Crossing the Appositive / At-issue Meaning Boundary

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1 Introduction

Since Potts 2005, it has been widely accepted that appositive content must be semantically separate from at-issue content.

- For example, (1), with an appositive relative clause, differs from (2), where the appositive's content is instead conjoined.

(1) John, who played tennis with a woman yesterday, played golf with her today too.

(2) John played tennis with a woman yesterday and played golf with her today too.

- Potts 2005 formally captures this semantic separation through *multidimensionality*.
- This makes the strong prediction that the two meaning components will be wholly separate with respect to all semantic phenomena.

Recent literature has provided partial evidence against this strong separation, but its systematicity has been overlooked.

- Nouwen 2007 shows that anaphora crosses the appositive / at-issue boundary freely.
- Amaral et al 2007 does so for both anaphora and presupposition; (such facts were also noted by Potts (2005), pp. 51-54; see also Potts 2009).
- We will show that various ellipsis processes are similarly able to cross this boundary freely.

The main idea of the analysis: Appositive and at-issue contents are part of the same meaning dimension, differing only in *how* they enter the Common Ground / Context Set (CG / CS, Stalnaker 1978[1]):

i. at-issue meaning is a *proposal* to update the input CS (a feature less emphasized in Stalnaker 1978 – for more discussion, see Farkas & Bruce 2010 and references therein)

ii. appositives are updates which are *imposed* on the CS and not (explicitly) up for negotiation

Implementing this distinction, however, requires a semantics which processes both kinds of updates *incrementally* (see Amaral et al 2007 for discussion of this point).

- This is because of 'boundary-crossing' phenomena like anaphora, ellipsis, and presupposition.
- For example, the pronoun HER in the main clause of (1) needs to find its antecedent within the appositive.
- . . . and the presupposition of TOO must be satisfied by the *propositional content* of the appositive.

Road map:

§**2** shows boundary-crossing behavior of anaphora, presupposition, and ellipsis;

§**3** presents the account of apposition and boundary-crossing anaphora;

§**4** examines appositive content and its behavior in conversation more closely;

§**5** concludes.

[1] We restrict our discussion to the simpler notion of CS for the remainder of the paper.

2 Phenomena crossing the boundary

Based on data from anaphora and presupposition, Nouwen 2007 and Amaral et al 2007 have argued that appositive content cannot be wholly separate from at-issue content.

- In this section, we show that these arguments hold for cross-sentential anaphora and presuppositions quite systematically.
- Furthermore, we present novel data showing a parallel pattern for NP ellipsis and VP ellipsis.[2]
- Finally, we show that all three of these processes operate freely in *both directions* (i.e. both at-issue→appositive and appositive→at-issue)

2.1 Presupposition

Presupposition with a variety of triggers is possible both in (a) the appositive→at-issue direction and (b) the at-issue→appositive direction.

- This includes both strong and weak presupposition triggers in the sense of Abusch 2010.
- *either*: (3a) and (3b)

(3) a. John, who wouldn't talk to Mary, wouldn't talk to SUSAN EITHER.
b. John wouldn't talk to Mary, who wouldn't talk to HIM EITHER.

- *too*: (4a) and (4b)

(4) a. John, who saw Mary, saw SUSAN TOO.
b. John saw Mary, who saw HIM TOO.

- the restorative reading of *again*: (5a) and (5b)

(5) a. John, who has been sick, is now healthy AGAIN.
b. The window will be opened by Mary, who will then close it AGAIN.

- the non-restorative reading of *again*: (6)

(6) Suppliers produce a garment, double the cost and sell it to a retailer, who DOUBLES THE COST AGAIN and sells it to a consumer. (Corpus of Contemporary American English – COCA, `www.americancorpus.org`)

- the aspectual verb *stop*: (7a) and (7b)

(7) a. John, who is now building a sandcastle, will STOP soon.
b. The sandcastle was only halfway built by John, who had suddenly STOPPED.

Finally, perhaps unsurprisingly, a presupposition introduced in one appositive can be *cross-sententially* retrieved in a subsequent appositive as in (8).

(8) "Joe!" exclaims a young woman, who jumps in the air and throws her arms around him. "Joe! Joe! It's really you!" cheers a second young woman, who HUGS HIM TOO. (COCA)

2.2 Anaphora

Singular Anaphora:

- example (9a): the pronoun (*her*) can retrieve an antecedent in the appositive.
- example (9b): singular anaphora (and presupposition) can also occur in the other direction, from the appositive to the main clause

(9) a. John, who had been kissed by Mary, kissed HER TOO.
b. John kissed Mary, who kissed HIM TOO.

Plural anaphora to quantifiers:

- plural anaphora to (certain) quantifiers is felicitous, both in the at-issue→appositive direction (10a), and vice-versa (10b)

(10) a. Every speaker, all of THEM PhD students, gave a great talk.
b. Jones, who graded each student's final paper, gave THEM detailed feedback.

Modal anaphora / subordination

- modal anaphora and subordination: (11a) and (11b)

(11) a. John, who might give a presentation, WOULD use slides. Bill WOULD just use the board.
b. John might punch Jorge, who WOULD punch John back.

[2] While ellipsis in general crosses the boundary freely, a systematic exception to this is Sluicing. See the first author's poster for discussion and an account of this exception, exemplified in (1).

(1) John, who once killed a man in cold blood, wondered who *(it was).

Quantificational Subordination

- Singular pronouns can pick up quantificational dependencies stored in an appositive (12a), and vice versa (12b).

(12) a. Mary, who courts a semanticist at every conference party, ALWAYS dances with HIM.
b. Mary courts a semanticist at every conference party, where she ALWAYS dances with HIM.

2.3 Ellipsis

NP-Ellipsis

Data from NP- and VP-Ellipsis (NPE / VPE) point in the same direction:

- since NPE does not require a linguistic antecedent (i.e., is arguably a type of deep anaphora in the sense of Hankamer & Sag 1976), we might expect (13a)-(13b) to be possible regardless of the status of appositive content

(13) a. Melinda, who won three games of tennis, lost because Betty won SIX.
b. Melinda lost three games of tennis to Betty, who lost SIX to Jane.

(14) a. The 1980's were dominated by the Lakers, who won five championships, and by the Boston Celtics, who won THREE. (COCA)
b. "When we've got four or five guys hitting threes," said guard Pat Bradley, who made THREE, . . . (COCA)

VP-Ellipsis

- but we find examples of VPE (a type of surface anaphora, requiring a *linguistic* antecedent) in both directions

(15) a. Mr. Gore at first believed the president, and even defended him to Tipper and his daughters, who DID NOT. (COCA)
b. So Lalonde, who was the one person who could deliver Trudeau, DID. (COCA)

As expected, we find the normal strict / sloppy ambiguity in (16a)-(16b).

- e.g., Jane was told to help Mary's sister (strict) vs Jane's (sloppy) in (16a)

(16) a. Mary, who doesn't help her sister, told Jane TO.
b. John, who helps people if they want him to, kisses them even if they DON'T.

- Hence, the appositive and at-issue components require access not only to each other's linguistic form, but also to their *semantic representation*

Finally, the example in (17) (from COCA) exemplifies VPE from one appositive to another across at-issue items.

(17) I got a few quick words with Halle Berry, who looked amazing in Prada, and Sigourney Weaver, who DIDN'T.

Summary:

- A wide variety of anaphora, presupposition, and ellipsis processes do not distinguish between appositive and at-issue content.
- These processes can operate in either direction, subject to linear order.
- Appositive and at-issue content is fundamentally *unidimensional* (as Amaral et al (2007) and Schlenker (2009) also conclude).

3 The Account

Central challenge: how to reconcile this robust unidimensionality with the data motivating Potts 2005's multidimensional account.

- How can we capture the contrast in (1-2), repeated as (18-19), in a unidimensional semantics?

(18) John, who played tennis with a woman yesterday, played golf with her today too.

(19) John played tennis with a woman yesterday and played golf with her today too.

- The basic insight is that appositive and at-issue contents differ in *how* they enter the common ground.
- At-issue assertions are *proposals* to update the CG / CS (as argued in detail by Farkas & Bruce 2010), subject to acceptance / rejection by other conversational participants.
- Appositive content, on the other hand, is *imposed*[3] on the common ground, with little room for negotiation (responses to appositives will be discussed in detail in §4).

This basic distinction can be phrased in quasi-Stalnakerian terms:

- We take the designated propositional variable p^{cs} to store the current CS
- The at-issue component puts forth a proposal p^{issue} to update the CS by restricting possible future contexts to those that have non-empty intersections with p^{issue}, namely $p^{cs} \cap p^{issue}$.
- The addressee can accept or reject this proposal;
- If accepted, the CS is updated by assigning a new value to the variable p^{cs}, namely the intersection $p^{cs} \cap p^{issue}$:
  - $p^{cs} := p^{cs} \cap p^{issue}$
- An appositive *imposes* (as opposed to *proposes*) an update on the CS with its content p^{appos}
- In the terms of Farkas & Bruce 2010, an appositive is not placed on the discourse table.

[3] Thanks to Floris Roelofsen for suggesting this term.

- Furthermore, appositive updates should always precede at-issue updates:
  - $p^{cs} := p^{cs} \cap p^{appos}$; $p^{cs} := p^{cs} \cap p^{issue}$

Thus far, the approach is very similar to Murray 2009a / Murray 2009b's approach to evidentials in Cheyenne.

- In these works, an evidential directly updates the common ground prior to the at-issue proposal.

3.1 Two types of updates

This account in terms of *sentence-level* and *sequential* update fails to account for the phenomena discussed in §2.

- Consider, for example, (20) below:

(20) John, who nearly killed a woman with his car, visited her in the hospital.

  - the content of the appositive cannot be determined independently of the at-issue component — the pronoun *his* in the appositive is anaphoric to the proper name *John* in the main clause
  - the content of the main clause cannot be determined independently of the appositive component — the pronoun *her* in the main clause is anaphoric to the indefinite *a woman* in the appositive

Thus:

- **We need to capture anaphora to properly determine propositional content.**
- **The appositive and at-issue updates need to be interwoven.**
- **But we still need a way to distinguish between *at-issue proposals* and *appositive impositions*.**

As a first attempt, suppose we follow Heim (1982) and represent the CS by means of a designated world variable w^{cs}.

- At any point in discourse, the information state at that point consists of all the variable assignments that are still live options.

- The CS consists of the worlds assigned to the variable w^{cs} by all these assignments:

w^{cs}
$\mathbf{w}_1$

w^{cs}
$\mathbf{w}_2$

w^{cs}
$\mathbf{w}_3$

- A sequence of (at-issue) updates is easy to capture – every update eliminates more and more assignments and, therefore, worlds associated with the variable w^{cs}.

(21) John^x nearly killed a^y woman with his$_x$ car. He$_x$ visited her$_y$ in the hospital.

(22)

w^{cs}
$\mathbf{w}_1$

w^{cs}
$\mathbf{w}_2$

w^{cs}
$\mathbf{w}_3$

John^x nearly killed a^y woman in w^{cs}

w^{cs}	x	y
$\mathbf{w}_1$	*john*	*woman*$_1$

w^{cs}	x	y
$\mathbf{w}_2$	*john*	*woman*$_2$

He$_x$ visited her$_y$ in w^{cs}

w^{cs}	x	y
$\mathbf{w}_1$	*john*	*woman*$_1$

But:

- If we model the CS by means of a world variable w^{cs}, there is only one way to update the CS: we eliminate worlds by eliminating assignments, incrementally restricting the CS.
- While both at-issue and appositive updates restrict the CS to one of its subsets, they do so in different ways ...
  - ...so, we need *two different ways* to select subsets of the CS.

First step: model the CS by means of a propositional variable p^{cs} that stores the current CS and all its non-empty subsets.

- For example, if the current CS is the set of worlds $\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$, the current information state, i.e., the set of assignments that are still live options in discourse, is as in (23).
- For readability, we will realize such information states graphically as in (24).

(23)

p^{cs}
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$

p^{cs}
$\{\mathbf{w}_1, \mathbf{w}_2\}$

p^{cs}
$\{\mathbf{w}_1, \mathbf{w}_3\}$

p^{cs}
$\{\mathbf{w}_2, \mathbf{w}_3\}$

p^{cs}
$\{\mathbf{w}_1\}$

p^{cs}
$\{\mathbf{w}_2\}$

p^{cs}
$\{\mathbf{w}_3\}$

(24)

p^{cs}
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$
$\{\mathbf{w}_1, \mathbf{w}_2\}$
$\{\mathbf{w}_1, \mathbf{w}_3\}$
$\{\mathbf{w}_2, \mathbf{w}_3\}$
$\{\mathbf{w}_1\}$
$\{\mathbf{w}_2\}$
$\{\mathbf{w}_3\}$

Second step: appositives contribute eliminative, Heim-style updates.

- For example, suppose that John nearly killed a woman with his car only in worlds $\mathbf{w}_1$ and $\mathbf{w}_2$.
- We eliminate all the assignments that assign to p^{cs} at least one world in which this is not true.
- That is, we eliminate all the assignments that assign to p^{cs} a set that includes world $\mathbf{w}_3$.

(25) John, who nearly killed a woman with his car, visited her in the hospital.

(26)

p^{cs}
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$
$\{\mathbf{w}_1, \mathbf{w}_2\}$
$\{\mathbf{w}_1, \mathbf{w}_3\}$
$\{\mathbf{w}_2, \mathbf{w}_3\}$
$\{\mathbf{w}_1\}$
$\{\mathbf{w}_2\}$
$\{\mathbf{w}_3\}$

$\xrightarrow[\textbf{1 — APPOS}]{\text{John nearly killed a woman in } p^{cs}}$

p^{cs}
$\{\mathbf{w}_1, \mathbf{w}_2\}$
$\{\mathbf{w}_1\}$
$\{\mathbf{w}_2\}$

- The appositive update is a *test* on the variable p^{cs}, much like the formula $woman(y)$ is a test on the variable y – and contributes new information about the possible values of that variable.

Third (and final) step: at-issue updates put forth a proposal p to update the CS by restricting the sets of worlds p^{cs} to a subset $p \subseteq p^{cs}$; if the proposal is accepted, the new context set becomes p, provided that p is non-empty[4]

- For example, suppose that John visited a woman in the hospital only in worlds $\mathbf{w}_1$ and $\mathbf{w}_3$.
- The proposal p stores both these worlds or only one of them.
- If the proposal is accepted, the variable p^{cs} is assigned the same values as p.

(27) John visited a woman in the hospital.

(28)

p^{cs}
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$
$\{\mathbf{w}_1, \mathbf{w}_2\}$
$\{\mathbf{w}_1, \mathbf{w}_3\}$
$\{\mathbf{w}_2, \mathbf{w}_3\}$
$\{\mathbf{w}_1\}$
$\{\mathbf{w}_2\}$
$\{\mathbf{w}_3\}$

$\xrightarrow[\textbf{1 — AT-ISSUE}]{p \subseteq p^{cs} \wedge \text{John visited a woman in } p}$

[4] In a technical sense, then, the output of the first update in (28) should also have one assignment which assigns $\emptyset$ to p for each possible assignment of a value to p^{cs}. The 'provided that' clause in the third step ensures that such rows will be eliminated if p is accepted, ruling out absurd updates.

p^{cs}	p
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$	$\{\mathbf{w}_1, \mathbf{w}_3\}$
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$	$\{\mathbf{w}_1\}$
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$	$\{\mathbf{w}_3\}$
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_1\}$
$\{\mathbf{w}_1, \mathbf{w}_3\}$	$\{\mathbf{w}_1, \mathbf{w}_3\}$
$\{\mathbf{w}_1, \mathbf{w}_3\}$	$\{\mathbf{w}_1\}$
$\{\mathbf{w}_1, \mathbf{w}_3\}$	$\{\mathbf{w}_3\}$
$\{\mathbf{w}_2, \mathbf{w}_3\}$	$\{\mathbf{w}_3\}$
$\{\mathbf{w}_1\}$	$\{\mathbf{w}_1\}$
$\{\mathbf{w}_2\}$	$\emptyset$
$\{\mathbf{w}_3\}$	$\{\mathbf{w}_3\}$

$\xrightarrow[\textbf{2 — AT-ISSUE}]{p^{cs}=p}$

p^{cs}	p
$\{\mathbf{w}_1, \mathbf{w}_3\}$	$\{\mathbf{w}_1, \mathbf{w}_3\}$
$\{\mathbf{w}_1, \mathbf{w}_3\}$	$\{\mathbf{w}_1\}$
$\{\mathbf{w}_1, \mathbf{w}_3\}$	$\{\mathbf{w}_3\}$
$\{\mathbf{w}_1\}$	$\{\mathbf{w}_1\}$
$\{\mathbf{w}_3\}$	$\{\mathbf{w}_3\}$

Thus:

- Both at-issue and appositive updates contribute new information, i.e., restrict the values assigned to the variable p^{cs}.
- The appositive update is eliminative and targets the variable p^{cs} directly.
- The at-issue update contributes a proposal p that is a subset of the CS variable p^{cs}.
- If the proposal is accepted, the set of worlds assigned to p is also assigned to p^{cs}.
- We can freely interleave these two ways of restricting the CS.
- That is, we make use of the fact that dynamic semantics keeps track of two kinds of interwoven information that can be updated simultaneously:
  - the *factual, propositional* information stored by the sets of worlds that are assigned as values to propositional variables $p, p', \ldots$ – we make use of this to formalize the new information contributed by the at-issue update
  - the *anaphoric* information stored by variable assignments and incrementally constrained in discourse – we make use of this to formalize the new information contributed by appositive update

Together, the two updates can be represented as shown below – in the linear order in which they occur.

- Assume that John nearly killed $woman_1$ and $woman_2$ in world $\mathbf{w}_1$ and, also, in world $\mathbf{w}_2$.
- There is no near-killing in world $\mathbf{w}_3$.

- Finally, assume that John visited $woman_1$ in world $\mathbf{w}_1$ only.

(29) John^x, who$_x$ nearly killed a^y woman with his$_x$ car, visited her$_y$ in the hospital.

(30)

p^{cs}
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$
$\{\mathbf{w}_1, \mathbf{w}_2\}$
$\{\mathbf{w}_1, \mathbf{w}_3\}$
$\{\mathbf{w}_2, \mathbf{w}_3\}$
$\{\mathbf{w}_1\}$
$\{\mathbf{w}_2\}$
$\{\mathbf{w}_3\}$

$\xrightarrow[\textbf{1 — AT-ISSUE}]{p \subseteq p^{cs} \wedge x = \text{JOHN}}$

p^{cs}	p	x
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$	$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$	*john*
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$	$\{\mathbf{w}_1, \mathbf{w}_2\}$	*john*
$\{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$	$\{\mathbf{w}_1, \mathbf{w}_3\}$	*john*
	...	
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_1, \mathbf{w}_2\}$	*john*
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_1\}$	*john*
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_2\}$	*john*
$\{\mathbf{w}_1, \mathbf{w}_3\}$	$\{\mathbf{w}_1, \mathbf{w}_3\}$	*john*
$\{\mathbf{w}_1, \mathbf{w}_3\}$	$\{\mathbf{w}_1\}$	*john*
$\{\mathbf{w}_1, \mathbf{w}_3\}$	$\{\mathbf{w}_3\}$	*john*
$\{\mathbf{w}_2, \mathbf{w}_3\}$	$\{\mathbf{w}_2, \mathbf{w}_3\}$	*john*
$\{\mathbf{w}_2, \mathbf{w}_3\}$	$\{\mathbf{w}_2\}$	*john*
$\{\mathbf{w}_2, \mathbf{w}_3\}$	$\{\mathbf{w}_3\}$	*john*
$\{\mathbf{w}_1\}$	$\{\mathbf{w}_1\}$	*john*
$\{\mathbf{w}_2\}$	$\{\mathbf{w}_2\}$	*john*
$\{\mathbf{w}_3\}$	$\{\mathbf{w}_3\}$	*john*

$\xrightarrow[\textbf{2 — APPOS}]{\text{who}_x \text{ nearly killed a}^y \text{ woman in } p^{cs}}$

p^{cs}	p	x	y
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_1, \mathbf{w}_2\}$	*john*	$woman_1$
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_1, \mathbf{w}_2\}$	*john*	$woman_2$
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_1\}$	*john*	$woman_1$
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_1\}$	*john*	$woman_2$
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_2\}$	*john*	$woman_1$
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_2\}$	*john*	$woman_2$
$\{\mathbf{w}_1\}$	$\{\mathbf{w}_1\}$	*john*	$woman_1$
$\{\mathbf{w}_1\}$	$\{\mathbf{w}_1\}$	*john*	$woman_2$
$\{\mathbf{w}_2\}$	$\{\mathbf{w}_2\}$	*john*	$woman_1$
$\{\mathbf{w}_2\}$	$\{\mathbf{w}_2\}$	*john*	$woman_2$

$\xrightarrow[\textbf{3 — AT-ISSUE}]{x \text{ visited } y \text{ in } p}$

p^{cs}	p	x	y
$\{\mathbf{w}_1, \mathbf{w}_2\}$	$\{\mathbf{w}_1\}$	*john*	$woman_1$
$\{\mathbf{w}_1\}$	$\{\mathbf{w}_1\}$	*john*	$woman_1$

$\xrightarrow[\textbf{4 — AT-ISSUE}]{p^{cs} = p}$

p^{cs}	p	x	y
$\{\mathbf{w}_1\}$	$\{\mathbf{w}_1\}$	*john*	$woman_1$

3.2 Appositives vs presuppositions

Like appositives, a presupposition targets the input CS through the dref p^{cs} directly.

- Neither is part of the novel proposal p to update the CS.

However, there is a fundamental difference between them.

- Aside from their non-negotiability, appositives are ordinary *updates* of the current information state (i.e., the current CS in Stalnakerian terms).
- A felicitous use of an appositive, then, is truth-conditionally *informative*.

In contrast:

- Presuppositions are *constraints* or *preconditions* on the current information state / CS.
- They are required to be satisfied *throughout the entire input information state / CS*.
- That is, any assignment g in the input information state has to satisfy the presupposition[5]
- Presupposed meaning is taken for granted and anaphorically links the non-presupposed (at-issue and / or appositive) meaning with its context of interpretation[6]

3.3 Dynamic proposals

Formally, we can produce these two types of updates in an extension of Dynamic Predicate Logic (Groenendijk & Stokhof 1991):

- models consist of:
  - the disjoint domains of individuals $\mathfrak{D}$ and possible worlds $\mathfrak{W}$
  - the basic interpretation function $\mathfrak{I}$ that assigns a subset of $\mathfrak{D}^n$ to any n-ary relation R relative to any world w: $\mathfrak{I}_w(R) \subseteq \mathfrak{D}^n$
- we have variables over:
  - individuals: $x, y, \ldots$

[5] We can formalize this along the lines of van der Sandt 1992; see also the discussion in Krahmer 1998, Ch. 6.

[6] Presuppositions which are not met throughout the input CS can, of course, be *accommodated*. Such accommodation, however, is an exceptional means of repairing the input information state / CS, rather than being the general case.

- worlds: $w, w', \ldots$
- propositions / sets of worlds: $p, p', p^{cs}, \ldots$

- we have the usual inventory of non-logical constants:
  - individual constants: JOHN, ...
  - properties: WOMAN, ...
  - binary relations: VISIT, ...
  - etc.

Formulas:

- interpreted relative to a pair of assignments $\langle g, h \rangle$
- denote binary relations between an input assignment g and an output assignment h

Dynamic conjunction – relation composition:

(31) $[\![\phi \wedge \psi]\!]^{\langle g,h \rangle} = \mathbb{T}$ iff there exists a k such that $[\![\phi]\!]^{\langle g,k \rangle} = \mathbb{T}$ and $[\![\psi]\!]^{\langle k,h \rangle} = \mathbb{T}$

New variables are introduced by means of random assignment formulas $[x]$, $[p]$, etc.

(32) $[\![[v]]\!]^{\langle g,h \rangle} = \mathbb{T}$ (for any variable v) iff g differs from h at most with respect to the value h assigns to v
(i.e., for any variable $v' \neq v$, $g(v') = h(v')$)

3.4 Discourse reference across the boundary

Sentence (33) (repeated from above) is represented as in (34) below.

(33) John^x, who nearly killed a^y woman with his$_x$ car, visited her$_y$ in the hospital.

(34) a. **New proposal**: $[p] \wedge p \subseteq p^{cs} \wedge$
b. **Issue**: $[x] \wedge x = \text{JOHN} \wedge$
c. **Appositive**: $[y] \wedge \text{WOMAN}_{p^{cs}}(y) \wedge \text{NEARLY-KILL}_{p^{cs}}(x, y) \wedge$
d. **Issue**: $\text{VISIT}_p(x, y) \wedge$
e. **Proposal accepted**: $[p^{cs}] \wedge p^{cs} = p$

- (34a) introduces the proposal to update the CS: we introduce a new variable $p \subseteq p^{cs}$ containing worlds satisfying the subsequent at-issue update
- (34b) and (34d) are the two at-issue updates and (34c) is the appositive update:
  - We introduce a new variable x whose value is John and comment that x nearly killed a woman y
  - The appositive nature of the update is captured by the fact that the appositive content is interpreted relative to p^{cs} rather than relative to the new proposal p[7]
  - Lexical relations relativized to propositions are distributively interpreted, as shown in (35) below
  - The final update in (34b), i.e., $\text{VISIT}_p(x, y)$, is part of the at-issue proposal, so it is interpreted relative to p
- (34e) contributes the proposal to update the CS p^{cs} by resetting it to p
  - Despite the possible non-maximality of the set of worlds p, the Stalnakerian CS will always be recoverable.
  - After the update in (34b), there will be an output assignment h such that $h(p)$ contains the *maximal* set of worlds in the current CS that satisfy the at-issue relation $\text{VISIT}_p(x, y)$
  - Therefore, in the output *information state*, there will always be an output assignment storing this maximal set of worlds – which is the new CS in Stalnaker's sense

(35) $[\![\text{WOMAN}_{p^{cs}}(y)]\!]^{\langle g,h \rangle} = \mathbb{T}$ iff $g = h$ and for all worlds $w \in h(p^{cs})$, $h(y) \in \mathfrak{I}_w(\text{WOMAN})$

Since the account is fundamentally *unidimensional*, ellipsis processes like VPE can be accounted for straightforwardly.

- One way to accomplish this is to extend the dynamic framework with discourse referents / variables for properties along the lines of Hardt (1999) and Stone & Hardt (1999).
- Just as the indefinite *a woman* in the appositive in (33) introduces a discourse referent, the antecedent VP does too.
- Retrieving the VP in the ellipsis site is similarly parallel to the anaphoric retrieval by the dref of the pronoun *her* in the main clause.

[7] One detail which we skip is how the decision between p^{cs} and p arises compositionally. One obvious way to do this is using Nouwen 2007's left and right comma operators ($\langle$ and $\rangle$ respectively). While for Nouwen, these operators toggle back and forth between two dimensions, for us, they would toggle back and forth between p^{cs} and p.

When appositive content is anaphoric: presuppositions in an appositive can be satisfied by at-issue content – see, for example, (9b), repeated below.

(36) John kissed Mary, who kissed HIM TOO.

- In these cases, we predict that the appositive forces the acceptance of the at-issue proposal prior to the appositive update.
- That is, proposals to update the common ground are not necessarily *accepted* only in sentence-sized or even clause-sized chunks.
- As Clark & Schaefer (1989) and others have noted, much of discourse negotiation takes place at subclausal level.

4 Appositives in discourse

- The account proposed in §3 treats appositives as updates which are *imposed* on the common ground.
- In this section, we explore the ways in which appositive content behaves in discourse, showing how they follow form this characterization.

4.1 Proposals and Questions Under Discussion

One central difference between at-issue and appositive content is the relative inability of the latter to interact with the question under discussion (QUD)[8]

- While apparent examples occur in *written* English, as in 37, questions cannot occur appositively in *spoken* English
- That is, an appositive cannot explicitly introduce a new QUD.

(37) COCA, Title: *Court Ties Campaign Largess to Judicial Bias*, Source: Washington Post.
   a. [BARNES:] Today's opinion requires state and federal judges simultaneously to act as political scientists (why did candidate X win the election?), economists (was the financial support disproportionate?), and psychologists (is there likely to be a debt of gratitude?)

- Parallel to this, appositive content cannot readily resolve an existing QUD.
- We see this plainly in the contrast in (38-39)

[8]For the notion of *question under discussion*, see Roberts 1996, Ginzburg 1996, Büring 2003 and Farkas & Bruce 2010 among others.

- While the appositive content in (38) clearly resolves the question, it's appositive nature makes it an infelicitous answer.

(38) a. Who had prostate cancer?
   b. ??Tammy's husband, who had prostate cancer, was being treated at the Dominican Hospital.

(39) a. Who was being treated at the Dominica Hospital?
   b. Tammy's husband, who had prostate cancer, was being treated at the Dominican Hospital.

- These facts follow directly from our characterization of appositive content as not being placed on the table, as characterized by Farkas & Bruce 2010.
- The table is not only where the acceptance / rejection of assertions take place, it is also where QUD stack is managed.
- One central claim of Farkas & Bruce 2010 is that serving as a *proposal* to update the CS intrinsically involves the same discourse resources as managing the QUD
- Farkas & Bruce 2010 support this claim empirically by examining the parallels between responses to at-issue assertions and polar questions.

Since the structure of the table is what relates at-issue content to the QUD, it follows that content which imposes an update on the CS itself (as we claim for appositives) cannot interact with the QUD.

4.2 Responding to appositive content

Another contrast between appositives and at-issue assertions is the range of possible responses an addressee can give to them.

- Farkas & Bruce 2010 show that at-issue assertions *allow* for roughly the same range of responses that polar questions *expect*.
- In particular, assertions readily allow for bare particle responses like *yes*, *no*, and *maybe* as in (40)

(40) a. A: Sonia is coming to the party.
   b. B: Yes // No // Maybe // Perhaps

In contrast, bare particle responses are not readily interpreted as ratifying appositive content, as the contrast in continuations in (41-42) show.

(41) a. A: Sonia, who is a terrible housemate, left the door unlocked last night.

b. B: Yeah, but she is still a good housemate.

c. B: No, but she *is* a terrible housemate.

(42) a. A: Sonia is a terrible housemate and she left the door unlocked last night.

b. B: #Yeah, but Sonia is still a good housemate.

c. B: #No, but she *is* a terrible housemate.

While bare particle responses do not readily target appositive content, responses like the following are possible:

(43) COCA, Title: *60 Minutes*, Source: CBS Sixty.

a. [Mr. DON FUQUA] He told me about Noah, his first-born, and how he shared his son's love of rockets. He told me about how thankful he was to have Mary, his only girl, and Luke, who loved to have his picture taken.

b. [SPOKESMAN] **Yeah, he always liked the camera.** He'd always smile, but he always squint his eyes and say, you know, say, "cheese" – real, real big.

(44) COCA, Title: *Lisa Ling goes inside one of the world's most dangerous gangs; journalists Lisa Ling, Anderson Cooper and Brian Ross discuss some of their most memorable stories*, Source: Ind Oprah.

a. [Mr. ANDERSEN] And there was some sense of justice, I think, for these children for me to track down this foster mother, who really got away with outrageous behavior.

b. [Ms. SALTZMAN] **Yeah. She got away with it.**

Denying appositives is less frequent, but also possible:

- a COCA search for ", who" followed by "no" in a 9-word window, revealed no clear example of appositive denial
- but discourses like the following seem to be nonetheless natural:

(45) a. He took care of his husband, who had prostate cancer.

b. No, he had lung cancer.

c. No, he took care of his brother.

(46) a. He told her about Luke, who loved to have his picture taken.

b. No, he didn't like that at all.

c. No, he told her about Noah.

However, both of these sorts of responses rely crucially on the utterance-final nature of the appositives in question.

- For example, parallel examples to (45-46), below in (47-48) sound quite degraded.
- This provides further support to del Gobbo 2003's suggestion that sentence-final appositive relative clauses differ from sentence medial ones.

(47) a. His husband, who had prostate cancer, was being treated at the Dominican Hospital.

b. ??No, he had lung cancer.

c. No, he was being treated at the Stanford Hospital.

(48) a. Luke, who loved to have his picture taken, was his son.

b. ??No, he didn't like that at all.

c. No, Luke was his nephew.

Finally, in cases where the appositive is utterance-final, a speaker can require explicit confirmation through the use of tags such as *right*:

(49) COCA, Title: *Tammy Faye Messner discusses the rise and fall of the PTL*, Source: CNN King.

a. [Mr. HAHN] And take care of your husband, who has prostate cancer, **right?**

b. [WILLIAM DALEY] **Yes.**

c. [Mr. HAHN] How's he doing?

(50) COCA, Title: *Charles Bryan earns right to play with Will Shortz*, Source: NPR Weekend.

a. [ANNOUNCER] Happy Mother's Day to your mother today, who I guess is in town with you, **right?**

b. [ANNOUNCER] **That's right**, I flew her to New York as a Mother's Day gift.

Note also that, in each of these cases, *right* can be felicitously replaced with an opposite polarity tag question (respectively, *doesn't he?* and *isn't she?*)

5 Conclusion

- In sum, the robust patterns of anaphora, ellipsis and presupposition between at-issue and appositive meaning demand a unidimensional account
- We make crucial use of the fact that dynamic semantics keeps track of two kinds of interwoven information that can be updated simultaneously:
  - the *factual, propositional* information stored by propositional variables $p, p', \ldots$ – we make use of this to formalize at-issue updates
  - the *anaphoric* information stored by variable assignments – we make use of this to formalize the new information contributed by appositive update
- Our richer representation of the CS as a set of *sets of worlds* plays a crucial role in distinguishing these two update procedures.

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