



MSP Lab

MINNESOTA SYNTAX AND  
PSYCHOLINGUISTICS LAB

# How to make a pronoun resumptive

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# A Paradox

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St. Louis has **a zoo** that I went to \_ \_ \_ .

- Gaps are **actively constructed**

(Fodor 1978; Crain & Fodor 1985; Stowe 1986; Traxler & Pickering 1996)

St. Louis has **a zoo** that I saw an otter at \_ \_ \_ \_ .

- ... but not in **syntactic islands**

(Phillips 2006, 2013; Wagers & Phillips 2009; Yoshida, Kazanina, Pablos, & Sturt 2014)

St. Louis has **a zoo** that [the first time I went to Missouri] I saw \_ \_ \_ \_ .

- Conclusion: Processing filler-gap dependencies recruits prediction, constrained by the **grammar**

# A Paradox

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St. Louis has **a zoo** that [the first time I went to **it**] I saw an otter.

- **Resumptive pronouns** facilitate utterance planning  
(Kroch 1981; Chao & Sells 1984; Ferreira & Swets 2005)
- But they are not rated as acceptable in formal judgments  
(Alexopoulou & Keller 2007; Heestand, Xiang, & Polinsky 2011; Keffala 2013;  
but see Ackerman, Frazier, & Yoshida 2018)
- Conclusion: Resumption is **ungrammatical** in English

# A Paradox

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- Resumption facilitates comprehension  
(Dickey 1996; Asudeh 2010; Beltrama & Xiang 2016;  
but see Morgan, von der Malsburg, Ferreira & Wittenberg 2018)
- Resumption's facilitation effect is observed immediately  
upon hearing pronoun  
(Hofmeister & Norcliffe 2013; Hammerly 2018)
- Conclusion: Resumptive relations are computed  
**in real-time**

# A Paradox

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1. Processing filler-gap dependencies recruits prediction, constrained by **the grammar**
2. Resumption is **ungrammatical** in English
3. Resumptive relations are constructed **in real-time**



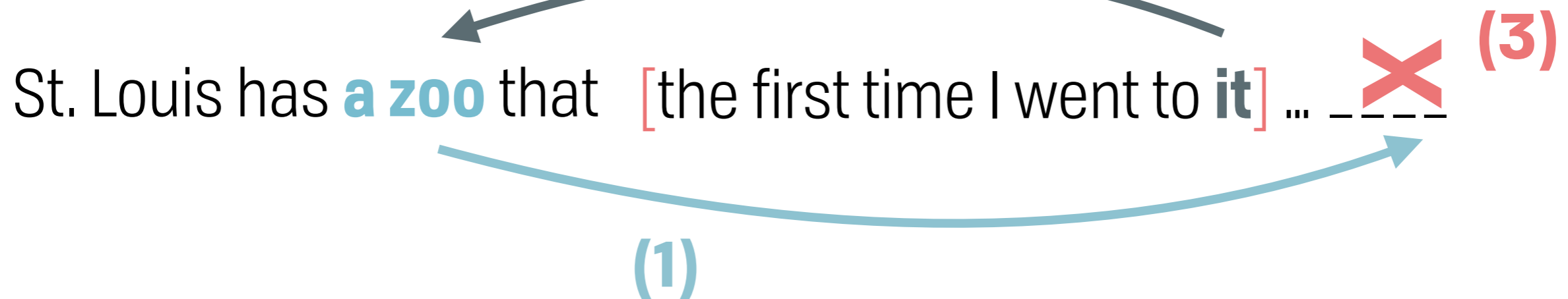
# A Wrong Theory

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- **Hypothesis:**

Comprehender needs a gap to interpret the filler

(Aoshima, Weinberg, Phillips 2004) (2)



- Anaphoric relation allows identifying semantic role of filler (Erteschik-Shir 1992)
- Comprehender can recruit generalization that RPs are common in islands (e.g., Ross 1967; Boeckx 2009)
- Triggers "gap abandonment"

# A Wrong Theory

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- **Supporting Evidence?:**

Gap productions decreased in sentence completion tasks if filler referred with a pronoun in an island

The bridesmaid said **which groomsman**

[the speech that **he** prepared] would offend the bride's grandma.

- Completion results were quite noisy (> 20% error rates)
- ... and the effect was not demonstrated in judgment studies  
(Chacón 2015, Chacón & Lakhani 2016)
- ... and could not be replicated in reading time studies  
(Chacón 2015, Chacón & Lakhani 2016)

# A Wrong Theory

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- **Empirical Problem:**

Identifying a semantic role for a filler does not lead to “gap abandonment”

(Wagers & Phillips 2009; Parker 2017)

**The cheese** which the gourmets were discussing \_\_\_ or **sipping** \_\_\_ ...





# A Better Theory?

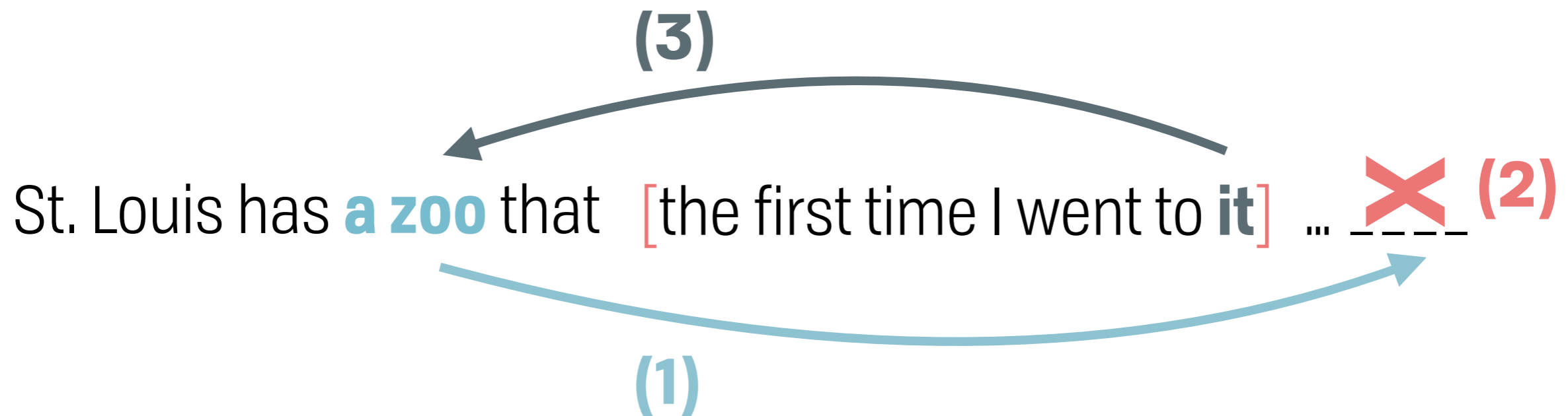
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- **Active gap formation** =  
maintaining a gap in memory, which is subject to decay  
(e.g., Lewis & Vasishth 2005)
- Decay of gap representation =
  1. Decreased sensitivity to gaplessness
  2. Filler is semantically orphaned
- RPs allow relating a filler to the event described by the sentence, facilitating comprehension

# A Better Theory?

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1. Gap is predicted upon detecting filler
2. This decays over time and/or due to complexity
3. Pronoun allows intended interpretation to be recovered



## Prediction:

RPs “facilitate” unresolved fillers under memory load

# Experiment 1

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- Speeded-acceptability judgment task; reveals ‘grammatical illusions’ (Wagers, Lau, & Phillips 2009; Parker & Phillips 2017)
- $N = 52$ ; 36 items, 38 fillers (50% ungrammatical)  
±Gap × { Ambiguous / Pronoun / Filler }
- **Q:** Reference between **her** and filler “heal” –Gap sentences?

Was just thinking?

The butler  
The maid  
The maid

said that this is

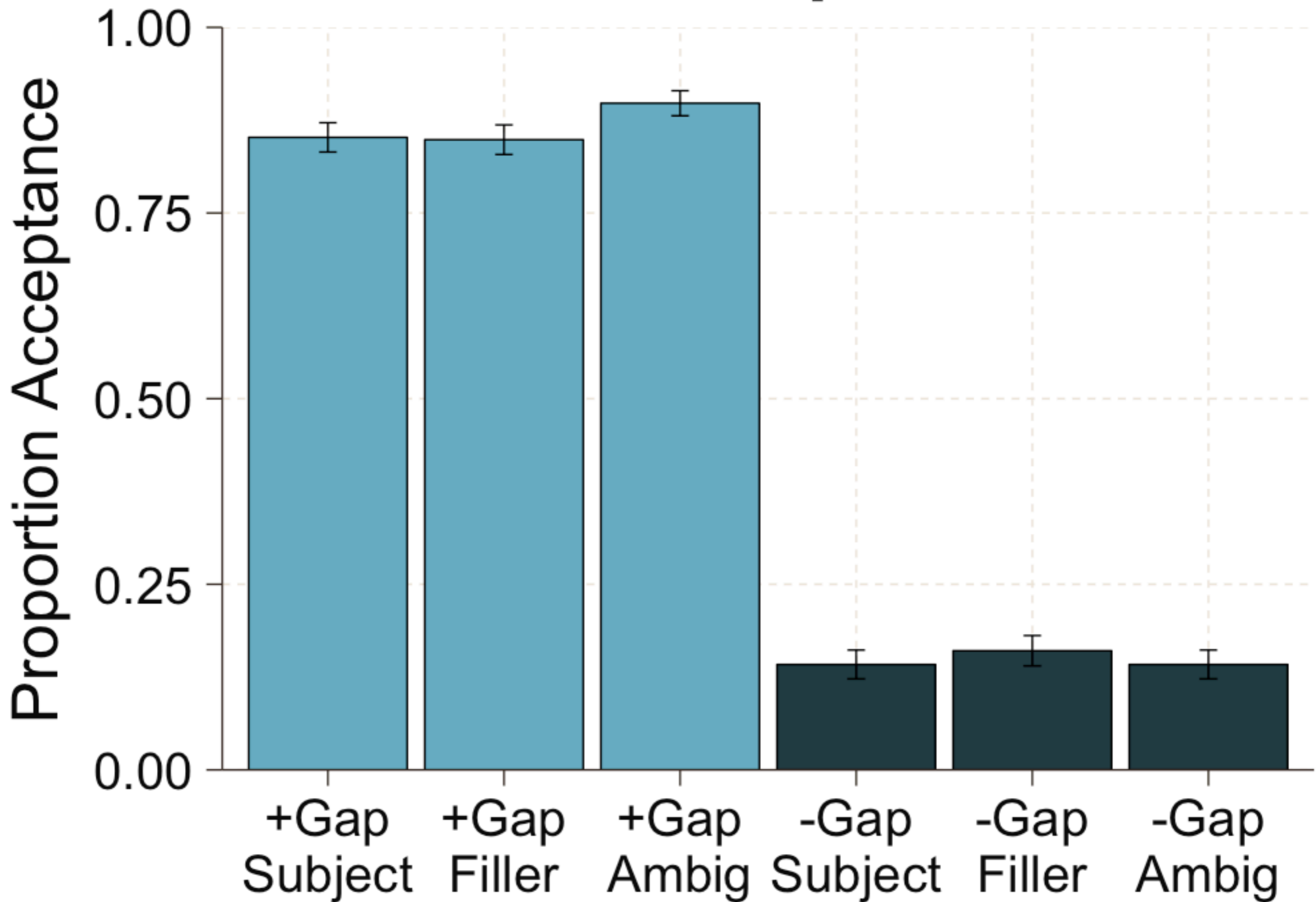
the babysitter  
the babysitter  
the butler

that [NP **her** friend]

**doesn't like kids**

really highly recommended \_ \_ \_ \_

# Results from Experiment 1



# Experiment 1

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- No “resumptive effect”:  
RP coreference with filler did not facilitate –Gap ratings
- ... but, how accessible was the resumptive analysis in Expt 1’s materials?

**not prominent antecedent?**

said that this is **the babysitter** that [<sub>NP</sub> **her** friend]



**not enough time for gap  
to decay?**

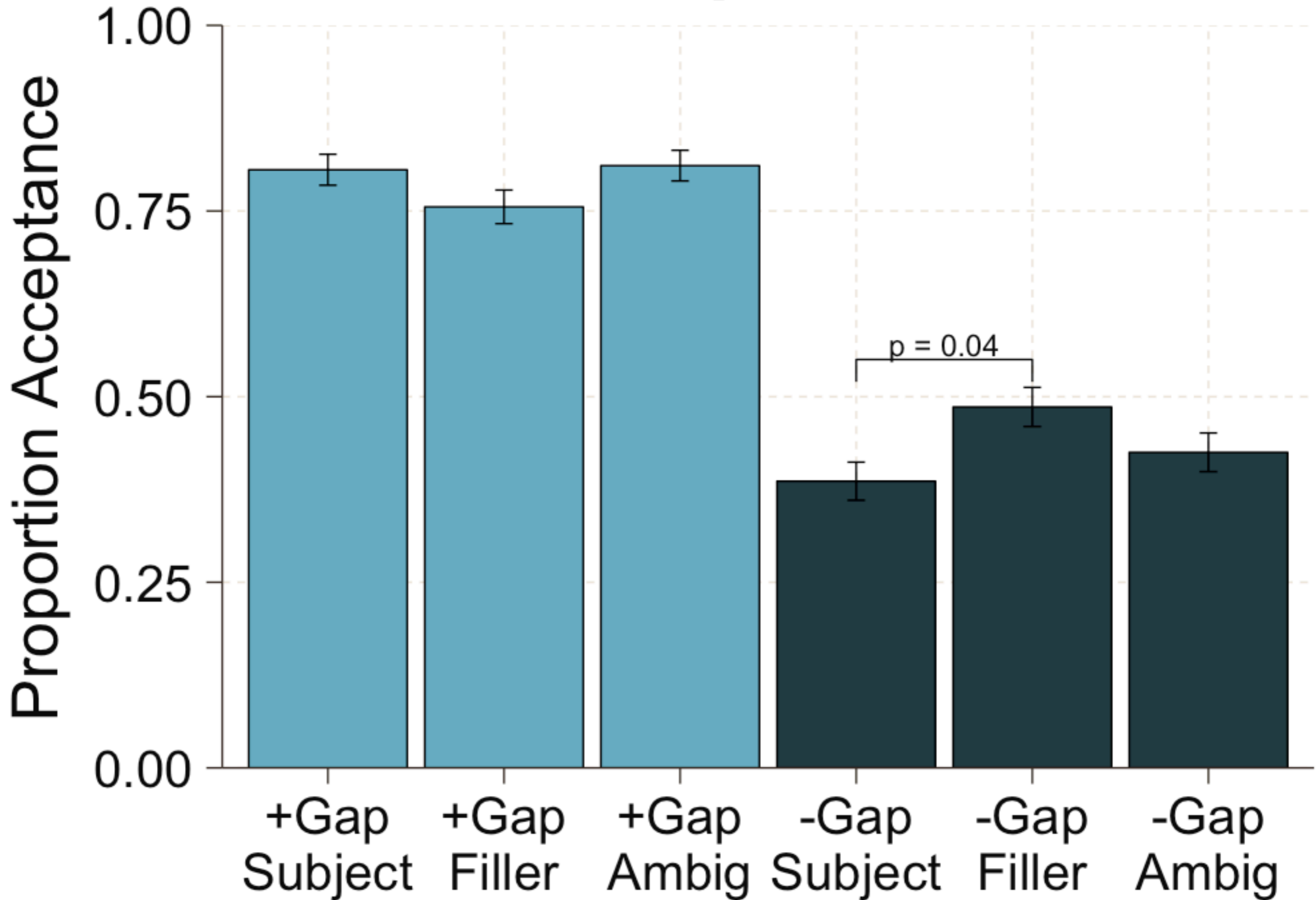
# Experiment 2

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- Same design as Experiment 1; but flipped the order of filler and subject NP;  $N = 60$
- **Q:** Reference between *her* and filler “heal” –Gap sentences?

                  the butler  
This is the maid that the babysitter the babysitter said  
                  the maid                  the butler  
  
  doesn't like kids  
that [NP *her* friend] really highly recommended \_ \_ \_ \_

# Results of Experiment 2



# Experiment 2

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- Increase in –Gap ratings across the board
- Decay of gap in memory →  
reduced sensitivity to “gaplessness”
- –Gap, Filler specifically increased
- **Prediction:** constraining memory resources while judging the sentence should exaggerate this effect



# Experiment 3

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- Speeded-acceptability judgment task  
+ **memory recall task**
- $N = 60$ ; same items as Expt 1
- Memorize four nouns  $\rightarrow$  judge  $\rightarrow$  respond to probe
- **Q:** Reference between **her** and filler “heal” –Gap sentences?

~~Was the babysitter recommended, or not?~~

The butler  
The maid  
The maid

said that this is

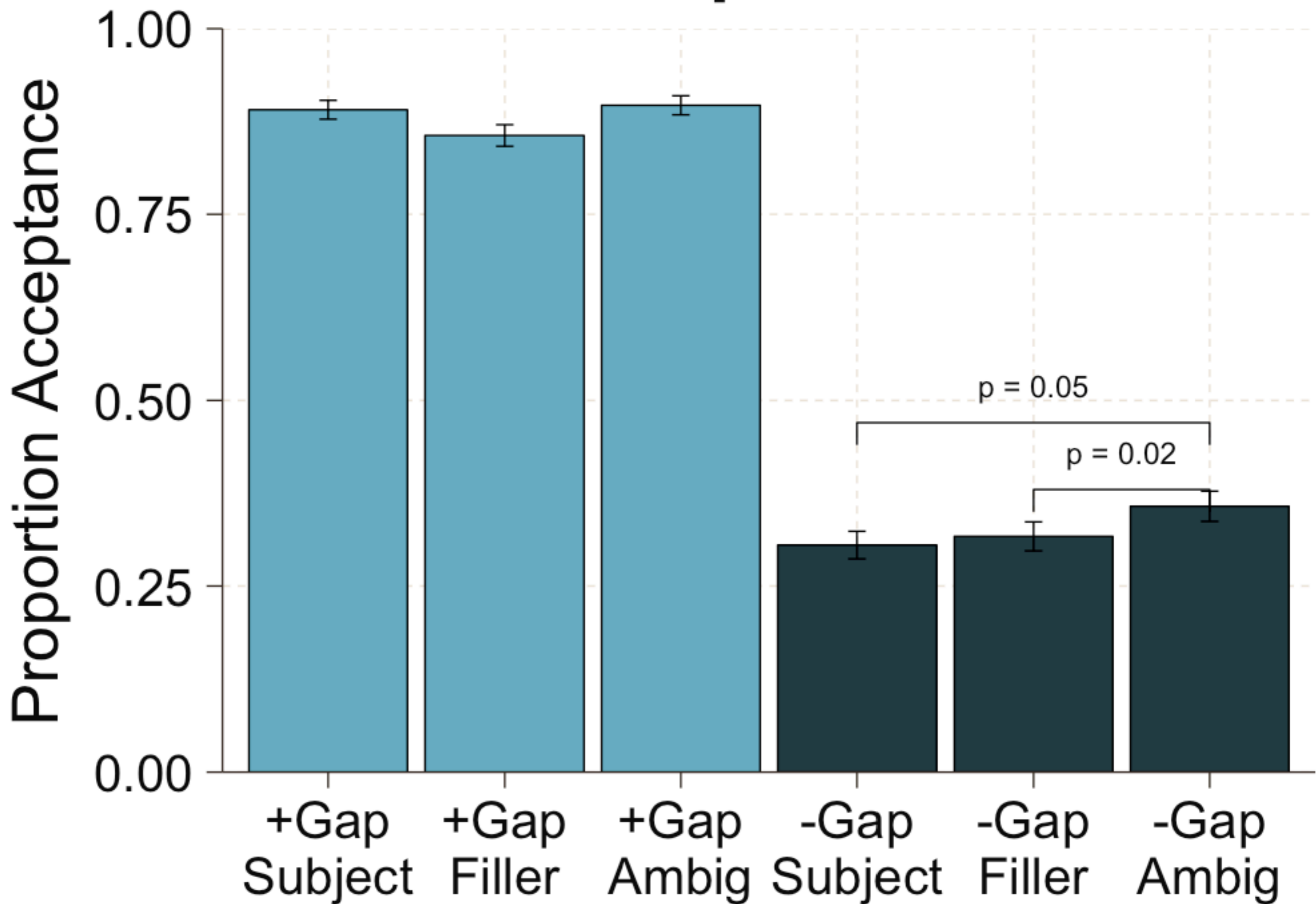
the babysitter  
the babysitter  
the butler

that [NP **her** friend]

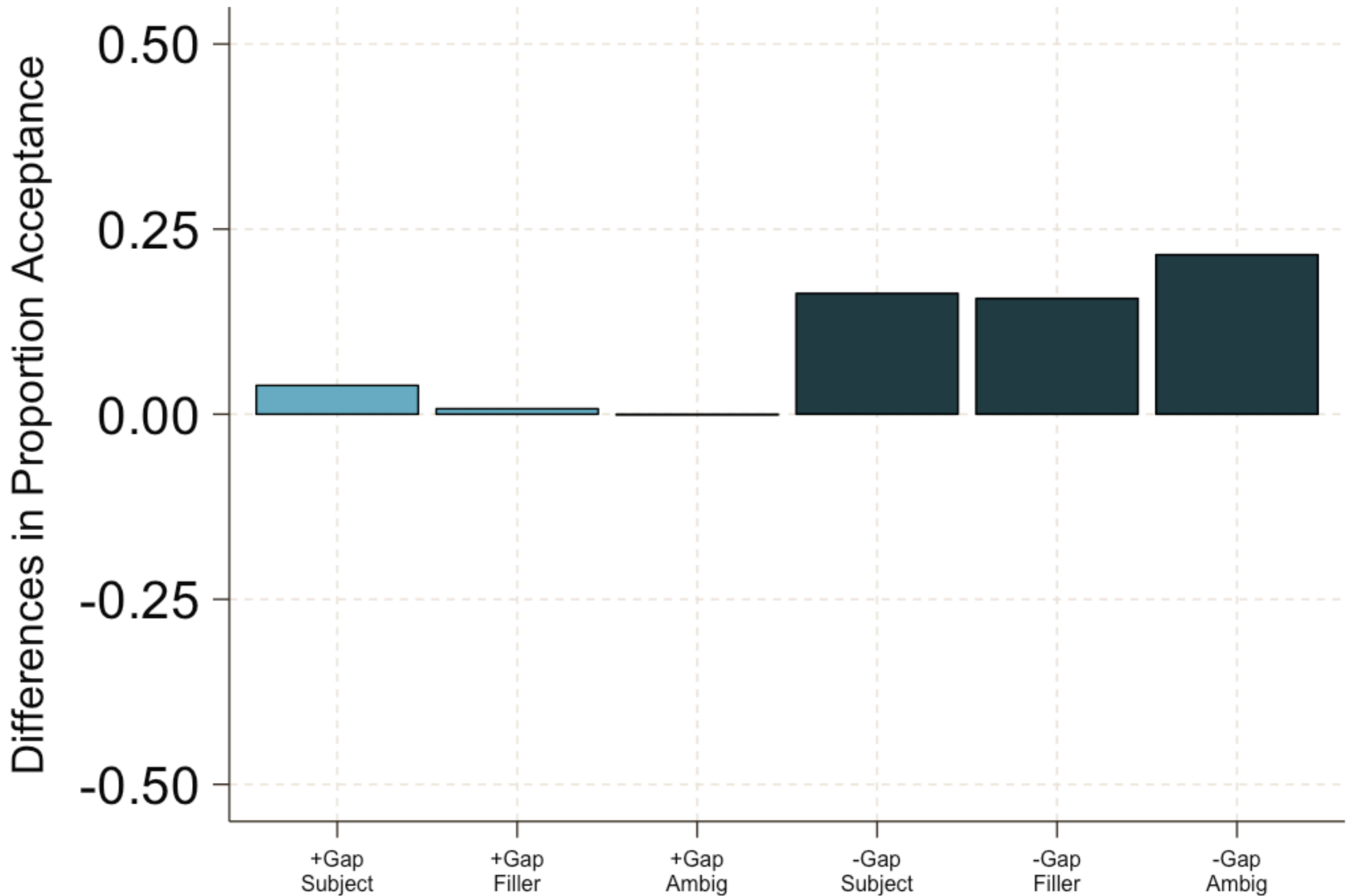
**doesn't like kids**

really highly recommended \_ \_ \_ \_

# Results of Experiment 3



# Expt 3 - Expt1



# Experiment 3

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- **Expt 1:**  
Not much of interest
- **Expt 3** (Expt 1 + Memory Recall Task):  
General improvement for –Gap

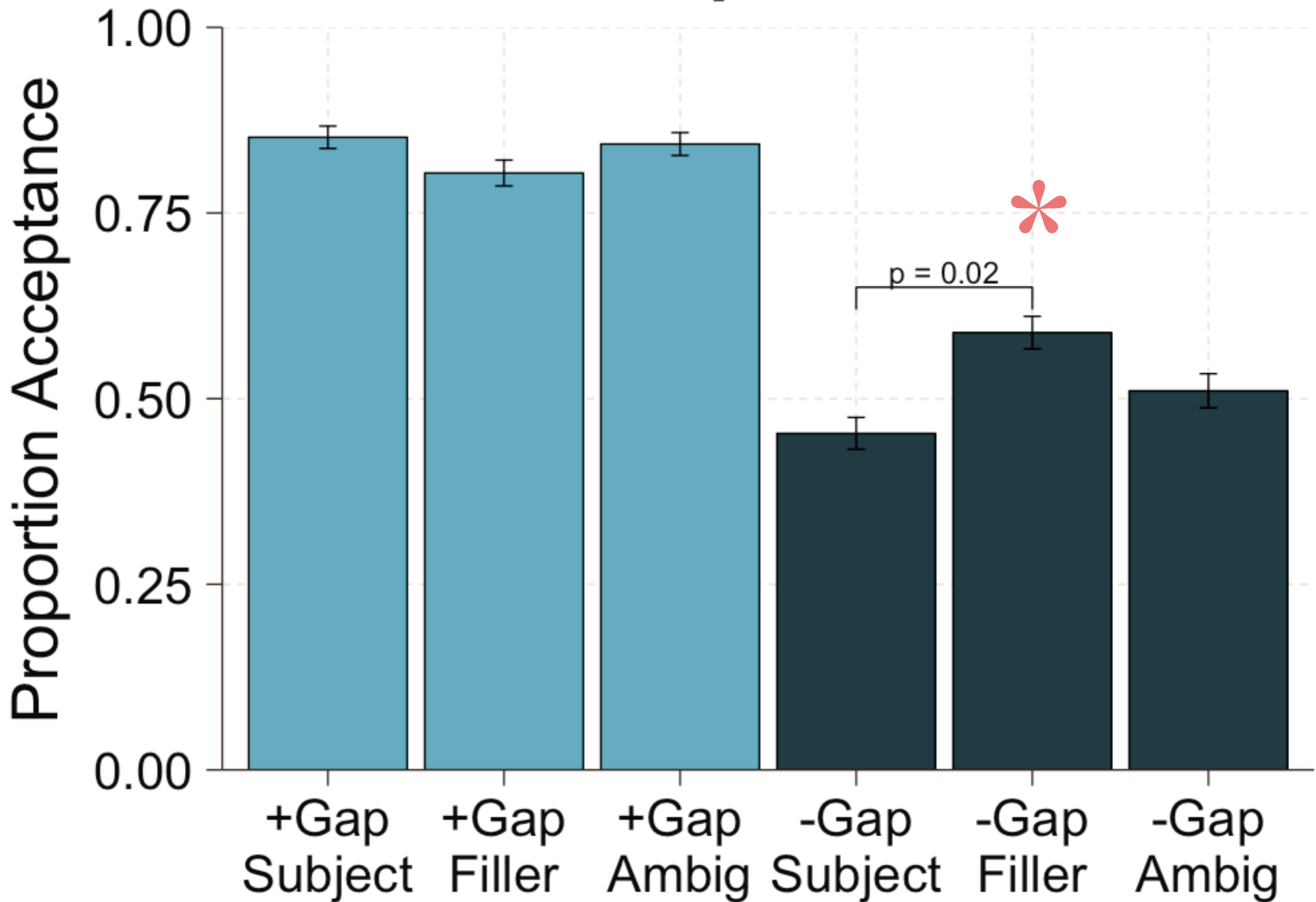
# Experiment 4

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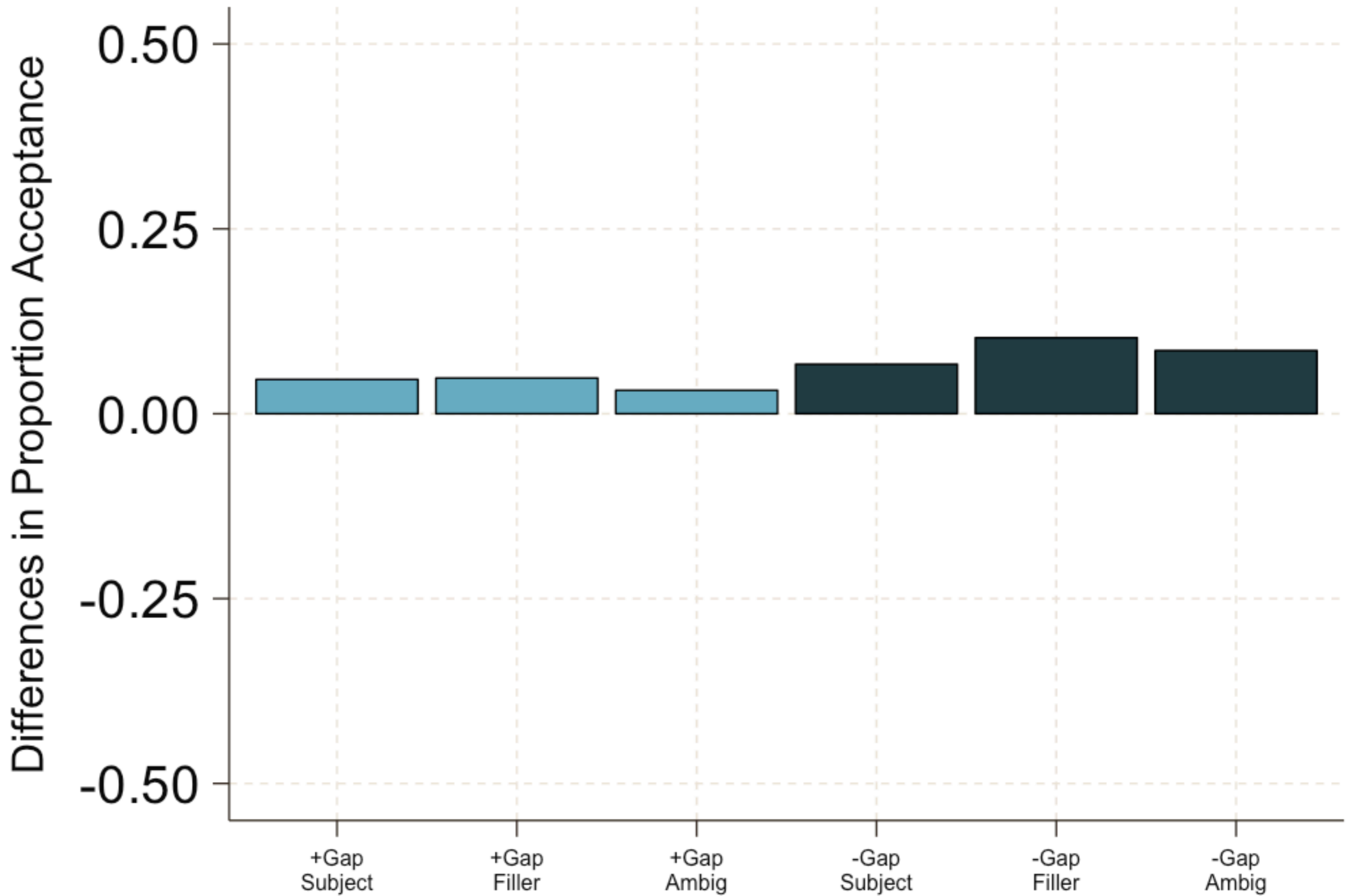
- Speeded-acceptability judgment task  
+ **memory recall task**
- $N = 60$ ; same items as Expt 2
- Memorize four nouns  $\rightarrow$  judge  $\rightarrow$  respond to probe
- **Q:** Reference between **her** and filler “heal” –Gap sentences?

the butler  
This is **the maid** that the babysitter said  
the maid the butler  
that [NP **her** friend] doesn't like kids  
really highly recommended \_ \_ \_ \_

# Results of Experiment 4



# Expt 4 - Expt2



# Experiment 4

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- **Expt 2:**
  - -Gap, Filler > -Gap, Subject
  - ... but no better than chance
- **Expt 4 (Expt 2 + Memory Recall Task):**
  - Expt 2 results + Extra bump =  
Even more higher acceptance!



# Summary

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- What does it take to get a sentence with an RP to be rated “good”?

**1. Processing difficulty** (islands; length; memory strain...)  
(to induce gap decay)

**2. The right kind of sentence**  
(accessible filler)

Supports the hypothesis that resumption is  
“loss of gap” + “anaphora”!

# Islands?

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- What role do island constraints play on this account? **None!**
- RPs may occur in island contexts more frequently if islands are configurations that are independently difficult to process (Kutas & Kluender 1993; Kluender 1998; Gibson 1998; Hawkins 1999; Hofmeister & Sag 2010)
- Not all islands appear to tax memory resources equally (Sprouse, Wagers, & Phillips 2012; Matchin, Almeida, Sprouse, & Hickok 2018)
- **Bold prediction:** ‘Harder’ islands  $\equiv$  ‘Better’ RPs (possibly compatible with Morgan & Wagers 2018?)

# Summary

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(to induce gap decay)
  - 2. The right kind of sentence**  
(accessible filler)

Supports the hypothesis that resumption is  
“loss of gap” + “anaphora”!

# The people that I'd like to thank them

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- Colin Phillips
- Ellen Lau
- Jason Overfelt
- Claire Halpert
- Maayan Keshev
- Aya Meltzer-Asscher
- Chris Hammerly
- Lauren Ackerman
- **Jo Shoemaker**
- **Margaret Kandel**
- **Rebecca Kraut**
- **Nikhil Lakhani**



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# Summary

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- What does it take to get a sentence with an RP to be rated better than chance?

## **1. Processing difficulty**

(to induce “forgetting” the gap)

## **2. The right kind of sentence**

(long dependency, accessible filler)

Supports the hypothesis that resumption is  
“loss of gap” + “anaphora”!

# Secret Slide 1: Other Languages?

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- RPs are grammaticized in other languages
- **Keshev & Asscher-Meltzer (2017):**  
Hebrew speakers actively search for RPs in islands!
- **McCloskey (2017):**  
... but, Irish speakers still produce RPs in “hard-to-process” contexts
- Why? RPs are harder to relate to a filler  
(*pace* Gibson 1998; Hawkins 1999; Beltrama & Xiang 2016)
  - Gaps uniquely identify their antecedent (= filler)
  - RPs are ambiguous (= filler, any other NP, any other entity)
- RPs make identifying the thematic role of a filler easier for the producer, not necessarily for the comprehender

# Secret Slide 2: One Exception?

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- ECP RPs are judged better than other RPs  
(McDaniel & Cowart 1999; also see Han, Elouazizi, Galeano, Görgülü, Hedberg, Hinnell, Jeffrey, Kim, Kirby 2012; Keffala 2013)

Thank you for entrusting me with **this thing** that  
I don't know [what **it** is]

- This may be an exception: Other languages appear to have grammaticized RPs only in this position  
(e.g., Swedish, Engdahl 1985; Yoruba, Carstens 1987)
- English CDS has examples of this type alone –  
**positive evidence** for the learner?  
(Chacón 2015)

# Secret Slide 3: Weak Crossover

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- +Gap, Filler conditions are weak cross-over violations!

This is **the maid** that **the butler** said

that [<sub>NP</sub> **her** friend] really highly recommended \_ \_ \_ \_

- Kush, Lidz & Phillips (2017) show that WCO is not detected in on-line results; my results are consistent with this



# Secret Slide 4: Reaction Times

- Typical reaction time results:
- Subject advantage in reaction times for –Gap
- Ambiguity disadvantage for Ambiguous, –Gap
- Increased RTs for WCO?

