Be small! Reconsidered
Be Small!
(derives the Repeated Name penalty)

i. alternatives = (anaphoric definite description, pronoun)

ii. \textsc{choose}(anaphoric definite description, pronoun) = the smaller if it achieves the same anaphoric reference to X.

(2) a. A woman entered the room.
   i. She opened a book.
   ii. ?? The woman opened a book.

b. A man and a woman entered the room.
   i. * She opened a book.
   ii. The woman opened a book.
→ **Be small!** is the Principle that regulates the choice between a pronoun and an anaphoric definite description. It is presented as a grammatical preference for ‘smaller’ alternatives among the possible alternative referring expressions:

NAMES > PRONOUNS > MINIMAL PRONOUNS
→ **Be small!** is the Principle that regulates the choice between a pronoun and an anaphoric definite description. It is presented as a grammatical preference for ‘smaller’ alternatives among the possible alternative referring expressions:

**NAMES > PRONOUNS > MINIMAL PRONOUNS**

(2) a. A woman entered the room.
   i. She opened a book.
   ii. ?? The woman opened a book.

b. A man and a woman entered the room.
   i. * She opened a book.
   ii. The woman opened a book.
Be Small!
(derives the Repeated Name penalty)

a. alternatives = (pronoun, anaphoric definite description)
b. choose(pronoun)(definite description) = the one that makes the best anaphoric reference to X.

(2) a. A woman entered the room.
   i. She opened a book.
   ii. ?? The woman opened a book.
b. A man and a woman entered the room.
   i. * She opened a book.
   ii. The woman opened a book.
Psycholinguistic perspective

→ Be small but recoverable!
   
a. alternatives = \{ pronoun, anaphoric definite description \}
b. choose the smallest option appropriate for the accessibility status of the antecedent.

→ Accessibility
   
- Commonly taken to be a property of a non-linguistic representation of antecedent that identifies how 'salient' it is in a speaker/listener's mind.
- Sometimes identified with **Topicality** (e.g. Centering Theory)
- Sometimes identified with **Attention** (e.g. Gundel et al, 1993)
- Sometimes identified as **Expectancy** (e.g. an item is accessible to the extent that the speaker anticipates they will refer to it next; Arnold, 2001)
We propose that there are six cognitive statuses relevant to the form of referring expressions in natural language discourse, and that these are related in the Givenness Hierarchy shown in 1.

(1) **The Givenness Hierarchy:**

```
  in focus > activated > familiar > uniquely identifiable > referential > identifiable
```

\{it\} \{that\} \{this\} \{this N\} \{that N\} \{the N\} \{indefinite this N\} \{a N\}

Each status on the hierarchy is a necessary and sufficient condition for the appropriate use of a different form or forms.\(^1\) The relevant English forms are given in 1. In using a particular form, a speaker thus signals that she assumes the associated cognitive status is met and, since each status entails all lower statuses, she also signals that all lower statuses (statuses to the right) have

**In focus:** The referent is not only in short-term memory, but is also at the current center of attention. This status is necessary for appropriate use of zero and unstressed pronominals. The entities in focus at a given point in the discourse will be that partially-ordered subset of activated entities which are likely to be continued as topics of subsequent utterances. Thus, entities in focus generally include at least the topic of the preceding utterance, as well as any still-relevant higher-order topics.\(^10\)
### Example: Gundel et al. (1993)

<table>
<thead>
<tr>
<th>In Focus</th>
<th>Activated</th>
<th>Familiar</th>
<th>Unique</th>
<th>Referential</th>
<th>Type</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>it</td>
<td>214</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>215</td>
</tr>
<tr>
<td>HE</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>this</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>that</td>
<td>1</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>this N</td>
<td>1</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>that N</td>
<td>10</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>the N</td>
<td>30</td>
<td>95</td>
<td>47</td>
<td>108</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>indefinite</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>this N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>a N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>41</td>
<td>55</td>
</tr>
<tr>
<td>Totals</td>
<td>246</td>
<td>150</td>
<td>54</td>
<td>108</td>
<td>42</td>
<td>55</td>
</tr>
</tbody>
</table>

**Table 3. Distribution of English forms according to highest status**

---

**Be small but recoverable!**

a. alternatives = \{pronoun, anaphoric definite description\}

b. choose the smallest option appropriate for the accessibility status of the antecedent.
Example: Gundel et al. (1993)

<table>
<thead>
<tr>
<th></th>
<th>In focus</th>
<th>Activated</th>
<th>familiarity</th>
<th>unique</th>
<th>referential</th>
<th>Type</th>
<th>totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>63</td>
</tr>
<tr>
<td>él (subj)</td>
<td>30</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>él (nonsubj)</td>
<td>57</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>59</td>
</tr>
<tr>
<td>éste</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>ése</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>aquél</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>este N</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>ese N</td>
<td>2</td>
<td>45</td>
<td>22</td>
<td>42</td>
<td></td>
<td></td>
<td>132</td>
</tr>
<tr>
<td>aquel N</td>
<td>23</td>
<td>45</td>
<td>22</td>
<td>42</td>
<td></td>
<td></td>
<td>132</td>
</tr>
<tr>
<td>el N</td>
<td>22</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>un N</td>
<td>22</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>totals</td>
<td>174</td>
<td>58</td>
<td>25</td>
<td>42</td>
<td>22</td>
<td>10</td>
<td>331</td>
</tr>
</tbody>
</table>

Table 6. Distribution of Spanish forms according to highest status.

Be small but recoverable!

a. alternatives = {pronoun, anaphoric definite description}

b. choose the smallest option appropriate for the accessibility status of the antecedent.
<table>
<thead>
<tr>
<th>Language</th>
<th>In Focus</th>
<th>Activated</th>
<th>Familiar</th>
<th>Uniquely Identifiable</th>
<th>Referential</th>
<th>Type Identifiable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese</td>
<td>ꜟ ꜝ ‘s/he, it’</td>
<td>TA ꜝ ‘this’ ꜝ ꜝ ‘that’ ꜝ ‘N</td>
<td>ꜝ ‘N</td>
<td>ꜝ ꜝ ‘a N’ ꜝ ‘N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>ꜝ ‘it’</td>
<td>HE, this, that, this ‘N</td>
<td>ꜝ ‘N</td>
<td>the ‘N</td>
<td>indefinite this ‘N a ‘N</td>
<td></td>
</tr>
<tr>
<td>Japanese</td>
<td>ꜟ</td>
<td>ꜟ ꜝ ‘he’ ꜟ ꜝ ‘this’ ꜟ ꜝ ‘that’ medial ꜝ ‘that’ distal ꜝ ‘that’ medial</td>
<td>ꜝ ꜝ ‘that’ ‘N’ ꜝ ꜝ ‘N’ distal</td>
<td>ꜝ ‘N’</td>
<td>ꜝ ‘N’</td>
<td></td>
</tr>
<tr>
<td>Russian</td>
<td>ꜝ ꜝ ‘he’</td>
<td>ꜝ ‘O’ ꜝ ꜝ ‘this’ ꜝ ‘that’ ꜝ ‘to’ ꜝ ‘that’</td>
<td>ꜝ ꜝ ‘o’ ꜝ ‘n’ ꜝ ‘to’ ꜝ ‘that’</td>
<td>ꜝ ‘N’</td>
<td>ꜝ ‘N’</td>
<td></td>
</tr>
<tr>
<td>Spanish</td>
<td>ꜝ ꜝ ‘he’</td>
<td>ꜝ ‘E’ ꜝ ‘e’ ꜝ ‘t’ ꜝ ‘h’ ꜝ ‘e’ ꜝ ‘s’ ꜝ ‘t’ ꜝ ‘d’ ꜝ ‘s’ ꜝ ‘e’ ꜝ ‘t’ medial ꜝ ‘a’ ꜝ ‘c’ ꜝ ‘u’ ꜝ ‘e’ ꜝ ‘l’ ꜝ ‘t’ medial</td>
<td>ꜝ ꜝ ‘e’ ꜝ ‘s’ ꜝ ‘t’ medial ꜝ ꜝ ‘a’ ꜝ ‘c’ ꜝ ‘u’ ꜝ ‘e’ ꜝ ‘l’ ‘N’ ‘t’</td>
<td>ꜝ ‘N’ ꜝ ‘e’ ꜝ ‘n’ ‘a’ ‘N’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Correlation between linguistic form and highest required status.
Filtering alternatives

→ Be small but recoverable!

a. alternatives $\sim_{\text{ACCESSIBILITY}} \{\text{pronoun, anaphoric definite description}\}$

b. choose the smallest option appropriate for the accessibility status of the antecedent.

a. A woman entered the room.
   i. She opened a book. ✗
   ii. ?? The woman opened a book.

b. A man and a woman entered the room.
   i. * She opened a book.
   ii. The woman opened a book.

In Focus
alternatives $= \{\text{pro, dd}\}$

wins

loses
Filtering alternatives

→ Be small but recoverable!

a. alternatives $\sim_{\text{ACCESSIBILITY}}$ {pronoun, anaphoric definite description}
b. choose the smallest option appropriate for the accessibility status of the antecedent.

a. A woman entered the room.
   i. She opened a book.  
   ii. ?? The woman opened a book.

b. A man and a woman entered the room.
   i. * She opened a book.
   ii. The woman opened a book.
What determines accessibility?

→ **Accessibility**
- Givenness: Mentioned antecedents are more accessible than unmentioned ones.
- Recency: More recently mentioned, more accessible
- Syntactic prominence: Grammatical subjects are more accessible than non-subjects.
- Thematic prominence: Some thematic roles may convey inherent accessibility.
- Uniqueness in context: Accessibility is determined competitively, so similar referents in context will reduce accessibility.
What determines accessibility?

→ **Accessibility**
  - **Givenness:** Mentioned antecedents are more accessible than unmentioned ones.
  - **Recency:** More recently mentioned, more accessible
  - Syntactic prominence: Grammatical subjects are more accessible than non-subjects.
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What determines accessibility?
What determines accessibility?

→ **Accessibility**
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  - Thematic prominence: Some thematic roles may convey inherent accessibility.
  - **Uniqueness in context:** Accessibility is determined competitively, so similar referents in context will reduce accessibility.
Mickey went for a walk in the hills one day.
Mickey went for a walk with Daisy in the hills one day.
Mickey went for a walk with Daisy in the hills one day.

Mickey went for a walk in the hills one day.
- Competition in working memory: Key idea is that activating a referent involves activating associated/constituent features, which in turn (re)activates any associated information in memory.
- Activating [+ANIM] feature, for instance, will boost accessibility of both Mickey and Daisy.
- If Daisy’s accessibility is increased, it will compete with Mickey at point of selection.
- **Assumption:** Attention / accessibility is a limited resource.
- Mickey is less accessible in two character context; hence we see more ‘name’ productions and shorter production latencies.
(2a) The king visited the castle with the pilot.

(2b) The king visited the castle with the stewardess.
Fukumura et al (2011)

Same gender

*a: Same situation*  
*b: Different situation*

Different gender

c: *Same situation*  
d: *Different situation*

Relevant action (getting off a horse)

*a: Same situation*  
*b: Different situation*

- getting off a horse
- on a horse
- having a hat

Graph:

- Situation: Same situation vs Different situation
- % of pronoun responses
- Gender ambiguity: Ambiguous vs Unambiguous
Fukumura et al (2011)

Relevant action (getting off a horse)

- a: Same situation
- b: Different situation

Irrelevant action (taking off a hat)

- c: Same situation
- d: Different situation

Graph showing the percentage of pronoun responses for relevant and irrelevant actions in the same and different situations.
Fukumura et al (2013)

1. Kuningas vieraili linnassa lentäjän/lentoemännän kanssa.

“The king visited the castle with the pilot/stewardess.”

2. a. Kuningas laskeutui hevosensa selästä.

“The king got off his horse.”

b. Hän laskeutui hevosensa selästä.  *hän* is used for referents of any gender

“He got off his horse.”
1. Kuningas vieraili linnassa lentäjän/lentoemännän kanssa.
“The king visited the castle with the pilot/stewardess.”

2. a. Kuningas laskeutui hevosensa selästä.
“The king got off his horse.”

b. Hänen laskeutui hevosensa selästä.
“He got off his horse.”

---

Figure 2. Mean percentages of pronouns out of all pronouns and repeated noun phrases (Experiment 1). Bars represent standard errors.
1. Kuningas vieraili linnassa lentäjän/lentoemännän kanssa.

“The king visited the castle with the pilot/stewardess.”

2. a. Kuningas laskeutui hevosensa selästä.

“The king got off his horse.”

b. Hän laskeutui hevosensa selästä.

“He got off his horse.”

Figure 3. Mean percentages of substitution errors out of all trials (Experiment 1). Bars represent standard errors.
- **Competition** should effect not just choice of pronoun, but also, probability of making a speech error, on the assumption that highly activated competitors are more likely to be mis-selected. Fukumura et al also observed this, but only for gender information.

1. Kuningas vieraili linnassa lentäjän/lentoemännän kanssa.
   “The king visited the castle with the pilot/stewardess.”

2. a. Kuningas laskeutui hevosensa selästä.
   “The king got off his horse.”

   b. Hänen laskeutui hevosensa selästä.
   “He got off his horse.”

*Ex*: lentäjäs –er kuningas laskeutui hevosensa selästä
- Does ambiguity avoidance also play a role? Fukumura tested Finnish speakers in English.
**Main findings:**
- Gender match between referents and situation similarity reduced pronoun usage in Finnish and English.
- Gender match, but not situational similarity, caused substitution errors in production.

**Fukumura’s proposal:** Competition plays out at multiple levels in production. Competition can result in diminished accessibility at the discourse level, but competition can also result in errors at the level at which lexical items (e.g. *lemmas*) are selected.

*Figure 6.* Diagram of competition at the level of person representation and lexical representation.
What determines accessibility?

→ **Accessibility**
  - **Givenness:** Mentioned antecedents are more accessible than unmentioned ones.
  - **Recency:** More recently mentioned, more accessible
  - **Syntactic prominence:** Grammatical subjects are more accessible than non-subjects.
  - **Thematic prominence:** Some thematic roles may convey inherent accessibility.
  - **Uniqueness in context:** Accessibility is determined competitively, so similar referents in context will reduce accessibility.
What determines accessibility?

→ **Accessibility**
  - Givenness: Mentioned antecedents are more accessible than unmentioned ones.
  - Recency: More recently mentioned, more accessible
  - **Syntactic prominence**: *Grammatical subjects are more accessible than non-subjects.*
  - Thematic prominence: Some thematic roles may convey inherent accessibility.
  - Uniqueness in context: Accessibility is determined competitively, so similar referents in context will reduce accessibility.
Implicit Causality: Listeners’ preferred referent for pronouns in ‘because’ clauses or clauses that provide an explanation for a state of affairs depends on the verb of the preceding clause. Some thematic roles tend to be more likely to be identified as ‘causes’ than others.

**Psych verbs** show this effect quite strongly, with listeners resolving ambiguous pronouns to the **stimulus** argument.

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment 1: Means from the pretest.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean percentages of NP1 references (out of all NP1 and NP2 references) by verb (95% confidence interval based on MSE&lt;sub&gt;verb&lt;/sub&gt; = 5.5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE verb</td>
</tr>
<tr>
<td>ES verb</td>
</tr>
</tbody>
</table>

| Mean percentages of pronoun responses (out of all pronoun and name responses) by antecedent and verb (95% confidence interval based on MSE<sub>antecedent × verb</sub> = 5.1%) |
|------------------|------------------|
| NP1 SE verb | 94.9 (352) | NP2 SE verb | 97.1 (104) |
| NP1 ES verb | 89.9 (346) | NP2 ES verb | 76.9 (108) |

**Note:** Antecedents consistent with the semantic bias (stimulus) in bold. Numbers in parentheses represent the number of observations in each condition.
Fukumura et al (2010)

- Subjects were more likely to be pronominalized than non-subjects.
- Probability of next mention (e.g. thematic role) did not strongly impact competition.

4a Gary scared Anna after the long discussion ended in a row. This was because…
4b Gary scared Anna after the long discussion ended in a row. This was because…
4c Gary feared Anna after the long discussion ended in a row. This was because…
4d Gary feared Anna after the long discussion ended in a row. This was because…

![Graph showing the percentage of pronouns and names.](image-url)
Fukumura et al (2010)

- Subjects were again more likely to be pronominalized than non-subjects.
- Probability of next mention (e.g. connector) did not interact with pronoun choice.
- Overall, fewer pronouns with ‘so’ than with because.

Table 2
Experiment 2: Means from the pretest.

| Mean percentages of NP1 references (out of all NP1 and NP2 references) by connective (95% confidence interval based on MSEconnective = 8.4%) |
|-----------------|-----------------|
|                  | Because         | So              |
|                  | 69.8 (441)      | 19.4 (434)      |

| Mean percentages of pronoun responses (out of all pronoun and name responses) by antecedent and connective (95% confidence interval based on MSEantecedent x connective = 5.4%) |
|-----------------|-----------------|-----------------|
|                  | Because         | So              |
| NP1              | 96.8 (308)      | 84.2 (133)      |
| NP2              | 95.2 (84)       | 78.3 (350)      |

Note: Antecedents consistent with the semantic bias in bold. Numbers in parentheses represent the number of observations in each condition.
Fukumura et al (2010)

- Fukumura concludes that the factors that govern accessibility are essentially structural in nature, with semantic biases / probability of next mention playing little role in choice of pronominalization/accessibility (also Kehler & Rohde, 2008).
- Argues that repeated name penalty in comprehension is rooted in this production preference, because the repeated name penalty disappears in contexts where speakers do not prefer to pronominalize (Gordon et al. 1993):

6a Susan decided to give Fred a hamster.  
6b Fred agreed to take care of Susan’s hamsters for the weekend.  
7 She/Susan told him exactly what to feed it.
What determines accessibility?

→ **Accessibility**
  - Givenness: Mentioned antecedents are more accessible than unmentioned ones.
  - Recency: More recently mentioned, more accessible
  - Syntactic prominence: Grammatical subjects are more accessible than non-subjects.
  - **Thematic prominence:** Some thematic roles may convey inherent accessibility.
  - Uniqueness in context: Accessibility is determined competitively, so similar referents in context will reduce accessibility.
- Fukumura’s conclusion concerning the essentially structural nature of accessibility remains controversial.
- Rosa and Arnold argue that thematic roles do impact accessibility, and therefore pronominalization choices, by modulating what is a probable next-mentioned antecedent.

**Transfer** verbs as a test case:
- *Goal* arguments more likely to be mentioned than source arguments in continuations (Stevenson et al. 1994)

(3) Goal continuation
   a. Subject position: *Sir Barnes* got a backrub from *Lady Mannerly*.
   b. Nonsubject position: *Lady Mannerly* gave a backrub to *Sir Barnes*.

(4) Source continuation
   a. Subject position: *The chef* handed a cookbook to the *maid*.
   b. Nonsubject position: *The maid* took a cookbook from *the chef*.
(3) Goal continuation

a. Subject position: *Sir Barnes* got a backrub from *Lady Mannerly*.
b. Nonsubject position: *Lady Mannerly* gave a backrub to *Sir Barnes*.

(4) Source continuation

a. Subject position: *The chef* handed a cookbook to the *maid*.
b. Nonsubject position: *The maid* took a cookbook from *the chef*.

Fig. 3. Experimental set-up from Experiment 1.
Exp. 1: Event retelling task

Fig. 4. Percentage of pronouns used by semantic and grammatical roles in prior sentence in Experiment 1.

Exp. 1: Event retelling task

Fig. 5. Latency to begin speaking by grammatical and semantic roles in prior sentence in Experiment 1.

Fig. 3. Experimental set-up from Experiment 1.
Lady Mannerly gave a painting of the two of them to Sir Barnes.

**Fig. 6.** Sample trial from Experiment 2. Underlining indicates which character should be continued.
Lady Mannerly gave a painting of the two of them to Sir Barnes.

Fig. 6. Sample trial from Experiment 2. Underlining indicates which character should be continued.

**Explanation:** Infer that the second sentence describes a cause or reason for the eventuality described in the first sentence.

Explanation is only one such relation; several other common ones include:

**Occasion:** Infer a change of state from the second sentence, taking its initial state to be the final state of the eventuality described in the first sentence.

*Mitt flew to San Diego this weekend. He took a taxi from the airport to his house.*

**Elaboration:** Infer that both sentences provide descriptions of the same eventuality.

*Mitt flew to San Diego this weekend. He took a private jet into Lindbergh field.*

**Result:** Infer that the first sentence describes a cause or reason for the eventuality described in the second sentence.

*Mitt flew to San Diego this weekend. He was therefore able to visit several high-profile campaign donors.*

**Violated Expectation:** Infer that the second sentence describes an unexpected result of the eventuality described in the first sentence.

*Mitt flew to San Diego this weekend. He wasn’t able to visit any high-profile campaign donors, however.*

**Parallel:** Infer that the first and second sentences express similar eventualities, as if each provides a partial answer to a common question.

*Mitt flew to San Diego this weekend. Rick stayed in Kansas to campaign.*
Lady Mannerly gave a painting of the two of them to Sir Barnes.

Fig. 6. Sample trial from Experiment 2. Underlining indicates which character should be continued.

**Explanation:** Infer that the second sentence describes a cause or reason for the eventuality described in the first sentence.

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*Mitt flew to San Diego this weekend. He was therefore able to visit several high-profile campaign donors.*

**Violated Expectation:** Infer that the second sentence describes an unexpected result of the eventuality described in the first sentence.

*Mitt flew to San Diego this weekend. He wasn’t able to visit any high-profile campaign donors, however.*

**Parallel:** Infer that the first and second sentences express similar eventualities, as if each provides a partial answer to a common question.

*Mitt flew to San Diego this weekend. Rick stayed in Kansas to campaign.*
(5) John seized the comic from Bill. He  

85% subject interpretations

(6) John passed the comic to Bill. He  

51% subject interpretations

Explanation: Infer that the second sentence describes a cause or reason for the eventuality described in the first sentence.

Explanation is only one such relation; several other common ones include:

Occasion: Infer a change of state from the second sentence, taking its initial state to be the final state of the eventuality described in the first sentence.

*Example:* Mitt flew to San Diego this weekend. He took a taxi from the airport to his house.

Elaboration: Infer that both sentences provide descriptions of the same eventuality.

*Example:* Mitt flew to San Diego this weekend. He took a private jet into Lindbergh field.

Result: Infer that the first sentence describes a cause or reason for the eventuality described in the second sentence.

*Example:* Mitt flew to San Diego this weekend. He was therefore able to visit several high-profile campaign donors.

Violated Expectation: Infer that the second sentence describes an unexpected result of the eventuality described in the first sentence.

*Example:* Mitt flew to San Diego this weekend. He wasn't able to visit any high-profile campaign donors, however.

Parallel: Infer that the first and second sentences express similar eventualities, as if each provides a partial answer to a common question.

*Example:* Mitt flew to San Diego this weekend. Rick stayed in Kansas to campaign.
(7) John passed a comic to Bill. He

(8) John was passing a comic to Bill. He

Table 1: Proportion of Source Interpretations (Aspect Manipulation)

<table>
<thead>
<tr>
<th>Source Interpretation</th>
<th>Perfective</th>
<th>Imperfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Interpretation</td>
<td>.57</td>
<td>.80</td>
</tr>
</tbody>
</table>

Table 2: Distribution of Five Most Common Coherence Relations and their Pronoun Interpretation Biases (Perfective Condition)

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Frequency of Occurrence</th>
<th>Bias to Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occasion</td>
<td>.38</td>
<td>.18</td>
</tr>
<tr>
<td>Elaboration</td>
<td>.28</td>
<td>.98</td>
</tr>
<tr>
<td>Explanation</td>
<td>.18</td>
<td>.80</td>
</tr>
<tr>
<td>Violated Expectation</td>
<td>.08</td>
<td>.76</td>
</tr>
<tr>
<td>Result</td>
<td>.06</td>
<td>.08</td>
</tr>
</tbody>
</table>
Lady Mannerly gave a painting of the two of them to Sir Barnes.

Fig. 6. Sample trial from Experiment 2. Underlining indicates which character should be continued.
- Rosa and Arnold’s data suggest that thematic role can in this instance impact the rate of pronominalization.

- Interesting question is whether this is related to predictability / next mention bias mediated through discourse coherence relation, or if it is a more general effect of goals per say being more pronominalizable.

- Important remaining empirical / theoretical question is why sometimes it looks like purely structural factors condition speakers’ pronominalization choices, versus predictability / thematic role / probability of next mention.
Filtering alternatives

→ **Be small but recoverable!**

a. alternatives \(\sim_{\text{ACCESSIBILITY}}\) \{pronoun, anaphoric definite description\}

b. choose the smallest option appropriate for the *accessibility status* of the antecedent.

→ **Prediction:** in contexts where the pronoun choice can be filtered out of the alternative set for accessibility reasons, Principle C should be alleviated. From Schlenker (2005):

When we consider longer examples, however, the Condition C violation can be made to disappear if the proper name can serve a function of disambiguation that a mere pronoun couldn't fulfill.

(67) a. A linguist [working on Binding Theory] was so devoid of any moral sense that he forced a physicist [working on particles] to hire the linguist's girlfriend in his lab.

b. ??A linguist working on Binding Theory was so devoid of any moral sense that he forced me to hire the linguist's girlfriend in his lab.
## Experiment 1b: Design

<table>
<thead>
<tr>
<th>Exp. 1a</th>
<th>Target Item (N=33)</th>
<th>Plausibility of Coconstrual</th>
<th>Antecedent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Emily\textsubscript{i}</strong> gave Tommy <strong>her\textsubscript{ij}</strong> phone number.</td>
<td>high</td>
<td>subject</td>
</tr>
<tr>
<td></td>
<td>Mr. Barker gave <strong>Emily\textsubscript{i}</strong> <strong>her\textsubscript{ij}</strong> report card.</td>
<td>high</td>
<td>object</td>
</tr>
<tr>
<td></td>
<td>Richard gave <strong>Emily\textsubscript{i}</strong> <strong>her\textsubscript{ij}</strong> contact information.</td>
<td>low</td>
<td>object</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exp. 1b</th>
<th>Target Item (N=33)</th>
<th>Plausibility of Coconstrual</th>
<th>Antecedent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>She\textsubscript{ij}</strong> gave Tommy <strong>Emily\textsubscript{i}</strong>’s phone number.</td>
<td>high</td>
<td>subject</td>
</tr>
<tr>
<td></td>
<td>Mr. Barker gave <strong>her\textsubscript{ij}</strong> <strong>Emily\textsubscript{i}</strong>’s report card.</td>
<td>high</td>
<td>object</td>
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<td></td>
<td>Richard gave <strong>her\textsubscript{ij}</strong> <strong>Emily\textsubscript{i}</strong>’s contact information.</td>
<td>low</td>
<td>object</td>
</tr>
</tbody>
</table>
Experiment 1b: Force Choice Task

- Participants (n=31) were asked to
  - read a sentence
  - choose one of the two female referents for the pronoun: **intra-sentential or extra-sentential**
  - indicate their answer using a response pad
The waiter brought her Pamela's choice wine.

Emily

Pamela
### Experiment 1b: Results

<table>
<thead>
<tr>
<th></th>
<th>Controls (No Principle C Violation) (N=27)</th>
<th>Target Sentences (Principle C Violation) (N=33)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pronominal Object</td>
</tr>
<tr>
<td>high plausibility</td>
<td>97.1%</td>
<td><strong>30.79%</strong></td>
</tr>
<tr>
<td>low plausibility</td>
<td>21.2%</td>
<td>2.93%</td>
</tr>
</tbody>
</table>

**Table 2.** Percentage choice of sentence-internal referent for target and control sentences in Experiment 1b.

(significant effects of plausibility, pronominal position, and Principle C violation status (all $p < 0.01$))
Filtering alternatives

→ Be small but recoverable!

a. alternatives $\sim_{\text{ACCESSIBILITY}} \{\text{pronoun, anaphoric definite description}\}$

b. choose the smallest option appropriate for the accessibility status of the antecedent.

<table>
<thead>
<tr>
<th>Exp. 1b</th>
<th>Notation</th>
<th>Accessibility</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>She$_{ij}$ gave Tommy Emily$_i$’s phone number.</td>
<td>high</td>
<td>subject</td>
<td></td>
</tr>
<tr>
<td>Mr. Barker gave her$_{ij}$ Emily$_i$’s report card.</td>
<td>high</td>
<td>object</td>
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