

# Verb Phrase Ellipsis: Discourse Effects in Syntax and Syntactic Effects in Discourse

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## Introduction

Recent work on verb phrase ellipsis (VPE) has shown sentence acceptability (1) depends on the extent of syntactic mismatch between the antecedent and the elided material [1,2,3].

- (1) a. Kurt blamed Mario for the terrible performance, {and, so} John did (blame Mario) too.
- b. Kurt blamed Mario for the terrible performance, {and, so} John was (blamed by Kurt) too.

However this sensitivity to syntactic mismatch can be modulated in various ways. E.g. (1b) contains a Voice mismatch, but using the connective *so* can improve acceptability [4,5].

The current study asks to what extent discourse relations between the antecedent and ellipsis clauses can account for patterns of acceptability at both the discourse level (2), as well as in coordinate structures (1).

- (2) Kurt blamed Mario for the terrible performance. (So) John did too.

Three experiments on syntactic mismatches in VPE and strict and sloppy interpretations show that syntactic and discourse structure do influence each other, but only in limited cases; in other cases, different intra- and cross-sentential interpretive patterns suggest a boundary between sentence-internal syntax and discourse-level structure.

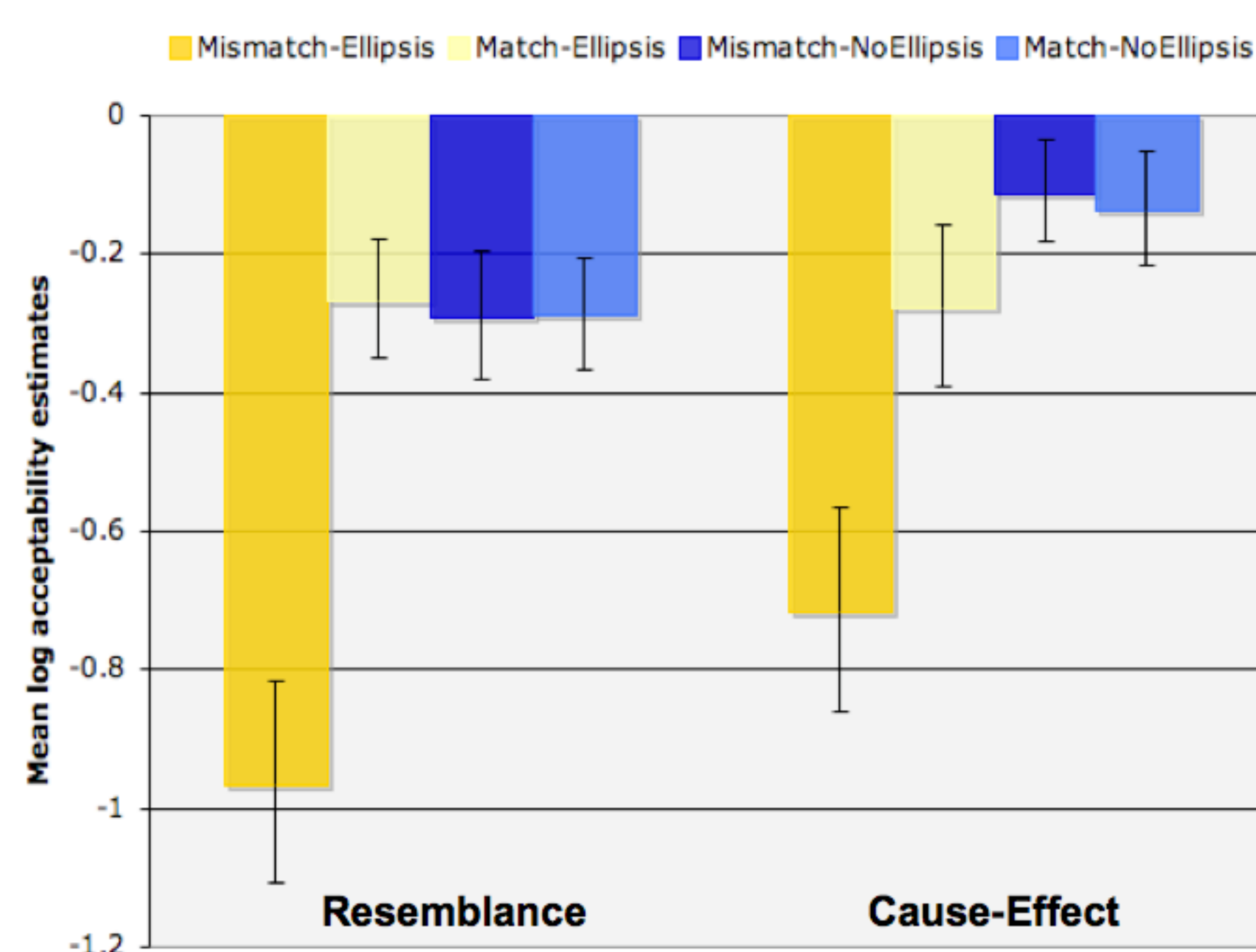
## Experiment 1

Previous work has suggested that syntactic effects are conditioned on discourse coherence [3,5] (though also see [6]). Experiment 1 asks whether syntactic effects interact with discourse coherence, by comparing the effect of Voice mismatch on VPE acceptability where antecedent and ellipsis were related by Resemblance (*and*) or Cause-Effect (*so*), in a magnitude estimation experiment [7]. Ellipsis-Mismatch cases were compared to both Matched and NoEllipsis controls.

### Predictions:

- According to Kehler [4], Resemblance depends on alignment of syntactic arguments--should be sensitive to mismatch.
- In contrast, Cause Effect (CE) relates sentences at the propositional level--should be insensitive to mismatch.

<b>Mismatch-Ellipsis:</b>	Kurt blamed Mario for the terrible performance, {and, so} John was too.
<b>Match-Ellipsis:</b>	Kurt blamed Mario for the terrible performance, {and, so} John did too.
<b>Mismatch-No Ellipsis:</b>	Kurt blamed Mario for the terrible performance, {and, so} John was blamed by him too.
<b>Match:</b>	Kurt blamed Mario for the terrible performance, {and, so} John blamed him too.



### Results:

- There was an Ellipsis-Mismatch interaction: Mismatch was judged worse than Match only with Ellipsis ( $F(1,23)=103, p<.0001$ ).
- There was also a 3-way DiscourseRelation-Ellipsis-Mismatch interaction: the Mismatch-Ellipsis effect was stronger when clauses were related by Resemblance vs. CE ( $F(1,23)=4, p<.05$ ).

Thus while syntactic mismatch effects persist across coherence relations, discourse structure modulates the strength of these syntactic effects.

## Conclusions

Taken together, these results suggest that constraints on VPE cannot be uniformly syntactic or discourse-structural, but instead vary depending on the syntactic phenomena examined.

- The syntactic parallelism condition on VPE is stronger when the discourse relation between antecedent and ellipsis clauses is Resemblance, compared to Cause-Effect. This discourse-level modulation of a syntactic effect is observed both sentence-internally and across sentences, suggesting that discourse-level representations recapitulate sentence-level structure, and analogously that sentence-level structure reflects discourse-level structure.
- Resemblance also enforces syntactic parallelism more than Cause-Effect in reference resolution, in cases where VPE creates ambiguity--there was a higher proportion of bound-variable (structurally parallel) interpretations in Resemblance vs. Cause-Effect within sentences. However this contrast fails to extend to cross-sentential ellipsis.
- The asymmetry in the Intra-sentential data is consistent with either a difference in coherence relation or syntactic structure. But the lack of asymmetry in Cross-sentence conditions suggests the sentence-internal effect is not due to Coherence. If we permit a non-local variable-binding operation as in [9], the change in c-command structure may cause the increase in likelihood of the matrix subject binding the variable in the second clause.

### References

- [1] A Arregui, C Clifton, Jr., L Frazier and K Moulton. 2006. Processing elided verb phrases with flawed antecedents: the recycling hypothesis. *J Memory Language* 55:232-246.
- [2] L Kertz. 2008. Information structural constraints on verb phrase ellipsis. *CUNY 21 poster*.
- [3] G Koble, C Kim, J Hale and J Runner. 2008. A processing model for ungrammatical verb phrase ellipsis. *CUNY 21 talk*.
- [4] A Kehler. 2000. Coherence and the resolution of ellipsis. *Linguistics & Philosophy* 23(6):533-575.

## Experiment 2

Experiment 1 shows a discourse coherence effect where the relevant coherence relations are between conjoined clauses. Experiment 2 asks whether this discourse effect extends to cross-sentential VPE.

- Kehler's original proposal [3] meant to characterize relations among sentences--effect of syntactic mismatch modulated by discourse coherence should be the same whether ellipsis is intra- or cross-sentential.
- But: Frazier and Clifton [8] suggest different constraints apply to syntactic domains (sentence-internal) and discourse structure (across sentences)--cross-sentential VPE should be insensitive to syntactic mismatch.

### Coordination-Mismatch:

Kurt blamed Mario for the terrible performance, {and, so} John was too.

### Coordination-Match:

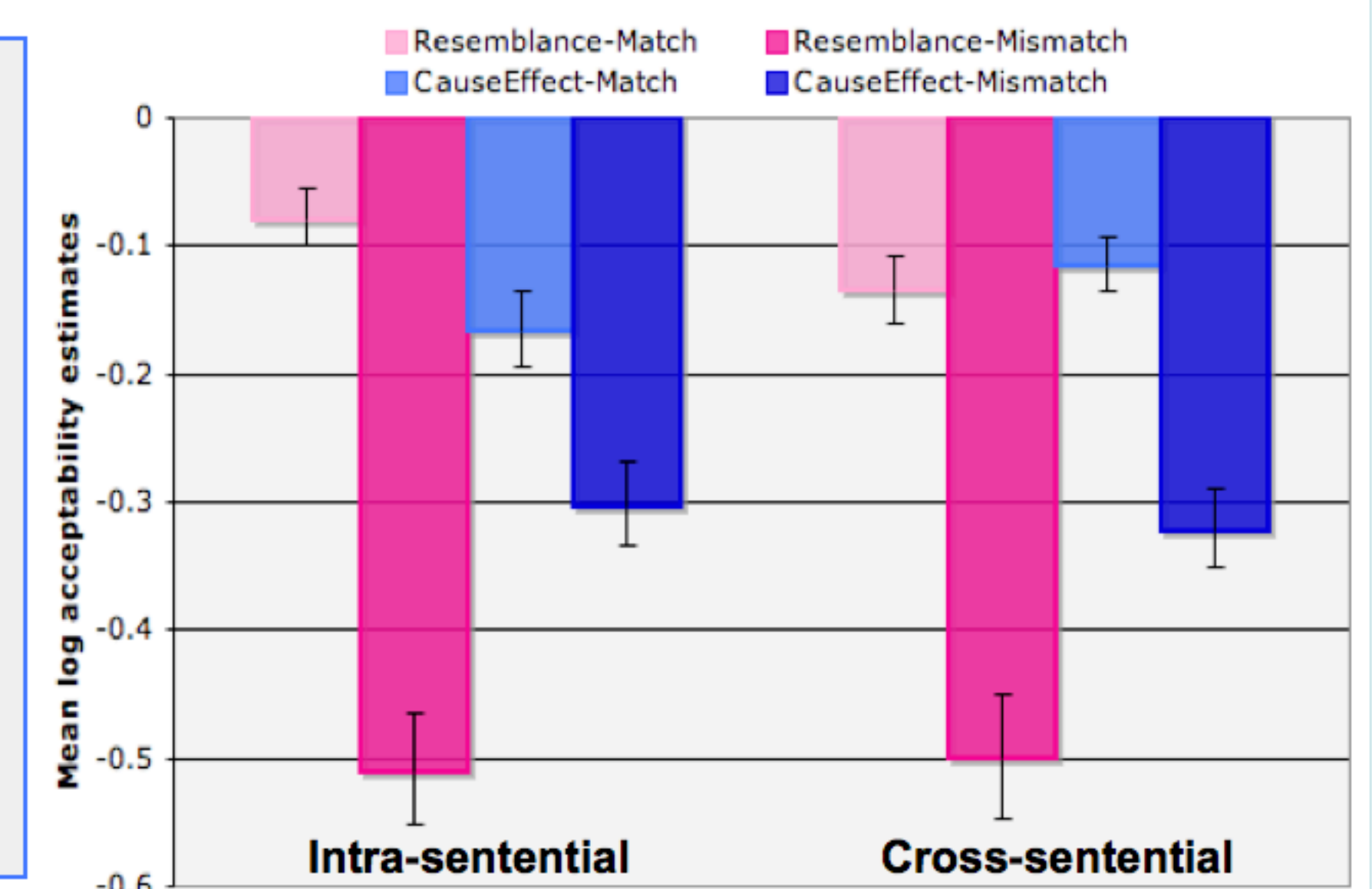
Kurt blamed Mario for the terrible performance, {and, so} John did too.

### CrossSentential-Mismatch:

Kurt blamed Mario for the terrible performance. (So) John was too.

### CrossSentential-Match:

Kurt blamed Mario for the terrible performance. (So) John did too.



### Results:

- There were main effects of Match ( $F(1,13)=187.7, p<.0001$ ) and Coherence ( $F(1,13)=14.6, p<.001$ ), and a Match-Coherence interaction ( $F(1,13)=30.3, p<.0001$ ).
  - There was no interaction of Coherence with Ellipsis Type ( $F(1,13)=.889, p=.34$ ).
- Discourse coherence modulation of syntax observed to the same extent cross-sententially as in coordination; this suggests the discourse representation must be at least structurally rich enough to encode the difference between passive and active syntax.

## Experiment 3

Does discourse structure always interact with syntactic structure as in Experiments 1-2? Experiment 3 shows that a different ellipsis phenomenon--strict (coreferential) vs. sloppy (bound-variable) readings--patterns differently from Voice mismatch. After reading a sentence or sentence pair with an ambiguity due to VPE, participants answered a 2-choice question indicating how they had interpreted the sentence.

### Predictions:

- Coherence proposal predicts strict identity to be ruled out for Resemblance (assuming syntactic identity includes variable-binding relations); both strict and sloppy interpretations should be possible for CE.
- This pattern should be observed for both intra- and cross-sentential ellipsis.

### Resemblance-IntraSentence:

Jane voted for herself in the election, and Ann did too.

### CauseEffect-IntraSentence:

Jane voted for herself in the election, so Ann did too.

### Resemblance-CrossSentence:

Jane voted for herself in the election. Ann did too.

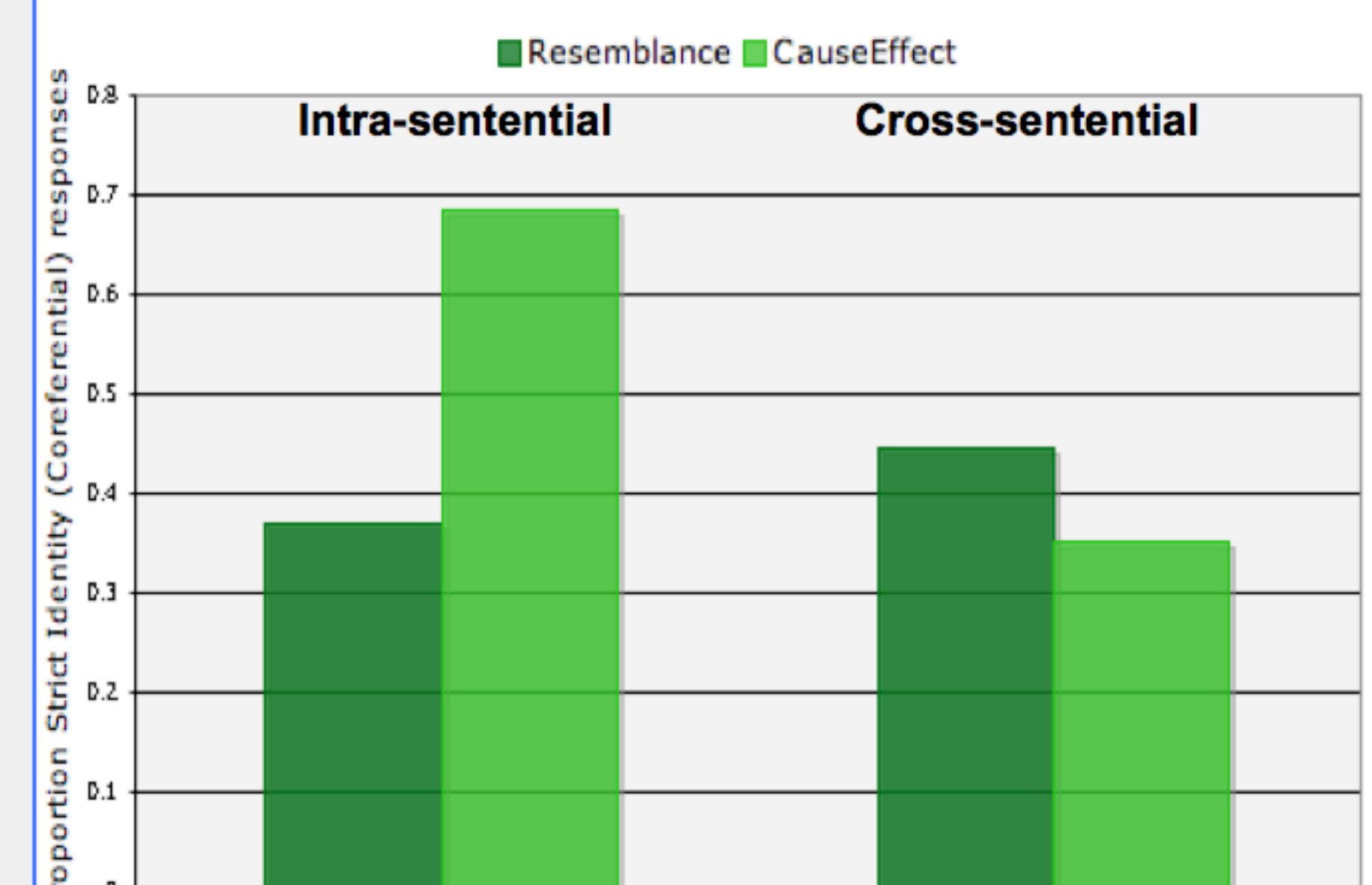
### CauseEffect-CrossSentence:

Jane voted for herself in the election. So Ann did too.

Who did Ann vote for?

(A) Ann ← sloppy/bound-variable

(B) Jane ← strict/coreferential



### Results:

- Main effects of EllipsisType (Intra-/Cross-sentence) ( $F(1,17)=5.7, p<.05$ ) and DiscourseRelation (Resemblance/CE) ( $F(1,17)=4.5, p<.05$ ): more strict interpretations within vs. across sentences, and in CE vs. Resemblance.
- EllipsisType-DiscourseRelation interaction: proportion of strict interpretations greater for CE than Resemblance, in within- but not cross-sentence ellipsis ( $F(1,17)=16.9, p<.001$ ).

While the expected discourse coherence effect was observed in within-sentence VPE, this pattern did not extend to ellipsis across sentences; this contrasts with the parallel sentence-internal and external effects observed in Experiment 2.

### References

- [5] A Kehler. 2002. *Coherence, reference and the theory of grammar*. CSLI.
- [6] L Frazier and C Clifton, Jr. 2006. Ellipsis and Discourse Coherence. *Linguistics & Philosophy*, 29:319-346.
- [7] EG Bard, D Robertson and A Sorace. 1996. Magnitude estimation of linguistic acceptability. *Language* 72(1):32-68.
- [8] L Frazier and C Clifton, Jr. 2005. The syntax-discourse divide: processing ellipsis. *Syntax* 8:121-174.
- [9] E Reuland. 2001. Primitives of binding. *Linguistic Inquiry* 32(3):439-492.