

## Some Choicepoints in the Syntax/Semantics Architecture for Tense (and Aspect)

Time as Evaluation Parameter vs. Argument

Tense as Operator vs. Predicate vs. Referential Argument

What about S, R, and E?

Instants vs. Intervals

Times vs. Events

### 1. The Classic Setup

All expressions are interpreted relative to certain parameters/indices of evaluation. Among those are a world and a time. Some expressions have interpretations that do not vary with world or time. Others have interpretations that are sensitive to the world or time indices.

Sentences have as their extension a truth-value once they are interpreted relative to a world and time. In other words, sentences are true or false in a world w at a time t. For now, we will ignore the world parameter.

#### 1.1 The Beginnings of a Toy System

(1) A sentence  $\phi$  uttered at a time  $t$  is true iff  $\llbracket \phi \rrbracket^t = 1$  .

(2) Functional Application

If  $\alpha$  is a branching node and  $\{\beta, \gamma\}$  the set of its daughters, then, for any time  $t$ :  
if  $\llbracket \beta \rrbracket^t$  is a function whose domain contains  $\llbracket \gamma \rrbracket^t$ , then  $\llbracket \alpha \rrbracket^t = \llbracket \beta \rrbracket^t(\llbracket \gamma \rrbracket^t)$  .

(3) For all times  $t$ ,  
 $\llbracket \text{John} \rrbracket^t = \text{John}$   
 $\llbracket \text{smile} \rrbracket^t = \lambda x. x \text{ smiles at } t$

(4) For all times  $t$ ,  
 $\llbracket \text{John smile} \rrbracket^t = \llbracket \text{smile} \rrbracket^t(\llbracket \text{John} \rrbracket^t) = 1$  iff John smiles at  $t$  .

(5) Intensions

For any expression  $\alpha$ , the intension of  $\alpha$  (notation:  $\llbracket \alpha \rrbracket_{\epsilon}$ ) is defined as follows:  $\llbracket \alpha \rrbracket_{\epsilon} = \lambda t. \llbracket \alpha \rrbracket^t$ .

(6) Intensional Functional Application

If  $\alpha$  is a branching node and  $\{\beta, \gamma\}$  the set of its daughters, then, for any time  $t$ : if  $\llbracket \beta \rrbracket^t$  is a function whose domain contains  $\llbracket \gamma \rrbracket_{\epsilon}$ , then  $\llbracket \alpha \rrbracket^t = \llbracket \beta \rrbracket^t(\llbracket \gamma \rrbracket_{\epsilon})$ .

1.2 What do Tenses and Aspects Do?

Tenses and aspects operate on (manipulate) the evaluation time for the expression they modify.

(7) For any time  $t$ ,  
 $\llbracket \text{PAST} \rrbracket^t = \lambda p_{\langle s, t \rangle}. \exists t' \text{ before } t: p(t') = 1$ .

(8) 
$$\left\llbracket \begin{array}{c} \text{PAST} \\ \swarrow \quad \searrow \\ \text{John} \quad \text{smile} \end{array} \right\rrbracket^t = \llbracket \text{PAST} \rrbracket^t(\llbracket \text{John smile} \rrbracket_{\epsilon}) =$$

$$\llbracket \text{PAST} \rrbracket^t(\lambda t. \llbracket \text{John smile} \rrbracket^t) = 1 \text{ iff}$$

$$\exists t' \text{ before } t: (\lambda t. \llbracket \text{John smile} \rrbracket^t)(t') = 1 \text{ iff}$$

$$\exists t' \text{ before } t: \llbracket \text{John smile} \rrbracket^{t'} = 1 \text{ iff}$$

$$\exists t' \text{ before } t: \text{John smiles at } t'.$$

(9) For any time  $t$ ,  
 $\llbracket \text{PROG} \rrbracket^t = \lambda p_{\langle s, t \rangle}. \exists t' \supseteq t: p(t') = 1$ .

(10) *John was smiling* = *PAST PROG John smile*  
 is true at  $t$  iff  $\exists t' \text{ before } t: \exists t'' \supseteq t': p(t'') = 1$ .

1.3 An Alternative: Tense as a Predicate

(11) two times as evaluation parameters!  
 the first time will generally be the utterance time and will remain unchanged as interpretation proceeds  
 the second time is related to the first by tense as a relational predicate and it serves as the parameter that the extensions of expressions are sensitive to

- (12) To generate the same meanings/truth-conditions as before we need an existential quantifier over times.

- (13) A sentence  $\phi$  uttered at time  $u$  is true iff  $\llbracket \phi \rrbracket^{u,u} = 1$ .

- (14)
- 

- (15)  $\llbracket \exists t \rrbracket^{v,w} = \lambda p. \exists t: p(\langle v, t \rangle) = 1$

- (16)  $\llbracket \text{PAST} \rrbracket^{v,w} = 1$  iff  $w$  is before  $v$

- (17) To accommodate aspect as another predicate, one would probably want to introduce a third evaluation time and another existential operator (or make one operator quantify over both extra times).

=> This would be a close approximation of a Reichenbachian S-R-E system in this intensional setup for tense & aspect.

## 2. Time Arguments

The main competing setup is one where the time-sensitivity of the meaning of expressions is not captured by making their extensions vary with an evaluation time but by giving these expressions temporal arguments in the syntax of the language. (Expressions that do not show time-sensitivity, such as names, can simply be treated as not having temporal arguments).

- (18)  $\llbracket \text{John} \rrbracket = \text{John}$

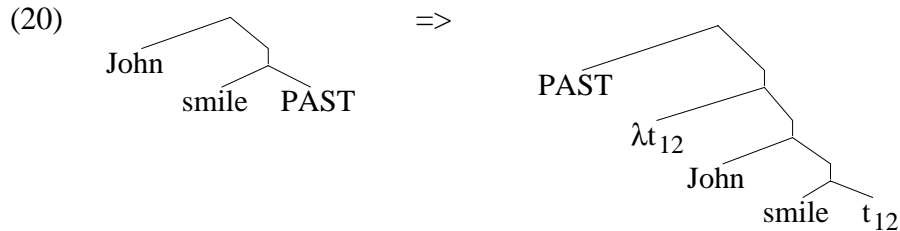
$$\llbracket \text{smile} \rrbracket = \lambda t. \lambda x. \text{John smiles at } t$$

- (19)
- 

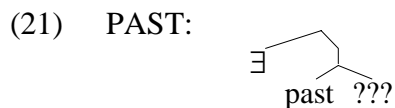
Immediate questions: (i) What occurs in the temporal argument position? (ii) What is the role of tense morphemes? (ii) Is there existential quantification over times, just as in the meanings/truth-conditions that we were working with earlier?

Here is one way to start. Pretend that PAST is an existential quantifier over times, generated in the temporal argument position of the predicate. Because of the type

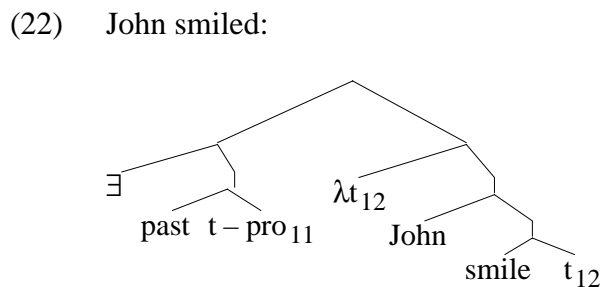
mismatch it needs to move to a clause-commanding position, leaving behind an argument-type trace.



If PAST were simply an unrestricted existential quantifier, then this would claim that there is a time at which John smiles. But obviously PAST must be a restricted quantifier. So, it contains a restrictive predicate over times, which means that it itself has a temporal argument in it.



We could say that the temporal argument is a covert “pronominal” and that its default/natural interpretation is the utterance time.



Question for interface scientists: how exactly do these interpretive parts correspond to the syntactic and morphological structures in *John smiled*?

Notice how it’s hard to tell what the nature of the PAST morpheme is: is it the surface realization of the entire restricted quantifier (“tense is an operator”), or is it the surface realization of the bound temporal argument (“tense is a variable in an argument position bound by an operator”), or is it the surface realization of the restrictive predicate inside the quantifier over times (“tense is a predicate/relation between times”)?

### 3. Considerations

#### 3.1 Partee

(23) I didn’t turn off the stove.

What is this an argument for/against?

### 3.2 Enc

- (24) Every fugitive is now (back) in jail.
- cf. Mary wants a hat just like mine. (Fodor, etc.)
- (25) Ogihara (1999 talk at Chronos):
- a. ??Every fugitive crying for joy is now in jail.
  - b. ??Every miserable child is now happy.

What is this an argument for/against?

### 3.3 Bäuerle, Ogihara, ...

- (26) John smiled every Monday.

Read von Stechow's brand new paper "Quantifying into Temporal PPs and The Theory of Tense and Aspect: Some Additions to (Pratt And Frances 2001)", available at <http://www2.sfs.nphil.uni-tuebingen.de/arnim/TemporalPPs.pdf>

## 4. Instants vs. Intervals

- (27) John ate the cake.

## 5. Do We Need Events?

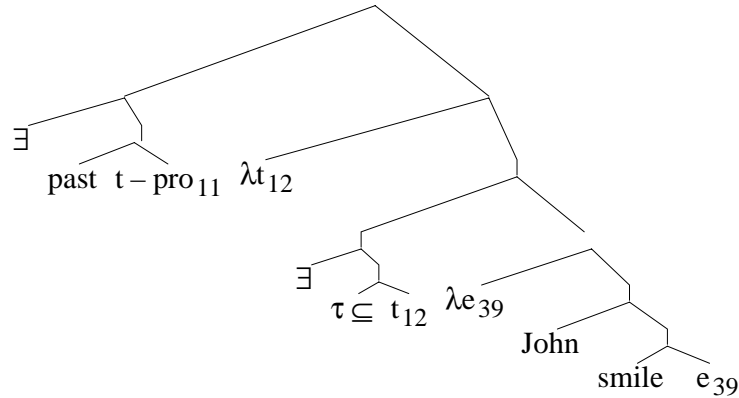
If yes, how can we add them to our system?

- (28)  $\llbracket \text{smile} \rrbracket = \lambda e. \lambda x. e \text{ is a smiling event by agent } x$

- (29) Temporal Trace

For any event  $e$ ,  $\tau(e)$  = the interval occupied by  $e$

(30)



## 6. Hygiene

“Sometimes when some linguists talk about event sentences, they talk as if there is one event designator, *e*, possibly complex, that shows up somewhere in the linguistic structure of an event sentence, “denoting” “the event” described by the sentence. Although this may sometimes be just loose shorthand talk, it seems that sometimes it is meant as an approximately correct way to think about the role of the “event argument”.” (Partee 2000: 486).

## Readings

Iatridou, Sabine, Anagnostopoulou, Elena, and Izvorski, Roumyana. 2001. Observations about the Form and Meaning of the Perfect. In *Ken Hale: A Life in Language*, ed. Michael Kenstowicz, 189-238. Cambridge, MA: MIT Press.

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<http://www2.sfs.nphil.uni-tuebingen.de/HandoutsTübingen/renate/seit.final.pdf>

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