Tense embedding and VP ellipsis

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0. Overview

- We discuss lessons from Tense Embedding (TE) about binding chains and VP-ellipsis.

- **The focus of the talk is TE. The conclusion of the talk is about VP-ellipsis.**

- We show data that distinguish Relative Clause TE (RC-TE) from Attitude Verb TE (AV-TE) – drawing on findings from Abusch 1994 and von Stechow 1995. The data show that TE across AVs behaves like a binding chain, while TE across RC boundaries does not (Section 2).

- We then turn to VP-ellipsis (Section 3), and show that RC-TE *does* behave like a binding chain, to the extent that ellipsis diagnoses binding.

- We argue that this heterogenous behavior of RC-TE suggests that VP-ellipsis is not a reliable indicator of binding chains.

1. Tense Embedding and simultaneity

1.1. Background

- We begin with the case of RC-TE in (1).

    (1)   John worked for a man who sold bibles   (RC-TE)

- (1) allows at least two readings, which differ on when, relative to John's employment, John's boss is understood to have sold bibles. On the <u>back-shifted reading</u>, the bible-selling precedes the (already anterior) employment, and on the <u>simultaneous reading</u> they are contemporaneous.

    (NOTE: (1) also allows a forward-shifted reading. This reading has a minor role in our talk).

- We observe similar ambiguities in cases of AV-TE:

    (2)   John thought that Mary sold bibles   (AV-TE)

- (2) is true in two kinds of scenarios: John (previously) thought to himself "Mary *sold* bibles" (back-shifted); and John (previously) thought to himself "Mary *sells* bibles" (simultaneous).

- **Our main concern is simultaneity**. What underlies simultaneity in (1/2)? Two possibilities (among others that we do not discuss):

    - A. Simultaneity always results from "accidental coreference".
    - B. Simultaneity sometimes results from binding.

1.2. Summary of theoretical assumptions

- Our assumptions are simple and limited for exposition of problem. They are not representative of the literature, nor designed with the full range of TE facts in mind.

  [A1] Parameters of interpretation: possible world w, utterance time u, evaluation time i, and contextual assignment g: $[\![\ ]\!]^{w,u,i,g}$.

  [A2] Tenses are pronominal (Partee 1973, and many since). A tense morpheme carries an index, and denotes the (temporal) referent of that index provided that it satisfies the presuppositions of the given tense morpheme (Heim 1994):

      (3) $[\![\textbf{PAST}_j]\!]^{u,i,g}$ is defined only if $g(j) < i$. If defined $[\![\textbf{PAST}_j]\!]^{u,i,g} = g(j)$.

      (4) $[\![\textbf{PRES}_j]\!]^{u,i,g}$ is defined only if $g(j) \circ u$. If defined $[\![\textbf{PRES}_j]\!]^{u,i,g} = g(j)$.
         (From now on we write j in place of $g(j)$ for simplicity.)

  [A3] At matrix level, the evaluation time i is u.

  [A4] Clauses denote truth values. Clausal nodes are composed with tense pronouns via Tense Anchoring (TA):

      (5)   <u>**Tense Anchoring (TA)**</u>: $[\![\textbf{T}_j\ \textbf{S}]\!]^{w,u,i,g} = [\![\textbf{S}]\!]^{w,u,[\![\textbf{T}_j]\!]^{w,u,i,g},g}$

- Example:

  (6) $[\![\textbf{PAST}_j\ [\textbf{John sneeze}]]\!]^{w,u,i,g}$

      $= [\![\textbf{PAST}_j\ [\textbf{John sneeze}]]\!]^{w,u,u,g}$ ($i{=}u$ at matrix)

      $= [\![\textbf{John sneeze}]\!]^{w,u,[\![\textbf{PAST}_j]\!]^{w,u,u,g},g}$ (By Tense Anchoring)

      $= [\![\textbf{John sneeze}]\!]^{w,u,j,g}$, provided that $j{<}u$ (By definition of PAST)
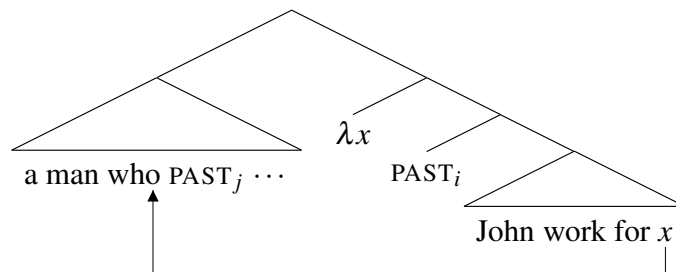
- Two LFs for the RC-TE example in (1):

  (1)   John worked for a man who sold bibles

  (7)

  (8)

2
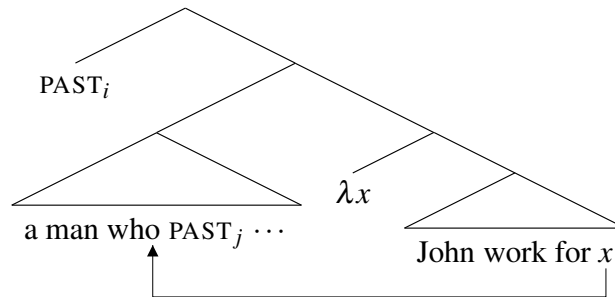
- (7) is sufficient to account for all readings of RC-TE: back-shifted ($j<i$), simultaneous ($j=i$), and forward-shifted ($i<j$).

1.3. Simultaneity by binding

- Another theoretical possibility, unmotivated for now, is that simultaneity results from *binding*.

- We follow von Stechow and Kratzer in employing <u>zero tenses</u> in implementing binding.

- Assumptions: tense morphemes may carry $\varnothing$ as index:

  | A5 | $[\![\varnothing]\!]^{w,u,i,g} = i$

- Consequences of assumptions so far:

  (9) $[\![\text{PAST}_\varnothing]\!]^{w,u,i,g}$ is undefined; because of PAST, $\varnothing<i$, and because of the definition of $\varnothing$, $\varnothing=i$.

- Enter deletion (Ogihara 1996):

  | A6 | **Sequence of Tense (SOT) rule:**[1] [$\mathbf{T_1}$ [$\cdots$ $\mathbf{T_2}$ $\cdots$]] $\Longrightarrow$ [$\mathbf{T_1}$ [$\cdots$ ~~$\mathbf{T_2}$~~ $\cdots$]], *optionally*, if $\mathbf{T_1}$ and $\mathbf{T_2}$ are instances of the same tense morpheme, and no other tense morpheme $\mathbf{T_3}$ c-commands $\mathbf{T_2}$ and is c-commanded by $\mathbf{T_1}$.

- Why is c-command necessary for deletion (and hence for licensing $\varnothing$)? The supporting evidence comes from cases of AV-TE:

  (10)   a. John is telling the woman who hired him that Susan was pregnant

   b. *[PRES$_u$ John telling the woman [who PAST$_j$ hire him] [that ~~PAST~~$_\varnothing$ Susan be pregnant]]

- From this LF (via non-c-command SOT) we expect the sentence to allow the reading: John is now telling the woman who previously hired him that Susan *is* pregnant.

- With zero-tenses and tense feature deletion (or transmission), simultaneity can be derived:

  (1)   John worked for a man who sold bibles

  (7′)
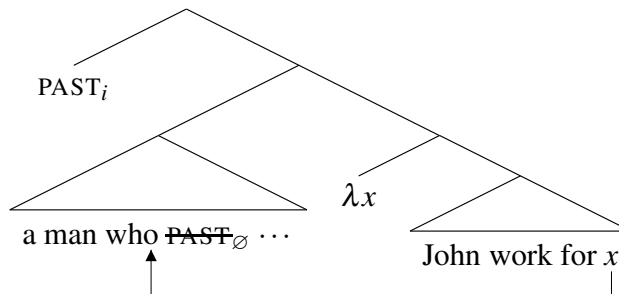
[1]Strictly speaking, we need not commit to a deletion rule. Tense-binding can be formulated with featureless zero-tenses that *inherit* features through a process of agreement. In this respect zero-tenses behave similarly to zero-pronouns (see Kratzer 1998).

- We now show arguments that temporal-dependencies cannot be established between a c-commanding and a c-commanded tense except across AVs. In other words, we show reasons why the binding analysis of simultaneity in RC-TE is wrong.

- Later we turn to arguments in its favor, and discuss the apparently discrepancy.

2. Evidence against binding in RC-TE

2.1. *Ought* and related modals

- Abusch and von Stechow observe that certain modals (**ought**, **should**, **might**, **could**) can be anchored by an embedding PAST-marked AV:

  (11) a. Last year John thought that Mary should take care of herself.   (✓ simultaneous)

        b. Last year John thought that Bill ought to study hard.   (✓ simultaneous)

- To Abusch/von Stechow, this shows that the temporal anchor of **should/ought/**etc can be "deleted", i.e. is $\varnothing$. This gives rise to the simultaneous readings above.

- But if this dependency were possible across RC boundaries, we expect to see analogous cases to (11) in RC-TE:

  (12) a. Last year John had a friend who should take care of herself.   (*simultaneous)

        b. Last year John had a student who ought to study hard.   (*simultaneous)

- The asymmetry between AV-TE and RC-TE shown above indicates that zero-tense-binding is only possible across AVs, not RC boundaries.

- Simultaneous readings in RC-TE result must therefore result from *coreference*, as exemplified in Section 1.1.

2.2. Semantically future PAST?

- The following example (of AV-TE) is based on Abusch:

  (13) A week ago, John decided that 10 days later he would tell his mother that they were having their last meal together.

- (13) allows a non-past reading of **were**: A week ago John decided this: "In ten days I will tell my mother this: "Mother, we are having our last meal together"." The past features on **were** in (13) are not associated semantically with any anteriority.[2]

- The reading can be accounted for straightforwardly on a binding approach:

  (14) PAST$_j$ [John decide that [~~PAST~~$_\varnothing$ [John will tell his mother that [~~PAST~~$_\varnothing$ they be having . . .]]]

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[2]Though see Altshuler and Schwarzschild (2013) and Sharvit (To appear).

- Compare (13) to (15):

  (15) ??A week ago, John saw a car that was going on sale 10 days later at a show where the manufacturing company was having its last convention.

- If zero-tense-binding was allowed across RC boundaries, (15) would be fully acceptable, for parallel reasons to (13). The LFs (exhibiting binding) would look something like:

  (16) PAST$_j$ [[a car ~~PAST~~$_\varnothing$ going on sale $\cdots$ [~~PAST~~$_\varnothing$ be having its last convention]] λx John see x]

  (17) [a car PAST$_j$ going on sale $\cdots$ [~~PAST~~$_\varnothing$ be having its last convention]] λx [PAST$_j$ John see x]

3. Evidence for binding in RC-TE: VP-ellipsis

- In contrast to the results discussed above, there seems to be some evidence *in favor* of zero-tense binding in RC-TE examples. Consider the following example of VP-ellipsis (based on Stowell 2014):

  (18) John works for a man who sells bibles. His grandfather did too.

- (18) can have a "doubly-simultaneous" reading: John works for a man who *now* sells bibles, and his grandfather worked for a man who *then* sold bibles.

- (19) is similar: the antecedent carries PAST-marking, and the elided VP is PRES-marked:

  (19) John's grandfather worked for a man who sold bibles. And now John does.

- If VP-ellipsis is licensed by semantic identity between two VPs, then simultaneity must be somehow encoded in the semantics of the VPs in (18) and (19), and must be *independent* of PAST/PRES.

- This is expected on a zero-tense-binding account of simultaneity, not on a coreference account: if the embedded PRES in (18) were semantically anchored to utterance time, then the (semantically identical) elided VP should embed PRES also – but this is not the attested doubly-simultaneous reading. A similar point holds on for (19).

  (20) <u>Without zero-tense binding/deletion</u>

      a. PRES$_i$ [John work for a man who [PRES$_j$ sell bibles]]
          PAST$_k$ [his grandfather do work for a man who [PRES$_j$ sell bibles]]

      b. PAST$_i$ [John work for a man who [PAST$_j$ sell bibles]]
          PRES$_k$ [his grandfather do work for a man who [PAST$_j$ sell bibles]]

  (21) <u>With zero-tense binding/deletion</u>

      a. PRES$_i$ [John work for a man who [~~PRES~~$_\varnothing$ sell bibles]]
          PAST$_k$ [his grandfather do work for a man who [$\varnothing$ sell bibles]]

      b. PAST$_i$ [John work for a man who [~~PAST~~$_\varnothing$ sell bibles]]
          PRES$_k$ [his grandfather do work for a man who [$\varnothing$ sell bibles]]

- Our doubly-simultaneous readings resemble **sloppy interpretations** of pronouns under ellipsis, and we will now see that they obey similar constraints.

3.1. Familiar constraints on ellipsis interpretation

3.1.1. Dahl's paradigm

- Dahl (1973) observed that, when an antecedent VP contains two pronouns, an elided VP allows only three of the four possible readings:

  (22)   Al thinks that he is doing everything for his kids. Ed does too.
      a. Ed does think Ed is doing everything for Ed's kids   (slp-slp)
      b. Ed does think Al is doing everything for Al's kids   (str-str)
      c. Ed does think Ed is doing everything for Al's kids   (slp-str)
      d. *Ed does think Al is doing everything for Ed's kids   (str-slp)

- Below we show that doubly-simultaneous readings are similarly restricted: where sloppy identity is absent, simultaneity is also absent.

  (23)   Al thought that Sue was hiring actors who were famous. Now Ed does.
      a. Now Ed does [think that Sue IS hiring actors who ARE famous]   (slp-slp)
      b. Now Ed does [think that Sue WAS hiring actors who WERE famous]   (str-str)
      c. Now Ed does [think that Sue IS hiring actors who WERE famous]   (slp-str)
      d. *Now Ed does [think that Sue WAS hiring actors who ARE famous]   (str-slp)

  (24)   Al thought that Sue lived in a city where smoking was illegal. Now Ed does.
      a. Now Ed does [think that Sue LIVES in a city where smoking IS illegal]   (slp-slp)
      b. Now Ed does [think that Sue LIVED in a city where smoking WAS illegal] (str-str)
      c. Now Ed does [think that Sue LIVES in a city where smoking WAS illegal] (slp-str)
      d. *Now Ed does [think that Sue LIVED in a city where smoking IS illegal]   (str-slp)

3.1.2. Witten's paradigm and demonstratives

- Sloppy readings for pronouns (in a VP) disappear when the pronoun is replaced by a proper name or a demonstrative phrase (Witten 1970):

  (25)   His$_j$ mother thinks John$_j$ is the smartest in the class. And Bill's mother does too.

  (26)   His$_j$ mother thinks that this boy$_j$ is the smartest in the class. And Bill's mother does too. (*sloppy)

- Tenses also resist simultaneous interpretations when modified by demonstrative adverbs:

  (27)   a. John works for the channel that shows the presidential debates.
            Four years ago, Bill did too.

       b. John works for the channel that shows this year's presidential debates.
            Four years ago, Bill did too.

c. John works for the channel that shows the presidential debates this year.
Four years ago, Bill did too.

- Conclusion of this subsection: Two familiar constraints on sloppy identity seem to apply in the domain of tense, specifically *blocking* simultaneous readings.

4. Can we reconcile the conflicting data?

- Recall that the zero-tense-binding approach seemed unlikely given *two* considerations: first, the inability to bind the temporal anchor of **ought** and related modals, and second, the lack of non-past readings of PAST.

- On the other hand, given the ellipsis data it seemed reasonable to appeal to a binding mechanism, thus generating what we called the "doubly-simultaneous" readings.

- Here we consider elliptical examples with **ought**/etc in antecedent VPs: if ellipsis requires a binding approach, and if **ought**/etc cannot have a bound anchor across RC boundaries, we expect doubly-simultaneous readings to no longer be possible. But they seem to be possible:

(28) a. John has a student who might be pregnant. Last year Mary did.

b. John is involved in a small company that should be dissolved. And in his prime, his grandfather was too.

- Ellipsis seems to show "binding"-like behavior of **ought**, in sharp contrast to non-elliptical contexts where the same modals resist binding.

5. Summary and conclusion

- We saw two ways of accounting for simultaneous readings of RC-TE: one by coreference, and another that also allows binding.

- The questions we asked:

Q1. Is binding needed to account for simple examples of RC-TE?
Answer: no (until we looked at VP-ellipsis).

Q2. Is binding in principle possible as an account for simultaneity in RC-TE?
Answer 1: no, otherwise we expect simultaneous readings of **ought**, and also expect non-past readings of PAST;
Answer 2: yes, otherwise we cannot account for doubly-simultaneous readings of VP-ellipsis.

- We then tested VP-ellipsis with antecedents that resist simultaneous readings, and found that doubly-simultaneous readings were available.

- Our conclusion is that VP-ellipsis is unreliable as a test for binding chains. Testing this with TE was useful, since the effects of binding can be checked in multiple ways.

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