De re tenses and Trace Conversion

This talk discusses problems for previous de re analyses of tenses, and argues for a quantificational account in which the seemingly peculiar behavior of tenses that are interpreted de re fall out from a general Trace Conversion rule that applies to quantifiers.

**Background.** It has been long observed (Jespersen, 1924; Ogihara, 1989; Abusch, 1997, a.o.) that a Past-under-Past sentence like (1a) in English can have either a backward-shifted reading ((2a)) or a simultaneous reading ((2b)) with respect to the attitude time (AT=the local evaluation time (t₀) of the embedded clause, John’s “now” in (1)). Additionally, a Present-under-Past sentence as in (1b) has only the double access reading (DAR) that requires the embedded event not only to hold at AT but to encompass the utterance time (UT=the t₀ of the matrix clause, the speaker’s “now” in (1)) too.

(1) a. John thought that Mary was ill. b. John thought that Mary is ill.

(2) a. John’s thought: “Mary was ill” b. John’s thought: “Mary is ill”

Abusch (1997) in her influential work suggests that the simultaneous reading of (1a) involves a zero tense in the embedded clause, whereas the DAR of (1b) results from interpreting the embedded Present de re, i.e., Present wrt UT, and not wrt AT. Given the assumption that tenses can be interpreted de re, an immediate question arises: why can neither (1a) nor (1b) have the forward shifted reading in (2c)?

Abusch (1997)’s answer is that de re readings result from tense movement that leaves behind a trace which is subject to the stipulative Upper Limit Constraint (ULC), that posits a restriction on the interpretation of the trace such that it must not follow AT.

(3)-(4) state the necessary ingredients for Past-under-Past ((3)) and Present-under-Past ((4)) de re structures and their semantic contribution given a ULC-based approach.

(3) a. Moved past: precedence wrt UT. b. ULC: precedence/inclusion wrt AT.

(4) a. Moved pres: inclusion wrt UT. b. ULC: precedence/inclusion wrt AT.

Ogihara (1989) differs in suggesting that tense movement leaves a copy that causes the unavailability of (2c). The comparable schema for the Copy-based approach is in (5)-(6):

(5) a. Moved past: precedence wrt UT. b. Past in-situ: precedence wrt AT.


**Problem #1.** On top of being based on an ad hoc constraint, the ULC-based approach faces problems; Bary and Altshuler (2014) provide the scenario in (7) to argue against it:

(7) John thinks Bill’s 40th birthday is in the past and that Mary was ill on that day.

Bill’s 40th birthday is in fact the day of John’s thinking, which is today. In this context, (1b) is infelicitous. However, the requirements in (4) are satisfied: the time of Bill’s 40th birthday includes UT (in the real world) and precedes AT (in all of John’s belief worlds it is Past). Therefore the ULC-based approach predicts it to be felicitous.

**Problem #2.** (8a) challenges the ULC-based approach as well. It is judged to be true if either all the doctors said “Mary was pregnant” or they all said “Mary is pregnant”; but not if some of them said “Mary was pregnant” and some said “Mary is pregnant” ((8b)).

(8) a. Every doctor said Mary was pregnant.

b. *Some doctors said: “Mary was pregnant”, and some said: “Mary is pregnant”.

It is not clear how (8b) can be ruled out given the ULC-based approach and given that tenses can get ‘functional’ readings (i.e., (8a) is true even if they all said “Mary was pregnant” but each had a different past-time in mind). Particularly, the restriction put by the ULC in (3b) is satisfied.

**Problem #3.** The Copy-based approach predicts the right results for (7) and (8b), but it reveals to be problematic from a crosslinguistic point of view: Ogihara and Sharvit (2012) point out that the Copy-based approach is ill-equipped to explain simultaneous readings of Past-under-Past in ‘non-SOT languages’, given that a zero tense account cannot work for them. Hebrew is traditionally considered a ‘non-SOT language’, since the Hebrew equivalent of (1a) has typically only the reading in (2a). However, consider the following
context: Dina is telling me a story about her class reunion two years ago. She says that she met Rina, who had been very skinny when they were attending college together, and saw that she had a swollen belly. Then Dina says:

(9) yadati še-hi hayta be-herayon!

Knew.1sg that-she was in-pregnancy!

‘I knew she was pregnant!’

In this scenario, (9) has a simultaneous reading which is unexplainable within the Copy-based approach: because of (5b), a de re Past-under-Past structure only yields anteriority. The de re analysis for tenses becomes then questionable. But there seems to be a close connection between the DAR of (1b) and the simultaneous reading of (9) that supports it: when the context described for (9) is changed such that the story is about yesterday rather than two years ago, a simultaneous reading for (9) is impossible. This correlates with a well-known contrast: when (1b) is preceded by “yesterday” it is felicitous, but not with “two years ago”. This argues in favor of a de re account in which both phenomena stem from the same structure. Note that approaches that build the indexical component into the semantics of pres (e.g., Bary and Altshuler 2014) cannot capture this correlation.

Proposal. The generalization in (10) correctly rules out both (1b) in the context of (7) (Problem #1) and the reading in (8b) (Problem #2), and rules in the simultaneous reading of (9) (Problem #3). Therefore, I suggest an account that aims to predict (10).

(10) If a tense is interpreted de re, then it must be interpreted as including AT.

I propose that (10) follows from assuming (i) a slightly modified quantificational semantics for tenses; (ii) that tense QR leaves a copy; (iii) the independently motivated Trace Conversion rule suggested by Fox (2002) (defined in (11)) applies to temporal quantifiers.

(11) a. Variable Insertion: (Det) Pred → (Det) [Pred λy(y = x)]

b. Determiner Replacement: (Det) [Pred λy(y = x)] → [the [Pred λy(y = x)]]

The semantics of tenses is given in (12). Tenses take a contextually provided domain of times (C), a property of times (T) and a clause. The second argument of tenses (T) is a function that is the result of applying the predicate T (defined in (13a)) to the local evaluation time c0, as in (13b): T applied to c0 yields the set of times that include c0.

(12) \[ \begin{align*}
\text{PRES} & \{C(t, t)(T(t, t))(P(t, t)) = 1 \text{ iff } \exists t[C(t) \land T(t) \land P(t) = 1] \\
\text{PAST} & \{C(t, t)(T(t, t))(P(t, t)) = 1 \text{ iff } \exists t[C(t) \land \exists t'[T(t') \land t < t']] \land P(t) = 1 \}
\end{align*} \]

(13) a. \( \mathcal{T} = \lambda t. \lambda t'. t' \supseteq t \)  

b. \( \mathcal{T}_{c_0} = \{ t \in \mathcal{T} | t \in c_0 \} \)

The de re structures for (1a)/(1b) in which the embedded tense has undergone QR are in (14) (the copies are underlined); the LFs that result from applying the Trace Conversion rule to (14) are in (15), and the truth conditions for (15) are in (16).

(14) \[ \begin{align*}
\text{PAST/PRES} & : \mathcal{T}_{c_0} \lambda t. \lambda \mathcal{T}_{c_0} \lambda \mathcal{T}_{c_0} \lambda t \text{ think}_t \lambda 0 \text{ PAST/PRES} : \mathcal{T}_{c_0} \lambda 0 \text{ M. ill}_2 \text{ M. ill}_2 \\
\text{PAST/PRES} & : \mathcal{T}_{t_0} \lambda 3 \text{ C. think}_t \lambda t \text{ think}_t \lambda 0 \text{ PAST/PRES} : \mathcal{T}_{t_0} \lambda 0 \text{ M. ill}_2 \text{ M. ill}_2 \\
\text{PAST/PRES} & : \mathcal{T}_{t_0} \lambda 3 \text{ C. think}_t \lambda t \text{ think}_t \lambda 0 \text{ PAST/PRES} : \mathcal{T}_{t_0} \lambda 0 \text{ M. ill}_2 \text{ M. ill}_2 \\
\exists ! \mathcal{T} & \{ C(t') \land t' \subset t_0 \cup t' \supseteq t_0 \} \land \exists ! \mathcal{T} \{ C(t') \land t' < t_0 \land \text{ for all } \langle w, t \rangle \text{ compatible with what John thinks in } w_0 \text{ at } t' \}
\end{align*} \]

As in (3)-(6), the current de re mechanism can be represented in the following schema:

(17) a. Moved PAST: precedence wrt UT. b. ‘the \( \mathcal{T}_{t_0} \)’ in situ: inclusion wrt AT.

(18) a. Moved PRES: inclusion wrt UT. b. ‘the \( \mathcal{T}_{t_0} \)’ in situ: inclusion wrt AT.

As desired, a de re tense structure always involves inclusion of AT; with respect to UT, it requires precedence for Past-under-Past and inclusion for Present-under-Past: this results in simultaneous readings as in (9) for the former and the DAR as in (1b) for the latter.