded as -1. We present the results from the analysis, splitting them between Competence and Warmth ratings.

### 5.2.1 Competence Traits

The mean ratings for the two Competence traits are plotted in **Figure 4**.



**Figure 4:** Exp. 2: Mean ratings for the two Competence traits by Reason, Informativeness and Trait.

A mixed effects model with Relevance, Informativeness and Trait and their interaction as fixed effects and random intercepts and random slopes for Reason for Violation and Informativeness for subjects and items was fit on participants' evaluations of Competence.<sup>12</sup> A main effect of Trait was found ( $\beta = 0.46$ ,  $se = 0.02$ ,  $p < 0.0001$ ), such that the *Competent-as-a-person* ratings were higher than the *Knowledgeable-in-conversation* ones ( $M = 3.14$ ,  $SD = 1.46$  vs.  $M = 2.12$ ,  $SD = 1.44$ ). No main effects of Reason for Violation ( $\beta = 0.10$ ,  $se = 0.05$ ,  $p = 0.06$ ) and Informativeness ( $\beta = 0.04$ ,  $se = 0.03$ ,  $p = 0.20$ ) were found. The main effect of Trait was qualified by an interaction between Trait and Reason for Violation ( $\beta = 0.17$ ,  $se = 0.02$ ,  $p < 0.0001$ ). A posthoc comparison showed that, for the *Competent-as-a-person* trait, the speaker received higher ratings when their violation was due to *Inability* as opposed to *Unwillingness* ( $M = 3.43$ ,  $SD = 1.44$  vs.  $M = 2.85$ ,  $SD = 1.43$ ;  $t(28) = 4.83$ ;  $p < 0.0001$ ); no difference was found between violations due to *Inability* vs. *Unwillingness* for the *Knowledgeable-in-conversation* trait ( $M = 2.17$ ,  $SD = 1.35$  vs.  $M = 2.17$ ,  $SD = 1.52$ ;  $t(28) = -1.14$ ;  $p = 0.26$ ). Finally, we found an interaction between Reason for Violation and Informativeness ( $\beta = 0.05$ ,  $se = 0.02$ ,  $p < 0.05$ ), such that, when violations were due to *Inability*, speakers producing *High Informativeness* utterances were rated higher than speakers producing *Low Informativeness* utterances ( $M = 2.84$ ,  $SD = 1.59$  vs.  $M = 2.76$ ,  $SD = 1.48$ ;  $t(45) = 2.36$ ;  $p < 0.05$ ); but when violations were due to *Unwillingness*, no difference was observed between speakers producing *High Informativeness* vs. *Low Informativeness* utterances ( $M = 2.55$ ,  $SD = 1.51$  vs.  $M = 2.56$ ,  $SD = 1.50$ ;  $t(45) = -0.21$ ,  $p = 0.83$ ). No interaction between Informativeness and Trait ( $\beta = -0.02$ ,  $se = 0.02$ ,  $p = 0.36$ ) and between Reason for Violation, Informativeness and Trait ( $\beta = -0.02$ ,  $se = 0.02$ ,  $p = 0.44$ ) were found.

## 5.2.2 Warmth Traits

The mean ratings for the two Warmth traits are plotted in **Figure 5**.

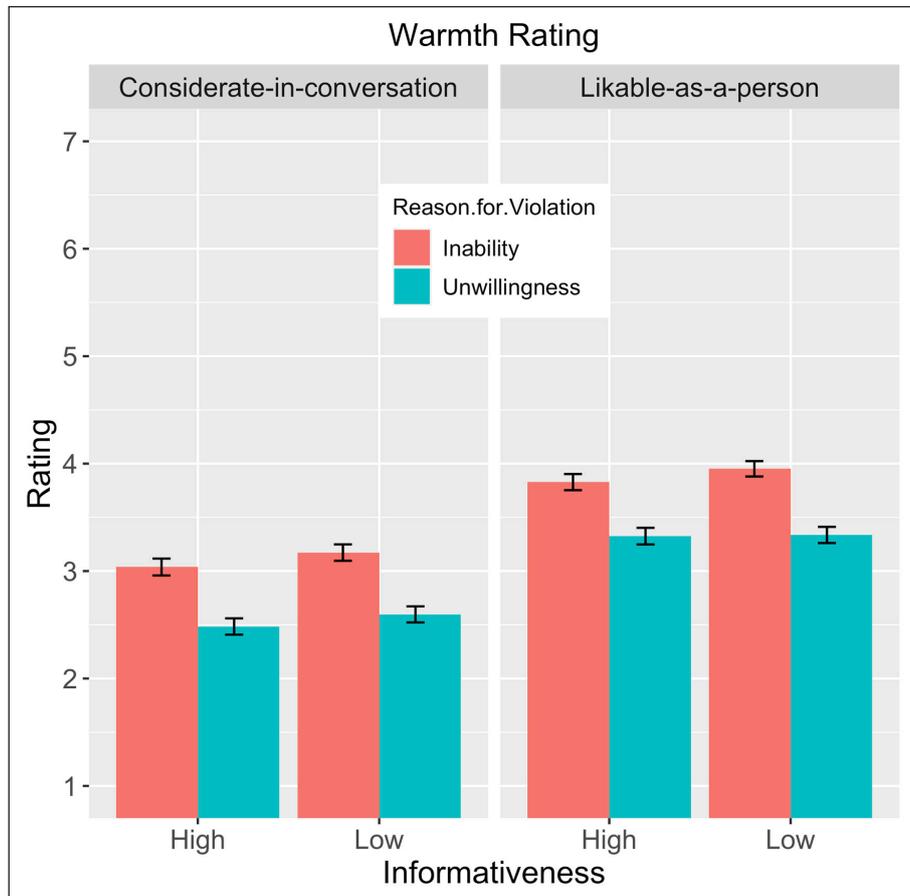
A mixed effects model with Relevance, Informativeness and Trait and their interaction as fixed effects and random intercepts and random slopes for Reason for Violation and Informativeness for subjects and items was fit on participants' evaluations of Warmth.<sup>13</sup>

A main effect of Reason for Violation was found ( $\beta = 0.26$ ,  $se = 0.05$ ,  $p < 0.0001$ ), such that violations due to *Inability* led to higher ratings than violations due to *Unwillingness* ( $M = 3.49$ ,

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<sup>12</sup> This model was a better fit than the model with only Relevance and Informativeness as fixed effects ( $\chi^2(4) = 521.21$ ,  $p < 0.0001$ ). This model was also a better fit than the models with the same fixed effects structure and only random slopes for Reason for Violation ( $\chi^2(6) = 17.05$ ,  $p < 0.01$ ) or Informativeness ( $\chi^2(6) = 77.24$ ,  $p < 0.0001$ ), as well as the intercepts only model ( $\chi^2(10) = 89.51$ ,  $p < 0.0001$ ).

<sup>13</sup> This model was a better fit than the model with only Relevance and Informativeness 10 as fixed effects ( $\chi^2(4) = 377.76$ ,  $p < 0.0001$ ). This model was also a better fit than the models with same fixed effects structure and only random slopes for Reason for Violation ( $\chi^2(6) = 33.22$ ,  $p < 0.0001$ ) or Informativeness ( $\chi^2(6) = 114.05$ ,  $p < 0.0001$ ), as well as the intercepts only model ( $\chi^2(10) = 138.05$ ,  $p < 0.0001$ ).



**Figure 5:** Exp. 2: Mean ratings for the two Warmth traits by Reason for Violation, Informativeness and Trait.

$SD = 1.50$  vs.  $M = 2.93$ ,  $SD = 1.51$ ). A main effect of Trait Type was also found ( $\beta = -0.39$ ,  $se = 0.02$ ,  $p < 0.0001$ ), such that ratings for the *Likable-as-a-person* attribute were higher than those for the *Considerate-in-conversation* trait ( $M = 3.61$ ,  $SD = 1.50$  vs.  $M = 2.82$ ,  $SD = 1.46$ ). No main effect of Informativeness was found ( $\beta = -0.03$ ,  $se = 0.02$ ,  $p = 0.38$ ). No interactions between Reason for Violation and Informativeness ( $\beta = 0.00$ ,  $se = 0.02$ ,  $p = 0.92$ ), Reason for Violation and Trait ( $\beta = 0.00$ ,  $se = 0.02$ ,  $p = 0.95$ ), Informativeness and Trait ( $\beta = 0.01$ ,  $se = 0.02$ ,  $p = 0.47$ ) and Reason for Violation, Informativeness and Trait ( $\beta = 0.01$ ,  $se = 0.02$ ,  $p = 0.56$ ) were found.

### 5.3 Discussion

In Experiment 2, we tested how the perception of violations of Relevance was affected by the reason that led to those violations. Specifically, we compared a context in which the speaker was in a position to provide a relevant contribution but chose not to (also deployed in Experiment 1)

with a context in which the speaker lacked the knowledge to make a pragmatically appropriate contribution altogether. We found that, across the board, the Warmth penalty for violating Relevance was mitigated when the violation was due to inability, as opposed to unwillingness; moreover, the Competence penalty for the *Competent-as-a-person* trait was also mitigated when a relevance violation was due to inability. Thus, as predicted, the social evaluation of a speaker was not merely informed by whether they obeyed or violated pragmatic maxims, but also by the reason that could have driven these patterns in the first place. These results are consistent with previous findings suggesting that reasoning about unwillingness vs. inability affects how people interpret linguistic utterances (Fairchild et al., 2020; Fairchild & Papafragou, 2018), as well as intentional action more broadly (Behne et al., 2005; Call et al., 2004; Canteloup & Meunier, 2017; Phillips et al., 2009).

Nevertheless, it is important to note that not all dimensions of social evaluation were uniformly affected by a speaker's pragmatic behavior. In particular, two observations deserve special attention. First, while the mitigation effect of inability was observed across the board for the Warmth traits, it was observed only on the permanent trait (*Competent-as-a-person*) but not the here-and-now, momentary trait (*Knowledgeable-in-the-conversation*) for Competence. We suggest that the lack of an effect in the latter case could be traced back to the interaction between this evaluation question and the particular epistemic state of the speaker. In particular, in the unwillingness context, the respondent claimed that they were familiar with the topic at stake, while in the inability context they claimed that they were not. This points to a difference in the speaker's epistemic state between the two contexts, which held above and beyond relevance considerations: in one case the speaker came across as being acquainted with the options being discussed in the conversational context, even though they eventually opted to not talk about them; in the other case they came across as ignorant – an asymmetry that could have offset the inability benefit when it came to the evaluation of how knowledgeable the speaker was taken to be in the here-and-now of the interaction. The second difference is that, while Informativeness did not have an effect on the Warmth ratings, it interacted with Reason for Violation to mitigate the penalty for a Relevance violation for the Competence ratings: specifically, the penalty for speakers unable to produce a relevant utterance was mitigated when these speakers produced more informative, as opposed to less informative, utterances. Similar to what we suggested above, this asymmetry between Competence and Warmth could be related to the particular epistemic relationship between Competence and a speaker's knowledge state in the conversational context. That is, providing a highly informative description could have been interpreted as indicating that the speaker was experienced and ultimately well-versed on a particular subject matter – all qualities that bear more on Competence than they do on Warmth, and that eventually contributed to boosting the evaluation along these ratings. Taking stock, Experiment 1 revealed the social costs of pragmatic violations when a speaker was able – but unwilling – to produce a pragmatically

felicitous utterance; Experiment 2 showed that, when the speaker lacked knowledge, they were not penalized as harshly for the failure to offer relevant information, at least in most cases. These data raise the question whether, within cases where someone is able but unwilling to offer relevant information, different motivations for the choice to veer off the conversational topic might lead to different patterns of social evaluation. Experiment 3 addressed this question.

## 6. Experiment 3

In Experiment 3, we tested how the social evaluation of a speaker who was able but unwilling to produce a relevant utterance might be impacted by whether the speaker presented no apparent motivation for this behavior (as in Experiment 1) or provided a plausible justification for the violation. We predicted that the second type of context would lead to a more positive evaluation.

### 6.1 Methods

#### 6.1.1 Participants

One hundred participants were recruited on Prolific. Participants were compensated \$3.00 for participating (average hourly rate: \$8.22 per hour). Of these, 17 participants were excluded for recording a comprehension score below 95%; responses from the remaining 83 participants were retained for the analysis (Age range: 19–69; Age median: 33; Self-declared female = 61; Self-declared male = 19; Self-declared non-binary = 3).

#### 6.1.2 Materials and procedure

As in Experiment 2, the test items of Experiment 3 contained exclusively conversations with irrelevant responses; however, all violations could be ascribed to unwillingness, as opposed to inability, to cooperate. We manipulated the Preamble to such pragmatic violations – specifically, whether the violations were introduced by a statement that the speaker had some personal investment in the topic they were about to switch to (*Preamble present*) or came without any introduction (*Preamble absent*), similar to the Unwillingness condition in Experiment 2. Once again, the Informativeness manipulation from Experiments 1 and 2 was retained, yielding a 2 × 2 within-subjects design crossing Preamble and Informativeness.

(3) illustrates a sample test item involving the conversation between the coworkers Kim and John. As in Experiment 2, Kim expressed the desire to go on a Caribbean vacation, while John responded by talking about his experience with skiing vacations. In the Preamble present condition, John’s irrelevant response was accompanied by a statement about his personal preferences (“But I really like skiing vacations”; highlighted in boldface for the reader), which provided a plausible indirect justification for the decision to veer off topic and acknowledged a contrast between this preference and the goal of the conversation. In the Preamble absent

condition, John's response lacked any special linguistic introduction, just as in Experiment 2. Otherwise, the procedure was as in Experiment 2.

(3) Experiment 3 test item:

a. *Preamble present:*

**Kim:** I'd like to go on a Caribbean vacation, but I don't know where to go. I'm thinking Antigua, Barbados or Bahamas.

**John (Low Informativeness):** I've been to all these places. **But I really like skiing vacations.** Let's see. I recently went to Zermatt, Switzerland.

**John (High Informativeness):** I've been to all these places. **But I really like skiing vacations.** Let's see. I recently went to Zermatt, Switzerland. It has the best slopes and views of all skiing places I've been to.

b. *Preamble absent:*

**Kim:** I'd like to go on a Caribbean vacation, but I don't know where to go. I'm thinking Antigua, Barbados or Bahamas.

**John (Low Informativeness):** I've been to all these places. Let's see. I recently went to Zermatt, Switzerland.

**John (High Informativeness):** I've been to all these places. Let's see. I recently went to Zermatt, Switzerland. It has the best slopes and views of all skiing places I've been to.

## 6.2 Results

For statistical analysis, we once again fit separate linear mixed-effects models on the Competence and the Warmth ratings. In each model, the fixed effect predictors included Preamble, Informativeness, and Trait and their interaction; the random effects minimally included random intercepts for subjects and items, as well as random slopes whenever the resulting model could converge and turned out to fit the data better than models with a simpler random structure. All predictors were sum coded before the data analysis, with *Preamble Present*, *High Informativeness* and the *in-conversation* Trait coded as 1, and *Preamble Absent*, *Low Informativeness*, and the *as-a-person* Trait coded as -1.

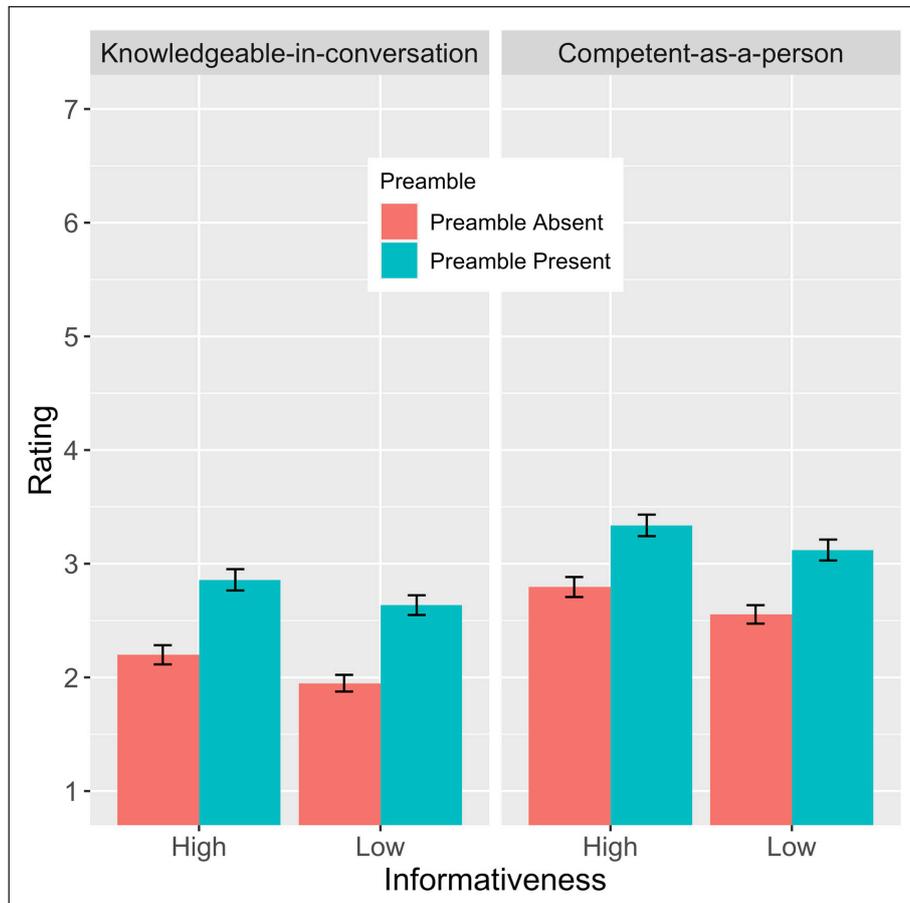
### 6.2.1 Competence traits

The mean ratings for the Competence traits are plotted in **Figure 6**.

A mixed effects model with Relevance, Informativeness and Trait and their interaction as fixed effects and random intercepts and random slopes for Preamble for subjects and items was fit on participants' evaluations of Competence.<sup>14</sup> A main effect of Preamble was

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<sup>14</sup> Models with more complex random effects structures did not converge. This model was a better fit than the model with only Relevance and Informativeness as fixed effects and the same random effects structure ( $\chi^2(4) = 138.57$ ,  $p < 0.0001$ ). This model was also a better fit than the intercepts only model ( $\chi^2(4) = 87.31$ ,  $p < 0.0001$ ).

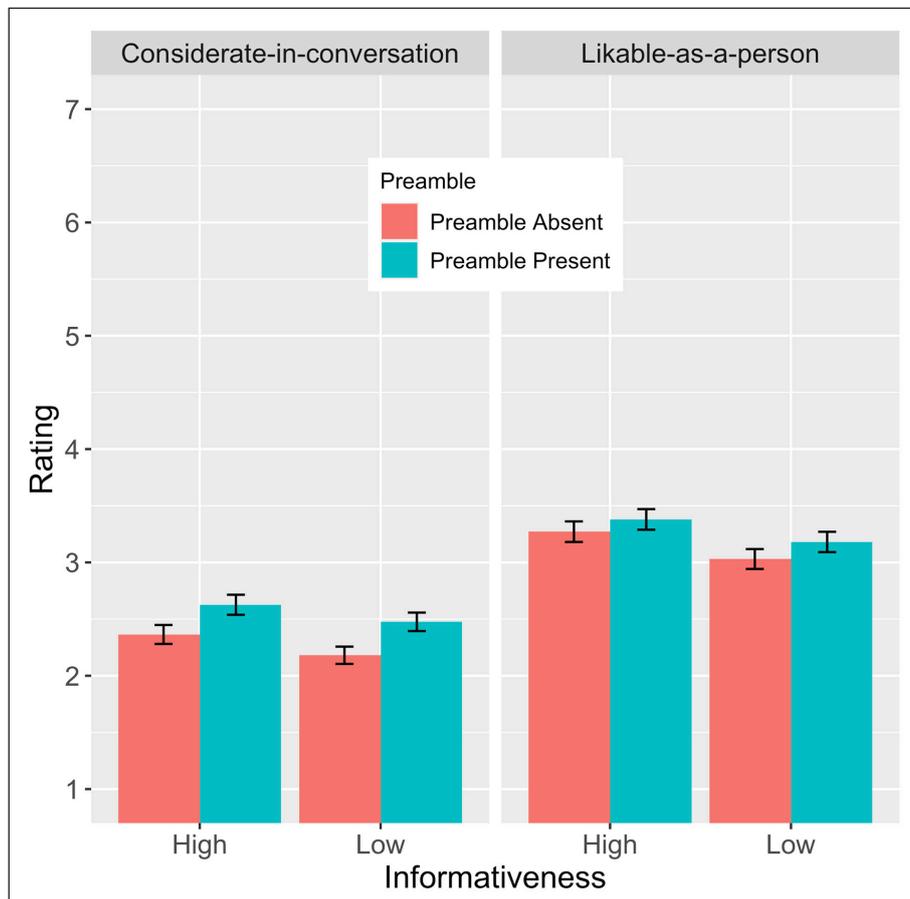


**Figure 6:** Exp. 2: Mean ratings for the two Competence traits by Preamble, Informativeness and Trait Type.

found ( $\beta = 0.28$ ,  $se = 0.05$ ,  $p < 0.0001$ ): when introducing an irrelevant response with a potential justification, speakers were rated as more competent ( $M = 2.98$ ,  $SD = 1.69$ ) than when they included no such preamble ( $M = 2.37$ ,  $SD = 1.52$ ). Furthermore, a main effect of Informativeness was found ( $\beta = 0.10$ ,  $se = 0.03$ ,  $p < 0.001$ ), such that speakers producing more informative utterances received higher ratings ( $M = 2.79$ ,  $SD = 1.69$ ) than speakers producing less informative ones ( $M = 2.56$ ,  $SD = 1.57$ ). Finally, a main effect of Trait was found ( $\beta = 0.27$ ,  $se = 0.02$ ,  $p < 0.0001$ ), such that Competent-as-a-person ratings ( $M = 2.95$ ,  $SD = 1.64$ ) were higher than Knowledgeable-in-conversation ratings ( $M = 2.41$ ,  $SD = 1.58$ ). No interactions between Preamble and Informativeness ( $\beta = 0.00$ ,  $se = 0.02$ ,  $p = 0.77$ ), Preamble and Trait ( $\beta = 0.03$ ,  $se = 0.02$ ,  $p = 0.20$ ), Trait and Informativeness ( $\beta = 0.00$ ,  $se = 0.01$ ,  $p = 0.93$ ), and Preamble, Informativeness and Trait were found ( $\beta = 0.00$ ,  $se = 0.02$ ,  $p = 0.99$ ).

## 6.2.2 Warmth traits

The mean ratings for the Warmth traits are plotted in **Figure 7**.



**Figure 7:** Exp. 3: Mean ratings for the two Warmth traits by Preamble, Informativeness and Trait.

A mixed effects model with Preamble, Informativeness and Trait and their interaction as fixed effects and random intercepts and random slopes for Preamble for subjects and items was fit on participants' evaluations of Warmth.<sup>15</sup> A main effect of Informativeness was found ( $\beta = 0.09$ ,  $se = 0.03$ ,  $p < 0.001$ ), such that more informative utterances ( $M = 2.91$ ,  $SD = 1.66$ ) led to higher ratings than less informative ones ( $M = 2.71$ ,  $SD = 1.58$ ). Furthermore, a main effect of

<sup>15</sup> Models with more complex random effects structures did not converge. This model was a better fit than the model with only Relevance and Informativeness as fixed effects and same random effects structure ( $\chi^2(4) = 313.42$ ,  $p < 0.0001$ ). This model was also a better fit than the intercepts only models ( $\chi^2(4) = 68.99$ ,  $p < 0.0001$ ).

Trait was found ( $\beta = 0.40$ ,  $se = 0.02$ ,  $p < 0.0001$ ), such that the ratings for Likable-as-a-person ( $M = 3.21$ ,  $SD = 1.64$ ) were higher than those for Considerate-in-conversation ( $M = 2.41$ ,  $SD = 1.51$ ). There was no main effect of Preamble ( $\beta = 0.08$ ,  $se = 0.05$ ,  $p = 0.10$ ), and no interaction between Preamble and Informativeness ( $\beta = 0.01$ ,  $se = 0.02$ ,  $p = 0.65$ ), Preamble and Trait ( $\beta = 0.03$ ,  $se = 0.02$ ,  $p = 0.09$ ), Informativeness and Trait ( $\beta = 0.01$ ,  $se = 0.02$ ,  $p = 0.55$ ), and Preamble, Informativeness and Trait ( $\beta = 0.00$ ,  $se = 0.02$ ,  $p = 0.95$ ).

### 6.3 Discussion

Experiment 3 tested the hypothesis that the social perception of a speaker who fails to observe Relevance in conversation depends on the presence (or absence) of an utterance signaling awareness of the violation and providing a possible justification for it. Our results confirm this hypothesis only partly: while speakers providing the extra utterance were judged as more competent than those who did not, they were not rated as warmer.

On a broad level, our main finding aligns with, and reinforces, our earlier observation that Warmth and Competence are differentially sensitive to aspects of linguistic behavior. Upon closer inspection, the selective effects of the preamble can be straightforwardly explained by its speaker-oriented content: while it did provide a plausible motivation for the speaker's change of topic, it nevertheless tied the speaker's conversational choice to personal taste and experiences – in a way that deliberately ignored, and ultimately pushed aside, the question under discussion that the hearer introduced (and cared about). As a result, while the preamble made the speaker come across as a more skilled conversational agent, and thus likely to be perceived as more competent, it failed to improve the evaluation along more relational, hearer-oriented traits such as Warmth. This explanation predicts that a different, less speaker-oriented preamble (e.g., “I think you should consider skiing”) might more uniformly improve both the speaker's perceived Competence and Warmth.

## 7. General discussion

It is well known that the information that listeners extract from a linguistic utterance goes well beyond the conventional meanings of the words deployed by the speaker. Research in pragmatics, in particular, has shown that interlocutors systematically reason about a speaker's conversational choices to draw inferences aimed at zeroing in on both the descriptive message conveyed by an utterance (Grice, 1975; Horn, 1984, among others; see 2.1). Moreover, such choices can also have an impact on the social level by means of inviting politeness inferences, which pertain to the interpersonal relationship between the speaker and the hearer as emerging in the conversational exchange (Brown & Levinson, 1987; Lakoff, 1974; Terkourafi, 2011, among others; see 2.1). Our study deepens our understanding of the range of inferences that can be drawn from conversational behavior by showing that different aspects of someone's pragmatic

behavior crucially impact different aspects of person perception – a domain of investigation extensively investigated in social psychology, but considerably less so within pragmatics.

Together, the present results offer novel insights into how interlocutors extract information from an utterance that goes above and beyond the literal content of what is said, connecting pragmatic approaches to the study of conversation with socio-psychological approaches to the study of social evaluation. In what follows, we consider in greater detail the implications of our findings for current accounts linking pragmatic reasoning and impression formation (7.1), as well as pragmatic theories of inferences and communication (7.2). We conclude by outlining limitations of our work, together with directions for future research (7.3).

## **7.1 From pragmatic behavior to social perception**

Our study asked how the social perception of a speaker's personality along Competence and Warmth is affected by the speaker's conversational choices with respect to the maxims of Relevance and Informativeness – as well as the specific motivation behind such choices. Our findings highlight two major takeaways. A first major conclusion is that, even after a brief exposure to someone's conversational behavior, people draw social inferences about the speaker's personality by relying on a variety of pragmatic cues. Specifically, whether a speaker obeys or violates Relevance (Experiment 1) and Informativeness (Experiments 1, 2, 3) turns out to affect how they are socially perceived. Moreover, the evaluation of the speaker after a violation of these principles is further modulated by the reason behind the violation (Experiment 2) and the availability of an explicit motivation for the speaker's behavior (Experiment 3). These results suggest that people form impressions about someone based on their conversational behavior by drawing on very similar cues to those that typically inform pragmatic inferences in the Gricean framework. These findings bear on the theoretical realm of current approaches to conversational inferences (Bott & Noveck, 2004; Degen & Tanenhaus, 2015; Grodner et al., 2010; Huang & Snedeker, 2009a, 2009b, 2018; Nieuwland et al., 2010) by showing that the most basic aspects of pragmatic behavior can license inferences about the social properties of the speaker, as opposed to the message. Moreover, our results cohere with prior efforts to study pragmatic inferences within a social context (e.g., Bonnefon et al., 2009; Fairchild et al., 2020; Gweon et al., 2018; Mazzarella et al., 2018) but show that the scope of the social inferences invited by pragmatic behavior is extremely broad, as it also extends to how the speaker is evaluated along traits that bear on their personality, and can be framed within psychological models developed to capture the evaluation of human behavior (Fiske, 2018; Fiske et al., 2002; Fiske et al., 1999; Judd et al., 2005). This, in turn, highlights linguistic communication as “a paradigm case of social interaction” (Sperber & Wilson, 1997) – a domain of human action that allows interlocutors to jointly draw inferences on both the descriptive and the social plane, and in ways that cannot be thought of as fully independent of one another (see also Clark, 1992; Eckert, 2019; Levinson, 1983; Silverstein, 1985, and 2.1).

A second major conclusion from our data is that social evaluation is not affected in the same way, and to the same extent, by the pragmatic factors that we considered in our experiments. Three asymmetries, in particular, emerge from our results. First, Relevance appears to have a more consistent effect on social perception than Informativeness (Experiment 1). Second, the contrasts between inability vs. unwillingness (Experiment 2) and between providing vs. not providing a reason for an upcoming pragmatic violation (Experiment 3) do not uniformly impact evaluation along the two pairs of Warmth and Competence traits that we tested in our studies. Third, even within Warmth and Competence, there are subtle differences between individual traits used to measure them (Experiments 1, 2 and 3). We believe that these differences can be understood by jointly considering insights from theories of pragmatics and impression formation.

To begin with, the observation that Relevance appears to have a stronger, and more consistent, impact on social evaluation than Informativeness is consistent with proposals in formal pragmatics that posit Relevance as the primary organizing principle in conversation – one to which other pragmatic considerations, including those pertaining to Informativeness, normally take a backseat (see e.g., Roberts, 1996/2012). Even though Relevance and Informativeness have been modeled as separate, independent principles of cooperative communication in post- and neo-Gricean models of communication (see in particular Horn, 1984), our results indicate that, when it comes to exchanging descriptive information, the pragmatic appropriateness of any assertion in discourse first and foremost requires that this move addresses the current Question Under Discussion – that is, that the assertion satisfies Relevance; only once this requirement is fulfilled do Informativeness considerations enter the picture (see also Sperber & Wilson, 1995, for a different, but equally overarching notion of Relevance).

This suggests that, similar to what they do when using language to describe the world, interlocutors might primarily consider Relevance as the major pragmatic cue to evaluate the speaker's personality: this, in turn, could shed light on the finding that, while a speaker's choices with respect to Relevance consistently impacted both dimensions of social evaluation, a speaker's decision with respect to Informativeness did so in a more limited fashion (Experiment 3); and, when Informativeness and Relevance were both manipulated in the same experiment, only when the utterance was relevant to the interlocutor's concerns (Experiment 1).

Moreover, the observation that Warmth and Competence are not uniformly impacted by the pragmatic factors that we manipulated can be traced back to the idea that, across different domains of human behavior, models of social evaluation frame Competence as an individual-oriented, rather than relational, dimension – that is, one that fundamentally differs from Warmth in virtue of tracking a person's individual intellectual skills, as opposed to their intentions towards others. As a result, the Competence vs. Warmth distinction might be tracking individual-oriented vs. relational aspects of pragmatic behavior, respectively, which are differentially sensitive to the reasons that might drive a speaker's choice to obey or violate these maxims. Accordingly, a

speaker's effort to answer a question despite their inability to do so in an adequate manner can be seen as boosting the assessment of this person's relational qualities, and is thus primarily and uniformly reflected on Warmth (Experiment 2); by contrast, a speaker's decision to motivate their decision to veer off the conversational topic with a self-centered justification can be seen as pertaining to the evaluation as an individual, mitigating the penalty for a Relevance violation along the dimension of Competence, but not that of Warmth (Experiment 3).

Finally, within the Warmth vs. Competence dimension we found subtle differences between traits that track a distinction between momentary, *in-the-conversation* vs. permanent, *person-level* attributes. Specifically, across both Warmth and Competence, the *in-the-conversation* traits are both more heavily penalized when the speaker violates Relevance and more conspicuously boosted when the speaker obeys Relevance (Experiment 1). But this pattern changes when our manipulations involve more subtle aspects of conversational behavior: within Competence, the *inability* vs. *unwillingness* manipulation in Experiment 2 exclusively affected the permanent Competent-as-a-person trait but not the attribute of being Knowledgeable-in-the-conversation – a result that we explained by appealing to the differences in the epistemic state of a speaker unwilling vs. unable to provide a relevant contribution. Looking at the broader picture, the subtle divergence between these two types of traits across both Warmth and Competence supports the view, largely advocated in sociolinguistics (Eckert, 2008; Kiesling, 2016; Moore & Podesva, 2009; Ochs, 1992), that social inferences are not a monolithic category, but crucially differ from one another along a variety of dimensions – including the degree to which they are bound to the specific here-and-now of the interaction vs. the more durable personality and identity characteristics of a speaker. The fact that momentary vs. permanent traits are indeed somewhat differentially impacted by different types of conversational behavior provides further support to the idea that social inferences form a coherent, yet internally varied category.

## **7.2 Broader implications for pragmatic theories: Cooperativeness and intentionality**

At their broadest, our findings suggest that conversation as a realm of human intentional action is characterized by inferences on multiple levels, including the propositional level, whereby listeners zero in on the descriptive content of what was said and/or implicated; and the interactional/social level, whereby listeners draw inferences about the speaker's epistemic and emotive state in the here-and-now of the interaction, as well as the speaker's personality and other more durable properties of his or her identity. Most importantly, our findings show that inferences drawn at these different levels are computed by listeners via similar dynamics: specifically, they are arrived at by reasoning about the speaker's conversational behavior on the basis of a core set of principles that underlie cooperative conversation – i.e., the Gricean maxims – as well as the reasons that motivate this behavior. In this respect, our empirical findings have parallels

in recent neo-Gricean efforts to model pragmatic and social inferences as jointly emerging from pragmatic reasoning (e.g., game-theoretic approaches aiming at incorporating social and propositional information alike as contributing to the informativeness of a message, and hence the utility of the message to the interlocutors: see Burnett, 2017, 2019; Goodman & Frank, 2016). Yet, even though our results support the effort of pursuing a more unified account of different linguistic inferences, it is important to highlight two important differences between the inferences normally investigated in pragmatics and the social evaluation inferences investigated in our studies. A first important difference revolves around the role of the speaker's intentionality in the inference drawing process. Pragmatic (including, for the most part, politeness) inferences are generally assumed to require speaker intention: they arise because the speaker intended to convey a particular message, and the listener crucially recognized this intention (see 2.1). Interestingly, the social inferences investigated in our study do not appear to fully belong to the same category. On the one hand, they are similar to pragmatic inferences by virtue of being ultimately anchored to the conventional meaning of the utterance: they are contingent on the fact that the utterances that convey them are recognized by a listener as being in violation of or in compliance with the maxims of Relevance or Informativeness – something that, in turn, is predicated on the fact that these utterances come with a propositional content, and this content has been successfully parsed by the listener. On the other hand, they are different in that they are, to a certain extent, outside the speaker's control: someone deliberately violating pragmatic maxims with no cooperative intent is likely to be socially penalized for that behavior – regardless of whether they deliberately intended to be seen as less warm or competent, or whether they were oblivious to or unconcerned with the consequences of their conversational move. From this point of view, the speaker evaluations investigated in our study are akin to the social inferences typically investigated in sociolinguistics in connection to the use of particular linguistic forms – particularly in the sound domain. For example, apical realizations of /ing/ as in “I'm goin' fishin'” have been argued to invoke, in a North American setting, speaker properties such as being laid-back, unpretentious, lazy and many others that might or might not be simultaneously salient in the same context (see Campbell-Kibler, 2011; Eckert, 2008). Crucially, these social associations appear to emerge regardless of whether the speaker purposefully chose to speak in this way to convey them, or was routinely describing things in whatever variety of their repertoire they thought would be appropriate (see Acton, 2022; Beltrama, 2020; Eckert, 2019); as a result, inferences on this sort have been argued not to require intentionality, but rather *legibility* – they need to be recognizable by listeners within the social context of a given speech community, regardless of the degree to which the speaker meant for them to be recognized (Eckert, 2019). Social assessments of Warmth and Competence can be similarly modeled as being orthogonal to intentionality, in the sense that they are drawn independently of whether the speaker intended to produce a certain social effect or not.

A second important difference between the inferences modeled in Gricean and neo-Gricean pragmatic theories and those investigated here bears on the assumption that conversation is a cooperative game – one in which interlocutors share the mutually beneficial goal of attaining a maximally efficient exchange of information with minimal effort, and coordinate with one another to pursue this objective. The studies discussed in the current article show that linguistic utterances can productively and systematically invite inferences even in situations in which cooperativeness cannot be assumed – that is, when the speaker makes choices that appear sub-optimal from the perspective of communicative efficiency, and such choices are not motivated by any obvious reason other than the speaker’s own self-interest. As discussed in 2.1, such cases have typically escaped the purview of pragmatic research – and the Gricean tradition in particular – on account of the fact that they lead to a breakdown of all inferences that presuppose cooperativeness between the interlocutors (but see Dulcinati, 2018; Marty et al., 2022, for evidence that pragmatic inferences are also drawn in the absence of cooperativeness). However, our results align with the findings of the politeness literature in showing that suspending cooperativeness does not lead to a suspension of pragmatic reasoning tout court: even when they cannot rely on the assumption that the speaker’s conversational moves are motivated by the goal of attaining a mutually beneficial exchange of information, listeners continue to rely on their knowledge of pragmatic principles to assign social meaning to an utterance – and do so by following very similar considerations to those that have been theorized to underlie pragmatic inferences. This observation, in turn, highlights the importance of enriching Gricean and neo-Gricean approaches to conversation with insights from models of communication that do not rely as centrally on cooperativeness but also posit a speaker’s self-interest as a major force driving their conversational choices in interaction (see Attardo, 1997; Haugh, 2015).

In sum, the social evaluations studied here can be seen as an instance of rational inference on the part of the comprehender about what the speaker said (and left unsaid) and why they chose to speak in that particular way. Such social inferencing is similar to pragmatic inferences in being anchored to semantic and pragmatic properties of the utterance, but at the same time transcends them by not always being subject to the constraints of intentionality or cooperativeness. Our investigation of these inferences thus allows us to refine our current typology of the social information that listeners can extract from speech, and contributes to a broader picture of the processes whereby listeners can reason about different types of linguistic input to derive social information. The upshot is that, similar to what we suggested about pragmatic theories, endeavors to develop a unified framework to model pragmatic and social inferences should be enriched to capture uncooperative cases as well, and to reflect the observation that social inferences can be drawn even in situations in which pragmatic inferences are not possible.

### 7.3 Limitations and directions for further research

Before concluding, it is important to discuss several questions that cannot be addressed on the basis of the present findings, and that highlight promising directions for further research on the topic. One issue revolves around how listeners integrate pragmatic reasoning with other streams of information about their interlocutor to form social impressions. In our paradigm, by using silhouettes and only providing very basic information about the characters' background, we aimed to minimize the social cues that could have invited social inferences independent of the speaker's conversational choices. But of course, interlocutors have a much richer package of information at their disposal when engaging in conversation: they can often rely on information about the speaker's mood, personal history, traits, social status, or even geographical origin – all of which are likely to play a role in determining how the speaker is perceived. Accordingly, future work needs to address how different pragmatic behaviors conspire with other sources of information to produce inferences about personality; and whether social attributions of the kinds studied here can extend from individual to group evaluations (as in, e.g., the case of politicians systematically giving under-informative or irrelevant answers to debate questions).

A second question concerns whether, and how, social and pragmatic inferences inform one another. For example, in a context in which elements of the speaker's personality or social identity are already known, does this information affect the way in which listeners draw pragmatic inferences from what the speaker said? This possibility is supported by recent work showing that social information about the speaker's identity influences how listeners interpret the literal content of an utterance at the pragmatic level (Beltrama & Schwarz, 2021, 2022; Fairchild & Papafragou, 2018).

A final issue revolves around the timescale along which social inferences are drawn in conversation (see Austen & Campbell-Kibler, 2022, for related discussion). At present, little is known about the time course of the social inferences studied here, and the way their derivation relates to more traditional pragmatic processing. One possibility is that social inferences emerge at a late stage of processing, with judgments reflecting slow, effortful reasoning about the speaker's identity. Alternatively, at least some inferences about the speaker's personal traits may be computed in parallel with semantic and pragmatic comprehension. This last possibility connects to the fact that speaker properties such as language background (Grey & van Hell, 2017; Hanulíková et al., 2012), knowledge state (Bergen & Grodner, 2012) and gender (Berkum et al., 2008) are accessed and brought to bear on sentence comprehension from the earliest moments of processing. This possibility is also supported by work in social psychology showing that impressions about others arise on the basis of a wide array of human actions (Fiske et al., 2002; Fiske et al., 2007; Goodwin et al., 2014; Judd et al., 2005; Rosenberg et al., 1968; Stoler et al., 2020), often rapidly and from rudimentary input (see Mende-Siedlecki, 2018, for an overview).

## 8. Conclusion

In a series of experiments, we have shown that a speaker's conversational choices with respect to the pragmatic principles of Relevance and Informativeness, as well as the reasons behind such choices, can lead a listener to draw social inferences about the speaker's personality. These findings highlight the value of combining work in pragmatics exploring how listeners draw inferences from linguistic utterances with insights from sociolinguistics and social psychology about how people reason about human speech and behavior to form an impression of others. This integrated perspective could yield important insights on the nature of linguistic communication as a domain of rational action.

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## Data accessibility statement

Item files, data files, and R code for data analysis and visualization are available on the public OSF repository with DOI: <https://doi.org/10.17605/OSF.IO/F3PHZ>.

## Ethics and consent

Individuals who participated in this and all subsequent experiments provided informed consent in compliance with the University of Pennsylvania Institutional Review Board.

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## Competing interests

The authors have no competing interests to declare.

## Author contributions

**Andrea Beltrama:** Conceptualization, Methodology, Formal Analysis, Investigation, Writing – Original Draft, Writing – Review & Editing.

**Anna Papafragou:** Conceptualization, Methodology, Writing –Original Draft, Writing – Review & Editing.

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