

## Stative and Non-Stative Predicates and Sequence-of-tense Phenomena

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This paper aims at investigating what semantic interpretation the occurrence of stative and non-stative predicates in the complement clauses of the prepositional attitude verbs make a contribution to, as illustrated in (1a-b) and (2a-b).

- (1) a. John believed that Mary was tired (Ambiguous)  
b. John believed that Mary walked to school
- (2) a. John believes that Mary was sick  
b. John believes that Mary is sick

### I. Previous Treatments

#### A. Abusch (1988)

Abusch (1988) proposes that there are two past tenses:  $Past_1$  and  $Past_2$ .  $Past_1$  which usually occurs in any context means the temporal precedence, and  $Past_2$  which is licensed within transposing context has the temporal overlapping relation as its meaning, as in (3):

- (3) a. John said [<sub>CP</sub> that Mary was sick]  
b. John PAST say [<sub>CP</sub> that Mary PAST be sick](either  $Past_1$  or  $Past_2$ )

However, her proposal is problematic when it deals with a sentence like (4).

- (4) John believed that Susan walked to school

B. Ogihara (1992, 1996)

Ogihara proposes the Tense Deletion Rule as a sequence-of-tense (SOT) rule.

- (5) If a tense A is locally commanded by another tense B at LF and A and B are occurrence of the same tense, A is optionally deleted. (Ogihara (1996:124)).

Two LF' s for (3a)

- (6) a. John PAST believe that Mary  $\emptyset$  be sick  
b. John PAST believe that Mary PAST be sick

Problem with Ogihara' s proposal:

- (7) John said that Mary walked to school

According to Ogihara' s SOT rule, (7) is expected to have two LF' s. (8a) should be ruled out.

- (8). a. John PAST say that Mary  $\emptyset$  walk to school  
b. John PAST say that Mary PAST walk to school

C. Song (2000)

Song(2000) proposes that the embedded past is semantically vacuous in sentences like (1a) and (1b), arguing that the different interpretation of past-under-past sentences depends on whether the stative or the non-stative predicates occur in the complement clauses in the propositional attitude verbs. His claim is based on the observation made by Hinrichs (1986), Partee (1984) and Portner (1998).

- (9) John walked in. (E1) He sat down. (E2) E1 > E2  
 (10) John was tired. (S) He sat down. (E) S o E  
 (11) John was angry. (S) Suddenly, he smiled. (E) S > E

Stative predicates have either a precedence or a overlap relation, while this is not the case with non-stative predicates. This holds for the SOT phenomenon, as in (12a-b).

- (12) a. John PAST believe that Mary PAST be sick  
 b. John PAST believe that Susan PAST walk to school

Notice that the presence of the stative or the non-stative predicates in the complement clauses determines what interpretations (18a-b) should have. This indicates that the embedded past tense is semantically vacuous.

Song (2000) further postulates that since the stative predicates establish the precedence or the overlap relation, they have either of the features: [ < ] or [ = ], where [ < ] and [ = ] refer to the former and the latter, respectively, whereas since the non-stative predicates establish the precedence relation, they have the feature [ < ] only.

- (13) Principle for the Assignment of the Feature to the Embedded Past Tense

In the construal [<sub>CP</sub> ... α V<sub>Att</sub> ... [<sub>CP</sub> ... β γ ...]], where α and β are past tenses, V<sub>Att</sub> is an attitude verb associated with α, and γ is the head of XP which is a sister of INFL immediately dominating β,

- i) either [ < ] or [ = ] is assigned to β iff γ is a stative predicate, and  
 ii) [ < ] is assigned to β elsewhere.

According to (13), (12a) and (12b) have (14a-b) and (15), respectively, as their tentative LF:

- (14) a. [CP John PAST believe [CP that Mary PAST[=] be sick]]  
 b. [CP John PAST believe [CP that Mary PAST[<] be sick]]  
 (15) [CP John PAST believe [CP that Mary PAST[<] walk to school]]

LF for (14a)

- (16) [CP John<sub>7</sub> PAST [VP e<sub>7</sub> believe λt[CP that [IP Mary<sub>8</sub> PAST[=] [VP e<sub>8</sub> be sick]]]]]

Translation for (14a)

- (17) ∃t[past(t) & t ∈ R & believe'(j, t, ^λt[be-sick'(m, t)])]<sup>1</sup>

Notice in (16) and (17) that since it gets the feature [=] from the embedded stative predicate and thus has the overlap relation, the embedded past tense PAST[=] is translated as λP∃t<sub>1</sub>[t = t<sub>1</sub> & P{t}].

(17) says that there is a past time interval t which is a member of the set of contextually salient times R such that at t John self-ascribes the property of being located at a time t such that Mary was sick at t.

LF for (14b)

- (18) [CP John<sub>7</sub> PAST [VP e<sub>7</sub> believe λt[CP that [IP Mary<sub>8</sub> PAST[<] [VP e<sub>8</sub> walk to school]]]]]

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<sup>1</sup> ||believe'||<sup>M, w, g, u</sup> is that function f ∈ D<sub><<s, <i, t>>, <e, <i, t>></sub> such that for any p ∈ D<sub><s, <i, t>></sub>, for any α ∈ D<sub>e</sub> and t ∈ D<sub>i</sub> f(p)(α)(t) = 1 iff {<w', t'>: <w, t>H<sub>α</sub><w', t'>} ⊆ p.

Notice in (18) that since the predicate in the complement clause is not stative, the feature [ $<$ ] is transmitted to the embedded past tense.

Translation for (14b)

(19)  $\exists t[\text{past}(t) \ \& \ t \in R \ \& \ \text{believe}'(j, t, \ \wedge \lambda t \exists t_1[t_1 < t \ \& \ \text{walk-to-school}'(m, t_1)])]$

(19) is true in  $w$  at  $t$  iff there is a past time interval  $t$  which is an element of the set of contextually salient times  $R$  such that  $\{ \langle w', t' \rangle : \langle w, t \rangle H_j \langle w', t' \rangle \} \subseteq \{ \langle w, t \rangle : \text{there is a time } t_1 \text{ such that } t_1 < t \text{ and Mary walks to school in } w \text{ at } t_1 \}$ .

Problems with Song (2000)

- (20) a. John believes that Mary was sick  
 b. John believes that Mary is sick
- (21) a. John PRES believe that Mary PAST[ $<$ ] be sick  
 b. \*John PRES believe that Mary PAST[ $=$ ] be sick

Notice that the interpretation like (21b) is impossible in a sentence like (20a).

- (22) a. \*John PRES believe that Mary PRES[ $<$ ] be sick  
 b. John PRES believe that Mary PRES[ $=$ ] be sick

What is common in sentences like (20a) and (20b) is that the local evaluation time for the embedded tense is the speech time.

## II. Toward the Solution

## (23) Presuppositions of Tenses

a.  $\| \text{PAST}(t) \|^{g, u, c}$  is defined iff  $g(t) < u$ b.  $\| \text{PRES}(t) \|^{g, u, c}$  is defined iff  $g(t) \circ u$ ,

where  $g$  is a variable assignment function,  $u$  the utterance time, and  $c$  a context.

## (24) John walked to school

(25)  $\| \exists t [\text{past}(t) \ \& \ \text{walk-to-school}'(j, t)] \|^{g(a/t), u, c}$  is defined iff  $g(a) < u$ .<sup>2</sup>(26) Where (25) is defined,  $\| (24) \|^{g, u, c}$  is true iff John walks to school at  $g(a)$ 

However, (23) is not sufficient since in some context, a tense can be embedded in another tense in the matrix clause.

## (27) John believed that Mary was sick

The embedded past is evaluated relative to the time referred to by the matrix clause. This indicates that (23) fails to hold in a sentence like (27). Thus, (23) should be revised. Notice that the local evaluation time is context-dependent.

## (28) The Upper Limit Constraint (Abusch (1997))

The local evaluation time is an upper limit for the reference of tenses.

Based on (28), we can revise (23) as follows, which is along the lines of Heim (1994):

## (29) Revised Presuppositions of Tenses

a.  $\| \text{PAST}(t) \|^{g, u, c}$  is defined iff  $g(t) < u$  and  $g(et) \rightarrow g(t)$ b.  $\| \text{PRES}(t) \|^{g, u, c}$  is defined iff  $g(t) \circ u$  and  $g(t) \circ g(et)$ ,<sup>3</sup>

<sup>2</sup>  $g(a/t)$  is the variable assignment function just like  $g$  except that it assigns  $a$  to  $t$ .

<sup>3</sup> In (29b), " $g(t) \circ g(et)$ " seems be redundant since the local evaluation time for the present tense overlaps the

where  $et$  is the local evaluation time.

(30) John believed that Mary was sick

(31) LF for (30)<sup>4, 5</sup>

- a. John PAST believe  $\lambda et$ [Mary PAST[=] be sick]
- b. John PAST believe  $\lambda et$ [Mary PAST[<] be sick]

Both (31a) and (31b) respect (29). Thus, both of them are not interpretable.

(32) John believes that Mary was sick

- (33) a. \*John PRES believe  $\lambda et$ [Mary PAST[=] be sick]
- b. John PAST believe  $\lambda et$ [Mary PAST[<] be sick]

(32a) shows presupposition failure since the embedded PAST[=] overlaps its local evaluation time, which coincides with the utterance time. Thus, (32a) is pragmatically anomalous.

(34) John believes that Mary is sick

- (35) a. John PRES believe  $\lambda et$ [Mary PRES[=] be sick]
- b. \*John PRES believe  $\lambda et$ [Mary PRES[<] be sick]

(35b) is also pragmatically anomalous.

The semantics of the propositional attitudes involves a universal quantification over

utterance time.

<sup>4</sup> Brief comments on LF's in (31): I assume that every well-formed LF should have a  $\lambda$ -abstraction over  $et$ . The local evaluation time for the matrix tense is at the utterance time. Thus I omit it since it is redundant. Simply take the default local evaluation time for the matrix tense to be the utterance time. The local evaluation time for the embedded tense will be represented in LF's. It is located in the Comp of the complement of the attitude verbs. This is intended to take the object of the propositional attitudes to denote a property, which is proposed by Lewis (1979).

world-time pairs. This suggests that the embedded tense in the propositional attitude constructions might not contribute to the semantics of tenses as much as to the tenses outside of the propositional attitude verbs. If this is right, we can see why the embedded tenses in the propositional attitude verbs behave differently (i.e. semantically vacuous) from tenses in other contexts.

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<sup>5</sup> The local evaluation time et is of type i.

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