Investigating shared representations in implying and inferring

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Utterances communicate much more than the literal meaning of the words. Consider the following exchange: A: "I hear Helen's husband is rich and intelligent." B: "Well, he's rich." Speaker B *says* that Helen's husband is rich, but *implies* that he is not intelligent. The linguistic and psychological mechanisms underpinning implicatures like these have been intensely studied since Grice (1975) (e.g. Bott & Chemla, 2016; Breheny, Ferguson, & Katsos, 2013; Chierchia, 2004; Noveck, 2001). However, this research has focused predominantly on the listener, and not the speaker. Here we present two experiments that investigate implicature *production* and test whether the psychological procedures involved in implying overlap with those involved in inferring.

Inferring and implying are different processes. Inferring is carried out by the listener and involves going from speech to meaning, whereas implying is carried out by the speaker and involves going from meaning to speech. This can also be seen by noting that the standard Gricean account of how implicatures are derived (by the listener) must be substantially adapted to before it makes sense from the perspective of the speaker (e.g. how can the speaker generate alternatives to their own utterances?). However, while there must necessarily be some differences between implying and inferring, there may be overlap. Some procedures may be used in both directions even if the system as a whole is different.

If implicature processes overlap, a listener who infers might subsequently be likely to imply. In other words priming of implicatures might exist between interlocutors (as with other linguistic structures, e.g. Pickering & Ferreira, 2008). To test this we adapted a dialogue-based communication game (see Branigan et al, 2000) for implicatures.

Overview.

A participant and a confederate took turns describing and identifying a referent card from a set of four, each of which included one or two images. The structure of the images is shown in Figure 1. Experimental trials referred to either the A or AB card. Crucially, one item was duplicated across these cards (a pencil in Figure 2). Thus, if the speaker used an unmodified expression to describe the A card, "The card with the pencil," they relied on the listener to derive an inference to disambiguate the referent (since the speaker did not say pencil and book, they must mean only the pencil). Alternatively, they could use an explicit modifier, "The card with just the pencil". The **dependent measure** was whether the participant (as speaker) chose an unmodified form (an *implicit* construction) or a modified form (an *explicit* construction).

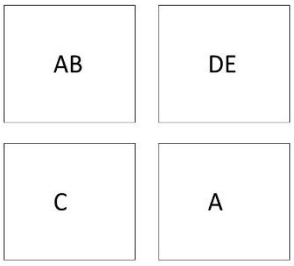

Figure 1. Image structure

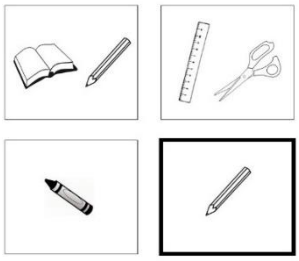

Figure 2. Example trial

We implemented a priming manipulation using the confederate. There were two forms of priming: global and local. Global priming was between subjects. For one group, the confederate used predominantly implicit constructions, and for the other, she used predominantly explicit constructions. Local priming was within participants. Here, the confederate used an implicature on some trials but not others, and the DV was the rate of implicatures on subsequent trials. If there are overlapping inference and implication processes, the rate of implicatures used by the participant should depend on that used by the confederate, both globally and locally.

Experiment 1. N =35

Global priming. Participants adopted the conversational style of their partner (Figure 3). When their partner was using

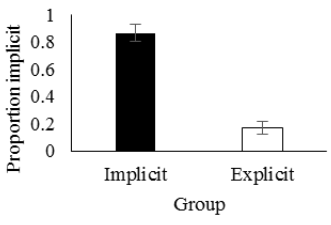

Figure 3. Proportion of implicit responses in each group

implicatures, participants were more likely to also use implicatures ($F(1,31)=125.11$, $p < .001$).

Local priming. We also manipulated trial-by-trial use of implicatures by the confederate. Participants were more likely to use an implicature immediately after the confederate had used one than when she did not, $F(1,31)=8.08$, $p=.008$. These findings support the hypothesis that there are overlapping processes between implying and inferring.

Experiment 2. N=35. Experiment 1 used a confederate as the interlocutor. However, we have no way of knowing whether participants believed our deception. Our results could therefore be a consequence of participants believing that the conversational partner was an experimenter. In Experiment 2 we tested this by manipulating whether the partner was presented as an experimenter or another participant. The basic design was exactly the same. The only difference was that one group of participants were told that their partner was an experimenter and the other group was not.

Partner role. We found no significant differences between when the partner was presented as an experimenter or as a confederate ($F(1, 36) = 1.13$, $p = 30$).

Global priming. We replicated the findings from Experiment 1. Participants in the implicit condition produced more implicit utterances than those in the explicit condition ($F(1, 36) = 45.72$, $p < .001$, 95% CI = 1.97 – 3.65). The global priming effect was significant in the experimenter ($F(1, 16) = 19.25$, $p < .001$, 95% CI = 1.53 – 4.39) and the confederate condition ($F(1, 16) = 30.06$, $p < .001$, 95% CI = 1.65 – 3.68).

Local priming. As in Experiment 1, the local priming effect was significant, $F(1, 32) = 6.64$, $p = .015$). However, the results were only marginal when considering experimenter and confederate condition separately ($F(1, 6) = 4.18$, $p = .058$; $F(1, 16) = 3.01$, $p = .100$).

Overall, we replicated the global and local priming effects from Experiment 1 and we found no evidence that the findings were dependent on whether the participants believed that the partner was a confederate.

Conclusion. We found that participants can be primed to produce implicatures in dialogue. This suggests that there are overlapping processes in implying and inferring. When a listener infers, they activate implicature processes, which in turn makes it more likely that those processes will be used in subsequent production.

Previous research has suggested that implications are produced as a consequence of socio-pragmatic factors such as politeness and efficiency (Holtgraves & Yang, 1990; 1992; Levinson, 2000). These factors cannot explain our results because in Experiment 1, we did not manipulate any social factors and participants systematically varied their choice of construction across conditions, and in Experiment 2 we manipulated the social status of the conversational partner but found no difference in rates of implicature production. Our findings therefore suggest sociopragmatic factors are only one source among many that influence the decision about whether a speaker is implicit or explicit.

More generally our study takes some initial steps into understanding implicature production. The nature of these processes and the extent to which comprehension and production overlap in pragmatics are interesting topics for the future.

Selected References

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