Identifying Temporal Relations from Tense and Coherence

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1 Tense and Temporal Relations in Discourse

(1) a. Bill walked up to the podium. Al introduced him.
$(E_1 <_t E_2$, *Narration*)

b. Bill walked away from the podium. He finished his speech.
$(E_1 >_t E_2$, *Explanation*)

c. Bill spoke to the crowd. He spoke loudly, so everyone could hear.
$(E_1 =_t E_2$, *Elaboration*)

d. Bill spoke to the press. Al talked to the television reporters.
$(E_1 ?_t E_2$, *Parallel*)

(2) a. Bill walked up to the podium. Al introduced him. (=1a)
$(E_1 <_t E_2$, *Narration*)

b. John walked up to the podium. Al had introduced him.
$(E_1 >_t E_2$, *Explanation*)

c. John walked up to the podium because Al introduced him.
$(E_1 >_t E_2$, *Explanation*)

d. John walked up to the podium because Al had introduced him.
$(E_1 >_t E_2$, *Explanation*)

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2 Tense-As-Anaphora Approaches

Claim: Simple and complex tenses are anaphoric

Use Reichenbach's (1947) notion of reference time:

Tense	Relations	Example
Present	E $=_t$ R $=_t$ S	see
Past	E $=_t$ R $<_t$ S	saw
Future	S $<_t$ R $=_t$ E	will see
Past Perfect	E $<_t$ R $<_t$ S	had seen
Future Perfect	S $<_t$ E $<_t$ R	will have seen
Future Perfect	S $=_t$ E $<_t$ R	will have seen
Future Perfect	E $<_t$ S $>_t$ R	will have seen

Example (2b): $R_2 =_t E_1, E_2 <_t R_2 \Rightarrow E_2 <_t E_1$ $\surd$

Example (2a): $R_2 =_t E_1, E_2 =_t R_2 \Rightarrow E_2 =_t E_1$ $\times$

Hinrichs (1986) says:

> "It turns out that if two sentences in the past tense *both* contain events that can be identified as either an accomplishment or an achievement, then the events are understood as happening in succession." (Hinrichs, 1986, page 68)

Proposal: Accomplishments and achievements introduce a reference point ordered after the event time, to which a subsequent past tense refers

Example (2a): $E_1 <_t R_1, E_2 =_t R_1 \Rightarrow E_1 <_t E_2$ $\surd$

Problems:

- Incorrectly predicts the forward movement of time in (1b-d).
- Does not explain felicity of (2c), since the temporal relations implied by tense ($E_1 <_t E_2$) and by the connective *because* ($E_2 <_t E_1$) contradict.
- Interaction with other tenses?

3 A Coherence-Based Approach

Coherence relations in discourse Hobbs (1979, 1990, inter alia)

(3) a. John took a train from Paris to Istanbul. He has family there.

b. ? John took a train from Paris to Istanbul. He likes spinach.

Relation	Constraint	Relation	Constraint
Narration(P,Q)	$E_P <_t E_Q$	Elaboration(P,Q)	$E_P =_t E_Q$
Explanation(P,Q)	$E_P >_t E_Q$	Parallel(P,Q)	$E_P\ ?_t\ E_Q$

Lascarides and Asher (1993): Temporal relations result from establishing coherence relations; **neither simple nor complex tenses are anaphoric**.

Coherence relations successfully account for the simple pasts in (1a-d). But what about the past perfect, e.g., the difference between (2a) and (2b)?

(4) **Connections When Changing Tense** (CCT)
$\Box(\langle \tau, \alpha, \beta \rangle \wedge sp(\alpha) \wedge pp(\beta) \rightarrow C_{pp}(\alpha, \beta))$, where

$$C_{pp}(\alpha,\beta) \rightarrow \text{Elaboration}(\alpha,\beta) \ \vee\ \text{Explanation}(\beta,\alpha) \ \vee\ \text{Parallel}(\alpha,\beta) \ \vee\ \text{Contrast}(\alpha,\beta)$$

(5) **Slipping Law**
$\langle \tau, \alpha, \beta \rangle \wedge C_{pp}(\alpha,\beta) \wedge \text{Info}(\alpha,\beta) > \text{Explanation}(\beta,\alpha)$

Problems:

- L&A's axioms merely reproduce the inferences that are derived by treating the past perfect as anaphoric
- Requires intermixing linguistic form within 'world knowledge' axioms
- Rules do not capture (2c), where an Explanation relation holds despite the simple past in the second clause (cf. (2d))
- Need more 'laws' for other tenses (e.g., future tense, tenses with greater degrees of iteration)
- Does not explain why the past perfect is odd discourse-initially:

  (6) Al had introduced him.

4 The Interface between Tense and Coherence

Data can be accounted for through the interaction of tense meaning and the establishment of coherence relations

Comrie (1981; 1985): Only complex tenses have reference times
⇒ **only complex tenses are anaphoric**

$$E\ \underset{magn}{(relative\ R)^n}\ \underset{magn}{(relative\ S)}$$

The schema can be simplified for English:

$$E\ (relative\ R)^n\ relative\ S$$

Tense	Relations	Example
Present	E $=_t$ S	see
Past	E $<_t$ S	saw
Future	E $>_t$ S	will see
Past Perfect	E $<_t$ R $<_t$ S	had seen
Future Perfect	E $<_t$ R $>_t$ S	will have seen

Analysis: Tense meaning imposes constraints per Comrie's system, followed by those imposed by coherence relations. These constraints must be consistent for the passage to be felicitous.

Makes the correct predictions for (1-2). Scorecard:

Example	Tense	Coherence	Result	Hinrichs	L&A	Us
1a	none	$E_1 <_t E_2$	$E_1 <_t E_2$	yes	yes	yes
1b	none	$E_1 >_t E_2$	$E_1 >_t E_2$	**no**	yes	yes
1c	none	$E_1 =_t E_2$	$E_1 =_t E_2$	**no**	yes	yes
1d	none	none	none	**no**	yes	yes
2b	$E_1 >_t E_2$	$E_1 >_t E_2$	$E_1 >_t E_2$	—	yes	yes
2c	none	$E_1 >_t E_2$	$E_1 >_t E_2$	**no**	**no**	yes
2d	$E_1 >_t E_2$	$E_1 >_t E_2$	$E_1 >_t E_2$	—	yes	yes

5 More Comparisons with Other Approaches

Dowty (1986) proposes a *Temporal Discourse Interpretation Principle* (TDIP) for "interpreting successive sentences in a discourse temporally". Caveat:

> ...if the discourse itself conveys some implication as to how events are to be specifically ordered, this should take priority over the third part of the [TDIP] rule that orders reference times successively. (Dowty, 1986, page 58)

In essence, TDIP covers Narrations, and the caveat covers the other relations.

Webber (1988): The simple past can refer to three parts of a previously evoked event (Moens and Steedman, 1988): the event itself (7), its *preparatory* phase (8), or its *consequent* phase (9).

(7) John played the piano. Mary played the kazoo. (Parallel)

(8) a. John bought Mary some flowers.

b. He picked out three red roses, two white ones and one pale pink. (Elaboration)

c. (He walked up to the register and paid for them.)

(9) a. John went into the florist shop.

b. He picked out three red roses, two white ones and one pale pink. (Narration)

Problems:

- Example (7) does not require that the event times be identical.
- Examples (1b) and (2c) are not compatible with any of the three alternatives (these must be distinguished from (8), which unlike (1b) and (2c), expresses temporal overlap).
- Choosing the correct alternative requires that the passage be understood semantically, which requires reasoning and coherence establishment. It is then unclear what information the anaphoricity of tense is contributing.

Lascarides and Asher (1993): Main point of disagreement is our treating complex tenses as anaphoric. In arguing against this, L&A note the incoherence of example (10).

(10) ? Max poured a cup of coffee. He had entered the room.

They state:

> Theories that analyse the distinction between the simple past and pluperfect purely in terms of different relations between reference times and event times, rather than in terms of event-connections, fail to explain why [(2b)] is acceptable but [(10)] is awkward. (Lascarides and Asher, 1993, pg. 470)

In both accounts, the incoherence of (10) results from there being no coherence relation that corresponds to Narration with reverse temporal ordering.

6 Conclusion

Summary:

- The simple past is not anaphoric. Do not be confused by the fact that Narrations may occur more frequently in discourse than other relations.
- The past perfect is anaphoric. There is no motivation for moving to a less elegant and intuitive coherence-based account of the past perfect.
- Comrie's theory is superior to Reichenbach's. (See Comrie (1981) for additional reasons.)
- Neither tense-as-anaphora nor coherence-based analyses alone can account for the temporal relations inferred during discourse interpretation. Each require inelegant and problematic modifications to the core theory.

  > ...the failure to distinguish between meaning and implicature is one of the main problems in working out an adequate characterisation of tenses...the investigation of the use of a grammatical category in discourse should not be confused with the meaning of that category; instead, the discourse functions should ultimately be accounted for in terms of the interaction of meaning and context. (Comrie, 1985, pp. 28-29)

- The data is accounted for by Comrie's theory of tense meaning, along with the constraints imposed when establishing discourse coherence.

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