The Role of Executive Function and Theory of Mind in Pragmatic Computations

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Introduction

- Two aspects of meaning (Grice, 1975)
  - Semantic, or literal, meaning
  - Pragmatic, or contextually enriched, interpretation
- When these interpretations do not match, listeners vary in choosing between them (Guasti et al., 2005; Noveck, 2001).
- Both Theory of Mind (ToM; Grice, 1975) and Executive Function (EF; De Neys & Schaeken, 2007) are thought to contribute to pragmatic inference but such factors have rarely been examined together.

What are the unique contributions of EF and ToM to pragmatic inference?

Experiment 1

- Participants (N=179) completed the following tasks:
  - Dual SI task: Under-Informative Sentence ratings under Memory Load (a) and No Load (b) conditions
  - Simple Scalar Implicature (SI) task
    - Is this a good or a bad sentence?
    - Under-Informative: Some dogs are mammals. (Yes = semantic response; No = pragmatic response)
    - Informative: Some reptiles are lizards.
  - Two EF tasks: Reverse Digit Span Task and Memory Score in dual task.
  - Two ToM tasks: Mind in the Eyes:

Experiment 2

- Participants (N=174) completed the tasks from Experiment 1 (except Dual SI task) as well as 2 additional pragmatic tasks:
  - Metaphor: Participants read either a novel metaphor or a literal phrase and rated how meaningful the statement was.
    - For example: “to harvest courage”
  - Indirect Request: Participants saw a picture and sentence pair, then rated how much they felt the speaker wanted something from them on a 5-point scale.

Strange Stories:

Katie and Emma are playing in the house. Emma picks up a banana from the fruit bowl and holds it up to her ear. She says to Katie, “Look! This banana is a telephone!” Why did Emma say this?

Does SI computation depend on Memory Load (Dual SI task)?

Linear mixed-effects regression predicting Sentence Ratings Judgments of Under-Informative sentences did not differ significantly between Memory Load and No Load conditions.

Pragmatic Difference Score (PDS) in Simple SI task:

Under-Informative minus Informative Rejections.

<table>
<thead>
<tr>
<th>Variable</th>
<th>β (S.E.)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF</td>
<td>0.173</td>
<td>1.741</td>
<td>0.083</td>
</tr>
<tr>
<td>ToM</td>
<td>0.491</td>
<td>4.754</td>
<td>&lt;.001</td>
</tr>
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Multiple regression predicting PDS from ToM and EF. R² = .305, p < .001.

ToM was positively associated with pragmatic responding; however, there was no unique contribution of EF.

Conclusions

Theory of Mind is an important contributor to pragmatic competence.

- In line with broadly Gricean and post-Gricean accounts (Grice, 1975; Sperber & Wilson, 1986/1995).
- Pragmatic inferences are based on reasoning about speaker knowledge/abilities and preferences.
- EF does not uniquely contribute to pragmatic computation (even though it can correlate with some pragmatic tasks; e.g., SI in Exp.1)
- Proposal: EF is involved in executing ToM computations, or in holding products of ToM reasoning in memory during pragmatic computations.

References


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