

## Anaphoric Reference to Propositions

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- An **anaphor** is a word whose reference we determine on the basis of the interpretation of some other word/phrase (its **antecedent**)

- For example, pronouns are anaphors whose antecedents denote **individuals**

- (1) Nancy has a car. *She* has owned *it* for five years.

- We can also use anaphors to refer to **propositions**

- (2) Nancy has a car. She told me *that*.

COLBERT: People still don't know that you're a great singer.  
 CARRELL: Mm, well, **that's** not really true. But, thank you.  
 COLBERT: That you're a great singer-  
 CARRELL: Yes  
 COLBERT: or that people don't know?  
 CARRELL: That I'm a great singer. But **that's** nice of you to say.  
 COLBERT: Do people- do you guys- Are aware that he's a great singer?  
 [audience cheers]

COLBERT: No one knows **that**, Steve Carrell. . . . Let's do a song.

(The Late Show with Stephen Colbert, December 7, 2015)

- Ambiguity, anaphora resolution, explicit negotiation...
- Not just for comedians, either

SENATOR BROWN: President Trump said that he's working with you on a replacement plan for the ACA which is nearly finished and will be revealed after your confirmation, is **that** true?

PRICE: It's true that he said **that**, yes.  
 (Senate Finance Committee hearing, January 24, 2017)

- Not just for laughs
- In fact, more common than you might think!
- Propositional anaphora, which has also been called discourse deixis (Webber 1988), sentential anaphora (Gast & König 2008), abstract entity anaphora (Asher 1993)

## My questions

- Which words of English can have this function?
- Is propositional anaphora like other kinds of anaphora? (How so/not?)
- When is anaphora to a proposition possible? What conditions its availability?
- How can we model it?

## Outline

- 1 Propositional Anaphora is Anaphora
- 2 Introducing Propositional Discourse Referents
- 3 Modeling Propositional Anaphora
- 4 Propositional Anaphora & At-issueness

## This section

- 1 What's anaphora?
- 2 What's a proposition?
- 3 Which anaphors of English can refer to propositions?
- 4 How does anaphora to propositions compare to other domains?

### The takeaway

Propositional anaphora is anaphora, parallel to other domains

## Anaphora

- Canonical cases of anaphora involve **coreference**
- (3) Nancy has a car. *It* is blue.
- This includes what Webber et al. 2003 calls **split reference**
- (4) Nancy was at the library, and so was Steve. *They* were studying.
- But not all anaphors *refer*, in a strict sense
- (5) After each girl sat down, *she* began studying.
- The pronoun *she* is **bound** under *each*; it doesn't pick out a single individual

## Anaphora

- Webber et al. 2003 distinguishes **indirect anaphora**, where an anaphor picks up an **associate** of the antecedent  
(≡ bridging anaphora, partial anaphora, textual ellipsis, associative anaphora, inferrables)

(6) Myra darted to a phone and picked up *the receiver*.  
(Webber et al. 2003: (25))

- Webber et al. 2003 also distinguishes **lexically specified anaphora**, where an anaphor denotes a function which takes the antecedent (or an associate of the antecedent) as its argument, and returns a referent

(7) I don't like sitting in this room. Can we move *elsewhere*?  
(Webber et al. 2003: (31))

(8) Sue lifted the receiver as Tom darted to *the other phone*.  
(Webber et al. 2003: (27))

## Propositions

- In a possible world semantics, propositions are sets of worlds: the worlds at which a statement is true (Stalnaker 1976, a.o.)
- To avoid problems of identity and logical omniscience, some prefer notions of the proposition which give it internal structure (Barwise & Perry 1981, a.o.)
- Which of the many conceptions we use isn't crucial here, as long as we can differentiate among propositions
- Peterson 1982; Parsons 1993 (and Asher 1993) distinguish *facts* (and *possibilities*) from propositions
- But I dispute this distinction, and instead follow Frege  
“Facts, facts, facts” cries the scientist if he wants to bring home the necessity of a firm foundation for science. What is a fact? A fact is a thought that is true.”  
(Frege 1918: 307)

## Propositions

- A proposition is the type of entity that includes facts, beliefs, etc.
- They allow us to capture sameness across people without making reference to any linguistic object

(9) a. [John:] I am hungry.  
b. [Nancy:] John is hungry.  
c. [Barb:] John tiene hambre. (Spanish)

(10) Everything Nancy says, Steve believes.

- Propositions are the sorts of things denoted by declarative sentences, the sorts of things embedded under attitude verbs
- Propositions are bearers of truth values

## Anaphors of English

- English has several words which can be anaphoric to a proposition
  - the demonstratives *this* and *that*
  - the pronoun *it*
  - the relative pronoun *which*
  - the coordinators *as* and *so*
  - the null anaphor (Ø)

(11) a. Nancy has a car. She told me *this*.  
b. Nancy has a car. She told me *that*.  
c. Nancy has a car. *It's* true.  
d. Nancy has a car, *which* surprised me.  
e. Nancy has a car, *as* is widely known.  
f. Nancy has a car. She told me *so*.  
g. Nancy has a car. She told me.

## Anaphors of English

- There are differences among these propositional anaphors
- For example, *this* allows for cataphoric uses (where the anaphor precedes the antecedent) but *that* does not

- (12) [Discussing who was at the party; Erik hasn't yet been mentioned.]
- a. i. *This* is what I was told: Erik was there.
  - ii. # *That* is what I was told: Erik was there.
  - b. i. I was told *this*: Erik was there.
  - ii. # I was told *that*: Erik was there.

## Anaphors of English

- Also which can stand alone with adverbial modifiers

- (13) Is John coming tonight?
- a. Possibly so.
  - b. \* Possibly as (much).
  - c. Possibly not.
  - d. \* Possibly this.
  - e. \* Possibly that.
  - f. \* Possibly it.
  - g. \* Possibly which.
  - h. Possibly.

- They differ, but they can all anaphorically refer to propositions

## Parallels across domains

- Certain features have been identified as core to anaphora, so as to argue that tense (Partee 1984, 1987) and modality (Stone 1997) are anaphoric processes
  - 1 non-linguistic antecedents
  - 2 bound readings
  - 3 donkey sentences
  - 4 strict/sloppy ambiguities (Stone & Hardt 1999)
- I show that the same can be found with propositional anaphora

## Parallels across domains

### Non-linguistic antecedents

- Most antecedents are linguistic objects, words (usually earlier) in a discourse
  - Individuals can be brought to salience by non-linguistic means, as well, enough to make them available for anaphoric reference
- (14) [We're sitting in a high school classroom, when suddenly the door is pushed open, and in walks a goat.]  
What is *that* doing here?!?

## Parallels across domains

### Non-linguistic antecedents

- The same can be true of propositions

- (15) Hankamer [observing Sag successfully ripping a phone book in half]:  
I don't believe *it*. (Hankamer & Sag 1976: (32))
- (16) [Mom walks into the living room, and sees her three children standing around the broken remains of a lamp.]  
Mom: Who broke the lamp?  
[Two of the children look at Dewey.]  
Dewey: *That's* not true!

## Parallels across domains

### Bound readings

- Under the scope of a quantifier, anaphors can act as bound variables

- (17) Every woman believes that *she* is happy. (Partee 1984: (4a))
- (18) Whenever Mary telephoned, Sam *was* asleep. (Partee 1984: (5a))

- In (17), *she* covaries with each woman in the set
- In (18), the past tense of *was* is bound by *whenever*

## Parallels across domains

### Bound readings

- Propositional anaphors can be bound as well

- (19) Whenever Rosie called, Peter told Susan  $\left\{ \begin{matrix} \text{that} \\ \text{so} \\ \text{as much} \end{matrix} \right\}$ .

- We understand the anaphor(s) as 'Rosie called (at time *t*)', for each time *t* at which Rosie called (quantified by whenever)

## Parallels across domains

### Donkey sentences

- Donkey sentences are those where a pronoun acts as though bound, despite not being in the right syntactic configuration to be properly bound (the anaphor is not c-commanded by its antecedent)

- The name comes from the famous "donkey-sentences" of Geach 1962; Kamp 1981, a.o.

- (20) If Pedro owns a donkey, he beats *it*. (Partee 1984: (6a))
- (21) Every farmer who owns a donkey beats *it*. (Partee 1984: (6b))

- In both cases, *it* refers to each donkey owned, covarying as if bound



## Summary

- Propositions bear truth values, are the sorts of things denoted (at least) by declarative sentences and complements of attitude verbs
- English uses the propositional anaphors *this*, *that*, *it*, *which*, *as*, *so*, and the null complement anaphor
- Propositional anaphora is parallel to individual, tense, and modal anaphora

## Discourse referents

- Noun phrases make individuals available for anaphoric reference, but not always

- (29) a. Bill has a car. (Karttunen 1969: (3a))  
          b. It is black. (Karttunen 1969: (3b))
- (30) a. Bill doesn't have a car. (Karttunen 1969: (4a))  
          b. # It is black. (Karttunen 1969: (4b))

- In Karttunen's terms, only some NPs introduce a **discourse referent**
- Karttunen 1969 was an investigation of when individual discourse referents are introduced
- This chapter aims to do the same, but for propositional discourse referents (pdrefs)

## This section

### The question

We know that declarative sentences and *that*-clauses introduce pdrefs, but what else does?

- Being careful to control across contexts
  - Using just the anaphor *that*
  - in complement position
  - with verbs like *believe*, *doubt*, ... (which take propositional arguments)
  - in single-speaker discourses
  - with attention to discourse relations & intervening material
- Looking at a variety of constructions, both syntactic and semantic contexts
  - subclausal, monoclausal, multicleusal, multisentential
  - More than I can go through here today
- Comparing the observed facts to the one proposal on the market, due to Krifka 2013: TPs and above introduce pdrefs

## Subclausal

### Small clauses

- Small clause constructions have a nominal and adjective following a verb
- They can introduce a predication, a cause, a result, or an epistemic state, among other things (Wilder 1991)
- Some disagreement on whether they are VPs (Wilder 1991) or PrPs (Bowers 1993), but syntacticians agree they're sub-TP
- Secondary predication small clause:

- (31) Hopper ordered his steak rare. Joyce told me *that*.  
          ✓ *that*: Hopper ordered his steak rare. MATRIX CLAUSE  
          #*that*: The steak was rare. SMALL CLAUSE
- (32) Steve left Nancy angry with herself. Barb couldn't believe *that*.  
          ✓ *that*: Steve left Nancy angry with herself. MATRIX CLAUSE  
          #*that*: Nancy was angry with herself. SMALL CLAUSE

## Subclausal

### Small clauses

- In general, small clauses don't license anaphora to a (non-matrix) proposition
- Causative small clause:

(33) Steve made Barb nervous. She told Nancy *that*.

✓ *that*: Steve made Barb nervous. MATRIX CLAUSE  
#*that*: Barb was nervous. SMALL CLAUSE

(34) Chief Hopper had Officer Callaghan promoted, but Joyce doesn't believe *that*.

✓ *that*: Chief Hopper had Officer Callaghan promoted.  
#*that*: Officer Callaghan was promoted. MATRIX CLAUSE  
SMALL CLAUSE

## Subclausal

### Small clauses

- In general, small clauses don't license anaphora to a (non-matrix) proposition
- Result state small clause:

(35) Joyce painted the room red. Jonathan told me *that*.

✓ *that*: Joyce painted the room red. MATRIX CLAUSE  
#*that*: The room is red. SMALL CLAUSE

(36) Lucas wiped the table clean, but I don't think *that's* true.

#*that*: Lucas wiped the table clean. MATRIX CLAUSE  
#*that*: The table is clean. SMALL CLAUSE

- Moore's paradox-like frame in (36) makes the matrix proposition unavailable (→ infelicity)

## Subclausal

### Small clauses

- However, some small clauses do license propositional anaphora
- Epistemic small clauses:

(37) Jonathan considers Nancy brave, but I don't think *that's* true.

#*that*: Jonathan considers Nancy brave. MATRIX CLAUSE  
✓ *that*: Nancy is brave. SMALL CLAUSE

(38) Barb called Steve a liar, but I don't think *that's* true.

#*that*: Barb called Steve a liar. MATRIX CLAUSE  
✓ *that*: Steve is a liar. SMALL CLAUSE

- Moore's frame knocks out the matrix interpretation, but the sentences are still felicitous

## Subclausal

### Small clauses

- Despite being sub-TP, *some* small clause constructions do license propositional anaphora
- This runs contra the prediction of Krifka 2013, but in two ways
- For Krifka 2013, TPs introduce their own pdref
- But I argue it's not the small clause doing it, it's the *embedding verb*

(39) [Francine and Rosa were wed in an airport casino, officiated by an Elvis impersonator.]

The clerk considered Francine and Rosa married, but I don't think *that's* true.

(40) [Francine and Rosa were wed in a Baptist church.]

The pastor pronounced Francine and Rosa married, # but I don't think *that's* true.

- Same small clause, different embedding verbs
- Epistemic consider ✓ Resultative pronounce ×

## Multiclausal

### Raising and control

- Raising and control constructions have received lots of attention in the syntactic literature
- Disagreements about whether the embedded clause is a TP or a CP
- Either way, on Krifka's (2013) account they should introduce pdrefs
- Might expect all to introduce pdrefs, or for none to
- And if there is a split, for raising to but control not, etc.
- But the data is a bit more complicated

## Multiclausal

### Raising and control: subject raising

- All subject raising verbs introduce pdrefs for their embedded clauses
- (41) Nancy seemed to be at the party. *That* was false, however.  
 #*that*: Nancy seemed to be at the party. MATRIX CLAUSE  
 ✓*that*: Nancy was at the party. EMBEDDED CLAUSE
- (42) Nancy appeared to be at the party, but Barb refused to believe *that*.  
 ✓*that*: Nancy appeared to be at the party. MATRIX CLAUSE  
 ✓*that*: Nancy was at the party. EMBEDDED CLAUSE
- This matches up with Krifka's (2013) proposal

## Multiclausal

### Raising and control: object control

- No object control verbs introduce pdrefs for their embedded clauses
- (43) a. Nancy asked Barb to be at the party, but Jonathan didn't believe *that*. He thought Barb came uninvited. MATRIX  
 b. # Nancy asked Barb to be at the party, but Jonathan didn't believe *that*. He thought Barb stayed home. EMBEDDED
- (44) a. Barb convinced Nancy to leave the party. I know *that* because I overheard them talking. MATRIX CLAUSE  
 b. # Barb convinced Nancy to leave the party. I know *that* because I saw her driving away. EMBEDDED CLAUSE
- This doesn't match Krifka's (2013) proposal, but at least is a control/raising split

## Multiclausal

### Raising and control: subject control

- Subject control verbs, though, don't behave uniformly
  - Some do introduce pdrefs
- (45) Nancy claimed to be at the party, but *that* wasn't true. (She was at the library.)  
 #*that*: Nancy claimed to be at the party. MATRIX CLAUSE  
 ✓*that*: Nancy was at the party. EMBEDDED CLAUSE
- Some don't
- (46) Nancy tried to be at the party, but *that* wasn't true. (She was at the library.)  
 #*that*: Nancy claimed to be at the party. MATRIX CLAUSE  
 #*that*: Nancy was at the party. EMBEDDED CLAUSE

## Multiclausal

Raising and control: object raising

- Object raising verbs similarly don't behave uniformly
- Some do introduce pdrefs

(47) Steve expected Nancy to be at the party, but Mike didn't believe *that*. (Mike thought she would stay home.)  
*?that*: Steve expected Nancy to be at the party.

MATRIX CLAUSE

✓ *that*: Nancy would be at the party. EMBEDDED CLAUSE

- Some don't

(48) Steve wanted Nancy to be at the party. He told me *that*.  
✓ *that*: Steve wanted Nancy to be at the party.

MATRIX CLAUSE

#*that*: Nancy would be at the party. EMBEDDED CLAUSE

## Lots more

DO:  
epistemic small clause embedders  
epistemic adverbs  
matrix declaratives  
matrix polar questions  
sentential negation  
epistemic modals  
subject raising verbs  
*some* object raising verbs  
*some* subject control verbs  
likely constructions  
finite clauses (factive & non)  
relative clauses (restrictive & non)  
slifted clauses  
*that*-nominalizations  
conditional antecedents  
conditional consequents  
prejacent of *even*  
conjunction (both 'juncts)  
disjunction (both 'juncts)

DON'T:  
names  
possessive phrases  
lexical presuppositions  
other small clause embedders  
other adverbs  
constituent negation  
root modals  
matrix *wh*- questions  
matrix alternative questions  
matrix imperatives  
*some* object raising verbs  
*some* subject control verbs  
object control verbs  
tough constructions  
slifting parentheticals  
*for*-nominalizations  
prejacent of *only*  
embedded interrogatives (all types)  
embedded imperatives

## Multiclausal

Raising and control

- The non-finite complements of raising & control verbs are TPs or CPs
- On Krifka's (2013) account, we expect them all to introduce pdrefs
- Not only is this not the case, but we can't point to any raising/control or subject/object split to explain the data
- Within the object raising verbs, and within the subject control verbs, we see differentiation
- Ultimately, this sort of evidence renders any syntactic account of pdref introduction insufficient

### The takeaway

A syntactic generalization is insufficient: we have to look to semantics

## The generalization

- Krifka's (2013) 'TP & above' doesn't capture all the data
  - sub-TP structures that do (epistemic small clause embedders, epistemic adverbs)
  - TPs/CPs that do not (object control verbs, tough constructions, non-polar interrogatives)
- A syntactic account in general is insufficient
  - Can't distinguish among different kinds of small clause embedders, different kinds of object raising/subject control verbs

### The generalization

An operator that takes a proposition as its argument introduces a discourse referent for that proposition

- Such operators include the declarative mood, sentential negation, certain embedding verbs...



## This section

- Talk of a formal representation is abstract without a formal model!
- We need a way to model the pdrefs introduced by a sentence
- Chapter includes:
  - A review of formalisms that model anaphora (DPL, Groenendijk & Stokhof 1991; DRT, Asher 1993; PLA, Dekker 1994; van Eijck & Cepparello 1994; Groenendijk et al. 1995; UC, Bittner 2009)
  - A review of formalisms that model propositions (Fine 1970; Veltman 1996; Geurts 1998; Stone & Hardt 1999; Aloni 2007; Murray 2010; AnderBois et al. 2013; Murray & Starr 2016)
- Today: Focusing on the system I introduce

## The system

### Propositions

- Propositions are type  $\langle s, t \rangle$
- Declarative sentences denote propositions
- The denotation of a sentence should be type  $\langle s, t \rangle$ , not  $t$
- I introduce variables over worlds, bound by lambdas
- A sentence will have outermost binding by  $\lambda w: \lambda w. \exists p \dots$
- This outermost  $w$  variable will bind the worlds that the conveyed proposition is true in:  $\lambda w. \exists p \dots \wedge p(w)$

## The system

### Introducing drefs

- Like DPL (Groenendijk & Stokhof 1991), anaphors will be treated as (free) variables which are bound by an existential quantifier
  - The existential quantifier is what does dref introduction
- (53) a. A man walks in the park. He whistles.
- b.  $\exists x[\text{man}(x) \wedge \text{walk\_in\_the\_park}(x)] \wedge \text{whistle}(x)$   
 (Groenendijk & Stokhof 1991)
- I use propositional variables, bound the same way:  $\exists p \dots p \dots$

## The system

### Simple declarative

- Verbs (events) are also relative to worlds
- Propositional variables identified with their contents via =
- In keeping with our generalization from the previous section, and like Bittner 2009, the pdref for a matrix declarative is associated with the declarative mood

(54) a. Joyce napped.  
 b. DECL [ Joyce napped. ]<sup>P</sup>  
 c.  $\lambda w \exists p. p = [\lambda w'. N(w', j)] \wedge p(w)$

$$\frac{\frac{st}{st} \quad \frac{st}{st}}{t} \quad \frac{\frac{st}{st} \quad s}{t}$$

$$\frac{}{st}$$

## The system

### Sentential negation

- Sentential negation takes a proposition, returns a proposition
  - Because it takes a propositional argument, it introduces a pdref
  - As before, declarative mood introduces a pdref for the matrix (negative) clause
- (55) a. Joyce didn't nap.  
       b. DECL [ NEG [ Joyce napped. ]<sup>q</sup> ]<sup>p</sup>  
       c.  $\lambda w \exists p \exists q. q = [\lambda w'. N(w', j)] \wedge p = [\lambda w''. \neg q(w'')] \wedge p(w)$
- Like Stone & Hardt 1999, negation is itself anaphoric in a sense
    - $\neg$  applies to the variable  $q$  associated with the prejacent
  - Two pdrefs,  $p$  and  $q$ , both available for anaphoric reference
  - But only  $p$  is applied to  $w$ , so only  $p$  affects the truth conditions of the sentence

## The system

### Embedding verbs

- Finite (*that-*) clauses are available for propositional anaphora
  - Per our generalization, the pdref for a clause is introduced by the embedding verb that takes it as a complement
  - As before, this is all under the declarative mood
- (56) a. Dustin said (that) Joyce napped.  
       b. DECL [ Dustin said [ (that) Joyce napped. ]<sup>q</sup> ]<sup>p</sup>  
       c.  $\lambda w \exists p \exists q. q = [\lambda w'. N(w', j)] \wedge p = [\lambda w''. S(w'', d, q)] \wedge p(w)$
- $q$  introduced for the embedded clause
  - $p$  introduced for the matrix clause
  - As with negation, only  $p$  affects the truth conditions
    - Don't want the complement of *say* to necessarily affect truth conditions
    - Understand uses where the embedded clause is a commitment of the speaker as strengthened

## The system

### Relative clauses

- Relative clauses (here a NRRC) convey propositions which
    - are available for anaphoric reference
    - are commitments of the speaker
  - I presume a relative clause operator, associated with (above) the relative pronoun
- (57) a. Joyce, who won the race, napped.  
       b. DECL [ Joyce, REL [ who won the race, ]<sup>q</sup> napped ]<sup>p</sup>  
       c.  $\lambda w \exists p \exists q. q = [\lambda w'. W(w', j)] \wedge p = [\lambda w''. N(w'', j)] \wedge q(w) \wedge p(w)$
- $q$  associated with the relative clause
  - $p$  associated with the matrix clause
  - Both are applied to  $w$ : both affect the truth conditions of the sentence

## The system

### Compositionality

- Like DPL, this system is compositional at the level of the sentence
  - Very tempting to have specific denotations for each morpheme, to show how pdref introduction is tied to operators
- (58)  $[\![\text{DECL}]\!] = \lambda p' \lambda w \exists p. p = p' \wedge p(w)$  (type  $\langle st, st \rangle$ )
- (59)
- 
- $\lambda w \exists p. p = [\lambda w'. N(w', j)] \wedge p(w)$   
 $\lambda w \exists p. p = [\lambda w'. N(w', j)] \wedge [\lambda w'. N(w', j)](w)$   
 $\lambda w \exists p. p = [\lambda w'. N(w', j)] \wedge N(w, j)$

## The system

### Compositionality

- This runs into problems with multiply-embedded operators
- Pdref introduction is ‘captured’ within the labeling of higher variables
  - e.g.,  $\exists p.p = [\lambda w'.\exists q.q = [\dots]]$
- Not clear how to interpret these sorts of labels:
  - What does it mean for a discourse referent to be at a world? Does that even make sense?
- Also not clear that letting such introductions all scope out is equivalent, has no side-effects
- Leaving the creation of a morpheme-compositional formalism for future work

## The system

### The status of a proposition

- In this system, propositions either have an associated pdref or not
- For those that do, they can be a speaker commitment and thus update the truth conditions (matrix clause, relative clause) or not (prejacent of negation, complement of embedding verb)
- Beyond that, though, the system doesn’t reflect the discourse status of a proposition
  - Within commitments, matrix & relative clauses have different statuses (Potts 2005 a.o.)
    - e.g., only the former can be used to answer questions
  - Within non-commitments, prejacent of negation & complement of embedding verb have different statuses
    - e.g., only the latter can be strengthened into a commitment
- Is this a feature, or a bug? How does discourse status interact with anaphora?

## Summary

- Propositional anaphora can be modeled
- I introduce one way to do so
  - Existential quantifiers bind propositional variables
  - Lambdas bind world variables
  - = associates propositional variables with their contents
- Pdref introduction associated with propositional operators: DECL, NEG, REL, embedding verbs...
- Compositional at the level of the sentence, not the morpheme

## This section

- How does the discourse status of a proposition interact with its anaphoric potential?
- In particular, looking at at-issue status (e.g., as defined by Simons et al. 2010)
- Presumption in the literature that at-issueness and anaphoric availability are linked
  - In diagnostics (Tonhauser 2012)
  - In modeling (Murray 2010, 2014; AnderBois et al. 2013)
- Presumption that all and only at-issue propositions are available for anaphoric reference (e.g., Syrett & Koev 2015)
- I argue against this tight linking

## The takeaway

A proposition’s anaphoric availability is independent of its at-issue status  
At-issueness is neither necessary nor sufficient for propositional anaphora

## Diagnosing at-issue status

- The Simons et al. 2010 definition of at-issueness is based on relevance to the Question Under Discussion (QUD, Roberts 1996)
- One frequently-used diagnostic for at-issueness (Tonhauser 2012) is based on direct dissent
  - I argue that this test is in fact diagnostic of anaphoric availability
  - It relies on anaphors like *that*, and response particles (which have been argued to be anaphoric, Krifka 2013; Roelofsen & Farkas 2015)
- Instead, I use the QUD-based diagnostics from Tonhauser 2012
- In the examples that follow, the QUD and what addresses it (= what's at-issue) will be in boldface

(60) Q: **Who is Maui?**

A: **Maui**, who is voiced by Dwayne Johnson, **is a demigod**.

(61) Q: **Who plays Maui?**

A: # **Maui**, who **is voiced by Dwayne Johnson**, is a demigod.

## Background on speech/attitude reports

- This isn't just a fact about appositives
  - Speech reports convey multiple propositions which can be at-issue (Simons 2007, see also Hunter 2016)
- (63) A: Who was Louise with last night?  
B: Henry thinks she was with Bill. (Simons 2007 (2))
- (64) A: What is bothering Henry?  
B: He thinks Louise was with Bill last night. (Simons 2007 (3))
- Either the matrix (reporting) content or the embedded (report) content can be at-issue in a context

## At-issueness isn't necessary

### Appositive relative clause

- Step one: convince you that at-issueness isn't necessary for anaphora
- By finding felicitous anaphora to not-at-issue propositions

(62) [Context: Mark is a teacher. His parents come to visit during a school assembly. His father is looking around the auditorium, curious about Mark's students.]

Dad: **Where are Mark's students sitting?**

Mom: **Lisa, who is Mark's favorite, is sitting in the front row.**  
He told me *that* in confidence, though, so don't tell anyone.

- Explicit QUD addressed by the at-issue matrix clause
- Appositive content doesn't address the QUD, is not-at-issue
- Anaphor *that* targets the appositive content
- ∴ not-at-issue content can be available for anaphora

## At-issueness isn't necessary

### Reports

(65) Q: **Who was at the party?**

A: Kevin said Meghan was there. Erin told me *that*.

- Explicit QUD addressed by the embedded report
- The matrix content attributing the source is not-at-issue
- Very natural reading for Erin to have spoken about Kevin: *that* targets the matrix reporting
- ∴ not-at-issue content can be available for anaphora
- ∴ at-issue status is not necessary for anaphoric availability

## At-issueness isn't sufficient

- Step two: convince you that at-issueness isn't sufficient for anaphora
  - By finding at-issue content which fails to be available for anaphora
  - "at-issue content may include non-conventional content as well, e.g. conversational implicatures which arise as a result of the utterance in context." (Roberts et al. 2009)
- (66) A: I have to pay this bill.  
 B: The customer accounts office isn't open today.  
 (*at-issue: A won't be able to pay.*) (Roberts et al. 2009 (9))
- "a presupposition...can have main point status" (Simons 2005)
- (67) Ann: The new guy is very attractive.  
 Bud: Yes, and his wife is lovely too.  
 (*at-issue: The new guy has a wife.*) (Simons 2005 (10))
- If at-issue content fails to be available for anaphora, then at-issue status is **not a sufficient condition** for anaphoric availability

## At-issueness isn't sufficient

### Entailment

- Entailments can be at-issue (Roberts et al. 2009)
- (69) [Context: Kim and Jessie are high school students. Kim's mom asks Jessie's:]  
 Q: Where was Kim last night? **Was she at the party?**  
 A: The whole class was there! Jessie told me *that*.  
 ✓that the whole class was at the party  
 #that **Kim was at the party**
- Explicit QUD is about Kim, response is about the whole class
  - QUD is addressed by an entailment of the answer (*whole class* ⊨ *Kim*)
  - Anaphor *that* can't be taken to refer to the proposition about Kim
  - This proposition is at-issue, but fails to be available for anaphora

## At-issueness isn't sufficient

### Presupposition

- Presuppositions can be at-issue (see, e.g., Simons 2005)
- (68) Q: **Does Vicky have any siblings?**  
 A: Her brother is a chef, just like me. Her mom told me *that*.  
 ✓that he's a chef  
 #that **he exists**
- Explicit QUD addressed by a presupposition, triggered by *her brother*
  - Anaphor *that* can't be taken to address the at-issue presupposition
  - This proposition is at-issue, but is not available for anaphora

## At-issueness isn't sufficient

### Conversational implicature

- Implicatures can be at-issue (Roberts et al. 2009)
- (70) Q: **Will Gretchen be able to make the meeting?**  
 A: There's a pile-up on I-287. Alexa told me *that*.  
 ✓that there is a pile-up on I-287  
 #that **Gretchen won't make the meeting**
- Explicit QUD is about Gretchen, literal response is about traffic
  - QUD is only addressed by conversational implicature
  - Anaphor *that* can't refer to the implicated proposition about Gretchen
  - At-issue content can fail to be available for anaphora
  - ∴ at-issue status is not sufficient for anaphoric availability

## What was that you said?

- Anaphoric reference to propositions abounds
- Propositional anaphora behaves in parallel to individual, tense, and modal anaphora
- Propositional discourse referents are introduced in a variety of contexts, whenever an operator takes a propositional argument
  - Syntactic factors alone don't determine anaphoric availability
  - Nor do pragmatic factors (at least not Simons et al. 2010 at-issueness)
- Propositional anaphora can be modeled

## What's next?

- A morpheme-compositional model that simultaneously tracks reference to propositions, individuals, and other types
- A cross-linguistic study of the inventory of propositional anaphors
- Cross-linguistic validation of the pdref introduction generalization put forward here
- But first...

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