

# Readers cling to poor recipients and quickly reject poor instruments

Allison Blodgett  
The Ohio State University

Julie E. Boland  
University of Michigan

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# Research Question

- How quickly do readers detect implausible recipients and instruments in PPs when the preposition supports the recipient or instrument role?
- Differences in timing could help discriminate among three accounts:
  - Syntax-first (e.g., Frazier & Clifton, 1996; Frazier, 1990)
  - Delay (e.g., Britt, 1994)
  - Constraint-based (e.g., Trueswell, Tanenhaus, & Garnsey, 1994; Boland 1997)

# Instrument Stimuli

- One set of 36 items

The repairman sealed a container WITH clear GLUE with a lid...

The repairman sealed a container OF clear GLUE with a lid...

The repairman sealed a container WITH clear KNOBS with a lid...

The repairman sealed a container OF clear KNOBS with a lid...

...while he smiled.

- Manipulated consistency of prep and plausibility of noun for instrument role
  - WITH = consistent, OF = inconsistent
  - GLUE = plausible, KNOBS = implausible

# Recipient Stimuli

- Two matched sets of 10 items

John gave a letter TO his SON to a friend a month ago.

John gave a letter ABOUT his SON to a friend a month ago.

Paul gave the script TO the PLAY to a girl during the break.

Paul gave the script FOR the PLAY to a girl during the break.

- Manipulated consistency of prep and plausibility of noun for recipient role
  - TO = consistent, ABOUT/FOR = inconsistent
  - SON = plausible, PLAY = implausible (between-items)

# Frequency Data:

Verb + Recip-*to* > Verb + Instr-*with*

- PennTreebank Corpus Search of Verbs
  - 33% of PPs modifying our dative Vs = recipients
  - 5% of PPs modifying our action Vs = instruments
- Sentence Completions
  - 75% recipient completions
    - Paul gave the script to...
  - 66% unambiguous instrument completions
    - The repairman sealed the container with...

# Syntax-First Account

- Detect implausible nouns immediately.
- Process
  - V+NP+PP                      PP = primary phrase
  - VP-attach PP as argument
  - Send structure to thematic processor
  - Check structure vs. most likely role
  - Implausible noun doesn't fit most likely role
- If our instruments are adjuncts (unlike recipient arguments), they might be rejected slightly later than recipients because of VP-argument to VP-adjunct reanalysis.

# Constraint-Based Account

- Detect implausible instruments immediately, but not implausible recipients.
- Process
  - Frequency and lexical information act as constraints
  - Recipient and instrument structures/interpretations most consistent with constraints
  - Plausibility has strong effect when other constraints weak, but little effect when frequency and lexical constraints strong (Garnsey, Pearlmutter, Myers, & Lotocky, 1997).

# Delay Account

- Detect both implausible nouns, but not immediately at the nouns themselves.
- Process
  - These PPs are optional
  - Build PP constituent before attaching
  - Consult discourse model
  - Detect implausibility

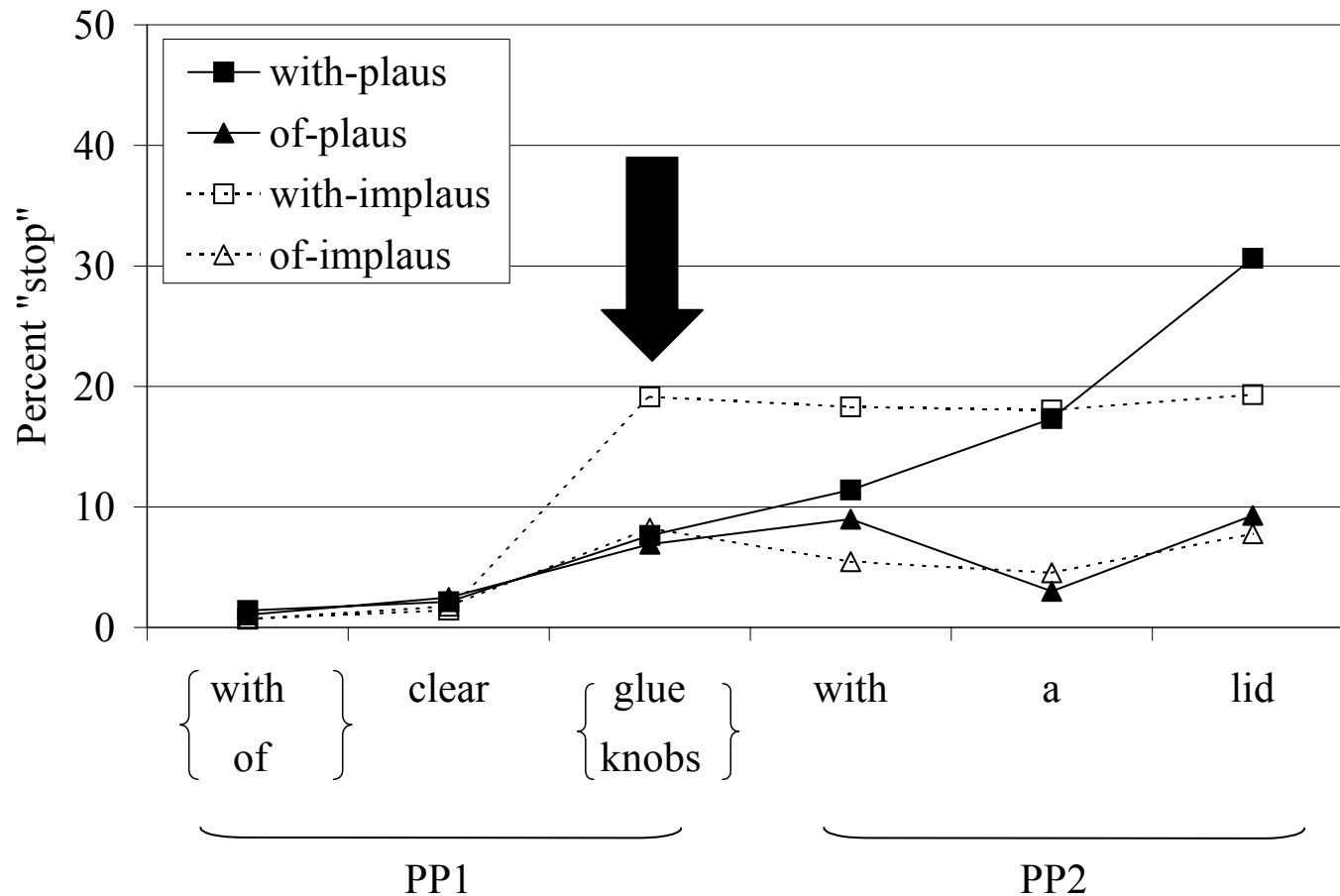
# Instrument Norms

- Mean length, frequency (Francis & Kucera, 1982) comparable
  - Implausible (e.g., KNOBS) 6.25, 36.39
  - Plausible (e.g., GLUE) 6.08, 62.47
- Plausible nouns were rated as better instruments than implausible.
- Complex NPs were comparable in naturalness and likelihood.
  - A container {with/of} clear {glue/knobs}
  - Only one effect: A container with clear glue was rated as marginally more likely than a container of clear knobs ( $t[35]=1.94$ ,  $p=.06$ ).
- Plausible and implausible nouns were likely to occur with PPs.
  - 41% PP completions in a set of sentence completions (A container...).
  - OF = most frequent (35% of PP completions)
  - WITH = rare (< 1% of PP completions)
- Recipient stimuli were previously normed in Boland & Boehm-Jernigan (1998).

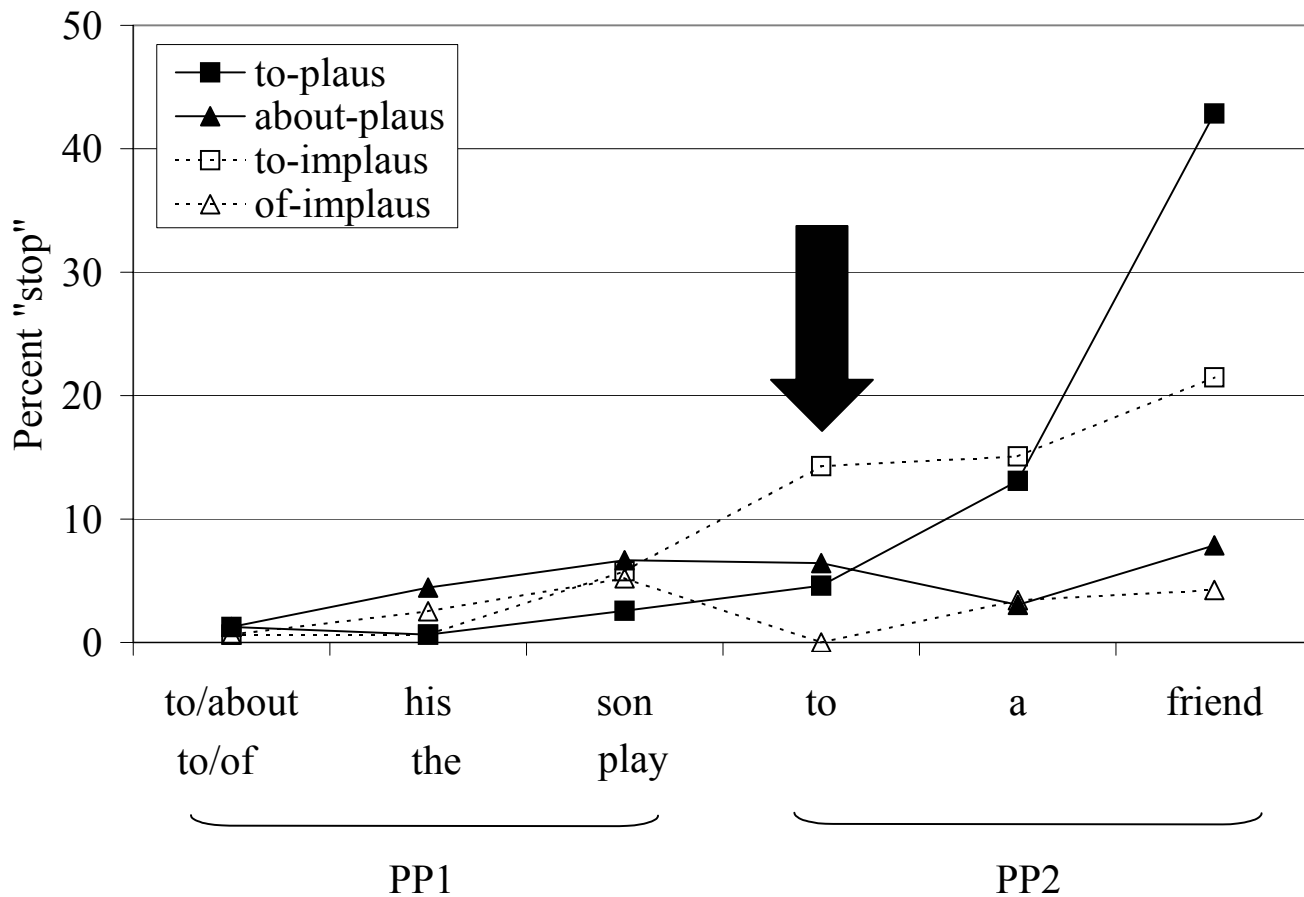
# Exp 1: Stop-Making-Sense Task

- Readers garden path immediately on implausible instruments (see Figure 1).
- As in Boland & Boehm-Jernigan (1998), readers do not garden path on implausible recipients until the onset of the second TO-PP (see Figure 2).
- ABOUT and OF show no evidence of being VP-attached and then reanalyzed, contrary to the syntax-first claim regarding all PPs in V+NP+PP structures.

# Figure 1: Immediate Detection of Implausible Instruments

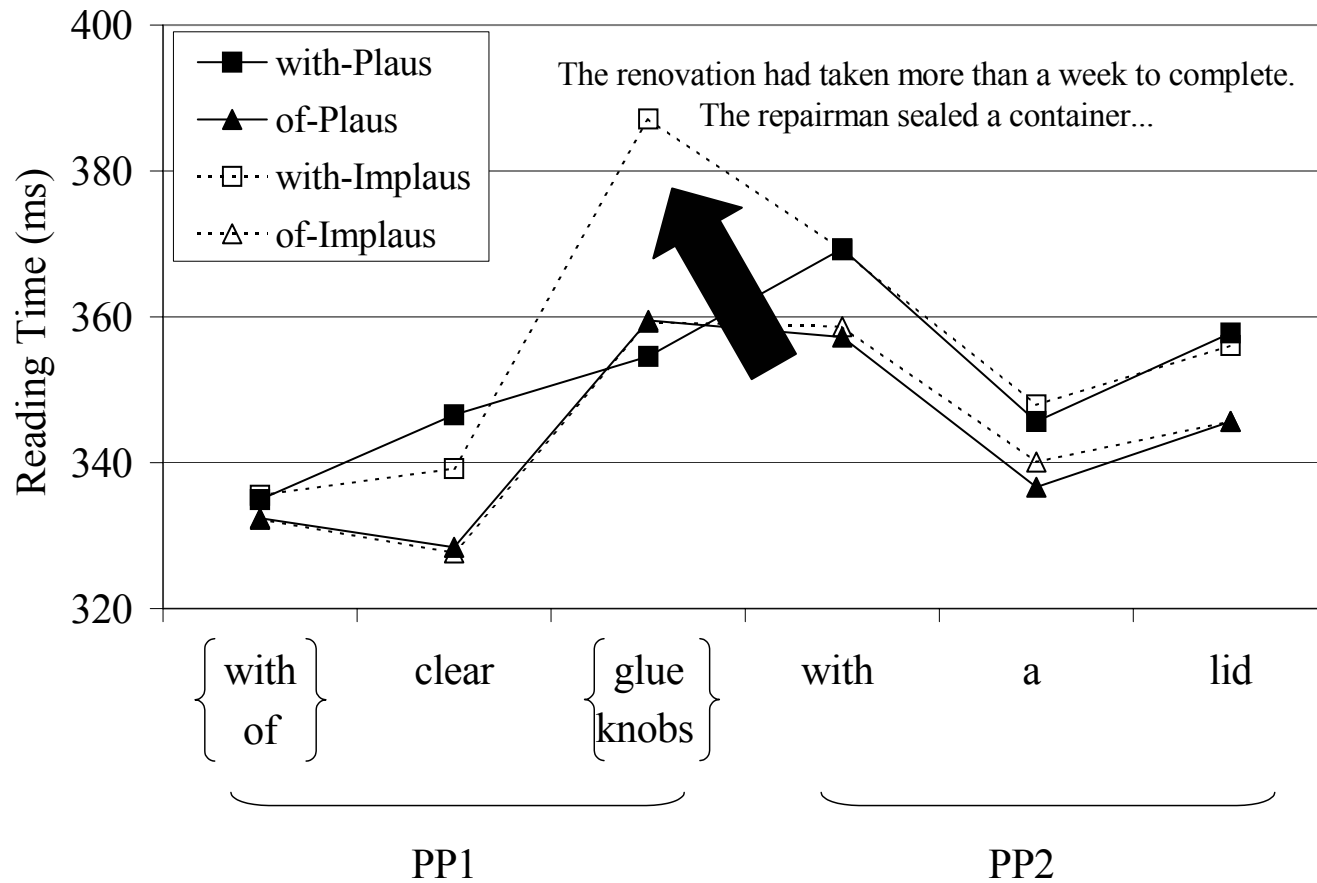


# Figure 2: Late Detection of Implausible Recipients



# Figure 3: Moving Window in Exp 2

## Replicates Early Instrument GP



# Conclusions

- Poor recipients are detected later than poor instruments when the preposition is consistent.
- The fact that implausible nouns cause garden path effects suggests that PP-attachment decisions are most likely made prior to the implausible noun (i.e., at the preposition).
- Lexical information helps determine PP-attachments (i.e., ABOUT and OF are NP-attached from the start).

# Implications

- These results are most consistent with the constraint-based account of Garnsey et al. (1997) in which plausibility interacts with lexical and frequency constraints.
- The results are inconsistent with syntax-first accounts in which a thematic processor establishes the most likely thematic relations and then checks those relations against the initial structure. Rather, high frequency argument relations seem to accept, not reject, implausible thematic roles.

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