

## Quantity implicatures in a competitive game

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In Grice's account (1989) quantity implicatures are afforded by the assumption that the speaker is cooperative and therefore informative. Grice does not give an account of how the expectations of hearers are affected when they cannot assume that the speaker is cooperative. However, from Grice's account we can derive the prediction that rational hearers should not expect a non-cooperative speaker to abide by the maxim of quantity and therefore they should not derive quantity implicatures. By contrast, Sperber et al. (2010) would predict that hearers derive relevant implicatures regardless, but might then decide not to believe them if the speaker is not trustworthy. We set out to test these predictions using a signalling game.

In our experiment 140 Native English speakers played an online game with another (virtual) player. In each round of the game they saw two cards (a winning card and a losing card) and they read a short description of the winning card written by the other player. Their goal in each round was to click on the winning card. They were assigned to one of three conditions:

- a *cooperative condition*, where the other player's goal was to help them click on the winning card
- a *competitive condition*, where the other player's goal was for them to click on the losing card
- a *competitive-truthful condition*, where the other player was also playing *against* them but was not allowed to lie.



Fig. 1 Cards associated with the description "On the winning card none of the objects are vases"

Each participant saw 16 control items, where the description was true of one card but false of the other (e.g., Fig.1), and 16 experimental items, where the description was true of both cards but could give rise to a quantity implicature (either a scalar implicature with *most* or *some* or an *ad hoc* quantity implicature) which was only true of one of the two cards (e.g., Fig.2).

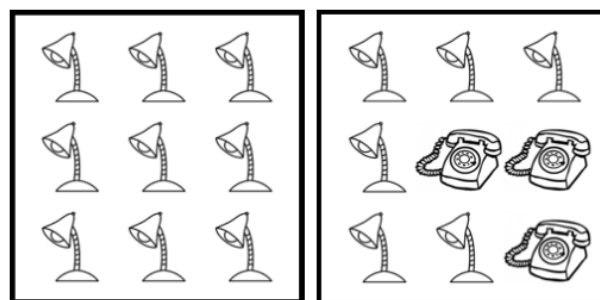
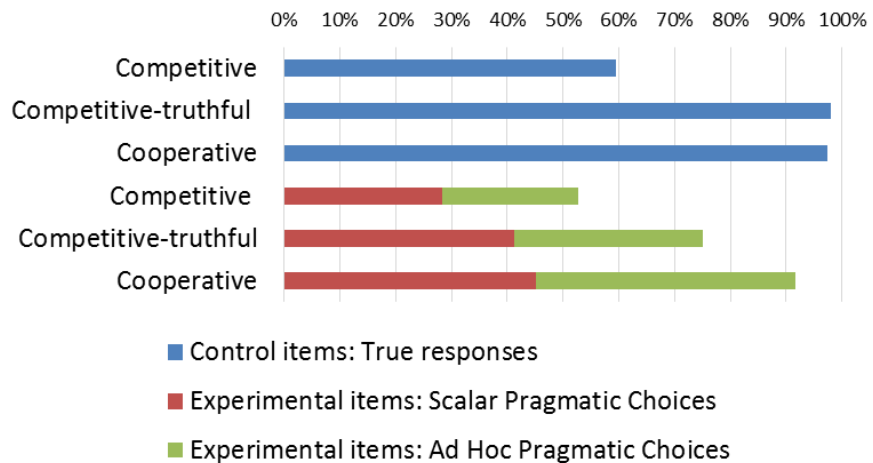


Fig. 2 Cards associated with the description "On the winning card most of the objects are lamps"

We analysed the frequency of 'true' responses for control items (i.e. clicking on the card that fits the description) and 'pragmatic response' for experimental items (i.e. clicking on the card that fits the quantity implicature of the description) in each condition (Fig.3). We found that the rate of pragmatic responses in experimental items was significantly lower in the competitive ( $W_{\text{subj}}=448$ ,  $p<0.001$ ;  $V_{\text{items}}=136$ ,  $p<0.001$ ) and competitive-truthful ( $W_{\text{subj}}=601$ ,  $p<0.001$ ;  $V_{\text{items}}=136$ ,  $p<0.001$ ) conditions compared to the cooperative condition. This indicates that our manipulation did have an effect. If participants in the competitive conditions did not infer implicatures at all, they should have no preference between the pragmatic response and the other response. Therefore, we compared the rate of pragmatic

choices with chance level ( $p=0.5$ ) and found that it was significantly higher than chance in the competitive-truthful condition ( $V_{\text{subj}}=720.5$ ,  $p<0.001$ ;  $V_{\text{items}}=136$ ,  $p<0.001$ ) but not in the competitive condition ( $V_{\text{subj}}=648$ ,  $p=0.541$ ;  $V_{\text{items}}=101$ ,  $p=0.090$ ). This preference for the pragmatic response in



**Fig. 3** Frequency of true/pragmatic responses in each condition

the competitive-truthful condition indicates that participants are inferring *and* accepting implicatures to some extent, which is not in line with the prediction we derived from the Gricean account. A plausible explanation for this result and for the difference between the two competitive conditions is that participants consider false implicature to be lies (Meibauer, 2014) and therefore tend to accept the content of the implicature in the competitive-truth condition but not in the competitive condition where lying is allowed. However, if participants considered false implicatures to be lies to the same extent as false assertions, they should not choose the pragmatic response in experimental items less frequently than they choose the 'true' response for control items in the competitive-truthful condition. We compared the responses to control and experimental items in the competitive-truthful condition and we found that the rate of pragmatic responses to experimental items was significantly lower than the rate of 'true' responses to control items ( $V_{\text{subj}}=486$ ,  $p<0.001$ ;  $W_{\text{items}}=0$ ,  $p<0.001$ ). This suggests that false implicatures are not considered lies to the same extent as false assertions. We also investigated whether there was a difference between scalar and ad hoc implicatures in this respect and we found that the rate of pragmatic choices was significantly higher for scalar implicatures than for ad hoc implicatures in the competitive-truthful condition ( $V_{\text{subj}}=285.5$ ,  $p=0.004$ ;  $W_{\text{items}}=62$ ,  $p<0.001$ ) but not in the cooperative condition ( $V_{\text{subj}}=87$ ,  $p=0.205$ ;  $W_{\text{items}}=31$ ,  $p=0.922$ ). Since this difference is present in the competitive-truthful condition but not in the cooperative condition, its cause is probably not a simple difference in the availability of the inferences but the fact that false scalar implicatures are more likely to be considered lies than false ad hoc implicatures.

In conclusion, our results suggest that hearers faced with a non-cooperative speaker infer quantity implicatures but they are less likely to believe them than if the speaker were a cooperative speaker. This is more in line with the view of Sperber et al. (2010) than Grice (1989). These results are also informative for the status of false implicatures with respect to lies (Meibauer, 2014).

#### References:

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 Sperber, D., Clément, F., Heintz, C., Mascaro, O., Mercier, H., Origgi, G., & Wilson, D. (2010). Epistemic vigilance. *Mind & Language* 25(4), 359-393.