

The cross-linguistic interpretation of embedded tenses

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This talk examines cross-linguistic variation in the interpretation of embedded tenses in Japanese, Russian and English, and proposes that a semantic account of such variation is preferable over syntactic ones given in previous research on the basis of typological and theoretical considerations.

1. Previous accounts of the variation

Ogihara (1994, 1996) uses the Sequence-of-Tense (SOT) rule to account for differences in the interpretation of tenses in embedded clauses in English and Japanese. In English Propositional Attitude Complements (PACs), the SOT rule optionally deletes an embedded past tense (PAST) under identity with the matrix tense at LF such that *Ken said Maria was sick* can mean either that Maria was sick at the time of Ken's saying (SOT rule applies) or at a time prior to Ken's saying (SOT rule does not apply). In Japanese, where the SOT rule is not available, a past-under-past PAC like (1a) can only get the latter interpretation. In English Temporal Adjunct Clauses (TACs), the SOT rule obligatorily deletes embedded tenses (which Ogihara assumes to be *relative* tenses like those of Japanese) such that e.g. a past tense *before*-clause is acceptable (cf. the translation of (1b)). In Japanese, on the other hand, the SOT rule does not apply; instead of a past tense, a non-past tense (NPST) must be realized in *before*-clauses (1b).

- (1) a. Ken-wa [Anna-ga byooki dat-ta to] it-ta [PAC]
Ken-TOP Anna-NOM sick be-PAST COMPL say-PAST
'Ken said that Anna had been sick.'
- b. [Ken-ga ku-ru/#ki-ta mae-ni] Anna-ga kaet-ta. [TAC]
Ken-NOM arrive-NPST/arrive-PAST before-at Anna-NOM leave-PAST
'Anna left before Ken arrived.'

Arregui and Kusumoto (A&K) 1998 point out that Ogihara's dichotomy between languages where the SOT-rule applies and languages where it doesn't cannot account for the interpretation of embedded tenses in Polish, which behaves like Japanese with respect to PACs but like English with respect to TACs. Russian behaves like Polish in this respect:

- (2) a. Ken skaza-l [čto Anna by-l-a bol'n-a]. [PAC]
Ken say-PAST.MASC that Anna be-PAST-FEM sick-FEM
'Ken said that Anna had been sick.'
- b. Anna u-exa-l-a [pered tem, kak Ken pri-exa-l]. [TAC]
Anna PERF-leave-PAST-FEM before that.INSTR as Ken PERF-arrive-PAST.MASC
'Anna left before Ken arrived.'

A&K account for variation in TACs as variation in the (syntactic) selectional restrictions of the temporal connectives: in English and Russian, they embed CPs (interpreted relative to the speech time), whereas they embed TPs in Japanese (interpreted relative to the matrix event time). However, A&K are forced to assume non-uniform analyses for tenses and for temporal connectives. In the talk, we also show that their analysis makes undesirable predictions for the interpretation of embedded tenses in PACs (which are CPs) since they would be interpreted relative to the speech time. Our proposal is to analyze cross-linguistic variation in the interpretation of TACs as variation in the (lexical) semantic meaning of temporal connectives. We show that our approach makes desirable typological predictions for the interpretation of embedded tenses in PACs and TACs.

2. A compositional analysis of the interpretation of embedded tenses

We analyze sentence radicals (e.g. 'Ken arrive') as sets of times ($\lambda t[AT(t, arrive'(k))]$), where

$AT(t, \phi)$ is true if ϕ is true at t (Dowty 1979). Tenses are temporal modifiers (cf. Stump 1985) of type $\langle\langle i, t \rangle, \langle i, t \rangle\rangle$; past and non-past tenses are interpreted as in (3):

- (3) a. $PAST \Rightarrow \lambda P_{\langle i, t \rangle} \lambda t [P(t) \wedge \mathbf{past}(t)]$ b. $NPST \Rightarrow \lambda P_{\langle i, t \rangle} \lambda t [P(t) \wedge \mathbf{npst}(t)]$

The interpretation of a past tense matrix clause (e.g. *Ken arrived*) is derived by applying past tense *PAST* to the denotation of the sentence radical (4a). Existential closure applies, resulting in (4b), which is true if there is a time t prior to the speech time at which Ken arrives.

- (4) a. $PAST(\lambda t [AT(t, arrive'(k))]) \Rightarrow \lambda t [AT(t, arrive'(k)) \wedge \mathbf{past}(t)]$
b. $\exists t [AT(t, arrive'(k)) \wedge \mathbf{past}(t)]$

Clauses embedded by propositional attitude verbs are interpreted with respect to the attitude holder's *now* (Abusch 1997, von Stechow 1995). In the lexical entry in (5a), the embedded event time t' is temporally located relative to the matrix event time t by the embedded tense (assuming the attitude holder's *now* is synchronized with t). Since the evaluation time of the embedded clause is shifted with the *AT* predicate, past-under-past examples like (1a) and (2a) are true (cf. (5b)) if at some past time t Ken says that Anna was sick at a time t' prior to t . We follow Gennari (2003) in assuming that the overlapping interpretation for past-under-past in English is a pragmatic implicature (which arises from the fact that the English (indexical) present cannot express that meaning).

- (5) a. $say/itta/skazal \Rightarrow \lambda P_{\langle i, t \rangle} \lambda x \lambda t [AT(t, say'(x, \wedge \exists t' [P(t')]))]$
b. $\exists t [AT(t, say'(k, \wedge \exists t' [AT(t', sick'(a)) \wedge \mathbf{past}(t')]) \wedge \mathbf{past}(t))]$

For TACs, we assume that sentences like (1b) and (2b) consist of two tensed clauses, and that TACs in the three languages are clausal modifiers (type $\langle\langle i, t \rangle, \langle i, t \rangle\rangle$) headed by the temporal connective. We illustrate our analysis with *before*-clauses. *Before* in the three languages encodes (cf. (6)) that the event time t of the main clause precedes the event time t_1 of the TAC ($t < t_1$). Following Ogihara (1996), the Japanese TAC (1b) is interpreted relative to the matrix event time t (6a) (by virtue of the *AT* predicate shifting the evaluation time). In English and Russian TACs (2b), the embedded clause is interpreted relative to the speech time (6b).

- (6) a. Japanese *mae* 'before' $\Rightarrow \lambda P \lambda Q \lambda t [Q(t) \wedge AT(t, \exists t_1 [P(t_1) \wedge t < t_1])]$
b. English *before* and Russian *pered* 'before' $\Rightarrow \lambda P \lambda Q \lambda t [\exists t_1 (Q(t) \wedge P(t_1) \wedge t < t_1)]$

(1b) and (2b) receive the interpretations in (7a) and (7b), respectively: according to both, the time t of Anna's leaving is in the past of the speech time and prior to the time t_1 of Ken's arrival.

- (7) a. $\exists t [\mathbf{past}(t) \wedge AT(t, leave'(a)) \wedge AT(t, \exists t_1 [\mathbf{npst}(t_1) \wedge AT(t_1, arrive'(k)) \wedge t < t_1])]$
b. $\exists t [\mathbf{past}(t) \wedge AT(t, leave'(a)) \wedge \mathbf{past}(t_1) \wedge AT(t_1, arrive'(k)) \wedge t < t_1]$

Japanese (1b) with a past tense in the *before*-clause is predicted to be semantically anomalous since t_1 would be required to be prior to t , thereby contradicting *before*'s requirement that $t < t_1$.

3. Typological implications

Our analysis differs from previous proposals in that it accounts for cross-linguistic variation in terms of *semantic* properties of the relevant constructions. That is, the interpretation of embedded tenses in the three languages does not differ in PACs since the embedded tense has to be interpreted relative to the attitude-holder's *now* (modulo English indexical present). For TACs, no such semantic restriction is imposed by the construction and, hence, variation is observed. Unlike A&K's syntactic account, the present proposal makes the typological prediction that there is no language 'EngJa' that behaves like English in PACs (indexical present) but like Japanese in TACs (lexical meaning of *before* as in (6a)): the indexical present tense of EngJa would not be able to realize the (non-indexical, relative) non-past tense meaning needed in a TAC like (1b). Since, to the best of our knowledge, EngJa is unattested, we take this prediction to further support our semantic analysis of the interpretation and distribution of tense in embedded constructions.

Selected references: Abusch D. 1997. Sequence of tense and temporal de re. *L&P* 20:1-50. Arregui, A. and K. Kusumoto. 1998. Tense in temporal adjunct clauses. *Proceedings of SALT VIII*, 1-18. Gennari, S. 2003. Tense meaning and temporal interpretation. *Journal of Semantics* 20:35-71. Ogihara, T. 1994. Adverbs of quantification and Sequence-of-Tense phenomena. *Proceedings of SALT IV*, 251-267.