

# Inferential Ellipsis Resolution: Sluicing, Nominal Antecedents, and the QUD

Till Poppels and Andy Kehler  
UC San Diego

Jan 5, 2020

# What is ellipsis?

# What is ellipsis?

Natural languages allow us to elide material that is provided contextually:

# What is ellipsis?

Natural languages allow us to elide material that is provided contextually:

- (1) a. Someone murdered Joe but we don't know who (murdered him).  
b. Joe was murdered but we don't know who #(murdered him).

# What is ellipsis?

Natural languages allow us to elide material that is provided contextually:

- (1) a. Someone murdered Joe but we don't know who (murdered him).  
b. Joe was murdered but we don't know who #(murdered him).
- All languages seem allow some forms of ellipsis, and it is easy to see why:

# What is ellipsis?

Natural languages allow us to elide material that is provided contextually:

- (1) a. Someone murdered Joe but we don't know who (murdered him).  
b. Joe was murdered but we don't know who #(murdered him).

- All languages seem allow some forms of ellipsis, and it is easy to see why:
  - Ellipsis is **efficient**: speakers get away with reduced utterances while still conveying complex meanings.
  - Helps establish **common ground**: by eliding material, speakers signal that they take it to be in common ground and topical.

# What is ellipsis?

Natural languages allow us to elide material that is provided contextually:

- (1) a. Someone murdered Joe but we don't know who (murdered him).  
b. Joe was murdered but we don't know who #(murdered him).

- All languages seem allow some forms of ellipsis, and it is easy to see why:
  - Ellipsis is **efficient**: speakers get away with reduced utterances while still conveying complex meanings.
  - Helps establish **common ground**: by eliding material, speakers signal that they take it to be in common ground and topical.
- **Big question**: what aspects of the context make ellipsis possible?

# What is ellipsis?

Natural languages allow us to elide material that is provided contextually:

- (1) a. Someone murdered Joe but we don't know who (murdered him).  
b. Joe was murdered but we don't know who #(murdered him).

- All languages seem allow some forms of ellipsis, and it is easy to see why:
  - Ellipsis is **efficient**: speakers get away with reduced utterances while still conveying complex meanings.
  - Helps establish **common ground**: by eliding material, speakers signal that they take it to be in common ground and topical.
- **Big question**: what aspects of the context make ellipsis possible?
- This talk focuses on **"sluicing:"** ellipsis of clauses that are embedded under interrogative wh-phrases, as shown in (1).



# Theories of ellipsis: Identity theories

(e.g. Chung, 2006, 2013; Merchant, 2001; Rudin, 2019; Sag, 1976)

## Theories of ellipsis: Identity theories

(e.g. Chung, 2006, 2013; Merchant, 2001; Rudin, 2019; Sag, 1976)

**Central claim:** Material can only be elided if it is identical to its antecedent.

# Theories of ellipsis: Identity theories

(e.g. Chung, 2006, 2013; Merchant, 2001; Rudin, 2019; Sag, 1976)

**Central claim:** Material can only be elided if it is identical to its antecedent.

- Collapsing common distinctions:
  - semantic vs. syntactic identity
  - reconstruction vs. deletion

## Theories of ellipsis: Identity theories

(e.g. Chung, 2006, 2013; Merchant, 2001; Rudin, 2019; Sag, 1976)

**Central claim:** Material can only be elided if it is identical to its antecedent.

- Collapsing common distinctions:
  - semantic vs. syntactic identity
  - reconstruction vs. deletion
- Key property for my purposes: Identity theories aim to **reduce** the effect of the context to the **linguistic antecedent**

# Theories of ellipsis: Identity theories

(e.g. Chung, 2006, 2013; Merchant, 2001; Rudin, 2019; Sag, 1976)

**Central claim:** Material can only be elided if it is identical to its antecedent.

- Collapsing common distinctions:
  - semantic vs. syntactic identity
  - reconstruction vs. deletion
- Key property for my purposes: Identity theories aim to **reduce** the effect of the context to the **linguistic antecedent**

- (2) a. Someone murdered Joe but we don't know who (murdered him).  
b. Joe was murdered but we don't know who #(murdered him).

# Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

## Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

**Central claim:** Ellipsis involves a null pro-form that presupposes that its referent is topical and uniquely identifiable in common ground.

## Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

**Central claim:** Ellipsis involves a null pro-form that presupposes that its referent is topical and uniquely identifiable in common ground.

- Treating ellipsis as discourse reference explains anaphoric properties:



## Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

**Central claim:** Ellipsis involves a null pro-form that presupposes that its referent is topical and uniquely identifiable in common ground.

- Treating ellipsis as discourse reference explains anaphoric properties:
  - cataphoric ellipsis

## Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

**Central claim:** Ellipsis involves a null pro-form that presupposes that its referent is topical and uniquely identifiable in common ground.

- Treating ellipsis as discourse reference explains anaphoric properties:
  - cataphoric ellipsis
  - exophoric ellipsis

## Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

**Central claim:** Ellipsis involves a null pro-form that presupposes that its referent is topical and uniquely identifiable in common ground.

- Treating ellipsis as discourse reference explains anaphoric properties:
  - cataphoric ellipsis
  - exophoric ellipsis
  - split-antecedent ellipsis

# Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

**Central claim:** Ellipsis involves a null pro-form that presupposes that its referent is topical and uniquely identifiable in common ground.

- Treating ellipsis as discourse reference explains anaphoric properties:
  - cataphoric ellipsis
  - exophoric ellipsis
  - split-antecedent ellipsis
  - ellipsis sites triggering “sloppy” readings

# Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

**Central claim:** Ellipsis involves a null pro-form that presupposes that its referent is topical and uniquely identifiable in common ground.

- Treating ellipsis as discourse reference explains anaphoric properties:
  - cataphoric ellipsis
  - exophoric ellipsis
  - split-antecedent ellipsis
  - ellipsis sites triggering “sloppy” readings
  - inferential ellipsis resolution

# Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

**Central claim:** Ellipsis involves a null pro-form that presupposes that its referent is topical and uniquely identifiable in common ground.

- Treating ellipsis as discourse reference explains anaphoric properties:
  - cataphoric ellipsis
  - exophoric ellipsis
  - split-antecedent ellipsis
  - ellipsis sites triggering “sloppy” readings
  - inferential ellipsis resolution
- Linguistic antecedent is important: it introduces the referent.

# Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

**Central claim:** Ellipsis involves a null pro-form that presupposes that its referent is topical and uniquely identifiable in common ground.

- Treating ellipsis as discourse reference explains anaphoric properties:
  - cataphoric ellipsis
  - exophoric ellipsis
  - split-antecedent ellipsis
  - ellipsis sites triggering “sloppy” readings
  - inferential ellipsis resolution
- Linguistic antecedent is important: it introduces the referent.
- But so are other factors:
  - World knowledge: e.g. by introducing situationally evoked referents (Poppels & Kehler, 2017)
  - Availability of relevant Question under Discussion (QuD)

# Theories of ellipsis: Referential theories

(e.g. Ginzburg & Sag, 2000; Hardt, 1993; Kehler, 2019; Webber, 1978)

**Central claim:** Ellipsis involves a null pro-form that presupposes that its referent is topical and uniquely identifiable in common ground.

- Treating ellipsis as discourse reference explains anaphoric properties:
  - cataphoric ellipsis
  - exophoric ellipsis
  - split-antecedent ellipsis
  - ellipsis sites triggering “sloppy” readings
  - inferential ellipsis resolution
- Linguistic antecedent is important: it introduces the referent.
- But so are other factors:
  - World knowledge: e.g. by introducing situationally evoked referents (Poppels & Kehler, 2017)
  - Availability of relevant Question under Discussion (QuD)
- **QuD hypothesis:** questions can be sluiced iff they correspond to a salient QuD (AnderBois, 2014; Barros, 2014; Ginzburg & Sag, 2000)



## Plan for today

Interim summary:

- 2 types of theories:
  - IDENTITY theories: ellipsis depends exclusively on the linguistic antecedent
  - Referential theories: other factors matter, e.g. 'QuD availability'

## Plan for today

Interim summary:

- 2 types of theories:
  - IDENTITY theories: ellipsis depends exclusively on the linguistic antecedent
  - Referential theories: other factors matter, e.g. 'QuD availability'
- **QuD hypothesis**: sluicing depends on 'QuD availability' (e.g. AnderBois, 2014; Barros, 2014; Ginzburg & Sag, 2000)

# Plan for today

Interim summary:

- 2 types of theories:
  - IDENTITY theories: ellipsis depends exclusively on the linguistic antecedent
  - Referential theories: other factors matter, e.g. 'QuD availability'
- **QuD hypothesis**: sluicing depends on 'QuD availability' (e.g. AnderBois, 2014; Barros, 2014; Ginzburg & Sag, 2000)

This talk: sluicing with **nominal antecedents**

# Plan for today

Interim summary:

- 2 types of theories:
  - IDENTITY theories: ellipsis depends exclusively on the linguistic antecedent
  - Referential theories: other factors matter, e.g. 'QuD availability'
- **QuD hypothesis**: sluicing depends on 'QuD availability' (e.g. AnderBois, 2014; Barros, 2014; Ginzburg & Sag, 2000)

This talk: sluicing with **nominal antecedents**

- Experiment 1: acceptability
- Experiment 2: 'QuD availability'
- Experiment 3: acceptability again

# Plan for today

## Interim summary:

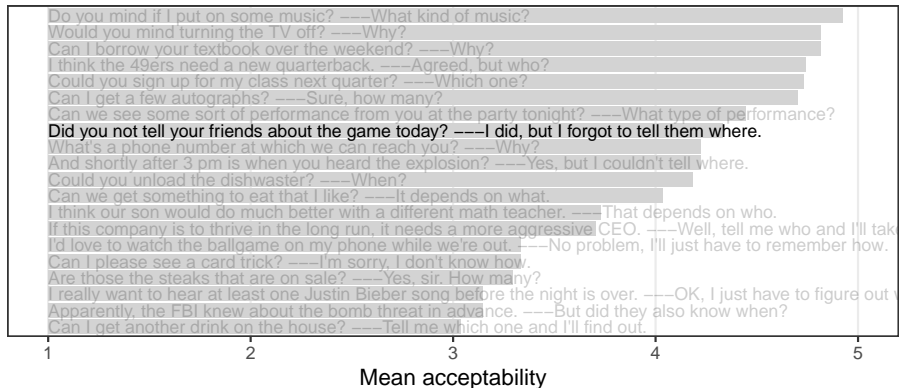
- 2 types of theories:
  - IDENTITY theories: ellipsis depends exclusively on the linguistic antecedent
  - Referential theories: other factors matter, e.g. 'QuD availability'
- **QuD hypothesis**: sluicing depends on 'QuD availability' (e.g. AnderBois, 2014; Barros, 2014; Ginzburg & Sag, 2000)

## This talk: sluicing with **nominal antecedents**

- Experiment 1: acceptability
- Experiment 2: 'QuD availability'
- Experiment 3: acceptability again
- **Preview**: our results raise novel challenges for both Identity and QuD theories

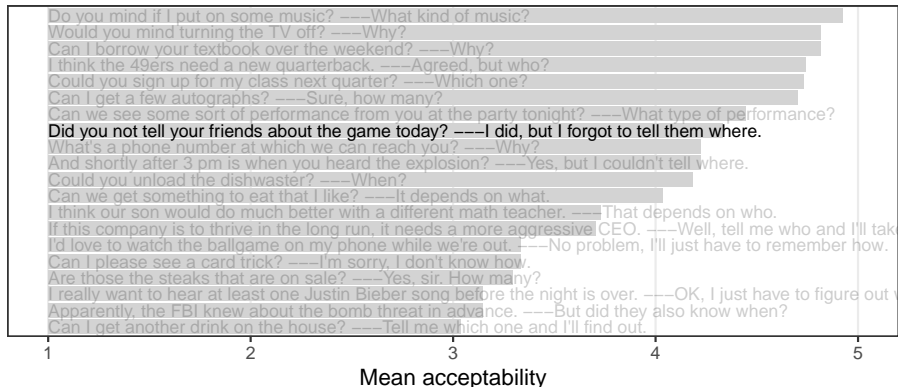
# Why look at nominal antecedents?

From Poppels and Kehler (2019):



# Why look at nominal antecedents?

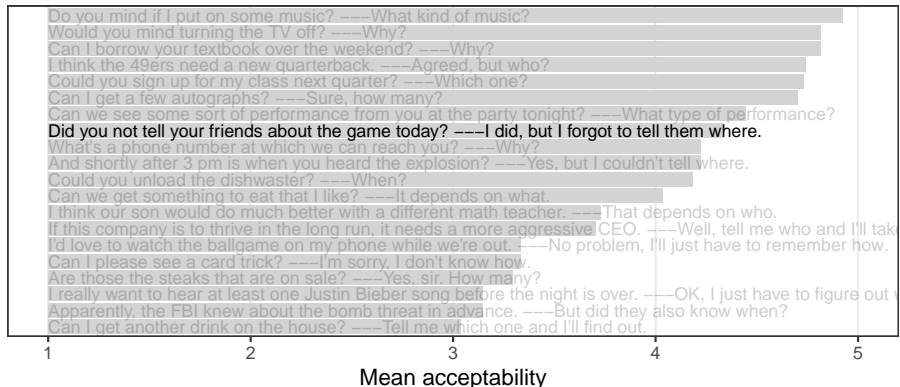
From Poppels and Kehler (2019):



- (3) Did you not tell your friends about the game today? —I did, but I forgot to tell them where (the game would be; it would take place; ...).

# Why look at nominal antecedents?

From Poppels and Kehler (2019):



- (3) Did you not tell your friends about the game today? —I did, but I forgot to tell them where (the game would be; it would take place; ...).



## Why look at nominal antecedents (cont'd)?

- (4) Did you not tell your friends about the game today? —I did, but I forgot to tell them where (the game would be; it would take place; . . .).
- Represent a challenge for IDENTITY theories: *clauses*  $\neq$  *nominals*

## Why look at nominal antecedents (cont'd)?

- (4) Did you not tell your friends about the game today? —I did, but I forgot to tell them where (the game would be; it would take place; . . .).
- Represent a challenge for IDENTITY theories: *clauses*  $\neq$  *nominals*
  - Only previous mention (that I am aware of): Beecher (2007).

## Why look at nominal antecedents (cont'd)?

- (4) Did you not tell your friends about the game today? —I did, but I forgot to tell them where (the game would be; it would take place; . . . ).
- Represent a challenge for IDENTITY theories: *clauses*  $\neq$  *nominals*
  - Only previous mention (that I am aware of): Beecher (2007).
  - Nominal-antecedent VP-ellipsis exhibits QUD effects (Miller & Hemforth, 2014):
- (5) Mubarak's survival is impossible to predict and, even if he does, his plan to make his son his heir apparent is now in serious jeopardy. [COCA: CBS Evening News]

# Expt 1

**Goal:** measure acceptability of sluices with nominal antecedents like (6):

## Expt 1

**Goal:** measure acceptability of sluices with nominal antecedents like (6):

(6) A: I can't see your parents in the audience. Did you not tell them about your performance today?

B: I did, but I forgot to tell them {when|where|what about|how long|why}.

# Expt 1

**Goal:** measure acceptability of sluices with nominal antecedents like (6):

(6) A: I can't see your parents in the audience. Did you not tell them about your performance today?

B: I did, but I forgot to tell them {when|where|what about|how long|why}.

- Strategy:
  - Carefully design contexts to enable 1 nominal-antecedent sluice (caveat: selection bias!)
  - Mechanically substitute other wh-phrases to create variability
  - Test if variability can be explained in terms of 'QuD availability'

# Expt 1

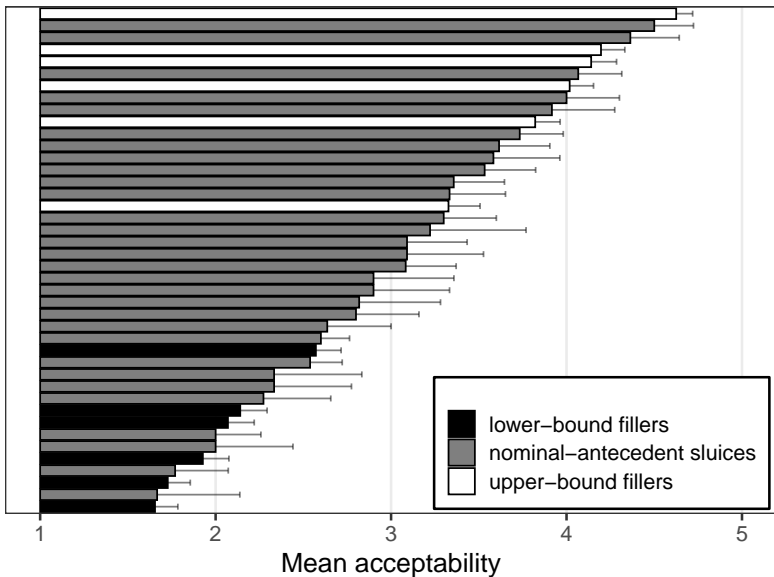
**Goal:** measure acceptability of sluices with nominal antecedents like (6):

(6) A: I can't see your parents in the audience. Did you not tell them about your performance today?

B: I did, but I forgot to tell them {when|where|what about|how long|why}.

- Strategy:
  - Carefully design contexts to enable 1 nominal-antecedent sluice (caveat: selection bias!)
  - Mechanically substitute other wh-phrases to create variability
  - Test if variability can be explained in terms of 'QuD availability'
- 30 nominal-antecedents sluices like (6): 6 contexts, 5 wh-phrases.
- 63 participants, 12 fillers (2:1 ratio)

# Expt 1: Results





## Expt 2

- **Question:** can we explain this gradability?

## Expt 2

- **Question:** can we explain this gradability?
- Challenging for IDENTITY theories

## Expt 2

- **Question:** can we explain this gradability?
- Challenging for IDENTITY theories
- QUD theories: sluicing depends on the availability of a relevant Question under Discussion (QUD) (AnderBois, 2014; Barros, 2014; Roberts, 2012)

## Expt 2

- **Question:** can we explain this gradability?
- Challenging for IDENTITY theories
- QUD theories: sluicing depends on the availability of a relevant Question under Discussion (QUD) (AnderBois, 2014; Barros, 2014; Roberts, 2012)
- Plan for Expt 2:
  - Measure predictability of sluiced question (QUD)
  - Check if this 'QUD availability' measure predicts acceptability

## Expt 2: passage-completion task

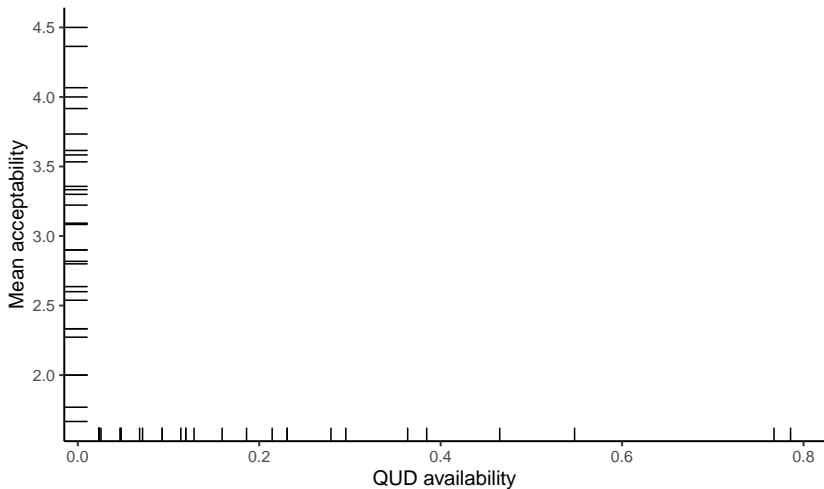
*(Instructions: carefully read the passage below, carefully read all continuations, and then choose the continuation you find most likely.)*

**"A: I can't see your parents in the audience. Did you not tell them about your performance today? B: I did, but I forgot to tell them...**

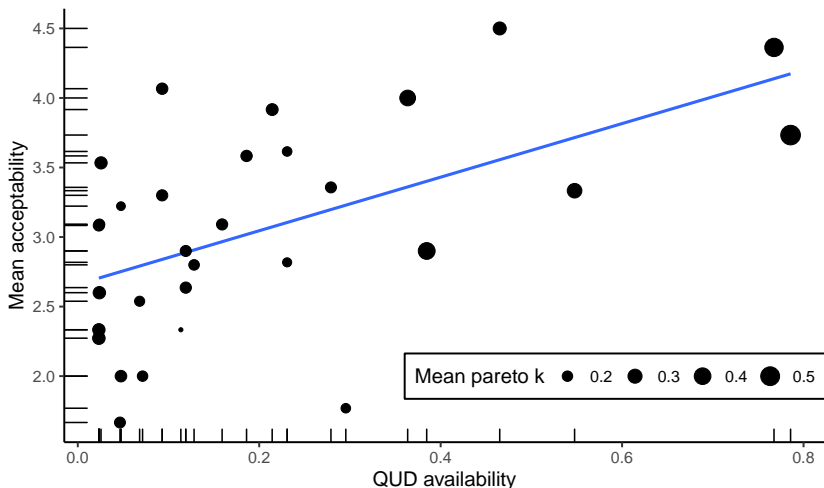
1. ...where I was performing."
2. ...how long it would last."
3. ...when it was going to start."
4. ...why they should be in the audience."
5. ...what it was about."

- Answer choices: modal response in separate norming experiment in which participants paraphrased the ellipsis site

# Expt 2: Results



## Expt 2: Results



- Frequentist analysis:  $\beta = 1.826, p = 0.037$
- Bayesian analysis:  $P(\beta > 0) = 0.983$

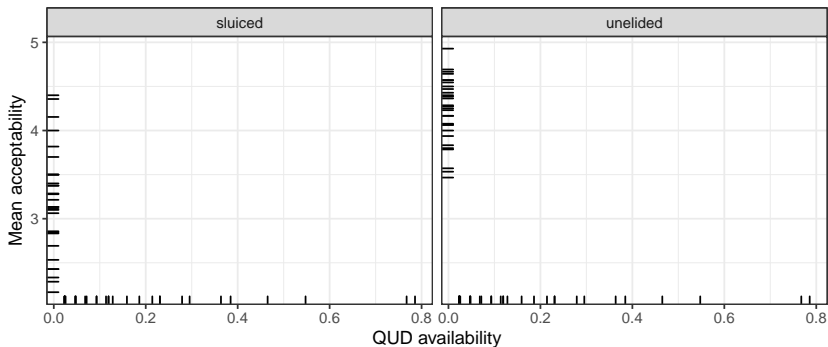
## Expt 3: revisiting acceptability

**Goal:** determine if QUD effect is specific to sluicing, by replicating Expt 1 and adding unelided variants (N = 153)



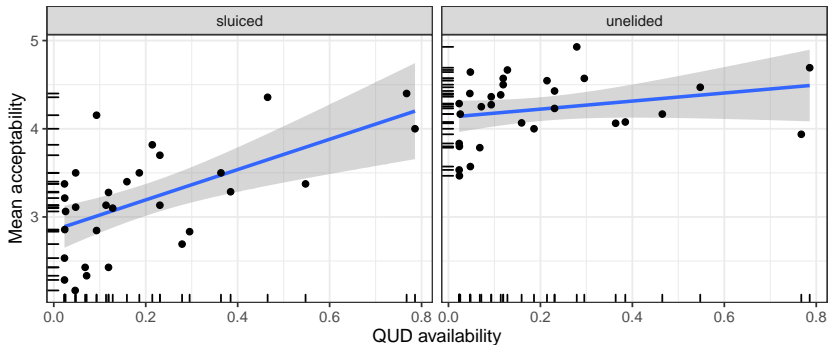
## Expt 3: revisiting acceptability

**Goal:** determine if QUD effect is specific to sluicing, by replicating Expt 1 and adding unelided variants (N = 153)



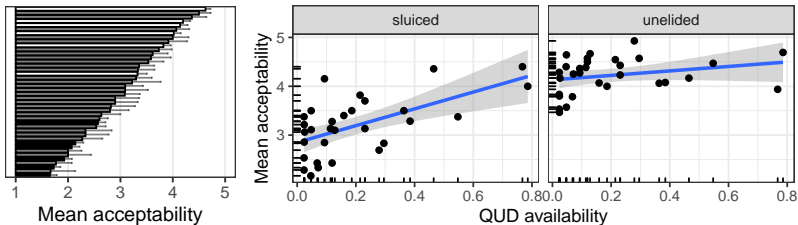
## Expt 3: revisiting acceptability

**Goal:** determine if QUD effect is specific to sluicing, by replicating Expt 1 and adding unelided variants (N = 153)



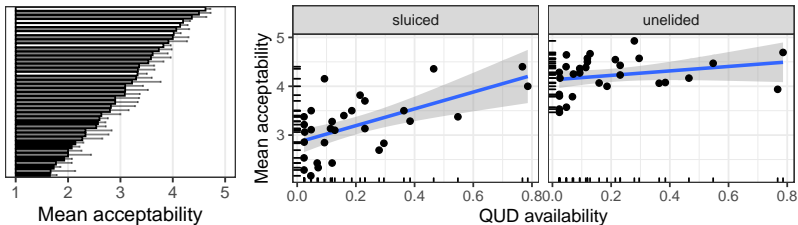
- Replication of QUD effect:  $P(\beta > 0) = 0.998$
- Interaction not significant:  $P(\beta < 0) = 0.837$
- No evidence that QuD effect is ellipsis-specific!

# Discussion



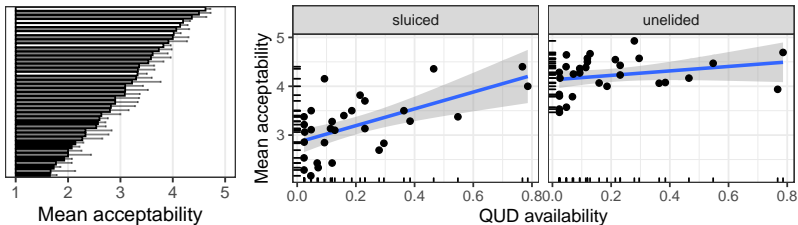
- Expt 1:
  - Some nominal-antecedent sluices are impeccable, others terrible.
  - This pattern is problematic for Identity theories.
  - Referential theories stand a better chance of explaining variability, since they recognize multiple factors as potentially relevant.

# Discussion



- **Expt 1:**
  - Some nominal-antecedent sluices are impeccable, others terrible.
  - This pattern is problematic for Identity theories.
  - Referential theories stand a better chance of explaining variability, since they recognize multiple factors as potentially relevant.
- **Expts 2 & 3:**
  - Some of the variance is due to variation in 'QUD availability'.
  - However, QUD effect is not specific to ellipsis.

# Discussion



- **Expt 1:**
  - Some nominal-antecedent sluices are impeccable, others terrible.
  - This pattern is problematic for Identity theories.
  - Referential theories stand a better chance of explaining variability, since they recognize multiple factors as potentially relevant.
- **Expts 2 & 3:**
  - Some of the variance is due to variation in 'QUD availability'.
  - However, QUD effect is not specific to ellipsis.
- **Bottom line:** something beyond predictability is constraining ellipsis.

## Partee's marbles

(7) I dropped 10 marbles and I only found 9 of them. #It must be under the sofa.

## Partee's marbles

(7) I dropped 10 marbles and I only found 9 of them. #It must be under the sofa.

⇒ Even though the missing marble is maximally salient, *it* is infelicitous unless the marble was introduced explicitly.

## Partee's marbles

(7) I dropped 10 marbles and I only found 9 of them. #It must be under the sofa.

⇒ Even though the missing marble is maximally salient, *it* is infelicitous unless the marble was introduced explicitly.

(8) I can't see your parents in the audience, did you not tell them about your performance today? —I did, but I forgot to tell them...

- a. ...when (the performance was).
- b. ...why #(they should be there).



## Partee's marbles

(7) I dropped 10 marbles and I only found 9 of them. #It must be under the sofa.

⇒ Even though the missing marble is maximally salient, *it* is infelicitous unless the marble was introduced explicitly.

(8) I can't see your parents in the audience, did you not tell them about your performance today? —I did, but I forgot to tell them...

- a. ...when (the performance was).
- b. ...why #(they should be there).

⇒ Even though a perfectly coherent continuation exists for (8-b), sluicing appears to point us back to the antecedent (i.e., the performance).

Thank you!

## References I

- AnderBois, S. (2014). The semantics of sluicing: Beyond truth conditions. *Language*, 90(4), 887–926.
- Barros, M. (2014). *Sluicing and identity in ellipsis*. (Doctoral dissertation).
- Beecher, H. (2007). Pragmatic inference in the interpretation of sluiced prepositional phrases. In *Proceedings of the fifth university of cambridge postgraduate conference in language research* (pp. 9–16). Citeseer.
- Chung, S. (2006). Sluicing and the lexicon: The point of no return. In *Proceedings of the annual meeting of the berkeley linguistics society* (Vol. 31, pp. 73–91). Berkeley Linguistics Society Berkeley, CA.
- Chung, S. (2013). Syntactic identity in sluicing: How much and why. *Linguistic Inquiry*, 44(1), 1–44.
- Ginzburg, J., & Sag, I. (2000). *Interrogative investigations*. Stanford: CSLI publications.

## References II

- Hardt, D. (1993). Verb phrase ellipsis: Form, meaning, and processing.
- Kehler, A. (2019). Ellipsis and discourse. In J. van Craenenbroeck & T. Temmerman (Eds.), *Handbook of ellipsis* (pp. 314–341). Oxford: Oxford University Press.
- Merchant, J. (2001). *The syntax of silence: Sluicing, islands, and the theory of ellipsis*. Oxford University Press on Demand.
- Miller, P., & Hemforth, B. (2014). *Verb phrase ellipsis with nominal antecedents*.
- Poppels, T., & Kehler, A. (2017). Overcoming the identity crisis: Novel evidence for a referential theory of verb phrase ellipsis. In *Proceedings of the annual meeting of the chicago linguistics society* (Vol. 53).
- Poppels, T., & Kehler, A. (2019). *Sluicing inferred propositions*. Poster to be presented at a workshop entitled 'Sluicing and Ellipsis at 50' at the University of Chicago.

## References III

- Roberts, C. (2012). Information structure in discourse: Towards an integrated formal theory of pragmatics. *Semantics and Pragmatics*, 5(6), 1–69. doi:10.3765/sp.5.6
- Rudin, D. (2019). Head-based syntactic identity in sluicing. *Linguistic Inquiry*, 50(2), 253–283.
- Sag, I. A. (1976). *Deletion and logical form*. (Doctoral dissertation, Massachusetts Institute of Technology).
- Webber, B. L. (1978). *A formal approach to discourse anaphora*. Bolt Beranek and Newman, Inc. Cambridge, MA.