The Effect of the Speaker's Motivation on the Interpretation of Logical Connectives

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Abstract

Logical connectives like 'or' and 'if-then' have been at the center of research on conversational implicature since Grice (1975). It is widely assumed that successful communication depends partly on the alternative expressions the speaker could have used but didn't, and mutual beliefs about the goals and rationality of the interlocutors.

However, most studies on implicature fail to consider the role of contextual factors such as the hearer's beliefs about the speaker's interests. For example, participants are likely to interpret utterances differently if they believe that the speaker has reason to be deceptive. The studies we report here demonstrates that these factors play a significant role in the process of utterance interpretation.

Background

- Conversation is often assumed to follow Grice (1975)'s ***cooperative principle***:
  - Conversation is a joint endeavor and both speaker and hearer assume that the other person will make an effort to be clear.
- However, under certain circumstances speakers might decide that ***deception*** is a better strategy than cooperation.

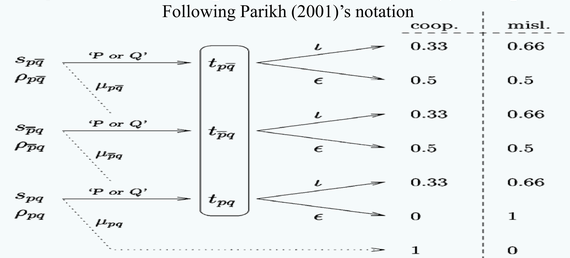
How do the perceived intentions of the speaker affect the hearer's interpretation of an utterance?

A game-theoretic analysis

- Based on game theory it is possible to predict the likely interpretation in contexts that involve varying levels of cooperation and mutual beliefs.
- Speaker attempts to gain maximum payoff for minimum effort.
  - Normally the goals of the speaker and hearer are aligned, leading to a ***default interpretation*** based on Grice's cooperative principle.
  - Infrequently other motives dominate the analysis (e.g., misrepresenting the truth)

Fig. 1: Expected payoffs for cooperative and misleading speakers using '*P or Q*' with hearer choosing an inclusive (*ι*) or exclusive (*ε*) reading.

Following Parikh (2001)'s notation



ρ- Prior probability of a specific interpretation

μ - An alternative (unambiguous) utterance

Design

- Ps presented with a series of 84 grids (Fig. 3)
- Each grids is accompanied by an utterance presented as coming from another person (Fig. 2)
  - The utterance ambiguously identifies 3 possible targets (out of 4 occurrences of that same target on the grid).
- Ps choose an item based on the information from the utterance.
  - Choice reflects Ps interpretation of the utterance
- ➢ The perceived motivation of the speaker is manipulated:
  - **'winner':** speaker stands to *win* on a correct choice by the P
  - **'loser':** speaker stands to *lose* on a correct choice by the P

Fig. 2: The 3 types of utterances accompanying the grids

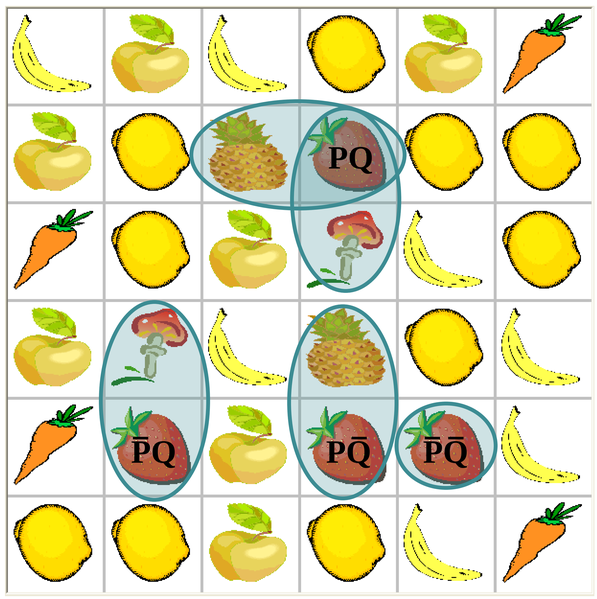
P or Q
John says "The prize is behind a strawberry that is next to a pineapple or a mushroom."

not P and Q
John says "The prize is behind a strawberry that is not next to a pineapple and a mushroom."

P if Q
John says "The prize is behind a strawberry that is next to a pineapple if it is next to a mushroom."

Fig. 3: Sample experiment grid

(Target = Strawberry; P = Pineapple; Q = Mushroom)



Experiment 1: Vested interest

Speaker and Participant have opposing goals

In this experiment whenever the speaker wins the participant loses and vice versa (based on Ps choice)

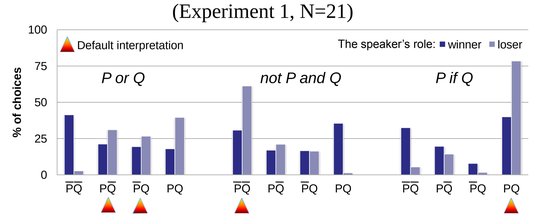
Prediction (based on a game-theoretic analysis)

Participants will be more likely to follow the default interpretation of the utterances if *they* win by making the correct choice

Results

Fig. 4: Distribution of choices by type of target

(Experiment 1, N=21)



Ps were more likely to make the choices predicted by the default interpretation (e.g., choose a target that is next to both a pineapple and a mushroom if the utterance was of the form 'P if Q') when they stood to win by making a correct choice. ($p < .01$)

Experiment 2: No vested interest

Participant is given instructions by one of two speakers with opposing goals

In this experiment there are 2 possible speakers. One wins when the P makes a correct choice, the other loses when the P makes a correct choice.

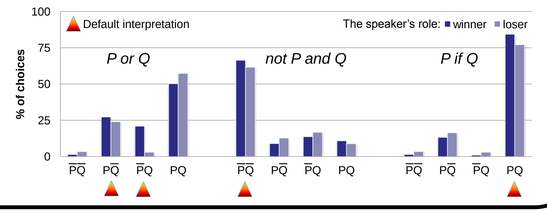
Prediction (based on a game-theoretic analysis)

Participants will be more likely to follow the default interpretation of the utterance if the *speaker* wins on a correct choice.

Results

Fig. 5: Distribution of choices by type of target

(Experiment 2, N=15)



Ps were more likely to make the choices predicted by the default interpretation when the speaker stood to win than lose. ($p < .05$)

Discussion

The results described here demonstrate that the utterance interpretation process is sensitive to the hearer's beliefs as to what they perceive to be the likely motivation of the speaker.

- **Experiment 1** demonstrated that participants interpret utterances differently depending on whether they win or lose if they choose correctly.
- **Experiment 2** showed that even in cases where the motivation of the Ps is kept constant they still respond differently based on whether the speaker would gain more from cooperation or from deception.

The *perceived intention* of the speaker plays a role in the hearer's interpretation of ambiguous utterances.

- Not all contexts in which communication occurs are fully cooperative. (e.g., hostile witnesses)
- Hearers sometimes need to take the possibility that the speaker might be misleading into account when interpreting utterances.
- Interpretations that are derived based on Grice's cooperative principle are less likely to hold when the speaker is perceived to have a reason for deception.

In order for communication to work, most contexts require a high degree of cooperation – But the cooperative principle can be violated on occasion.

- Predictions based on game theory can account for the differences in interpretation based on the motivation of the speaker.

Game theory allows for the generalization of Gricean principles to cases in which the cooperative principle might not hold.

References

- Grice, H. P. (1975) Logic and conversation. In P. Cole and J. L. Morgan (eds), *Syntax and Semantics, Vol. 3, Speech Acts* (pp 41-58), New York: Academic Press.
- Parikh, P. (2001) *The use of language*, CSLI Publications, Stanford: CA