

Introducing Propositional Discourse Referents

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- Karttunen 1969 is a comprehensive look at what noun phrases (NPs) can be referred to by pronouns

(1) Lucy has a car. *It* is blue.

(2) # Lucy doesn't have a car. *It* is blue.

- In his terms, which NPs introduce **discourse referents** (drefs)
 - For our purposes, these are *individual* drefs
- Based on (1) & (2), we can observe that NPs under sentential negation don't introduce individual drefs
- Karttunen's (1969) conclusion: NPs introduce drefs in sentences whose propositional content is "asserted, implied or presupposed by the speaker to be true"

- Here, asking the same question about propositions:
What introduces **propositional discourse referents** (prefs)?
- Since at least Krifka 2013, we know the same generalization can't be true for anaphoric reference to propositions

(3) Lucy has a car. She told me *that*.

(4) Lucy doesn't have a car. She tells people *that*, though.
(cf. Krifka 2013:(24))

- Based on (4), we can observe that the prejacent of sentential negation does introduce a pdref
 - Can't be the same generalization as Karttunen 1969, not about truth
- So what *is* the right generalization?

A syntactic approach

- Krifka 2013 argues that the introduction of drefs is done by specific syntactic projections
 - vP introduces event drefs
 - ActP introduces speech act drefs
 - TP (and other higher projections like NegP) introduces pdrefs

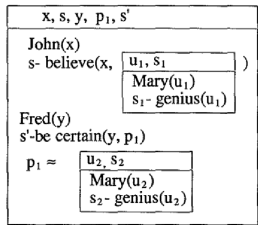
[_{ActP} ASSERT [_{NegP} *Ede did-n't* [_{TP} t_{Ede} t_{did} [_{vP} t_{Ede} t_{steal} *steal the cookie*]]]]
 ↪ d_{speech act} ↪ d'_{prop} ↪ d''_{prop} ↪ d'''_{event}

(Krifka 2013:(22))

- Each syntactic projection introduces a dref for its contents
- This approach makes strong testable predictions
- Call this approach **TP+**

A discursive approach

- One could identify pdref introduction with particular structures from work on discourse relations & structure (Asher 1993; Carlson & Marcu 2001; Asher et al. 2012; Hunter & Asher 2016; Asher et al. 2017)
 - Discourse Relation Structures (DRSs) (and subDRSs) from DRT
 - Or otherwise identified *elementary discourse units* (EDUs)



- The idea here is that, for every box/EDU, there is an associated label (\equiv pdref)
- Can be tricky to identify, but there are guidelines in place, so it is testable
- Call this approach **EDU**

(Asher 1993: 242)

- With two approaches available, how do we decide between them?
Throw a whole bunch of data at them!

- Looked at data from subclausal, monoclausal, multiclausal, and multisentential constructions (Snider 2017a)
- In the next 2 sections, we'll look at some particularly interesting cases
- I'll argue that neither approach is sufficient
- Instead, the approach we need must be sensitive to semantics

A semantic generalization

Operators which take propositional arguments introduce propositional discourse referents for those arguments

A methodological note

- Before introducing the data, a note on what these tests will look like
- We're testing the availability of anaphoric reference to a proposition

(5) $[p \dots [q? \dots]]$

- We want to know if q is available, but p always is!
- We need a way to ensure that p isn't a viable antecedent

- I'm using what I call a *Moore's frame*

(6) # It's raining but I don't believe it's raining. (*Moore's paradox*)

- Using sentences which deny the truth of the anaphoric antecedent
 - If there is no other antecedent pdref, the sentence will be infelicitous
 - If it is felicitous, there must be an antecedent other than p
 - ∴ there must be a pdref for q

Small clause constructions

- Small clause constructions involve an NP and a predicate (which constitute the small clause, SC) after a main verb
- They can introduce a secondary predication, a cause, a result, or an epistemic state, among other things (Wilder 1991)

(7) Linus painted the fence red.

- Some disagreement on whether SCs are VPs (Wilder 1991) or PrPs (Bowers 1993), but syntacticians agree they're sub-TP

Predictions

- TP+** SCs don't introduce pdrefs (sub-TP)
- EDU** Unstated, unless SCs are 'clausal complements' (then they all do)

Small clause constructions

- Most types of SCs behave don't introduce pdrefs:

(8) # Lucy wanted her steak rare, but *that's* not true. (It's medium.)
SECONDARY PREDICATION

(9) # Lucy made Charlie angry, but *that's* not true. (He's happy.)
CAUSATIVE

(10) # The rabbi pronounced them married, but *that's* not true.
 (They're single.) RESULTATIVE

- But epistemic small clauses do introduce pdrefs:

(11) The rabbi considered them married, but *that's* not true.
 (They're single.) EPISTEMIC

Small clause constructions

Predictions

TP+ SCs don't introduce pdrefs (sub-TP) ✕
EDU Unstated, unless SCs are 'clausal complements' (→ all do) ?/✕

- As is, this data is challenging to both approaches
- For **TP+** to be right, (10) & (11) must differ syntactically
 - e.g., the epistemic SC in (11) must be a covert infinitive
 - This isn't a priori implausible, but requires a change to our syntax
- For **EDU** to account for this data,
 - them married* would constitute an EDU in (10)
 - them married* wouldn't constitute an EDU in (11)

NP adverb constructions

- Constructions where an adverb modifies an NP are also test cases

Predictions

TP+ Only TP+ adverbs introduce pdrefs (not NPs)
EDU Only elliptical or temporal adverbs are EDUs

- Most NP adverbs don't introduce pdrefs

(12) # Lucy lifted a fairly heavy box, but I don't believe *that*. DEGREE

(13) # Lucy lifted a surprisingly heavy box, but I don't believe *that*.
EVALUATIVE

- Even the agent-oriented *surprisingly* in (13) doesn't introduce a pdref for 'the box was heavy' (with either a subject/speaker anchor)

NP adverb constructions

(12) # Lucy lifted a fairly heavy box, but I don't believe *that*. DEGREE

(13) # Lucy lifted a surprisingly heavy box, but I don't believe *that*.
EVALUATIVE

- But an epistemic adverb does seem to introduce that pdref

(14) Lucy lifted a supposedly heavy box, but I don't believe *that*.
EPISTEMIC

- Taken simplistically, it seems like *heavy box* would have to constitute a TP in (14) but not in (12) or (13), for **TP+** to be right
- EDU** is out of luck, as these aren't elliptical or temporal

NP adverb constructions

- One other explanation **TP+** could offer is to interpret (14) as in (15)

(14) Lucy lifted a supposedly heavy box, but I don't believe *that*.

(15) [supposedly [_{TP} Lucy lifted a *t* heavy box]]
 ≡ Supposedly, Lucy lifted a heavy box.

- This way, epistemic adverbs are above TP (in line with Cinque 1999), so there is a non-matrix proposition to deny
- For this to work, the other inferences must be purely implicated:
 - that the speaker believes 'Some kind of box exists'
 - that the speaker believes 'Lucy lifted that box'
 - that the speaker doesn't believe 'that box was heavy'

Predictions

TP+ Only TP+ adverbs introduce pdrefs (not NPs) ×/?
EDU Only elliptical or temporal adverbs are EDUs ×

Interim summary

- From SC and NP adverb constructions, we can already tell that **at least some sub-TP/EDU material has an associated pdref**
- For either of these approaches to be right, we would have to analyze phrases like *them married* and *heavy box* as only sometimes(!) constituting a TP or EDU
- We also have indications of another shortcoming of these approaches, but that will be brought into sharper contrast soon...

Raising and control constructions

- Much ink has been spilled over raising and control constructions, a topic in every Syntax I class
- Disagreements about whether the embedded clause is a TP or a CP
 Either way, the embedded clause counts for **TP+**
- Discussed in detail in the discourse structure annotation world
 - Embedded clauses are only EDUs if they are
 - 1 non-infinitive; and
 - 2 the complement of an attribution predicate or a cognitive predicate
 - None of the cases we're about to use fit this description

Predictions

TP+ All of the following should introduce pdrefs
EDU None of the following should introduce pdrefs

Raising and control constructions

- All subject raising constructions introduce pdrefs (contra **EDU**)
- (16) Lucy seemed to be at the party, but *that* wasn't true.
 (She was home.) SUBJECT RAISING
- No object control constructions do (contra **TP+**)
- (17) # Patty asked Lucy to be at the party, but Linus didn't believe *that*. (He thought she would stay home.) OBJECT CONTROL
- Already reason to challenge both approaches
 - If it turned out pdref introduction split along
 - raising/control lines, or
 - subject/object lines
 how simple the world would be! But...

Raising and control constructions

- Neither object raising nor subject control constructions behave uniformly, as classes

- (18) Patty expected Lucy to be at the party, but Linus didn't believe *that*. (He thought she would stay home.) OBJECT RAISING
- (19) # Patty wanted Lucy to be at the party, but Linus didn't believe *that*. (He thought she would stay home.) OBJECT RAISING
- (20) Lucy claimed to be at the party, but *that* wasn't true. (She was home.) SUBJECT CONTROL
- (21) # Lucy tried to be at the party, but *that* wasn't true. (She was home.) SUBJECT CONTROL

Predictions

- TP+** All of the above should introduce pdrefs ×
- EDU** None of the above should introduce pdrefs ×

Raising and control constructions

- Complements of embedding verbs *seem*, *expect*, *claim* have associated pdrefs
- Complements of embedding verbs *ask*, *want*, *try* don't
- This is unexpected under either **TP+** or **EDU**
- The crucial observation here seems to be that **whether a construction introduces a pdref depends not just on the embedded structure, but on the embedder**

Lots more

DO:	DON'T:
epistemic small clause embedders	names
epistemic adverbs	possessive phrases
matrix declaratives	lexical presuppositions
matrix polar questions	other small clause embedders
sentential negation	other adverbs
epistemic modals	constituent negation
subject raising verbs	root modals
<i>some</i> object raising verbs	matrix <i>wh</i> - questions
<i>some</i> subject control verbs	matrix alternative questions
likely constructions	matrix imperatives
finite clauses (factive & non)	<i>some</i> object raising verbs
relative clauses (restrictive & non)	<i>some</i> subject control verbs
slifted clauses	object control verbs
<i>that</i> -nominalizations	tough constructions
conditional antecedents	slifting parentheticals
conditional consequents	<i>for</i> -nominalizations
prejacent of <i>even</i>	prejacent of <i>only</i>
conjunction (both 'juncts)	embedded non-polar interrogatives
disjunction (both 'juncts)	embedded imperatives

- It doesn't seem to be specific structures which are responsible for the introduction of pdrefs
- Nor is the discourse status of their respective propositions (Snider 2017b)
- Instead, what seems to matter is what things embed those structures
- So far, I've only been talking about embedded structures
- But if we consider sentential mood to 'embed' the matrix clause (à la Bittner 2011), this generalization can extend to matrix clauses as well

A semantic generalization

Operators which take propositional arguments introduce propositional discourse referents for those arguments

- These operators include DECL, NEG, certain verbs, ...
- Can account for the split on the previous slide

Comparing the generalizations

- Differs from Karttunen’s (1969) generalization for individual anaphora “[a] non-specific indefinite NP in an affirmative sentence (single sentence or a complement) establishes a[n individual] discourse referent just in case the proposition represented by the sentence is asserted, implied or presupposed by the speaker to be true” (13)
 - Sensitive to the (discourse) truth of the context
 - Introduction by the NP for its contents
- But propositional anaphora is different
 - Not sensitive to truth (e.g., preajcent of sentential negation)
 - Introduction not by the clause-like structure, but by its embedder (e.g., not by the small clause, but by the small clause embedding verb)

Comparing the generalizations

The Formal Link Condition

- One way in which they are similar: they both require the formal representation of the entity being referred to
 - In the nominal domain, this is called the Formal Link Condition (Postal 1969; Kadmon 1987 a.o.)
- (22) a. One of the ten balls is missing from the bag. It’s under the couch.
 b. # Nine of the ten balls are in the bag. It’s under the couch. (Partee 1989)
- (23) a. Fritz owns a dog and it bites him.
 b. # Fritz is a dog-owner and it bites him. (cf. Evans 1977)
- An individual being salient/lexically entailed is insufficient for an idref

Comparing the generalizations

The Formal Link Condition

- The parallel seems true for propositional anaphora
 - Polar interrogatives don’t introduce a pdref for the complement of the partitioning proposition (cf. Hamblin 1973)
- (24) Did Lucy go to the party? Because Patty told me *that*.
 ✓ *that*: Lucy went to the party. PARTITIONING PROP
 # *that*: Lucy didn’t go to the party. COMPLEMENT PROP
- (25) # Did Lucy go to the party? Because Patty told me *that*, and she’s always reliable, but I think Barb actually DID_F go!
- Consider this a parallel to Partee’s marbles
 - Even a salient complement (proposition) is not available for anaphora
 - The requirement for a Formal Link has been argued to be gradient, not categorial (Patel-Grosz & Grosz 2010)
 - The same seems to be the case for propositional examples (not now)

Summary

- Propositional discourse referents are introduced in a variety of contexts
- Neither a syntactic nor discursive approach is sufficient to explain pdref introduction
 - There are subTP/EDU constructions that do, clausal constructions that don’t
 - Classes like ‘subject control verbs’ are not precise enough
- Instead, we must pay attention to the semantic type of an argument
- Pdrefs are introduced not by certain types of clauses, but by the operators which take propositions as arguments
- Unlike individual anaphora, propositional anaphora is insensitive to truth
- But like individual anaphora, it requires a formal representation of the referent

- If we want to model the introduction of propositional discourse referents by certain operators, we need a formal system which models both reference tracking and propositions

- Bittner's Update with Modal Centering (2011) is one such system

- UC_ω is an update semantics, tracking knowledge in an info state
- Tracks discourse referents on two lists: \top topical & \perp background
- Includes variables over individuals (δ), worlds (ω), propositions (ωt), events (ε), states (σ), times (τ)

(26) Marcie danced

$\rightsquigarrow \top[x|x = \text{marcie}]; [w|\text{danced}_w\langle\top\delta\rangle]$

- Abstracting over tense for the moment
- But even so, this is incomplete...

$\text{DECL} \rightsquigarrow [p|p = \perp\omega]; [\perp\omega \in \top\omega]; [\top\omega = \perp\omega]; \top[p|p = \top\omega]$

- Building on Murray 2014, the declarative mood:

- 1 introduces a pdref for its argument (the matrix clause) into the \perp -list,
- 2 triggers a proposal to update,
- 3 updates the context set,
- 4 and then introduces a pdref for the new context set (into the \top -list) as a starting point for subsequent utterances.

(27) Marcie danced DECL (\equiv Marcie danced.)

$\rightsquigarrow \top[x|x = \text{marcie}]; [w|\text{danced}_w\langle\top\delta\rangle]; [p|p = \perp\omega]; [\perp\omega \in \top\omega]; [\top\omega = \perp\omega]; \top[p|p = \top\omega]$

- 1 introduces a topical dref for Marcie
- 2 adds the worlds where the topical individual danced
- 3 adds a pdref for those worlds
- 4 triggers a proposal to update
- 5 updates the context set
- 6 introduces a topical pdref for the new context set

- We can extend the same idea to NEG and certain embedding verbs
- Any propositional operator will include $[p|p = \perp\omega]$ in addition to its lexical contribution

$\text{DECL} \rightsquigarrow [p|p = \perp\omega]; [\perp\omega \in \top\omega]; [\top\omega = \perp\omega]; \top[p|p = \top\omega]$

$\text{NEG} \rightsquigarrow [p|p = \perp\omega]; [w|w \notin \perp p]$

- introduces a pdref for its prejacent; introduces p 's complement worlds

$\text{say} \rightsquigarrow [p|p = \perp\omega]; [w|\text{say}_w\langle\top\delta, \perp p\rangle]$

- introduces a pdref for its complement; adds the worlds where the topical individual said p

- And similarly for *seem*, *consider*, *supposedly*, etc.—but not *want*, etc.
- These operators, if in a declarative sentence, will themselves be part of the argument of DECL , thus giving us 2 (or more) pdrefs

Takeaways

- The introduction of propositional discourse referents doesn't work the same way as for individuals
 - Not sensitive to truth in the same way
- Our current syntactic & discursive theories don't categorize things in a fine-grained enough way to capture the behavior of pdref introduction
- Instead, we can make the right generalization if we pay attention to semantic type & embedders
- Operators which take propositional arguments (including some matrix moods) introduce pdrefs for those propositional arguments
- We can represent pdref introduction formally, including via UC_ω

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