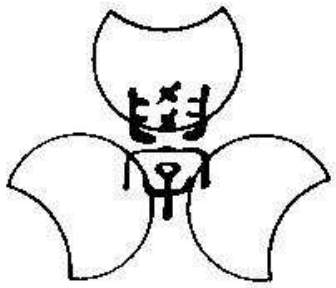

Pronoun Resolution and The Influence of Syntactic and Semantic Information on Discourse Prominence

Ralph L. Rose
<rose@gpwu.ac.jp>
Gunma Prefectural Women's University
Gunma, Japan

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Introduction

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- Prominence is determined by syntactic prominence

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- Experiments
- Discussion
- Conclusions

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  - CR.RA: when semantic information shows that a previous assignment is incorrect, make a reassignment.

Discourse Prominence Theory

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Jane$_i$ thinks she$_i$ is sick.

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CR.PN (new x)

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CR.PN (new x)

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Jane$_i$ thinks	she$_i$ is sick.
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CR.PN (new x)	CR.PN (new y), CR.EQ ($y = x$)

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Greater number of operations in the repeated-name case cause longer reading times.

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2. Could it be determined by multiple factors (e.g., Lappin and Leass, 1994)?

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discourse prominence determined by	preferred referent
syntactic prominence	(matrix) SUBJECT $\star$
semantic prominence	AGENT $\bullet$

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CONTROL	John$_i$ could easily hit Matt$_j$.
AGENT	He$_i$ even managed to land a knockout punch.
PATIENT	He$_j$ became bruised and bloodied all over.

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CONTROL	John_i could easily hit Matt_j.
AGENT	He_i even managed to land a knockout punch.
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SPLIT	Matt_j was easy for John_i to hit $\emptyset_j$.
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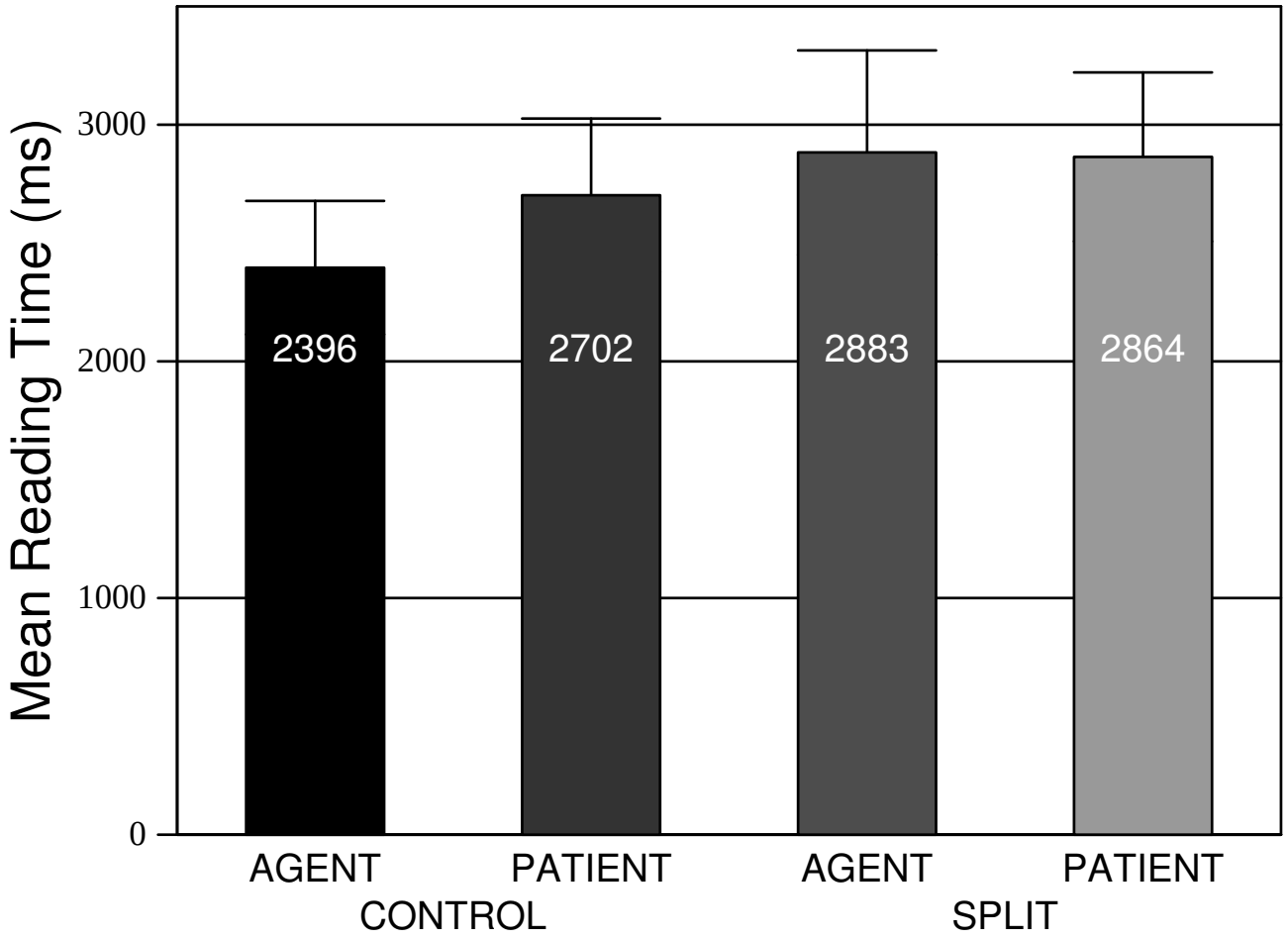
Procedures: Stimuli were shown one sentence at a time in a self-paced reading task. Measurements of the continuation sentence were recorded. Participants included 32 native-English speaking undergraduate students.



	by participants		by items	
CONTEXT	$F(1,31) = 12.5$	$p < 0.005$	$F(1,31) = 7.8$	$p < 0.01$
REFERENT	$F(1,31) = 2.6$	n.s.	$F(1,31) = 1.1$	n.s.
CONTEXT*REFERENT	$F(1,31) = 2.2$	$p = 0.15$	$F(1,31) = 4.3$	< 0.05

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	CR.PN (new y) CR.PN (new x)
AGENT	He$_i$ even managed to land a knockout punch.
	CR.PRO (fail, new z), CR.EQ ($z = x$)
PATIENT	He$_j$ became bruised and bloodied all over.
	CR.PRO (fail, new z), CR.EQ ($z = y$)

Experiment 2a-b

Criticism of Experiment 1: comparisons are being made across different continuation sentences.

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	John_i walked to the supermarket.
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In DPT, this is explained by the greater number of construction rules required.

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Experiment 2a: CONTROL condition

AGENT	John_i could easily hit Matt_j.
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Experiment 2b: SPLIT condition

AGENT	Matt_j was easy for John_i to hit $\emptyset_j$.
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AGENT	Matt_j was easy for John_i to hit $\emptyset_j$.
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NAME	Matt_i became bruised and bloodied all over.

REFERENT (AGENT, PATIENT) $\times$ FORM (PRONOUN, NAME)

Experiment 2a-b

Experiment 2a: CONTROL Condition

	penalty	by participants		by items	
AGENT	83ms	$t(31) < 1.0$	n.s.	$t(31) < 1.0$	n.s.
PATIENT	-270ms	$t(31) = 2.5$	n.s.	$t(31) = 2.7$	$p = 0.07$

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- Negligible penalty for the AGENT continuation.
- Repeated-name *advantage* for the PATIENT continuation.

Experiment 2b: SPLIT Condition

	penalty	by participants		by items	
AGENT	-168ms	$t(31) < 1.0$	n.s.	$t(31) = 1.4$	n.s.
PATIENT	-46ms	$t(31) < 1.0$	n.s.	$t(31) < 1.0$	n.s.

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- Repeated-name *advantage* for the PATIENT continuation.

Experiment 2b: SPLIT Condition

	penalty	by participants		by items	
AGENT	-168ms	$t(31) < 1.0$	n.s.	$t(31) = 1.4$	n.s.
PATIENT	-46ms	$t(31) < 1.0$	n.s.	$t(31) < 1.0$	n.s.

- Negligible penalty for either continuation.

Experiment 2a-b

CONTROL Condition

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AGENT — John$_i$ could easily hit Matt$_j$.

CR.PN (new x) CR.PN (new y)

PRONOUN — He$_i$ even managed to land a knockout punch.

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NAME — John$_i$ even managed to land a knockout punch.

CR.PN (new z), CR.EQ ($z = x$)

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In Gordon et al. (1993), candidate referents topicalized $x >> y$

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In present study, candidate referents not topicalized $x > y$, $x = y$

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In Gordon et al. (1993), candidate referents topicalized $x >> y$

In present study, candidate referents not topicalized $x > y$, $x = y$

Thus, perhaps the search for a suitable referent is influenced by the degree of difference between candidate referents.

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CR.PN (new z), CR.EQ ($z = x$)

PATIENT — John$_i$ could easily hit Matt$_j$.

CR.PN (new x) CR.PN (new y)

PRONOUN — He$_j$ became bruised and bloodied all over.

CR.PRO ($x \leftarrow$ he), CR.RA ($y \leftarrow$ he)

NAME — Matt$_i$ became bruised and bloodied all over.

CR.PN (new z), CR.EQ ($z = x$)

Discussion

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- Relative discourse prominence of competing referents influences search process:

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How does the search for a suitable referent take place (i.e., how does DPT need to be adapted/extended)?

- Refer to multiple prominence factors (cf., Lappin and Leass, 1994).
  - syntactic prominence
  - semantic prominence
- Relative discourse prominence of competing referents influences search process:
  - when $x >> y$, rapidly choose x
  - when $x > y$, slowly choose x
  - when $x = y$, fail

Conclusions

Further Work

- Investigate the relative contribution of syntactic and semantic information to discourse prominence in a language with freer word order (e.g., Japanese).

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- Investigate the relative contribution of syntactic and semantic information to discourse prominence in a language with freer word order (e.g., Japanese).
- Evaluate a model which captures the influence of the relative prominence of referents on the time-course of pronoun resolution.

Thank You!

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Discourse Prominence Theory

In CR.PRO, how is a "suitable" referent determined? Gordon & Hendrick say it is the most discourse-prominent referent as determined by syntactic position. They discuss some consequences.

a. John sent a package to Bill.

b. He received it two days later.

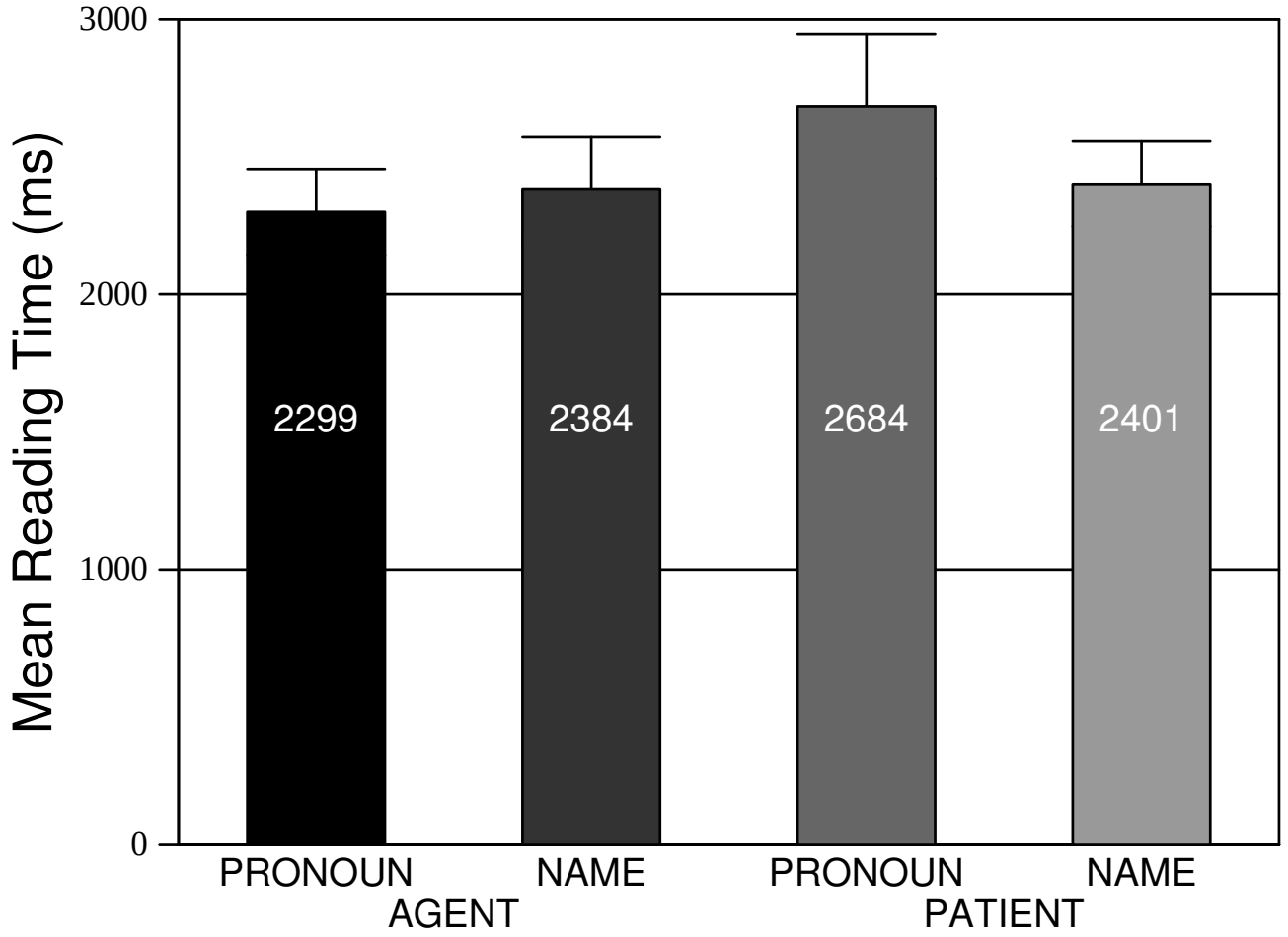
The pronoun is initially resolved to John, but later information and real-world knowledge shows this is incorrect. So, reanalysis is necessary.

Thus, I assume another construction rule here (implied by GH):

- CR.RA: when semantic information shows that a previous assignment is incorrect, make a reassignment.

But, could it be semantic information instead of syntactic information?

CONTROL Condition Reading Times



	by participants		by items	
REFERENT	$F(1,31) = 7.9$	$p < 0.01$	$F(1,31) = 3.6$	$p = 0.067$
FORM	$F(1,31) = 1.6$	$n.s.$	$F(1,31) = 1.5$	$n.s.$
REFERENT*FORM	$F(1,31) = 6.3$	$p < 0.05$	$F(1,31) = 8.5$	< 0.01

Experiment 2a-b

CONTROL Condition

AGENT — John$_i$ could easily hit Matt$_j$.

CR.PN (new x) CR.PN (new y)

PRONOUN — He$_i$ even managed to land a knockout punch.

CR.PRO ($x \leftarrow$ he)

NAME — John$_i$ even managed to land a knockout punch.

CR.PN (new z), CR.EQ ($z = x$)

PATIENT — John$_i$ could easily hit Matt$_j$.

CR.PN (new x) CR.PN (new y)

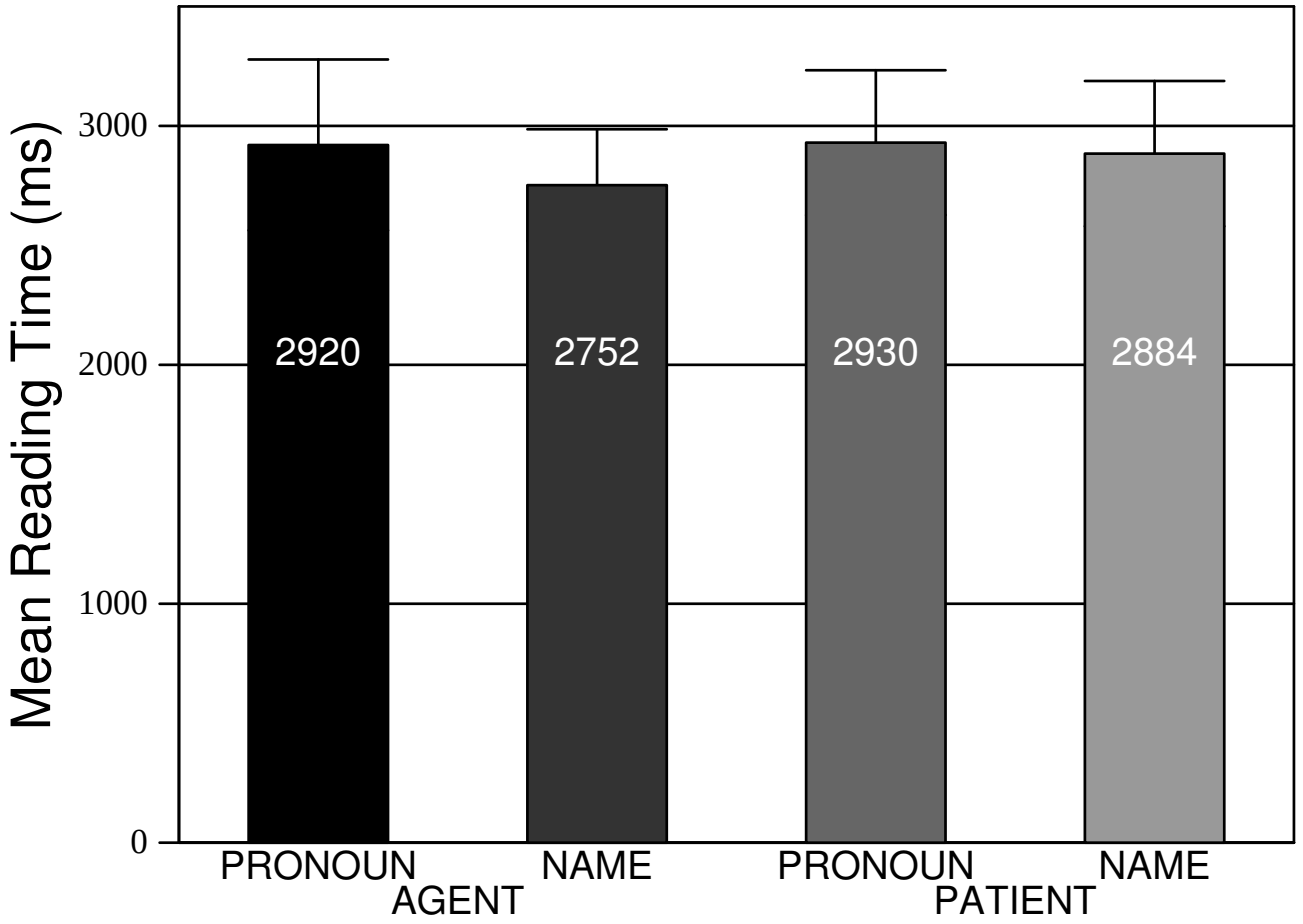
PRONOUN — He$_j$ became bruised and bloodied all over.

CR.PRO ($x \leftarrow$ he), CR.RA ($y \leftarrow$ he)

NAME — Matt$_i$ became bruised and bloodied all over.

CR.PN (new z), CR.EQ ($z = x$)

SPLIT Condition Reading Times



	by participants		by items	
REFERENT	$F(1,31) < 1.0$	n.s.	$F(1,31) < 1.0$	n.s.
FORM	$F(1,31) < 1.0$	n.s.	$F(1,31) = 1.9$	n.s.
REFERENT*FORM	$F(1,31) < 1.0$	n.s.	$F(1,31) = 1.0$	n.s.

Experiment 2a-b

SPLIT Condition

AGENT — Matt$_j$ was easy for John$_i$ to hit $\emptyset_j$.

CR.PN (new y) CR.PN (new x)

PRONOUN — He$_i$ even managed to land a knockout punch.

CR.PRO (fail, new z), CR.EQ ($z = x$)

NAME — John$_i$ even managed to land a knockout punch.

CR.PN (new z), CR.EQ ($z = x$)

PATIENT — Matt$_j$ was easy for John$_i$ to hit $\emptyset_j$.

CR.PN (new y) CR.PN (new x)

PRONOUN — He$_j$ became bruised and bloodied all over.

CR.PRO (fail, new z), CR.EQ ($z = y$)

NAME — Matt$_i$ became bruised and bloodied all over.

CR.PN (new z), CR.EQ ($z = y$)