

Verb Phrase Ellipsis is discourse reference: novel evidence from dialogue¹

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0 Plan for this talk

- (I) Verb Phrase Ellipsis (VPE) and IDENTITY
- (II) Experiment: VPE meanings beyond IDENTITY
- (III) A discourse reference model of VPE

Main claims

1. VPE meanings *can* be inferred beyond IDENTITY with linguistic antecedents
2. Those inferences show all the symptoms of DISCOURSE ACCOMMODATION
3. They follow naturally from a model of VPE as *discourse reference*

1 Introduction

1.1 IDENTITY theories of Verb Phrase Ellipsis (VPE)

- (1) a. After the exam, I wasn't sure if I had passed it.

As it turns out, I did. { [I passed it.]
*[I failed it.]
*[...]

- b. After the exam, I wasn't sure if I had failed it.

As it turns out, I did. { *[I passed it.]
[I failed it.]
*[...]

Here and throughout, antecedents are underlined.

Identity theories of Verb Phrase Ellipsis (VPE)

Syntactic IDENTITY theories

require that elided material be **syntactically** identical to the antecedent.

Semantic IDENTITY theories

require that the meaning of the elided material be **semantically** identical to the meaning of the antecedent.

Both model VPE dependency within the *linguistic* context.

Reference \neq semantic IDENTITY!

1.2 Challenges for IDENTITY theories of VPE

- (2) a. **Lexical "mismatches:"** John didn't see anyone, but Mary might. [see someone]²
- b. **"Split antecedents:"** John wanted to go to Bolivia and Mary Ø to Peru, but because it's expensive, neither of them can. [go to Bolivia or Peru, respectively]³
- c. **Exophora:** I will, if you will. [jump]⁴

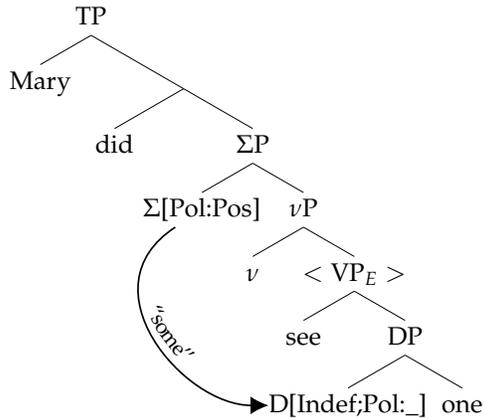
² Adapted from Merchant (2013a)

³ Adapted from Webber (1978)

⁴ Imagine two people standing on the edge of a cold swimming pool; Chao (1987), cited in Hardt (1993). See also Miller and Pullum (2013).

1.3 Strategy I: the “representational” approach

- (3) a. John didn’t see anyone, but Mary did. [see **someone**]⁵
 b. John saw someone, but Mary didn’t. [see **anyone**]
- (4) a. Need to show that: [_{VP} see anyone] = [_{VP} see someone]
 b. Analysis (Merchant, 2013a, ex. 3):⁶



“Representational” approaches

Reanalyze the representation of apparently non-identical elements. For example, if “mismatching” values are assigned post-syntactically to otherwise identical abstract elements (e.g. by Agreement with a VP-external phrasal head), IDENTITY can be preserved VP-internally. Non-VP antecedents (e.g. nominals) may be analyzed as hosting a VP covertly. (e.g. Merchant, 2013b,a; Elbourne, 2005; Fu et al., 2001)

⁵ Merchant (2013a, ex. 1 and 2)

⁶ Merchant (2013b) applies a similar strategy to Voice mismatches; Elbourne (2005) proposes a “representational” account of split-antecedent cases like (2-b).

1.4 Strategy II: inferring antecedents

Mechanism 1: ANTECEDENT ACCOMMODATION⁷

Thoms (2015) applies Katzir’s (2007) algorithm⁸ to ellipsis:

- (5) Accommodating alternative antecedents for ellipsis⁹
 - a. A set of additional antecedents, Ad(A), may be accommodated on the basis of the original (overt) antecedent A.
 - b. The members of Ad(A) are alternatives derived from A by
 - (i) deletion
 - (ii) contraction
 - (iii) substitution
 - c. **Semantic constraint:** All members of Ad(A) must be semantically identical to A

- (6) a. John didn’t see anyone, but Mary did. [see someone]
 b. Non-identical: [_{VP_A} see anyone] ≠ [_{VP_E} see someone]
 c. But “accommodatable:”
 [_{VP_E} see someone] ∈ Ad([_{VP_A} see anyone])

Mechanism 2: RECYCLING (Arregui et al., 2006; Frazier, 2013)

- (7) This process requires active participation, and only if you do, ...

Interim summary

1. IDENTITY theories of VPE capture strong dependency between ellipsis clause and antecedent
2. Strategies for dealing with cases of (apparent) non-identity: (1) Representational; (2) Inferential.

⁷ ANTECEDENT ACCOMMODATION ≠ DISCOURSE ACCOMMODATION !!

⁸ Katzir (2007) applies this algorithm to the problem of generating alternatives for computing implicatures.

⁹ My (5) is adapted from Thoms’ (51).

Inferring antecedents

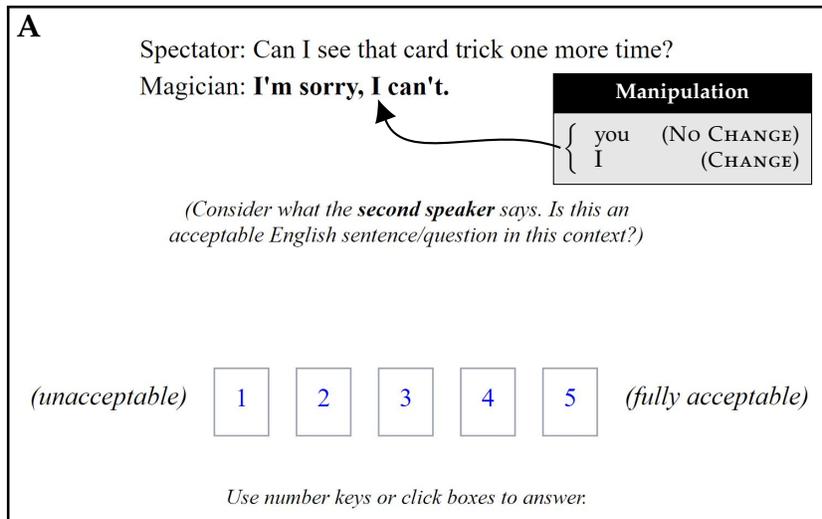
Another strategy is to propose an inferential mechanism for **generating alternative antecedents** from a ‘flawed’ one. ANTECEDENT ACCOMMODATION is such a mechanism that recruits machinery that has been used for deriving implicatures, generating focus alternatives, etc. (Thoms, 2015; Van Craenenbroeck, 2013; Fox, 1999) Another prominent proposal is the RECYCLING hypothesis (Arregui et al., 2006; Frazier, 2013), which recruits the parser’s mechanism for garden-path recovery in order to ‘recycle’ unsuitable antecedents.

2 Experiment: VPE meanings beyond the antecedent

2.1 Materials

- (8) **Spectator:** Can I please see that card trick one more time?
 - a. **Magician:** I'm sorry, you can't. [see it again] (NO CHANGE)
 - b. **Magician:** I'm sorry, I can't. [show it to you] (CHANGE)

2.2 Acceptability judgment task



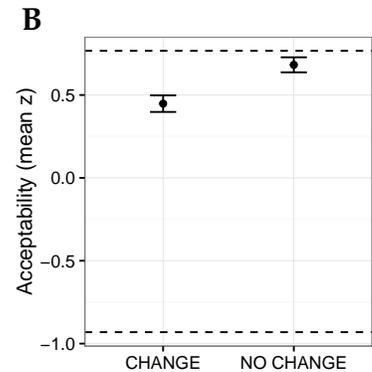
Motivation Explore if VPE meanings can be inferred beyond the meaning of the linguistic antecedent

Participants 20 native English speakers recruited via Amazon.com's Mechanical Turk

Items 10 dialogues like (8); Appendix A has the complete list

Fillers 40 dialogues: 20 upper-bound, 20 lower-bound; half of each elliptical, half non-elliptical (Appendix A)

Figure 1: Screenshot (A) and results (B) from the acceptability judgment task. Raw scores were transformed into by-subject z-scores. Dashed lines indicate upper- and lower-bound elliptical fillers.



2.3 Paraphrase task

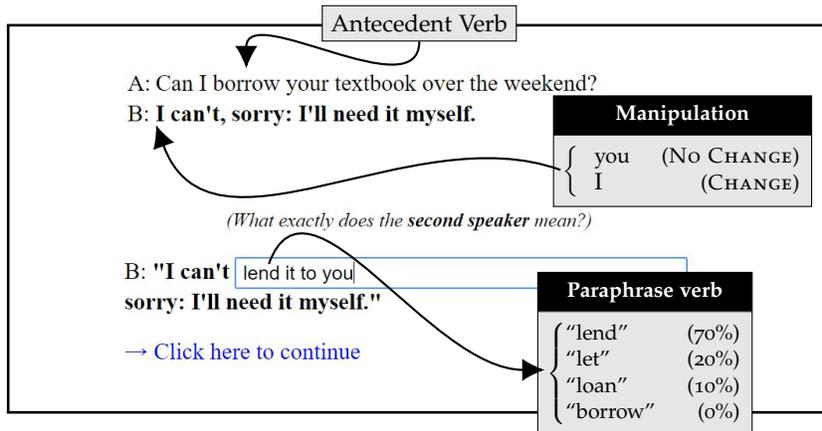


Figure 2: Screenshot of the paraphrase task. Paraphrase verbs were analyzed in terms of (i) % antecedent verb (Fig. 3A; here: 0%), and (ii) entropy (Fig. 3B; here: 1.2 bits).

2.4 Results from the paraphrase task

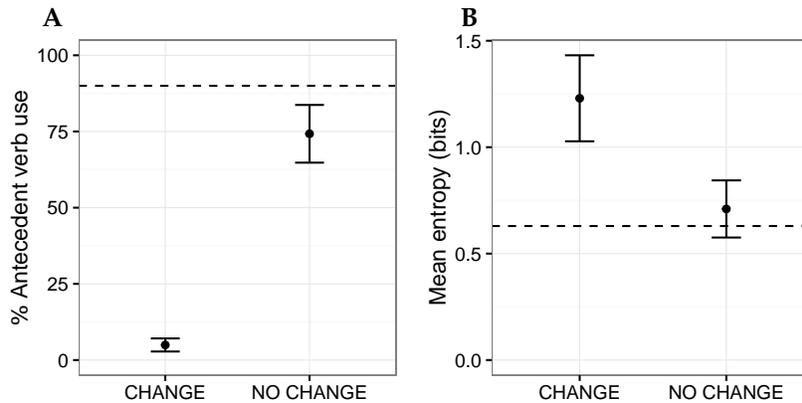


Figure 3: Results from paraphrase task. A shows the proportion of antecedent verb use; B shows variation (entropy) in verb choice. Dashed lines show upper-bound elliptical filler means.

Summary of results

1. CHANGE items yielded **few antecedent verbs** in paraphrases
2. CHANGE items triggered **higher entropy** in verb choice
3. CHANGE items were relatively **acceptable**

cf. Appendix B for detailed stats

2.5 A qualitative look at the data

- (9) Spectator: Can I please see that card trick one more time?
 Magician: I'm sorry, I can't. { "show you the card trick again" (≈ 50%)
 "do the card trick again" (≈ 50%)
- (10) A: Before Trump got elected, people demanded to see his tax returns, but he refused. B: And now that he's president,
 I don't think he ever will. { "release his tax returns" (≈ 63%)
 "show his tax returns" (≈ 27%)
 "provide his tax returns" (≈ 9%)

3 Implications for theories of VPE

3.1 Strategy I: applying the "representational" strategy

- (11) Need to show that:
- $$\begin{aligned}
 [VP_A \text{ see } \dots] &= [VP_E \text{ show } \dots] \\
 &= [VP_E \text{ do } \dots] \\
 &= [VP_E \text{ release } \dots] \\
 &= [VP_E \text{ provide } \dots]
 \end{aligned}$$

Recall Merchant's analysis of *some/any*: *some* = *any* = [Pol_] prior to post-syntactic lexicalization.

Problem: Whatever representational strategy gets this done, it will inevitably generate lots of unattested identities by transitivity, for example: $[_{VP} \text{ do } \dots] = [_{VP} \text{ provide } \dots]$.

3.2 Strategy II: Inferring antecedents?

Can we infer the antecedent we need? Sure, but:

1. Replacing verbal heads will violate semantic identity¹⁰, so the Thoms (2015) algorithm won't work.
2. Even if we did allow substituting *show*, *do*, *release*, etc. for *see*: how do we prevent overgeneration?
3. Constraining *linguistic*-inference mechanism adequately will require pragmatic reasoning.

¹⁰ Recall semantic identity condition in (5-c): every member of the set of accommodated antecedents must be semantically equivalent to the overt antecedent.

3.3 VPE as discourse reference

Sketch of a discourse-reference theory of VPE

1. VPE ellipsis sites contain a null form
2. is a discourse-*referential* device that gets its meaning from the discourse model
3. Most canonically, VPE referents are introduced by the linguistic antecedent
4. Beyond antecedent VPs, VPE referents must be accommodated
5. What referents can and cannot be accommodated is jointly determined by linguistic and non-linguistic context

Note that this discourse-*reference* model is importantly different from QUD-based models of VPE. In fact, this is a fascinating distinction that is unfortunately beyond the scope of this talk, but if you're interested, ask me about it!

Properties that VPE shares with other discourse-referential devices:

(12) a. Non-local antecedents:

- (i) Jon collapsed into the arm chair. This had been a particularly long day at work. Not knowing what to do now that it was over, **he** turned on the TV.
- (ii) The thought came back, the one nagging at him these past four days. He tried to stifle it. But the words were forming. He knew he couldn't <PRO>. (Hardt, 1990)

b. Cataphora:

- (i) If **she** calls you, Hailey is probably bored.
- (ii) If you really want to <PRO>, we can go to the mall.¹¹

¹¹ (Kehler, 2015)

c. Exophora:

- (i) Did you hear **that**?!
- (ii) Don't <PRO>!

d. Split-antecedents:

- (i) Haily met up with Jordan so **they** could have lunch together.

- (ii) Bruce can walk and he can chew gum. Sarah can <PRO>, too, but not at the same time. (adapted from Webber, 1978)

3.4 An outstanding puzzle: *pass/fail vs. see/show*

- (13) After the test I wasn't sure if I had passed or not. $\approx(1-a)$
- | | | | |
|------------------|---|----------------------------------|---------------|
| As it turns out, | { | I did <PRO> | [pass][*fail] |
| | | I didn't <PRO> | [pass][*fail] |
| | | it's less likely than I thought. | [pass][*fail] |

A reviewer points out that [fail] does become available for VPE when the antecedent is changed to *passed or failed*. That is precisely the point: it seems impossible to recover the meaning *unless* it is introduced explicitly.

Conclusion

1. VPE meanings *can* be inferred beyond the linguistic antecedent.
2. Those inferences may operate at the discourse level and result from DISCOURSE ACCOMMODATION.
3. Having documented that VPE meanings *can* be inferred, the next challenge is to explain when such inferences are possible and when they aren't, and why (not).

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A Experimental Materials

A.1 Experimental items

1. Spectator: Can I please see that card trick one more time? Magician: I'm sorry, I (you) can't.
2. Driver: Please officer, I mustn't get another speeding ticket. Officer: Relax, I wasn't (you weren't) going to.
3. Fan: Can I get an autograph? Star: I wish you could, but my agent won't let me.
4. Guest: Can I get another drink on the house? Waitor: I'll check with my boss, but I don't think I'm (you're) supposed to.
5. Father: Will your mother and I get a post card while you're abroad? Son: I promise I (you) will, but probably not during the first 2 weeks, OK?
6. Fan A: I really want to hear at least one Justin Bieber song before the set is over. Fan B: Given the kind of music the DJ seems to be into tonight, I don't think he (you) will.
7. Wife: I want to know what the classified meeting was about. Please? Husband: You know I'm (you're) not supposed to.
8. A: Can I borrow your textbook over the weekend? B: I (you) can't, sorry: I'll need it myself.
9. Wife: That's great news. I just wish I had gotten it from you directly, rather than your secretary. Husband: I know, and I (you) would have, but I was in meetings all morning.
10. A: Before Trump got elected, people demanded to see his tax returns, but he refused. B: And now that he's president, I don't think he ever will.

A.2 Filler items

Upper-bound elliptical:

1. Reader A: For what it's worth, that decision wasn't made by the president. Reader B: Are you sure? I heard it was.
2. Police chief: The thief was arrested. Reporter: And his brother was as well, right?
3. Boyfriend: Can you see the remote control anywhere? Girlfriend: I can't, sorry.
4. Mother: I thought your brother was going to cook dinner tonight. Daughter: Me too, but he refuses to.
5. Host: Others brought food to the party. Guest: I thought we didn't have to.
6. Twin A: Here, I got you flowers. I hope you like them. Twin B: You shouldn't have!
7. Accountant: You know that housing prices will likely increase in the future, right? CEO: Of course I do.
8. Voter: I understand she was angry, but she shouldn't have insulted the reporter. Congressman: Yes, but she did, and now we have to deal with the consequences.
9. Journalist: The flora and fauna of West Africa has fascinated travelers and explorers for centuries. Tourist: It really has, and for good reason, it's beautiful.
10. Reporter: Are you going to the party tonight? Agent: I am; wouldn't miss it for the world.

Lower-bound elliptical:

1. Priest: Of course I believe in God. Atheist: Even though a proof that God exists doesn't?
2. A: Tap water is potable everywhere in the US. B: Maybe, but I wouldn't regardless.
3. Friend A: I'm telling you, don't involve your family in the wedding planning! Friend B: I know, Beth's mother invited more people to her wedding than were by Beth herself.
4. A: Do you think you will want to see the movie? B: I am.
5. A: Who brought what to the event? B: Roses were brought by some, and others lillies.
6. A: Bill is pretty popular, isn't he? B: Yes, but Sarah admires him more than he is by anyone else.
7. Nanny: Kevin's diaper is wet. Aunt: No, it won't.
8. A: I know for a fact that Betsy hasn't left yet. B: I agree, she won't be.
9. Boy 1: Trust me, you can't lift this rock. Boy 2: But I know a guy you can and bend a crowbar, too.
10. A: It was Tiffany who ate the last bagel. B: That's weird, I just don't understand why and Janine didn't.

Upper-bound non-elliptical:

1. Teacher: Sometimes John has a hard time keeping up in class. Parent: Is it because he reads too slowly?

2. Audience member A: I can't hear what he's saying. Audience member B: I don't care.
 3. A: You didn't answer my question. B: I told you: I don't know.
 4. Panelist: Why didn't you stop him when his time was up? Moderator: I tried, but he wouldn't listen to me.
 5. Lawyer: You said your firm was going to hire someone? Client: Yes, but Mr. Jones just isn't qualified enough.
 6. Daughter: I'm hungry! Father: I know honey, I'm working on it.
 7. A: I told you a million times, I don't want to hear your complaints. B: I don't care, I'm going to tell you any-ways.
 8. Secretary: The coach knows that James can play well under pressure. Associate: Yes, he's his favorite.
 9. Teacher: How come you don't know the national anthem? Student: You never taught us.
 10. Son: Wasn't Dad going to fix the fridge? Mother: Yes, but he says he doesn't feel like it today.
- Lower-bound non-elliptical:**
1. Pedestrian: You almost ran me over! Truck driver: If it hasn't so dark, I would have saw you earlier.
 2. Employee: I'm telling you, I didn't get your email. Boss: That's impossible, whose did you get email?
 3. Restaurant guest A: Please tell me who it was! Restaurant guest B: I can't tell you whose I took picture, even if you knew her.
 4. A: The woman Wallace met last week said she hates that. B: What did he meet a woman that hates?
 5. Visitor: What's this? Guide: This is the painting that the journalist claimed he knows who stole.
 6. Head coach: Claire isn't as fast as she once was. Assistant coach: Certainly not as fast as the reporter remembers who was five years ago.
 7. A: The question was asked before it happened. B: Who did the press secretary ask a question before we interviewed?
 8. Parent A: What did the teacher say Kim should read over the break? Parent B: I don't remember what he wondered whether is worth reading for him.
 9. Customer: What was the mechanic trying to repair? Assistant: I don't know what the attempt to repair ultimately damaged the car.
 10. A: If I could, I would buy everything they have in store. B: What do you wish most that to buy would be no problem?

B Statistical analyses

All results are based on linear or logistic mixed-effects models with maximal random-effect structure (Barr et al., 2013).

1. There was strong tendency for *CHANGE* items like (8-a) to deviate in their interpretation from the preceding VP: only 5% of paraphrases employed the antecedent verb, compared to 74% for their *NO-CHANGE* counterparts ($\beta = 4.47$, $p < .001$; see Fig. 3A).
2. Despite this deviation, *CHANGE* items were much more

acceptable than lower-bound elliptical fillers ($\beta = 1.39$, $p < 0.001$), and only slightly less acceptable than their *NO-CHANGE* counterparts ($\beta = -0.22$, $p = 0.011$; cf. Fig. 1B).

3. *CHANGE* items were also associated with significantly more uncertainty (entropy) in paraphrase verb choice ($t = 2.14$, $p = 0.048$).

4. Entropy in verb choice:

$$\mathcal{H}(V) = - \sum_{v \in V} P(v) \log P(v)$$