

Variation in the Interpretation of Embedded Tenses: Ogihara & Sharvit (2012) “Embedded Tenses”

The empirical focus of Ogihara & Sharvit’s (2012) paper is the variation in how embedded tenses are interpreted.

- We’ll begin by reviewing the facts for English and how the analysis developed so far in class (which they largely assume) captures them...

1. The Interpretation of Embedded Tenses in English

In English (and, as we’ll see, in Hebrew and Japanese), the interpretation of an embedded tense depends upon two things:

- (i) The identity of the tense in the matrix clause
- (ii) Whether the embedded clause is a complement (of a propositional attitude verb) or an adjunct (i.e., relative clause).

1.1 Embedded Past in English

1.1.1 Embedded Past in Complement Clauses

(1) Past-Under-Past

As we’ve seen numerous times, such sentences in English appear to be ambiguous, allowing for either a ‘simultaneous’ or a ‘back-shifted’ reading.

Dave **said** that George **was** president.

- a. Simultaneous Reading: Dave said “George is president”
- b. Back-shifted Reading: Dave said “George was president”

(2) Past-Under-Present

Such sentences in English (and also Japanese and Hebrew) allow only for back-shifted readings, as would be expected from our semantics.

Dave **thinks** that George **was** president.

- a. Back-shifted Reading: Dave thinks “George was president”

(3) Past-Under-Future

- These allow only for back-shifted interpretations.
- Under the back-shifted reading, the time of embedded predication can follow matrix evaluation time (a kind of ‘Later-than-Matrix’ Reading)

Dave **will think** that George **was** president.

- a. Back-shifted Reading: Dave will think “George was president (in 2002 / 2016)”

(4) **Important Note**

- The facts above all follow from the semantics developed thus far in class.
- The only case not yet discussed in detail is (3), which is detailed below
 - (I'll assume a quantificational semantics for tense, so that I won't have to deal with the presuppositional statements concomitant with pronom. semantics)

a. LF for (3):

[Pres₁ [WOLL [Dave think [λw [λt [Past [George be president] ...]

b. Predicted Truth-Conditions

$\exists t' . t' > c(\text{time}) \ \& \ \forall \langle w', t' \rangle \in \text{Dox-Alt}(\text{Dave}, w, t')$:

$\exists t''' . t''' < t'' \ \& \ \text{George is president in } w' \text{ at } t'''$

There's a future time at which Dave will locate himself at a world/time where George was president in the past...

1.1.2 **Embedded Past in Relative Clauses**

(5) **Past-Under-Past**

As we've seen numerous times, such sentences in English appear to be ambiguous, allowing for either a 'simultaneous', 'back-shifted', or 'later-than-matrix (LTM) reading

Dave **met** that a man that **was** president.

- a. Simultaneous Reading: The man was president at the time Dave met him.
b. Back-shifted Reading: The man was president *strictly before* Dave met him.
c. Later-than-Matrix: The man was president *strictly after* Dave met him.

(6) **Past-Under-Present**

Such sentences in English (and also Japanese and Hebrew) allow only for back-shifted readings, as would be expected from our semantics.

Dave **is talking** to a man who **was** president.

- a. Back-shifted Reading:
The man was president *strictly before* Dave talks with him.

(7) **Past-Under-Future**

- These allow only for back-shifted interpretations.
- Under the back-shifted reading, the time of embedded predication can follow matrix evaluation time ('Later-than-Matrix' Reading)

Dave **will meet** a man who **was** president.

- a. Back-shifted Reading: The man was president *strictly before* Dave meets him.

(8) **Important Note:**

- Again, all these facts follow from the semantics for English tense that we've developed in class...
- Recall that the facts in (7) motivated our treatment of English *WOLL* as an index-shifting 'modal'...

1.2 Embedded Present in English

1.2.1 Embedded Present in Complement Clauses

(9) **Present-Under-Past**

As we just reviewed in detail, such sentences in English only allow for so-called 'double access' readings.

Dave **said** that George **is** president.

a. Double Access Reading:

- (i) TRUE: Dave said (a year ago) "George is president now"
- (ii) FALSE: Dave said (ten years ago) "George is president now"
- (iii) FALSE: Dave said (a year ago) "George will be president in 2015"

(10) **Present-Under-Present**

Such sentences in English (and also Japanese and Hebrew) allow only for simultaneous readings, as would be expected from our semantics.

Dave **thinks** that George **is** president.

a. Simultaneous Reading: Dave thinks "George is president (now)."

(11) **Present-Under-Future**

In English, these sentences allow for simultaneous readings.

Dave **will say** that George **is** president.

a. Simultaneous Reading: Dave will say "George is president (now)"

(12) **Important Note:**

- The facts above all follow from the semantics developed thus far in class.
- The only case not yet discussed in detail is (11), which is detailed below

(13) **The Analysis of Present-Under-Future Complement Clauses in English**

- Recall that a matrix clause with *will* is assumed to have PRES tense.
- Therefore, we can give sentences like (11) a ‘Tense-Agreement’ LF, shown below in (13a) [assuming the Kratzer 1998/2009 system discussed in class]

a. Possible ‘Tense Agreement’ LF for Sentence (11)

[Pres₁ [**1** [t₁ [WOLL [Dave think [λw [**2** [T-∅₂ [George be president] ...]

b. Predicted Pronunciation: Dave *will*_{pres} think that George *is*_{pres} president

c. Predicted Truth-Conditions

∃t' . t' > c(time) &

∀⟨w',t'⟩ ∈ Dox-Alt(Dave,w, t'): George is president in w' at t''

- Our semantics also predicts that (11) gets a ‘temporal *de re* LF’, whereby it gets a ‘double access’ interpretation.
- **However, as discussed by Ogihara & Sharvit (2012), our simultaneous reading in (13c) is weaker than such a ‘double access’ reading, and so it’s very difficult to determine empirically whether this additional ‘double access’ reading exists...**

1.2.2 **Embedded Present in Relative Clauses**

(14) **Present-Under-Past**

In English, such sentences require the time of the ‘embedded’ event to overlap the present.

Dave **met** a man who **is** president.

- a. Present Reading: The man is president *now* (may or may not have been president at time of meeting).

(15) **Present-Under-Present**

Such sentences in English (and also Japanese and Hebrew) allow only for simultaneous readings, as would be expected from our semantics.

Dave **is talking** to a man who **is** president.

- a. Simultaneous Reading: The man is president at the time Dave talks to him.

2. The Interpretation of Embedded Tenses in (Modern) Hebrew

2.1 Embedded Past in Hebrew

2.1.1 Embedded Past in Complement Clauses

(19) Past-Under-Past

- In Modern Hebrew, such sentences readily allow for a back-shifted reading (19b).
- However, in certain contexts, speakers also allow for a simultaneous reading (19a).

a. Yosef **xasav** se Miriam **ahava** oto az.
Yosef **thought** that Miriam **loved** him then

Yosef thought that Miriam loved him then.

Simultaneous Reading: Yosef thought “Miriam loves me now”

b. Yosef **xasav** se Miriam **ahava** oto be-yalduto
Yosef **thought** that Miriam **loved** him in-his.childhood

Yosef thought that Miriam loved him in his childhood.

Back-shifted Reading: Yosef thought “Miriam loved me in my childhood”

(20) Past-Under-Present

- No data for such sentences in Hebrew is given by Ogihara & Sharvit (2012)
- However, their theory predicts the same range of interpretations as found in English. (*i.e.*, they get a back-shifted reading)

(21) Past-Under-Future

- No data for such sentences in Hebrew is given by Ogihara & Sharvit (2012)
- However, their theory predicts the same range of interpretations as found in English. (*i.e.*, they get a back-shifted reading)

(22) Important Note

The inability for (22a) below to get a ‘simultaneous reading’ shows that Hebrew lacks the kind of ‘Tense-Agreement/Deletion’ operation seen in English simultaneous readings.

a. Dan **xasav** etmol se Mira **hayta** amara az
Dan **thought** yesterday that Mira **was** supposed then

lomar le-ima tox savua se hi **hitga’age’a** eleha.
to.tell to-her.mother within week that she **missed** to-her

*Dan **thought** yesterday that Mira **was** supposed to tell her mother in a week that she **missed** her.*

b. Verifying Scenario: Mira was supposed to tell her mother: “I **missed** you”
Not Verifying Scenario: Mira was supposed to tell her mother: “I **miss** you”

(25) **Past-Under-Present**

- No data for such sentences in Hebrew is given by Ogihara & Sharvit (2012)
- However, their theory predicts the same range of interpretations as found in English. (*i.e.*, they get a back-shifted reading)

(26) **Past-Under-Future**

- No data for such sentences in Hebrew is given by Ogihara & Sharvit (2012)
- However, their theory predicts the same range of interpretations as found in English. (*i.e.*, they get a back-shifted reading)

2.2 Embedded Present in Hebrew

2.2.1 Embedded Present in Complement Clauses

(27) **Present-Under-Past**

Unlike English – and like most other languages of the world – Hebrew allows for such sentences to get a (plain) simultaneous reading.

Lifney alpayim sana, Yosef **gila** se Miriam **ohvet** oto.
before 2,000 year Yosef **found.out** that Miriam **loves** him
2,000 years ago, Yosef found out that Miriam loved him.

Simultaneous Reading: Yosef found out: “Miriam loves me (now)”

Note:

- The English sentence “2000 years ago, Yosef found out that Miriam loves him” is deviant, due to the special semantics of the ‘double access’ reading.
- Therefore, the felicity of (27) shows us that the Hebrew sentence isn’t getting such a ‘double access’ interpretation.

(28) **Present-Under-Present**

- No data for such sentences in Hebrew is given by Ogihara & Sharvit (2012)
- However, their theory predicts the same range of interpretations as found in English. (*i.e.*, they get a simultaneous reading)

(29) **Present-Under-Future**

As in English, such sentences allow for a simultaneous reading.

Yosef **yegale** se Miriam **ohvet** oto
Yosef **will.find.out** that Miriam **loves** him
Yosef will find out that Miriam loves him.

Simultaneous Reading: Yosef will find out: “Miriam loves me (now)”

2.2.2 Embedded Present in Relative Clauses

(30) Present-Under-Past

As in English, such sentences require the time of the ‘embedded’ event to overlap the present. Thus, they do not get ‘simultaneous readings’

Be-yalduto **pagas** Yosef isa se **ohvet** letayel.
in-childhood **met** Yosef woman that **loves** traveling

In his childhood, Yosef met a woman who loves traveling.

Present Reading: Woman must love traveling at the matrix utterance time.

(31) Present-Under-Present

- No data for such sentences in Hebrew is given by Ogihara & Sharvit (2012)
- However, their theory predicts the same range of interpretations as found in English. (*i.e.*, they get a simultaneous reading)

(32) Present-Under-Future

As in English, such sentences are ambiguous. They allow a ‘simultaneous reading’, but also a reading where the embedded event overlaps the present.

Be-gil ha-amida, sofs of **yifgos** Yosef isa se **ohvet** letayel
in-middle age-his finally **will.meet** Yosef woman that **loves** travelling

In his middle age, Yosef will finally meet a woman that loves travelling.

Present Reading:

Woman loves travelling now (not necessarily at the meeting time)

Simultaneous Reading:

Woman loves travelling at meeting time (not necessarily now)

(33) Availability of Simultaneous Readings in Hebrew

	Past-Under-Past	Present-Under-Past	Present-Under-Future
Complement CP	Possible (but hard)	Possible	Possible
Relative CP	Possible	Impossible	Possible

3. The Interpretation of Embedded Tenses in Japanese

3.1 Embedded Past in Japanese

3.1.1 Embedded Past in Complement Clauses

(34) Past-Under-Past

- In Japanese, such sentences *only* allow for a back-shifted reading.
- A simultaneous reading of such sentences is entirely impossible.

a. Back-Shifted Reading

Joseph-wa Mary-ga 1999-nen-ni zibun-o **aisitetato** **sinziteita**
Joseph-TOP Mary-NOM 1999-year-in self-ACC **loved** **believed**
Joseph believed that Mary loved him in 1999. (Said in 2005)

b. No Simultaneous Reading:

* Joseph-wa Mary-ga sono-toki zibun-o **aisitetato** **sinziteita**
Joseph-TOP Mary-NOM that-time self-ACC **loved** **believed**
Joseph believed that Mary loved him then.

(35) Past-Under-Present

- No data for such sentences in Japanese is given by Ogihara & Sharvit (2012)
- However, their theory predicts the same range of interpretations as found in English. (*i.e.*, they get a back-shifted reading)

(36) Past-Under-Future

- No data for such sentences in Japanese is given by Ogihara & Sharvit (2012)
- However, their theory predicts the same range of interpretations as found in English. (*i.e.*, they get a back-shifted reading)

3.1.2 Embedded Past in Relative Clauses

(37) Past-Under-Past

As in English and Hebrew, such sentences in Hebrew allow for (i) simultaneous readings, (ii) back-shifted readings, and (iii) LTM readings.

1989-nen ni, Joseph-wa (sono toki / 1970 nen dai ni / 1990 nen dai ni)
1989-year in Joseph-TOP that time 1970s in 1990s in
aisiteita zyosei-ni **atta.**
loved woman-DAT **met**

In 1989, Joseph met a woman who loved him (then / in the 1970s / in the 1990s)

(38) **Past-Under-Present**

- No data for such sentences in Japanese is given by Ogihara & Sharvit (2012)
- (However, their theory predicts they get a back-shifted reading)

(39) **Past-Under-Future**

- No data for such sentences in Japanese is given by Ogihara & Sharvit (2012)
- (However, their theory predicts they get a back-shifted reading)

3.2 Embedded Present in Japanese

3.2.1 Embedded Present in Complement Clauses

(40) **Present-Under-Past**

Unlike English – but like Hebrew and most other languages – Japanese allows for such sentences to get a (plain) simultaneous reading.

Taroo-wa Hanako-ga **byooki-da-to** **itta.**
Taro-TOP Hanako-NOM **is.sick-COMP** **said**

Taro said that Hanako was sick

Simultaneous Reading: Taro said “Hanako is sick”

(41) **Present-Under-Present**

- No data for such sentences in Japanese is given by Ogihara & Sharvit (2012)
- However, their theory predicts the same range of interpretations as found in English. (*i.e.*, they get a simultaneous reading)

(42) **Present-Under-Future**

As in English and Hebrew, such sentences allow for a simultaneous reading.

Joseph-wa Mary-ni **aisareteiru-to** **wakarudaroo.**
Joseph-TOP Mary-DAT **is.loved-C** **will.understand**

Joseph will find out that Mary loves him.

Simultaneous Reading: Joseph finds out “Mary loves me (now).”

3.2.2 Embedded Present in Relative Clauses

(43) **Present-Under-Past**

Unlike English and Hebrew, such sentences in Japanese are *ambiguous*. They allow for both a ‘simultaneous reading’ and one where the embedded event overlaps matrix UT.

Joseph-wa ryokoo-o **aisuru** zyosei-ni **atta.**
Joseph-TOP travelling-ACC **loves** woman-DAT **met**

Joseph met a woman who loves travelling.

Simultaneous Reading: The woman loved travelling when they met (not necessarily now)

Present Reading: The woman loves travelling now (not necessarily when they met)

(44) **Present-Under-Present**

- No data for such sentences in Japanese is given by Ogihara & Sharvit (2012)
- However, their theory predicts the same range of interpretations as found in English. (*i.e.*, they get a simultaneous reading)

(45) **Present-Under-Future**

As in English and Hebrew – and as with sentence (43) – such sentences are ambiguous. They allow a ‘simultaneous reading’, but also a reading where the embedded event overlaps the present.

Joseph-wa yatto tabi-o aisuru zyosei-ni audaroo.
Joseph-TOP finally traveling-ACC loves woman-DAT will.meet
Joseph will finally meet a woman who loves travelling.

- Simultaneous Reading:
The woman will love travelling when they meet (not necessarily now)
- Present Reading:
The woman loves travelling now (not necessarily when they meet)

(46) **Availability of Simultaneous Readings in Hebrew**

	Past-Under-Past	Present-Under-Past	Present-Under-Future
Complement CP	Impossible	Possible	Possible
Relative CP	Possible	Possible	Possible

(47) **Important Note**

The fact that Japanese completely disallows a simultaneous reading for ‘past-under-past’ sentences shows that it lacks the Tense-Agreement/Deletion operations of English.

(48) **Important Puzzle**

But, why doesn’t Japanese allow for a simultaneous reading of ‘past-under-past’ via a ‘temporal *de re*’ parse (as seems to happen in Hebrew)?

4. First Steps Towards a Typological Theory

(49) The Distribution of Simultaneous Readings in English, Hebrew, and Japanese

In the charts below, I've boldfaced those facts covered by our current semantics for tense

	<u>English</u>	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
Complement CP	Possible	Impossible	Impossible	Possible
Relative CP	Possible	Impossible	Impossible	Possible
	<u>Hebrew</u>	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
Complement CP	Possible (but hard)	Possible	Possible	Possible
Relative CP	Possible	Impossible	Impossible	Possible
	<u>Japanese</u>	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
Complement CP	Impossible	Impossible	Possible	Possible
Relative CP	Possible	Possible	Possible	Possible

(50) Things We Don't Quite Yet Understand / Have an Analysis For

- Simultaneous readings of Present-Under-Future in English *relative* clauses
- Embedded Present in Hebrew and Japanese
- Why simultaneous readings of Past-Under-Past are impossible in Japanese complement clauses (i.e., why not 'temporal *de re*' parse?)

(51) First Parameter: 'Relative Present' vs. 'Indexical Present'

- Relative Present (Hebrew, Japanese, Everybody Sane):
[[Pres-REL_i]] ^{w,t,g,c} is defined only if **g(i) = t**.
If defined, [[Pres-REL_i]] ^{w,t,g,c} = g(i)
- Indexical Present (English)
[[Pres-IND_i]] ^{w,t,g,c} is defined only if **g(i) = c(time)**.
If defined [[Pres-IND_i]] ^{w,t,g,c} = g(i)

(52) **Key Prediction: Present in Complement CP Always Gives Simultaneous Reading**
If a language contains ‘Pres-REL’, then present tense complement clauses will always permit a simultaneous reading.

- a. LF of Present Tense Complement Clause:
[λw [λt [Pres-REL_i [George be president]]]]
- b. Predicted Semantics of Present Tense Complement Clause
[$\lambda w'$: [$\lambda t'$: George is president in w' at t']]

(53) **Proposed Parameterization**

- a. English: Only [Pres-IND]
b. Hebrew: [Pres-REL]
c. Japanese: [Pres-REL]

(54) **Predictions**

- a. In English:
- Present-Under-Past with complement clauses will not allow simultan. reading
 - Present-Under-Future with complement clause will allow simultan. reading
 - Because of Tense-Agreement/Deletion
- b. In Hebrew:
- Present-Under-Past and Present-Under-Future in complement clauses will allow a simultaneous reading
- c. In Japanese:
- Present-Under-Past and Present-Under-Future in complement clauses will allow a simultaneous reading

(55) **Further Prediction**

Under our assumed semantics for ‘WOLL’ (FUT), it is a modal which shifts/binds the evaluation time.

$$a. \quad [[\text{FUT XP}]]^{w,t,g,c} = [\lambda t' : \exists t'' . t'' > t' \ \& \ [[\text{XP}]]^{w,t'',g,c}(t'') = T]$$

- **Therefore, an instance of ‘[Pres-REL]’ in the scope of ‘WOLL’ (FUT) will be interpreted as the shifted future time t' ”**
- Therefore, in languages with ‘[Pres-REL]’, we predict that Present-Under-Future in *relative* clauses should also allow for simultaneous readings (56)

(56) **Simultaneous Reading of Present-Under-Future in Relative Clauses**

- a. LF:
[Pres-REL₁ [FUT [Dave meet [a man [2 [Pres-REL₃ [t₂ be president] ...]]]]]]
- b. Predicted Truth-Conditions:
 $\exists t'' . t'' > t$ & $\exists x . x$ is a man in w &
x is president in w at t' & Dave meets x in w at t'

(56) **Another Further Prediction**

Whether or not a language has [Pres-REL] or [Pres-IND], Present-Under-Past with *relative* clauses should not allow for a simultaneous reading.

- a. LF:
[Past₁ [Dave meet [a man [2 [Pres-REL₃ / Pres-IND₃ [t₂ be president] ...]]]]]
- b. Predicted Truth-Conditions
[[(56a)]]^{w,t,g,c} is defined only if $g(1) < t$. If defined, then [[(56a)]]^{w,t,g,c} = T iff
 $\exists x . x$ is a man in w &
x is president in w at t (= **c(time)**) & Dave meets x in w at $g(1)$.

(57) **Interim Summary: Facts We Now Understand**

In the charts below, I've boldfaced those facts covered by our analysis thus far

a. <u>English</u> :	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
Complement CP	Possible	Impossible	Possible
Relative CP	Possible	Impossible	Possible
b. <u>Hebrew</u> :	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
Complement CP	Possible (but hard)	Possible	Possible
Relative CP	Possible	Impossible	Possible
c. <u>Japanese</u> :	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
Complement CP	Impossible	Possible	Possible
Relative CP	Possible	Possible	Possible

(58) **Things We *Still* Don't Yet Understand**

- a. Simultaneous readings with Present-Under-Future in English relative clauses
- b. Simultaneous readings with Present-Under-Past in Japanese relative clauses.
- c. Impossibility of simultaneous readings with Past-Under-Past in Japanese complement clauses.

5. A Modification to the Theory of English Simultaneous Readings

(59) **Our LF for English Simultaneous Readings of Past-Under-Past in Complement CPs**

$[_{TP} \mathbf{Past}_1 [_{VP} \text{Dave} [_{VP} \text{think} [_{CP} \lambda W [_{CP} 2 [_{TP} T-\emptyset_2 [\text{George} [\text{be president}] \dots]$

(60) **A (Not-So-Minor) Modification**

- a. Let's suppose that the 'minimal tenses' $T-\emptyset_i$ are semantically *relative presents*

- (i) $[[T-\emptyset_i]]^{w,t,g,c}$ is defined only if $g(i) = t$.
- (ii) If defined, $[[T-\emptyset_i]]^{w,t,g,c} = g(i) (=t)$

- b. The binder for these 'minimal tenses' is now ' λt '

New LF for Simultaneous Reading

$[_{TP} \mathbf{Past}_1 [_{VP} \text{Dave} [_{VP} \text{think} [_{CP} \lambda W [_{CP} \lambda t [_{TP} T-\emptyset_2 [\text{George} [\text{be president}] \dots]$

- c. We'll have to assume some adjustment to 'Predication' and 'FTUB' to ensure that the [Past] feature will still be passed down to the embedded ' $[T-\emptyset_2]$ ' in (60b)

(61) **Another (Not-So-Minor) Modification**

- Let's suppose that instead of the 'shifty' lexical entry in (55a), 'WOLL/FUT' has the simple $\langle it, it \rangle$ lexical entry in (61a).

$$a. \quad [[FUT]]^{w,t,g,c} = [\lambda P_{\langle it \rangle} : [\lambda t' : \exists t'' . t'' > t' \ \& \ P(t'') = T]]$$

- Let's suppose that heads of type $\langle it, it \rangle$ can undergo movement, and when they do the following weird things happen:

b. Movement of FUT

- (i) The lambda created by movement is ' λt '
- (ii) The trace of movement is $[t^*]$, which always denote evaluation time
 $[[t^*]]^{w,t,g,c} = t$

(62) **Illustration: Simultaneous Reading of Present-Under-Future in Relative Clauses**

Even with the modifications in (61), we still predict that Present-Under-Future in Hebrew/Japanese relative clauses will allow simultaneous readings.

- a. LF:
[Pres-REL₁ [FUT [λt [t* [Dave meet
[a man [2 [Pres-REL₃ [t₂ be president] ...]
- b. Predicted Truth-Conditions:
 $\exists t'' . t'' > t$ & $\exists x . x$ is a man in w &
x is president in w **at t'** & Dave meets x in w **at t'**

(63) **Capturing Simultaneous Readings of Present-Under-Future in English Relatives**

- Let's finally suppose that the LF of an English sentence like (63a) is the one in (63b).
 - To make this work syntactically, we'd need to suppose the following:
 - Head-raising of WOLL/FUT to Tense puts the feature [PRES] on FUT
 - Predication then puts the [PRES] feature on ' λt '
 - FTUB then transfers this [PRES] feature to [T- \emptyset_3] (but not to [t*])
- a. Dave **will meet** a man who **is** president.
- b. [Pres-IND₁ [FUT [λt [t* [Dave meet [a man [2 [T- \emptyset_3 [t₂ be president] ...]
- As shown below, we predict the truth-conditions in (63c), and therefore that (63a) will allow for a simultaneous reading.
- c. Truth-Conditions:
 $\exists t'' . t'' > t$ & $\exists x . x$ is a man in w &
x is president in w **at t'** & Dave meets x in w **at t'**

(64) **Result: We Now Understand All The Facts Regarding English**

	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
Complement CP	Possible	Impossible	Possible
Relative CP	Possible	Impossible	Possible

6. Quantificational Tense and Tense Copying in Japanese

(65) The Distribution of Simultaneous Readings in Japanese and Hebrew

Again, facts in boldface are ones that our semantic theory can account for thus far...

a. <u>Hebrew:</u>	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
Complement CP	Possible (but hard)	Possible	Possible
Relative CP	Possible	Impossible	Possible
b. <u>Japanese:</u>	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
Complement CP	Impossible	Possible	Possible
Relative CP	Possible	Possible	Possible

(66) Things We *Still* Don't Yet Understand

- Simultaneous readings with Present-Under-Past in Japanese relative clauses.
- Impossibility of simultaneous readings with Past-Under-Past in Japanese complement clauses.

(67) Quantificational Tense in Japanese

- Let's suppose that the tenses of Japanese are *ambiguous*. In addition to the pronominal/referential interpretations in (67a), they can also get the quantificational interpretations in (67b).

- Referential Tense:
 - $[[\text{Past}_i]]^{w,t,g,c} = g(i)$, only if $g(i) < t$
 - $[[\text{Pres-REL}_i]]^{w,t,g,c} = g(i)$, only if $g(i) = t$
- Quantificational Tense:
 - $[[\text{PAST}]]^{w,t,g,c} = [\lambda P_{<it>} : [\lambda t' : \exists t''. t'' < t' \ \& \ P(t'') = T]$
 - $[[\text{PRES}]]^{w,t,g,c} = [\lambda P_{<it>} : [\lambda t' : \exists t''. t'' = t' \ \& \ P(t'') = T]$

- Let's continue to suppose that the tenses of English and Hebrew only receive the pronominal/referential semantics in (67a)

(71) **Key Result: ‘Temporal *De Re*’ With Past Tense Disallows Simultaneous Scenarios**

Given the semantics of the embedded CP in (70b), the entire LF in (70a) ends up having the meaning below.

- $[[(70a)]]^{w,t,g,c}$ is defined only if $g(2) < t$.
- If defined, $[[(70a)]]^{w,t,g,c} = T$ iff

$\exists t'. t' < t \ \& \ \exists P \ \& \ g(2) = \text{the time } z \text{ such that } P(w)(t')(z) \ \& \ \forall \langle w', t'' \rangle \in \text{Dox-Alt}(\text{Dave}, w, t') :$
 $[\lambda t'' : t'' < t' . \text{George is president in } w' \text{ at } t'']$
 (the time z such that $P(w')(t'')(z) = T$)

Key Observation:

Because of the presuppositions introduced by the [Past] feature on the tense-trace, these truth-conditions require the property P to map times t'' to times *strictly in the past* of t'

- Therefore, in Japanese, the ‘temporal *de re*’ reading of a Past-Under-Past sentence (70a) can only describe ‘past-directed’ attitudes...
- That is, under such a reading, the attitude holder must be representing the ‘temporal *res*’ as a **past** time.
- Therefore, the attitude holder cannot be directing their attitude towards times that they conceive of as ‘on-going’ (overlapping their ‘now’).
- **Therefore, we predict that even ‘temporal *de re*’ parses of Past-Under-Past attitude sentences in Japanese will *not* be true in ‘simultaneous scenarios’**

(72) **The Distribution of Simultaneous Readings in Japanese and Hebrew**

a.	<u>Hebrew:</u>	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
	Complement CP	Possible (but hard)	Possible	Possible
	Relative CP	Possible	Impossible	Possible
b.	<u>Japanese:</u>	<u>Past-Under-Past</u>	<u>Present-Under-Past</u>	<u>Present-Under-Future</u>
	Complement CP	Impossible	Possible	Possible
	Relative CP	Possible	Possible	Possible

7. Further Predictions of the Typology

(73) Summary: The Parameters and the Values

	English	Hebrew	Japanese
a. Tense-Agreement/Deletion	Yes	No	No
b. Relative/Indexical Present	Ind	Rel	Rel
c. Quant/Pronominal Tense	Pronom	Pronom	Both
d. T-Movement Leaves Features	No	No	Yes

What are some other languages that this typological system predicts?...

(74) Predicted Language

a. Tense-Agreement/Deletion	Yes
b. Relative/Indexical Present	Rel
c. Quant/Pronominal Tense	Pronom
d. T-Movement Leaves Features	No

e. Predicted Distribution of Simultaneous Readings

	Past-Under-Past	Present-Under-Past	Present-Under-Future
Complement CP	Possible	Possible	Possible
Relative CP	Possible	Impossible	Possible

- This language will be a kind of ‘mix’ of English and Hebrew
- Past-Under-Past in complement CPs will allow for (non *de re*) simultaneous readings
- But so will Present-Under-Past (in complement CPs)!

(75) Predicted Language

a. Tense-Agreement/Deletion	Yes
b. Relative/Indexical Present	Rel
c. Quant/Pronominal Tense	BOTH
d. T-Movement Leaves Features	No

e. Predicted Distribution of Simultaneous Readings

	Past-Under-Past	Present-Under-Past	Present-Under-Future
Complement CP	Possible	Possible	Possible
Relative CP	Possible	Possible	Possible

- This language will allow simultaneous readings EVERYWHERE!

(76) **Predicted Language**

- | | | |
|----|-----------------------------------|------------|
| a. | Tense-Agreement/Deletion | No |
| b. | Relative/Indexical Present | Rel |
| c. | Quant/Pronominal Tense | Pronom |
| d. | T-Movement Leaves Features | YES |

e. Predicted Distribution of Simultaneous Readings

	Past-Under-Past	Present-Under-Past	Present-Under-Future
Complement CP	Impossible	Possible	Possible
Relative CP	Possible	Impossible	Possible

- This language will be extra restrictive.
- Simultaneous readings won't at all be possible in Past-Under-Past complement CPs
 - No Tense-Agreement/Deletion
 - Traces of tense-movement have tense features
- Simultaneous readings won't at all be possible in Present-Under-Past relative CPs
 - Only pronominal tenses, as in Hebrew and English

...And this doesn't yet exhaust the logical possibility of parameter settings...