

Fake Past and Awareness

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This paper discusses what is called the “fake” past sentences [1] as in “I had an exam tomorrow.” Such past tense can be used when the speaker remembers what had been forgotten or had been lost. I will analyze the fake past sentences with three points in time and argue that the past tense refers to the reference time. Awareness, instead of belief or knowledge, is what is involved. I will analyze the past tense of surprise as knowledge past and propose logic of awareness.

1. Fake Past

The past tense can be used for the non-past reference in English as well as in Japanese and Dhaasanac [2, 3, 4]. In (1a), the speaker had forgotten about the party scheduled on the following day. [5] calls such type of sentences to be the temporally mismatched matrix sentences. Even though the party is scheduled in the future, the past tense is used. Without oblivion, the use of the past tense is odd. The present tense or the modal *will* should be used instead as in (1b). The past tense in (1a) and (2a) is “fake” [1] in that the party and the exam are scheduled in the near future.

- (1) a. I had a party tomorrow. I have forgotten about it.
b. I (will) have a party tomorrow.
- (2) a. I had an exam today. I should have known.
b. There was a party yesterday but I forgot to go.
- (3) a. Oh, the book was here all along. I put it here myself.
b. The book was here but it is gone now.

In (1a), (2a) and (3a), the speaker had forgotten and had not been *aware* of the schedule or the location of the book until a little before the utterance [2].

2. Reference Time

In sentences with the ordinary past tense, the reference time in Reichenbachian tense system [6] is prior to the time of utterance. E, the abbreviation of event, stands for the point of time that the depicted event happens. S is the time of speech and R is the time of reference. In (4a), the time that the party was held is prior to the speech time so that E precedes S as the line connects the two points. The line represents temporal precedence and the comma expresses simultaneity as used in (4b). From the perspective of the utterance time, the party occurred in the past. The temporal adverb *yesterday* associates with E [cf. 7]. on the other hand, in a past perfective sentence such as (5a), R switches to the past, preceded by E as shown in (5).

- (4) a. I had a party yesterday.

b. E- S, R
yesterday

- (5) a. I had hosted parties one hundred times by last year.

b. E -R -S
last year

If the past tense does not refer to the event time in the fake past sentences in (1-3), what does it refer to? In (6a,b), the second and the third sentences both refer back to the time when the party was held, which is a reference point, as indicated by the parentheses. It indicates that the simple past tense has a reference point which can be referred back by the anaphoric past tense in the following sentences [cf. 8]. The reference time of the fake past sentences are anaphoric, as shown in (6b) and (7-8). The reference times of the first sentences are the antecedents of temporal anaphors in the following sentences in (6a,b) as well as in (7-8). We consider the past tense in the fake past sentences to represent “knowledge past” whose reference time can be anaphoric.

- (6) a. There was a party. John had many drinks (then). The day after (that day) he had a headache.
b. Oh, there was a party tomorrow. John told me (about tomorrow).
- (7) Weren't we going to the theater tomorrow or was that next week?
- (8) Q: What are we going to do tomorrow?
A: Weren't we going to the theater tomorrow?

The tense in the second sentence is anaphoric to the reference time of the first sentence as demonstrated in Neo-Davidsonian semantics in (9c).

- (9) a. Oh, the book was here. I put it here myself.
b. R- E, S E- R, S

c. $\exists e_1, e_2 [be(e_1) \wedge put(e_2) \wedge time(e_1) = time(e_2) = t_1 \wedge t_1 \prec t_0 \wedge theme(e_1) = x \wedge book'(x) \wedge agent(e_2) = speaker \wedge theme(e_2) = x \wedge location(e_1) = location(e_2) = here]$

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- (10) a. I had an exam tomorrow.
 b. R -S -E
 tomorrow

Even though the event time lies in the future in (10a), scheduling of the exam was done prior to the time of utterance. From the past perspective, or from the reference time in the past, the exam was surely on the schedule.

3. Knowledge Past: Past Belief

[2, 3] claimed that the fake past sentences update information states of the speaker and the hearer.

- (11) a. A, koko-ni at-ta. (Japanese)
 oh here-LOC be-PAST
 “Oh, it was here.”
 b. PAST(BELIEVE(speaker, \sim being'(x))) \wedge
 PRES(BELIEVE(speaker, being'(x)))

I used two tense operators—PAST and PRESENT. Even though in the past, the speaker did not believe in the existence of the book there, presently s/he does believe that the book is there. The unexpected finding of the book is represented by the past non-belief and the present belief.

Now, this paper uses three points in time, rather than two points of past and present. As represented in (12), in the past, the speaker did not believe ϕ to be true even though s/he used to believe it prior to that time. Now, after recalling or finding what was missing or forgotten, the speaker again believes ϕ as formalized in (12).

- (12) $P(\neg B\phi \wedge PB\phi) \wedge B\phi$
 (P: past, B: believe)

If we consider the belief operator B to be a two-place holder which takes time and a proposition as arguments, the belief update can be also expressed as in (13).

- (13) $\exists t' \prec t \wedge t \prec t_0 \wedge \neg B(t, \phi) \wedge B(t_0, \phi) \wedge B(t', \phi)$
 (t_0 : now)

4. Logic of Dynamic Awareness Operator

When uttering fake past sentences, the speaker expresses that s/he had forgotten ϕ but should have known it. It is not that the speaker stopped believing ϕ at some point and started to believe it again. Rather, speaker just forgot ϕ which s/he had already known. Therefore, it is plausible to distinguish belief and awareness, i.e., B operator and A operator [cf. 9, 10]. In the fake past sentences, the speaker had become unaware of ϕ in the past and came to be aware again of ϕ a little prior to the utterance (14). The awareness operator distinguishes between conscious and unconscious beliefs. What the agent is aware of is what s/he believes but s/he may not be aware of his/her belief (15).

- (14) $P(\neg A\phi \wedge PA\phi) \wedge A\phi$

4.1 Syntax

The language \mathcal{L} of the awareness logic is given below. Assuming a countably infinite set of agents $i \in \mathcal{N}$ and a countably infinite set of propositions $\phi \in \mathcal{P}$,

- (15) $\phi ::= \{\top \mid p \mid \phi \wedge \psi \mid \phi \vee \psi \mid \neg\phi \mid \phi \rightarrow \psi \mid \phi \leftrightarrow \psi \mid A_i\phi \mid B_i\phi \mid K_i\phi\}$
 (16) $\neg B\phi \rightarrow \neg A\phi$
 (17) a. $A\phi \rightarrow B\phi$
 b. $B\phi \nrightarrow A\phi$
 (18) a. $K\phi \nrightarrow A\phi$
 b. $A\phi \nrightarrow K\phi$
 c. $A\phi \rightarrow BA\phi$
 d. $\neg A\phi \rightarrow B\neg A\phi$

4.2 Semantics

An epistemic awareness model for agents \mathcal{N} and propositional variables \mathcal{P} is a tuple \mathcal{M} .

- (19) $\mathcal{M} = (\mathcal{W}, \mathcal{R}, \mathcal{N}, \mathcal{V})$
 \mathcal{W} : the set of possible worlds w
 \mathcal{R} : accessibility function $R: \mathcal{N} \rightarrow \mathcal{P}(\mathcal{W} \times \mathcal{W})$
 A : an awareness function
 $A: \mathcal{N} \rightarrow \mathcal{W} \rightarrow \mathcal{P}(\mathcal{P} \cup \mathcal{N})$
 V : a valuation function
 $V: \mathcal{P} \rightarrow \mathcal{P}(\mathcal{W})$
 (20) $(M, w) \models \top$
 $(M, w) \models \phi$ iff $w \in V(\phi)$
 $(M, w) \models \phi \wedge \psi$ iff $(M, w) \models \phi$ and $(M, w) \models \psi$
 $(M, w) \models \phi \vee \psi$ iff $(M, w) \models \phi$ or $(M, w) \models \psi$
 $(M, w) \models \neg\phi$ iff $(M, w) \not\models \phi$
 $(M, w) \models K_i\phi$ iff $\phi \in K_i(w)$
 $(M, w) \models A_i\phi$ iff $\phi \in A_i(w)$
 (21) a. $(M, w) \models \sim A_i\phi \wedge \sim A_i \sim \phi$
 b. $(M, w) \models A_i\phi \wedge A_i \sim \phi$
 c. $(M, w) \models A_i\phi \Leftrightarrow A_i \sim \phi$
 d. $(M, w) \models \sim A_i\phi \Leftrightarrow \sim A_i \sim \phi$

The possible worlds are partitioned into A worlds and non-A worlds, B worlds and non-B worlds. The worlds the agent is aware of intersects with the worlds the agent believes. The worlds the agent believes may intersect with the worlds the agent is not aware of. There is also intersection between the worlds the agent does not believe and the worlds s/he is not aware of. There is partition between these worlds, as given in (22).

- (22) a. $A \parallel \neg A$
 b. $B \parallel \neg B$
 c. $A \cap B \parallel \neg A \cap B \parallel \neg A \cap \neg B$

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