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The Temporal Interpretation of Embedded Structures:

Contrasting English and Turkish

Wissenschaftliche Arbeit zur ersten Staatsprüfung
für das Lehramt an Gymnasien (GymPO)
im Fach Englisch

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Abstract: This paper empirically investigates the temporal interpretation of embedded structures in Turkish. Languages like English are classified to be +SoT languages, since a simultaneous reading and a shifted reading are available in past-under-past constructions. Other languages like Russian and Japanese are considered to be -SoT languages, since they can only derive a shifted interpretation in past-under-past constructions. Cross-linguistically, this is an interesting variation, that raises the interest of temporal interpretations for other languages. The sentence structures that are looked at are Turkish complement clauses and relative clauses, as these sentence structures behave interestingly in English. The result is that for both structures the simultaneous, the backward-shifted as well as the forward-shifted readings are available.

1 Introduction

Cross-linguistic research has shown that languages behave different with respect to their temporal interpretation of subordinated clauses. English, for example, is a sequence of time (=SOT) language, which means that an embedded sentence construction gives rise to a temporal ambiguity, mostly between the shifted and simultaneous interpretations. Complement Clauses and Relative Clauses are the sentence structures that are looked at with respect to their temporal interpretations, whereas the tense in matrix clause and in the embedded clause are both past tensed. In this case, it is observed that English complement clauses can have a backward-shifted interpretation and a simultaneous interpretation.

(1) Mira believed that Lara was happy.

a. Mira believed: `"Lara is happy."` (SIMULTANEOUS)
b. Mira believed: `"Lara was happy."` (SHIFTED)

An English relative clause even has three readings: the backward-shifted reading, the simultaneous reading, and the later-than-matrix interpretation.

(2) Eva talked to the boy who was crying.

a. Eva talked to the boy who was crying at *t*,
where *t* is at the time of her talking to him. (SIMULTANEOUS)

b. Eva talked to the boy who was crying at *t*,
where *t* is before her talking to him. (EARLIER-THAN-MATRIX)

c. Eva talked to the boy who was crying at *t*,
where *t* is after her talking to him. (LATER-THAN-MATRIX).

Russian, in contrast, does not have this ambiguity, since the very same sentence construction can only reveal the backward-shifted interpretation in Russian. Hence, Russian is a non-SOT language (von Stechow 2009).

	Shifted	Sim	Later-than
English	√	√	*
Russian	√	*	*

Table 1.1: Past Under Past in Complement Clauses

These findings in the semantic field raised the interest to categorize other under-researched languages to the group of SOT or non-SOT. The overall scientific goal of this paper is to empirically show that Turkish is a SOT language. The structure is as followed: The first chapter is a detailed adoption of English tense semantic in Complement Clauses and Relative Clauses. Additionally, a comparison of English, as +SOT, and other -SOT languages is displayed. As this paper mainly focuses on Turkish embedded tense interpretation, the background section entails a general introduction into the syntax of Turkish, especially Turkish subordination. The paper then presents the setup and implementation of a quantitative on-line rating study followed by the evaluation of the empirical results. In a next step, the results are semantically analyzed and explained. Finally, this paper gives a short summary of the findings and points out on several questions and future work topics.

2 Background

In order to understand the temporal interpretation of embedded structures, we first of all need to go beyond Heim and Kratzer (1998) and the system of extension and introduce intensional semantics. Further, this section gives an insight to the semantics of tense, which builds the main ground for the temporal interpretation of embedded structures. In the next step there is a compositional interpretation of an English embedded sentence, which later is to be contrasted with a Turkish embedded sentence.

2.1 Intensional Semantics

The problem with the system of Extensional Semantics, as it is used in Heim and Kratzer (1998), is its ignorance with respect to displacement. One of the core characteristics of human language that is distinct from animal language is its capability of modal and temporal displacement, as human discourse is not restricted to the actual here and now. Natural language rather can turn from the present, to a situation of the past or future. For this to happen, human communication uses displacement operators like modals (e.g. *might, must*), prepositional attitude verbs (e.g. *believe, know*), intentional adjectives (e.g. *former*) and last, the past or future tense and temporal adverbials (e.g. *few days ago*) Fintel and Heim 2011. As previously suggested, extensional semantics fails to capture these displacements, which formulates the central motivation of intensional semantics, since it marks displacement and deals with it. In addition, there is another problem for an extensional semantics, which I will explain with a sentence that contains a propositional attitude verbs:

(1) a. Mary believes [$_{\text{CP}}$ that John is loyal.]

b. Mary believes [$_{\text{CP}}$ that Mike is loyal.]

Under the system of extensional semantics the embedded CP has the denotation type <t>, which is a misleading assumption saying that all true sentences mean the same, if they are mapped to true, and all false sentences mean the same, if they are mapped to false:

c. [$_{\text{CP}}$ that John is loyal.] = [$_{\text{CP}}$ that Mike is loyal.] = 1

Our intuition is extremely strong and we can judge this assumption to be wrong, since

Mike and John are two different individuals. We encounter this problem with every sentence with the denotation type <t>. Intensional semantics solves this problem, as well, for now a sentence is not true or false per sé anymore, but is evaluated in a possible world or time. Therefore, the following assumption takes place:
Let us suppose that Mira went to Spain on May 1^{th} and came back to Germany on May 7^{th}, and this is the only trip she made to Spain. In this context, the sentence *Mira went to Turkey* would be true when the time of utterance is after May 7^{th}. Consequently, the sentence would be false when uttered on February 9^{th} at 9 AM, but true when uttered on May 9^{th} at 9 AM. This example shows the dependency of truth conditions to the time of evaluation. Hence, sentence denotations have to be sensitive to times. As the meaning of a sentence is generated from the meaning of its segments, we have to relativize the denotation of nouns, verbs and other sentential elements on with respect to times, as well (Kusumoto 1999).

A sentence now is either treated as a function from possible worlds to truth values, <s,t>, or as a function from possible times to truth values, <i,t>.
As this study is interested in a temporal interpretation of sentences, I will have a great emphasis on temporal displacement and introduce times in the frame of intensional semantics. In the following, I will introduce new elementary semantic types, which we need in order to deal with temporal displacement. The new range of types we will use are:

(2) Semantic Types
  a. *e, t, i* and *s* are types
  b. For any types α an β, $<\alpha,\beta>$ is a type
  c. Nothing else is a type

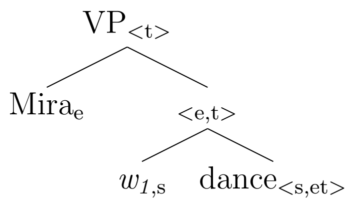
The model we assume for semantic domains contains D, the set of all individuals, T, the set of all intervals, and W, the set of all worlds.

(3) Semantic Denotation Domains
  e for individuals, *t* for truth values, *i* for time intervals, *s* for possible worlds.

It is worth to see an example of a modal displacement and compare it to a temporal displacement:

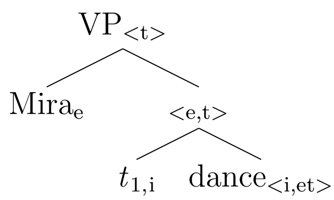
(4) a. Mira must dance.

$[\![\text{dance}]\!]^{g} = \lambda w \epsilon D_{s}.\ \lambda x \epsilon D_{<s,et>}.\ x$ dances in w (type <s,et>)



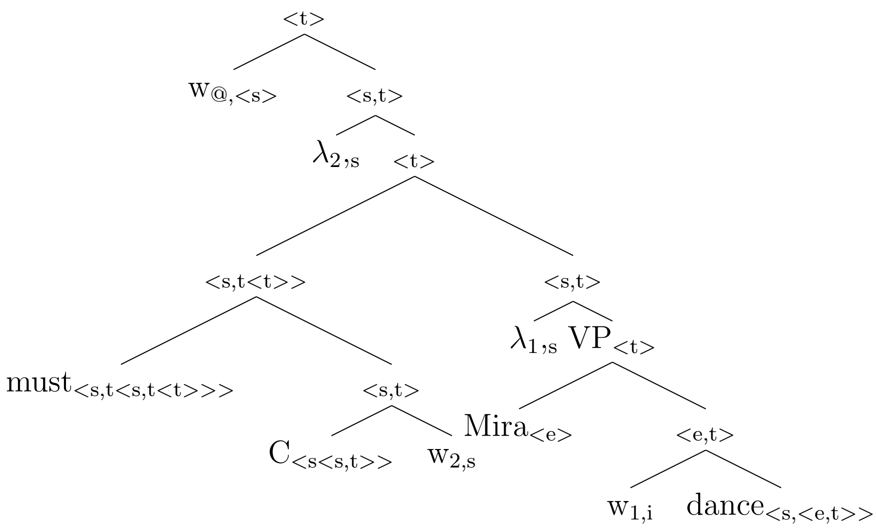
(5) b. Mira danced.

⟦dance⟧^{g} = $\lambda t \in D_i$. $\lambda x \in D_e$. x dances at t (type <i,et>)

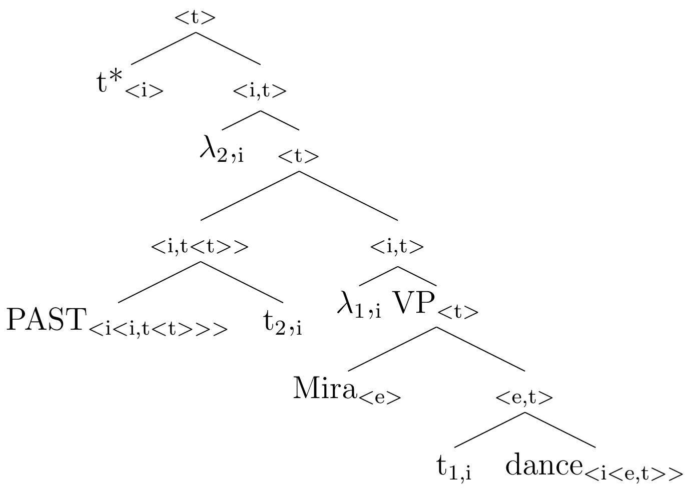


It is to mark that now intransitive verbs that are traditionally considered to be one-place predicates, under intensional semantics are treated as two-place predicates seeking for an individual argument e and a time argument i (Kusumoto 2005 p.318). The trees above are not complete, since the modal is missing in (4), tense is missing in (5) and the variables are not bound in both. Beck and Hohaus (2010) suggest the following trees, the lexical entry for PAST is given in (8):

(6)



(7)



(8) $[\![\text{PAST}]\!]^{g} = [\lambda t\in D_{<i>}.\lambda P\in D_{<i,t>}.\ \exists t'[t' < t\ \&\ P(t')=1]]$[1]

Under this lexical entry the following desired result is obtained:

(9) $[\![\text{Mira danced}]\!]^{g}\ (t^*) = 1$ iff $\exists t'\ [t' < t^*$ & MIRA dances at t'], where t* is the time of utterance

See (10) for a step-by-step compositional interpretation.

Further lexical entries:
$[\![\text{Mira}]\!]^{g}$=MIRA
$[\![\text{dance}]\!]^{g}=[\lambda i.\lambda a.$ a dances at i]

(10)

$[\![(7)]\!]^{g}=1$ iff FA

$[\![[2_{<i>}[\text{PAST}[t_{2<i>}]][_{I'}[1_{<i>}\ [_{VP}\ [\text{Mira}_{<e>}\ [_{V'}\ [t_{1<i>}\ [\text{dance}_{<i,et>}\ ]]]]]]]]]\!]\ (t^*)=1$ iff PA

$[\lambda t\in D_{<i>}.[\![[\text{PAST}[t_{2<i>}]][_{I'}[1_{<i>}\ [_{VP}\ [\text{Mira}_{<e>}\ [_{V'}\ [t_{1<i>}\ [\text{dance}_{<i,et>}\ ]]]]]]]]\!]^{g[2\to t]}](t^*)=1$ iff FA

$[\lambda t\in D_{<i>}.[\![[\text{PAST}[t_{2<i>}]][_{I'}\ (1_{<i>}\ [_{VP}\ [\text{Mira}_{<e>}\ [_{V'}\ [t_{1<i>}\ [\text{dance}_{<i,et>}\ ]]]]]])]\!]^{g[2\to t]}](t^*)=1$ iff FA

$[\lambda t\in D_{<i>}.[\![\text{PAST}\ (t_{2<i>})[_{I'}\ (1_{<i>}\ [_{VP}\ [\text{Mira}_{<e>}\ [_{V'}\ [t_{1<i>}\ [\text{dance}_{<i,et>}\ ]]]]])]\!]^{g[2\to t]}](t^*)=1$

[1]Note that I ignore context dependency of the tense operator in this thesis, as it is not our main focus.

iff PA

$[\lambda t \in D_{<i>}.[\![PAST\ (t_{2<i>})([\lambda s \in D_{<i>}.[Mira_{<e>}\ [_{V'}\ [t_{1<i>}\ [dance_{<i,et>}\ ]]]]])]\!]^{g[\substack{2 \to t \\ 1 \to s}]}(t^*)=1$
iff FA

$[\lambda t \in D_{<i>}.[\![PAST\ (t_{2<i>})([\lambda s \in D_{<i>}.[_{V'}\ [t_{1<i>}\ [dance_{<i,et>}\ ]]](Mira_{<e>}))])]\!]^{g[\substack{2 \to t \\ 1 \to s}]}(t^*)=1$
iff FA, TN

$[\lambda t \in D_{<i>}.PAST\ (t_{2<i>})([\lambda s \in D_{<i>}.[dance_{<i,et>}\ ](t_{1<i>})(MIRA)])](t^*)=1$ iff PRONOUN, TN

$[\lambda t \in D_{<i>}.[\lambda t \in D_{<t>}.\lambda P \in D_{<i,t>}.\ \exists t'[t' < t\ \&\ P(t')=1]](t_2[2 \rightarrow t](2))[(\lambda s \in D_{<i>}.[dance_{<i,et>}](t_{1<i>})(MIRA)])](t^*) = 1$ iff TN, PT

$[\lambda t \in D_{<i>}.[\lambda t \in D_{<t>}\ \lambda P \in D_{<i,t>}.\ \exists t'[t' < t\ \&\ P(t')=1]](t)\ ([\lambda s \in D_{<i>}.[\lambda i.\lambda a.$ a dances at $i](t_1\begin{bmatrix} 2 & \rightarrow & p \\ 1 & \rightarrow & s \end{bmatrix}(1))(MIRA)])](t^*)=1$ iff simpl

$[\lambda t \in D_{<i>}.\ \lambda P \in D_{<i,t>}.\ \exists t'[t' < t\ \&\ P(t')=1]([\lambda s \in D_{<i>}.[\lambda i.\lambda a.$ a dances at $i](s)(MIRA)])](t^*)=1$
iff simpl

$[\lambda t \in D_{<i>}.\lambda P \in D_{<i,t>}.\ \exists t'[t' < t\ \&\ P(t')=1]([\lambda s \in D_{<i>}.$ MIRA dances at $s])](t^*)=1$ iff simpl

$[\lambda t \in D_{<i>}.\exists t'[t' < t\ \&\ [\lambda s \in D_{<i>}.$ MIRA dances at $s](t')=1]](t^*)=1$ iff simpl

$\exists t'[t' < t^*\ \&$ MIRA dances at $t']$, where t^* is the time of utterance

If we can have a lexical entry for the past tense, we can also have a lexical entry for the other tense operators:

(11) $[\![PRES]\!]^g = \lambda t \in D_{<i>}.\lambda P \in D_{<i,t>}.\exists t'[t'=t\ \&\ P(t') = 1]$

(12) $[\![FUT]\!]^g = \lambda t \in D_{<i>}.\lambda P \in D_{<i,t>}.\exists t'[t' > t\ \&\ P(t') = 1]$

According to Kusumoto (1999), we can make some further assumptions with these lexical entries for the different time orders and the example above:

i) tense manipulates times only in the meta-language,

ii) tense is a sentential operator,

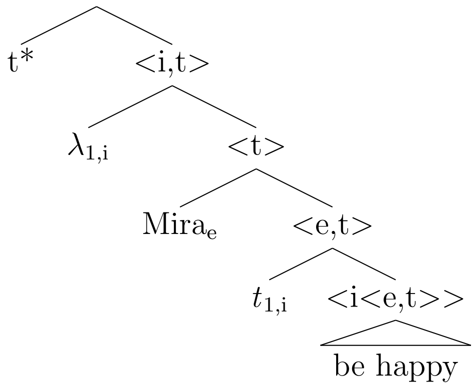
iii) sentences are evaluated with respect to one temporal index, and

iv) tense is an existential quantifier over times.

Evidently, there are some more features that are derived from the assumptions above, like tense introducing a new time, which turns out to be the time of evaluation replacing the original evaluation time.
In addition, there is another approach, in which the lexical entry in (11) is unnecessary by assuming that there is no PRES-operator. The two options are shown below.

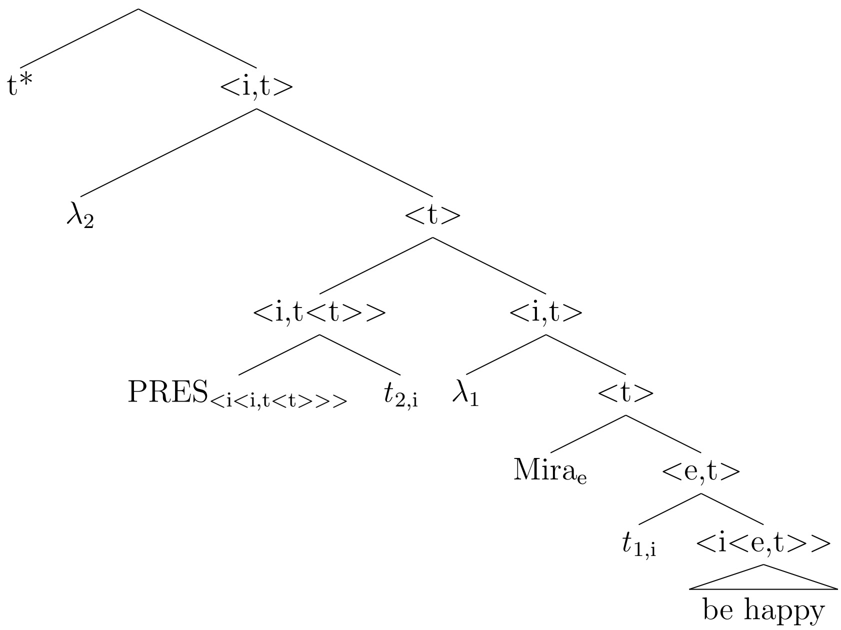
(13) Mira is happy.

(14) a.



b. $[\![\text{Mira is happy}]\!]^g(t^*) = 1$ iff Mira is happy at t*

(15) a.



b. $[\![\text{Mira is happy}]\!]^g(t^*) = 1$ iff Mira is happy at t*

2.2 English Subordinate Tense

The most interesting part of tense is its behavior in subordinate constructions, which, according to von Stechow (2009), can be divided in three types:

i) tense in Complement Clauses, i.e., tense under attitudes;

ii) tense in Relative Clauses;

iii) tense in Participle Clauses, like before/after clauses.

This subsection will first introduce the behavior of tense in these three constructions and second look at how our current system handles these findings.

2.2.1 Tense in Complement Clauses

(16) Mira said that Lara was angry.
- a. Mira said: `"Lara is angry."` (SIMULTANEOUS)
- b. Mira said: `"Lara was angry."` (SHIFTED)

(17) Mira believed that Lara was happy.
- a. Mira believed: `"Lara is happy."` (SIMULTANEOUS)
- b. Mira believed: `"Lara was happy."` (SHIFTED)

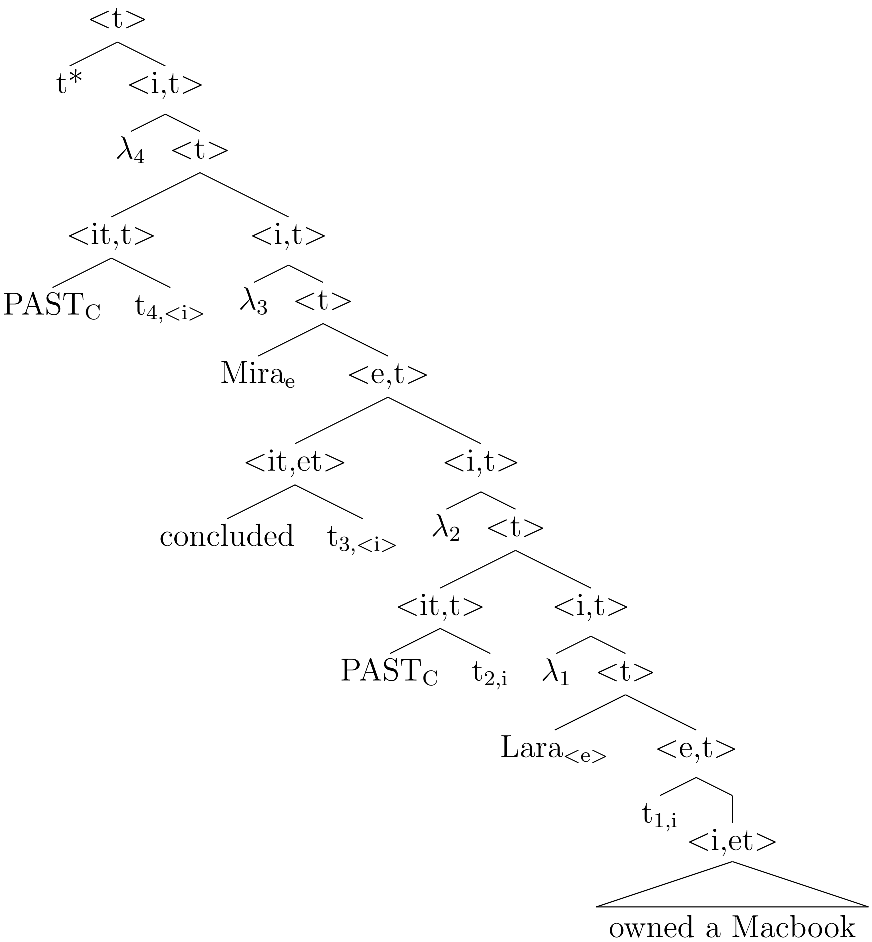
(18) Mira concluded that Lara owned a Macbook.
- a. Mira concluded: `"Lara owns a Macbook."` (SIMULTANEOUS)
- b. Mira concluded: `"Lara owned a Macbook."` (SHIFTED)

The previous examples in (16), (17), and (18) are clearly ambiguous with respect to their temporal interpretation. Now, we want to see if our system can actually cope with this ambiguity. One way to deal with tense under attitudes is to consider possible worlds and reconstruct our lexical entries. Recall that *s* is the type of possible worlds, which means that now every lexical entry will denote an intension. Under this account, we have to revise our lexical entries, like in ((19)-a). A simplified way to move on is by breaking down the lexical entry of *conclude* in order to avoid possible worlds, which is shown in ((19)-b) (Beck and Hohaus 2010).

(19)
- a. $[\![\text{conclude}]\!]^g = \lambda w_{<s>}.\ \lambda t_{<i>}.\lambda P_{<i,t>}.\lambda x._{<e>}.$ $\forall$w[x draws a conclusion in w at t, and if this conclusion is correct, then P(t)(w)] (type <s<i<i,t<e,t>>>>)
- b. $[\![\text{conclude}]\!]^g = \lambda t_{<i>}.\lambda P_{<i,t>}.\lambda x._{<e>}.$ x draws a conclusion at t, and if this conclusion is correct, then P(t). (type <i<i,t<e,t>>>)

The two Logical Forms of (18) are in (20) with the **SHIFTED** reading, and (21) with the **SIMULTANEOUS** reading. For the following step-by-step interpretations, I have chosen the lexical entry of (25-b).

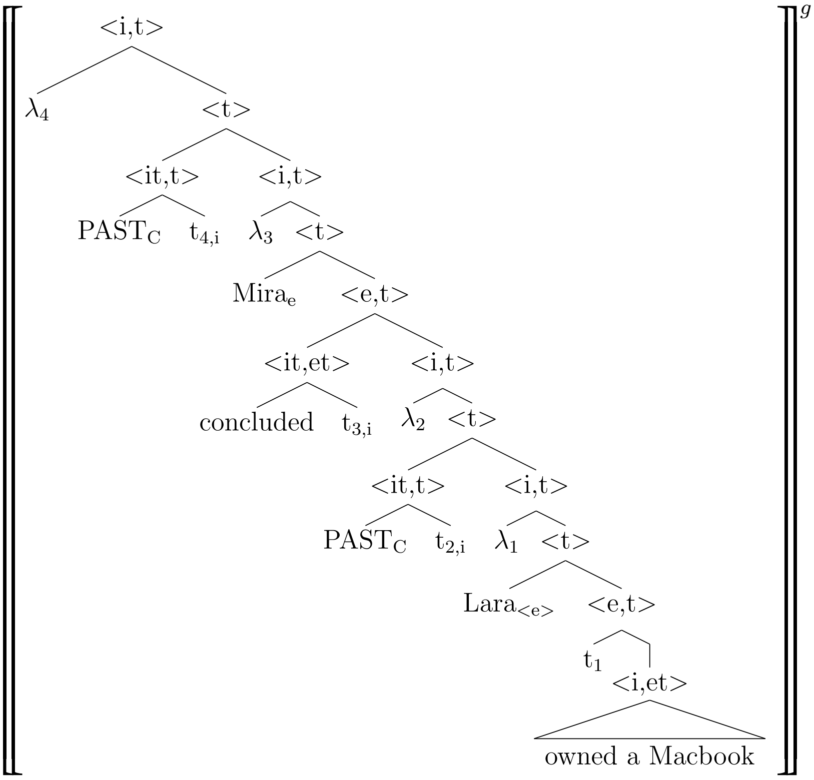
(20) I. Logical Form & Semantic Types (24-b)



II. Lexical Entries (22):

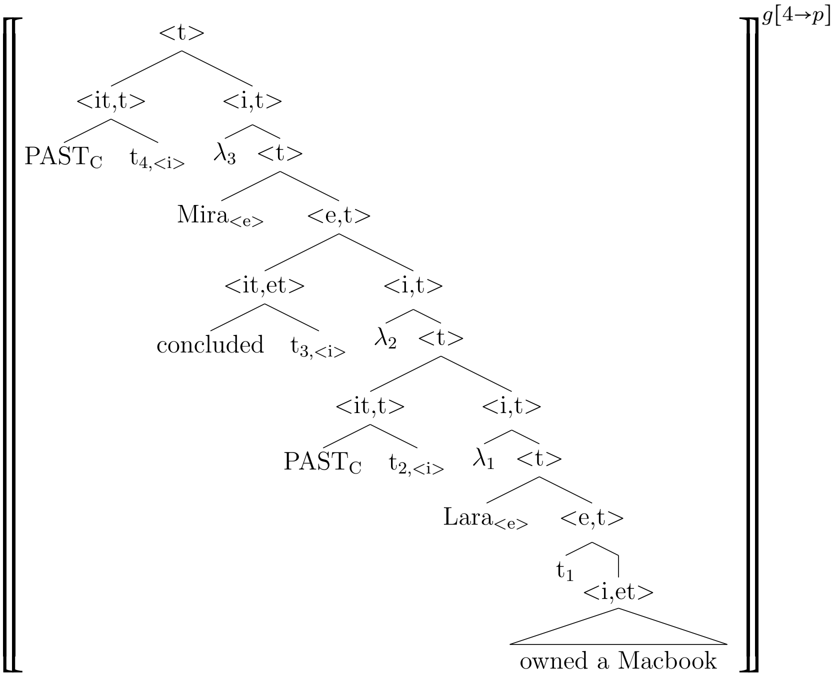
$[\![\text{Mira}]\!]^{g} = \text{MIRA}$
$[\![\text{Lara}]\!]^{g} = \text{LARA}$
$[\![\text{own a Macbook}]\!]^{g} = \lambda t \in D_{<i>}.\lambda x \in D_{<i>}.$ x owns a Macbook at t.
$[\![\text{PAST}]\!]^{g} = [\lambda t \in D_{<t>}.\lambda P \in D_{<i,t>}.\ \exists t'[t' < t\ \&\ P(t')=1]]$ $[\![\text{conclude}]\!]^{g} = \lambda t_{<i>}.\lambda P_{<i,t>}.\lambda x._{<i>}.$
x draws a conclusion at t, and if this conclusion is correct, then P(t).

III. Step-by-Step Interpretation
$[\![(24\text{-b})]\!]^{g} = 1$ iff FA



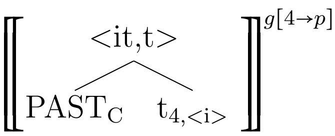
(t*)=1 iff PA

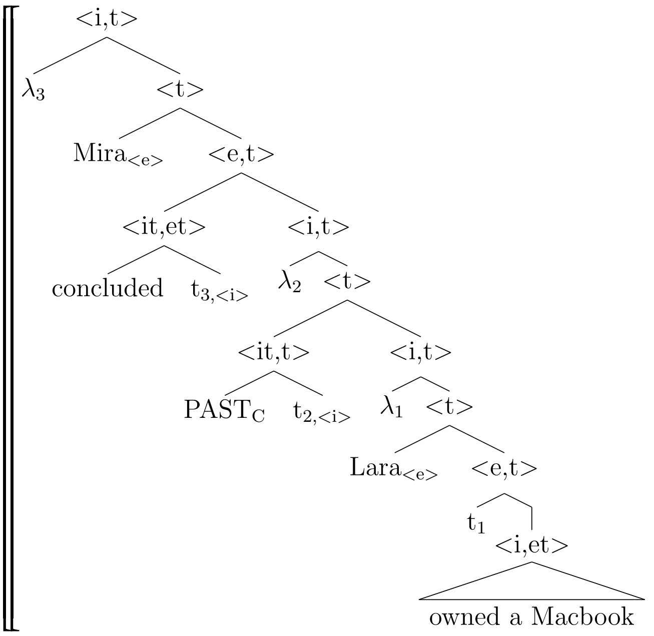
[λp∈D.



](t*) = 1 iff FA

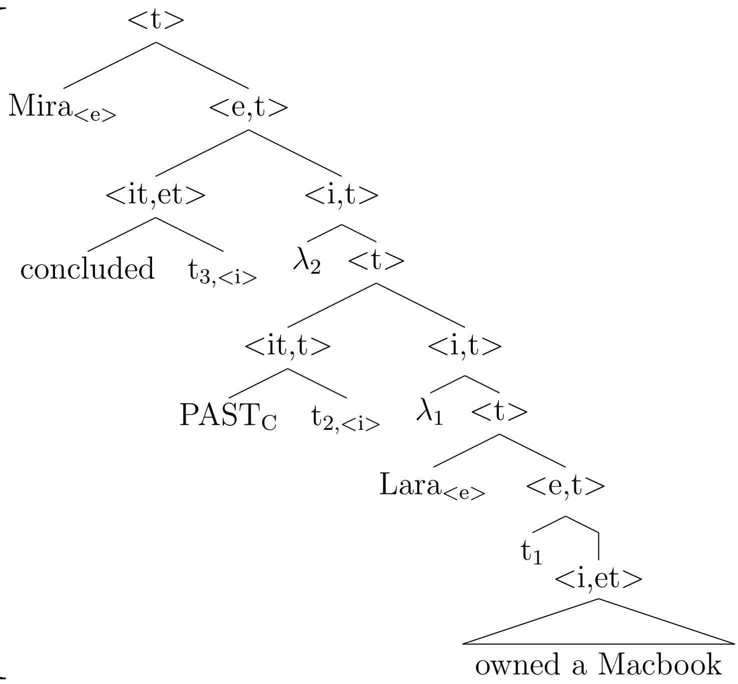
[λp∈D.



$($ 

$]^{g[4 \to p]}$)] (t*)= 1 iff FA,PA

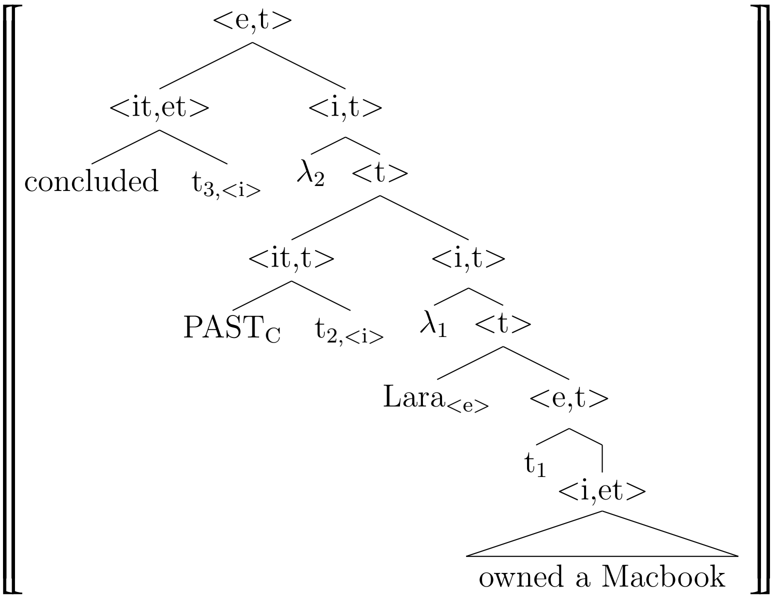
[$\lambda p \in D$. $[\![PAST_C]\!]^{g[4 \to p]}$ ($[\![t_{4,<i>}]\!]^{g[4 \to p]}$) ([$\lambda s \in D$.



$]^{g\begin{bmatrix}4 & \to & p\\ 3 & \to & s\end{bmatrix}}$])](t*)=1 iff Trace,

FA

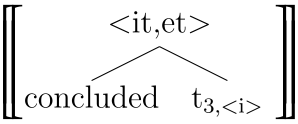
[$\lambda p \in D$. $[\![PAST_C]\!]^{g[4 \to p]}$ $(g[4 \to p](4))$
([$\lambda s \in D$.



$^{g\begin{bmatrix}4 & \rightarrow & p\\ 3 & \rightarrow & s\end{bmatrix}}$ $(⟦\text{Mira}⟧^{g\left[\begin{smallmatrix}4 & \rightarrow & p\\ 3 & \rightarrow & s\end{smallmatrix}\right]}$

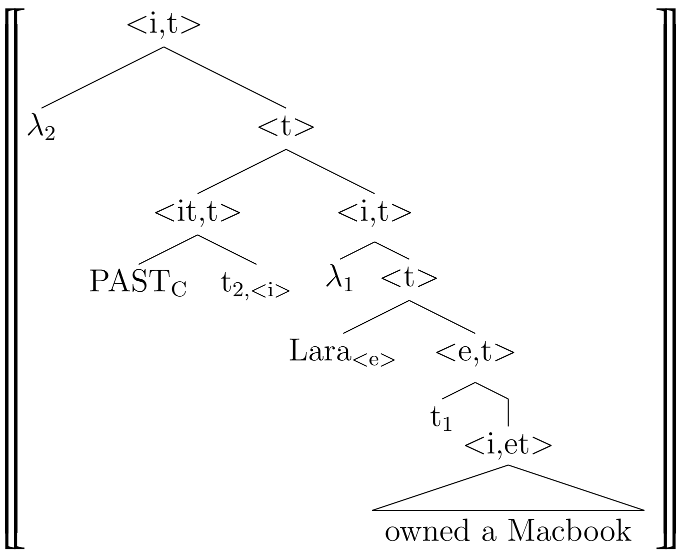
)])](t*)=1 iff TN, FA

[λp ϵD. $⟦\text{PAST}_C⟧^{g[4 \;\rightarrow\; p]}$ (p) ([λsϵD.



$^{g\begin{bmatrix}4 & \rightarrow & p\\ 3 & \rightarrow & s\end{bmatrix}}$

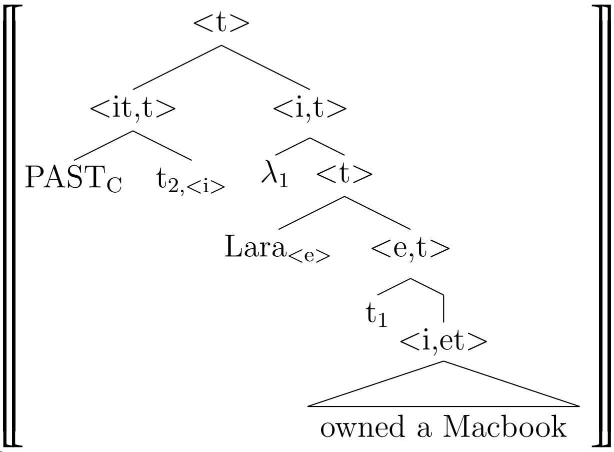
(



$^{g\begin{bmatrix}4 & \rightarrow & p\\ 3 & \rightarrow & s\end{bmatrix}}$) (MIRA)])](t*)=1 iff

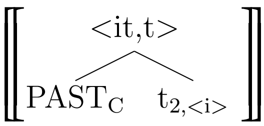
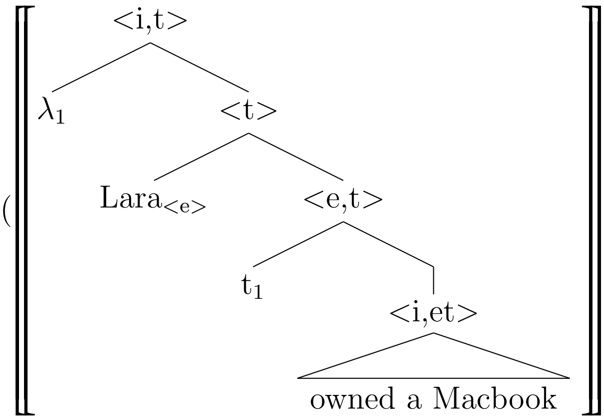
FA, PA, TN

$[\lambda p \in D.[\lambda t \in D_{<t>}.\lambda P \in D_{<i,t>}.\ \exists t'[\ t' < t\ \&\ P(t')=1]](p)([\ \lambda s \in D.[\![concluded]\!]^{g[4 \to p, 3 \to s]}$ $([\![t_3]\!]^{g[4 \to p, 3 \to s]})$

$([\lambda q \in D.$  $]^{g[4 \to p, 3 \to s, 2 \to q]}$ $])$ (MIRA)$])](t^*)=1$

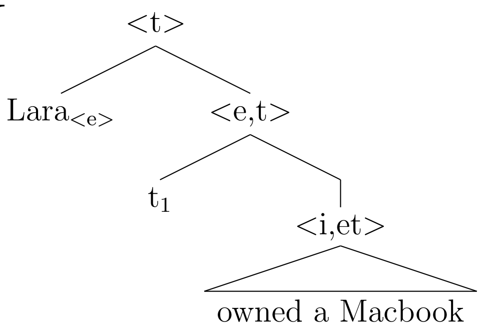
iff FA, Trace

$[\ \lambda p \in D.\lambda P \in D_{<i,t>}.\ \exists t'[\ t' < p\ \&\ P(t')=1]\ ([\ \lambda s \in D.[\![concluded]\!]^{g[4 \to p, 3 \to s]}\ (g[4 \to p, 3 \to s](3))$

$([\lambda q \in D.$  $]^{g[4 \to p, 3 \to s, 2 \to q]}$ ( $]^{g}$ $^{g[4 \to p, 3 \to s, 2 \to q]}])$

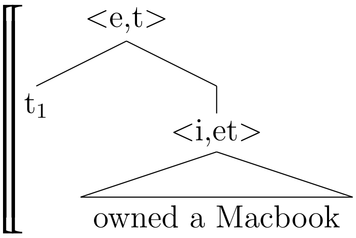
(MIRA)$])](t^*)$= 1 iff FA, PA, TN

$[\lambda p \in D.\lambda P \in D_{<i,t>}.\ \exists t'[\ t' < p\ \&\ P(t')=1]\ ([\ \lambda s \in D.[\lambda t_{<i>}.\lambda P_{<i,t>}.\lambda x._{<e>}.$ x draws a conclusion at t, and if this conclusion is correct, then $P(t)](s)([\lambda q \in D.\ [\![PAST_C]\!]^{g[4 \to p, 3 \to s, 2 \to q]}$

$([\![t_2]\!]^{g\left[\begin{smallmatrix}4 & \rightarrow & p\\3 & \rightarrow & s\\2 & \rightarrow & q\end{smallmatrix}\right]})$ (λi∊D. $[\![$  $]\!]^{g\left[\begin{smallmatrix}4 & \rightarrow & p\\3 & \rightarrow & s\\2 & \rightarrow & q\\1 & \rightarrow & i\end{smallmatrix}\right]}$]) (MIRA)])](t*)=

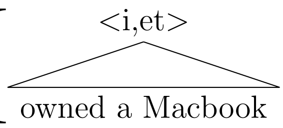
1 iff Trace, FA

[λp ∊D.λP∊$D_{<i,t>}$. ∃t'[t'< p & P(t')=1] ([λs ∊D.[$\lambda t_{<i>}$.$\lambda P_{<i,t>}$.$\lambda x._{<e>}$. x draws a conclusion at t, and if this conclusion is correct, then P(t)](s)([λq∊D. $[\![PAST_C]\!]^{g\left[\begin{smallmatrix}4 & \rightarrow & p\\3 & \rightarrow & s\\2 & \rightarrow & q\end{smallmatrix}\right]}$

$\left(g\begin{bmatrix}4 & \rightarrow & p\\3 & \rightarrow & s\\2 & \rightarrow & q\end{bmatrix}(2)\right)$ (λi∊D. $[\![$  $]\!]^{g\left[\begin{smallmatrix}4 & \rightarrow & p\\3 & \rightarrow & s\\2 & \rightarrow & q\\1 & \rightarrow & i\end{smallmatrix}\right]}$ ($[\![Lara]\!]^{g\left[\begin{smallmatrix}4 & \rightarrow & p\\3 & \rightarrow & s\\2 & \rightarrow & q\\1 & \rightarrow & i\end{smallmatrix}\right]}$)]])(MIRA)])]

(t*)= 1 iff FA, TN, TN

[λp ∊D.λP∊$D_{<i,t>}$. ∃t'[t'< p & P(t')=1] ([λs ∊D.[$\lambda t_{<i>}$.$\lambda P_{<i,t>}$.$\lambda x._{<e>}$. x draws a conclusion at t, and if this conclusion is correct, then P(t)](s)([λq∊D. [λt∊ $D_{<t>}$.λP∊$D_{<i,t>}$.

∃t"[t"< t & P(t")=1]] (q) (λi∊D.[$[\![$  $]\!]^{g\left[\begin{smallmatrix}4 & \rightarrow & p\\3 & \rightarrow & s\\2 & \rightarrow & q\\1 & \rightarrow & i\end{smallmatrix}\right]}$ $[\![t_1]\!]$ (LARA)]])(MIRA)])]

(t*)= 1 iff Trace, TN

[λ p∊$D_{<i>}$. [λP∊$D_{<i,t>}$. ∃t'[t'< p & P(t')=1]]([λs∊D.$\lambda P_{<i,t>}$.$\lambda x._{<e>}$. x draws a conclusion at s, and if this conclusion is correct, then P(s)]([λq∊D.λP∊$D_{<i,t>}$. ∃t"[t"< q & P(t")=1]]([λi∊D.λt∊$D_{<i>}$.λx∊$D_{<i>}$. x owns a Macbook at t. (i)(LARA))](MIRA)]]))
](t*) =1 iff

[λ p∊$D_{<i>}$. [λP∊$D_{<i,t>}$. ∃t'[t'< p & P(t')=1]]([λs∊D.$\lambda P_{<i,t>}$.$\lambda x._{<e>}$. x draws a conclusion at s, and if this conclusion is correct, then P(s). ([λq∊D.λP∊$D_{<i,t>}$. ∃t"[t"< q &

P(t”)=1]]([λi∈D. LARA owns a Macbook at i])])(MIRA)]])](t*) =1 iff simpl

[λ p∈$D_{<i>}$. [λP∈$D_{<i,t>}$. ∃t’[t’< p & P(t’)=1]]([λs∈D.λ$P_{<i,t>}$.λx.$_{<e>}$. x draws a conclusion at s, and if this conclusion is correct, then P(s). ([λq∈D. ∃t”[t”< q & [λi∈D. LARA owns a Macbook at i](t”)=1]])(MIRA)]])](t*) =1 iff simpl

[λ p∈$D_{<i>}$. [λP∈$D_{<i,t>}$. ∃t’[t’< p & P(t’)=1]]([λs∈D.λ$P_{<i,t>}$.λx.$_{<e>}$. x draws a conclusion at s, and if this conclusion is correct, then P(s). ([λq∈D. ∃t”[t”< q & LARA owns a Macbook at t”]])(MIRA)]])](t*) =1 iff simpl

[λ p∈$D_{<i>}$. [λP∈$D_{<i,t>}$. ∃t’[t’< p & P(t’)=1]]([λs∈D.λx.$_{<e>}$. x draws a conclusion at s, and if this conclusion is correct, then [λq∈D. ∃t”[t”< q & LARA owns a Macbook at t”]](s).(MIRA)]])](t*) =1 iff simpl

[λ p∈$D_{<i>}$. [λP∈$D_{<i,t>}$. ∃t’[t’< p & P(t’)=1]]([λs∈$D_{<i>}$.MIRA draws a conclusion at s, and if this conclusion is correct, then ∃t”[t”< s & LARA owns a Macbook at t’]])](t*) =1 iff simpl

[λ p∈$D_{<i>}$. ∃t’[t’< p & [λs∈D.$_{<i>}$.MIRA draws a conclusion at s, and if this conclusion is correct, then ∃t”[t”< s & LARA owns a Macbook at t”]]](t’)=1](t*) =1 ff simpl

[λp∈$D_{<i>}$. ∃t’[t’< p & MIRA draws a conclusion at t’, and if this conclusion is correct, then ∃t”[t”< t’ & LARA owns a Macbook at t”]]](t*) =1 iff simpl

So we end up with:

⟦Mira concluded that Lara owns a Macbook⟧^{g}(t*)= 1 iff
∃t’[t’< t* & MIRA draws a conclusion at t’, and if this conclusion is correct, then ∃t”[t”< t’ & LARA owns a Macbook at t”]]

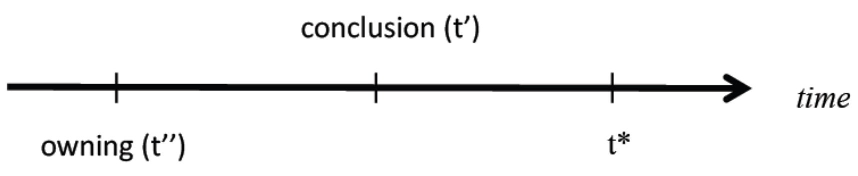
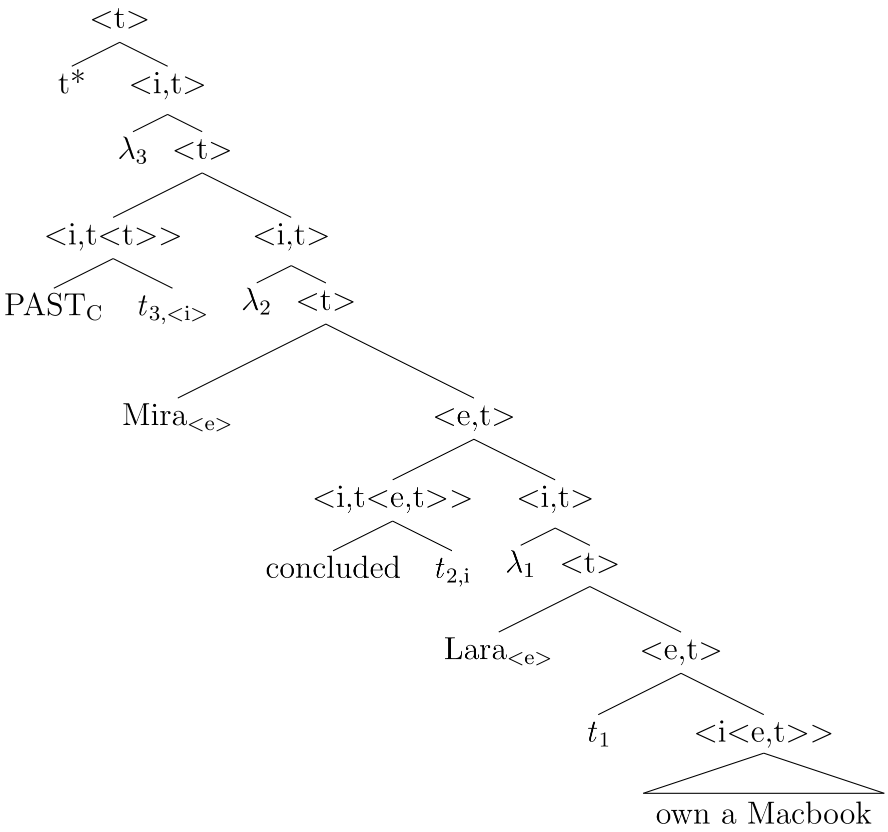


Figure 2.1: Backward-Shifted Reading

(21) I. Logical Form & Semantic Types (24-a)



(22) II. Lexical Entries

$[\![\text{Mira}]\!]^g = \text{MIRA}$
$[\![\text{Lara}]\!]^g = \text{LARA}$
$[\![\text{own a Macbook}]\!]^g = \lambda t \in D_{<i>}.\lambda x \in D_{<i>}.$ x owns a Macbook at t.
$[\![\text{PAST}]\!]^g = [\lambda t \in D_{<t>}.\lambda P \in D_{<i,t>}.\ \exists t'[t' < t \ \&\ P(t')=1]]$
$[\![\text{conclude}]\!]^g = \lambda t_{<i>}.\lambda P_{<i,t>}.\lambda x._{<e>}.$ x draws a conclusion at t, and if this conclusion is correct, then P(t).

(23) III. Compositional Interpretation

$[\![(23)\ ]\!]^g = 1$ iff FA

We end up with:[2]

[2] You can find a full Step-by-Step Interpretation in the Appendix

⟦Mira concluded that Lara owns a Macbook⟧^{g}(t*)=
∃**t'[t'< t* & MIRA draws a conclusion at t', and if this conclusion is correct, then Lara owns a Macbook at t']**

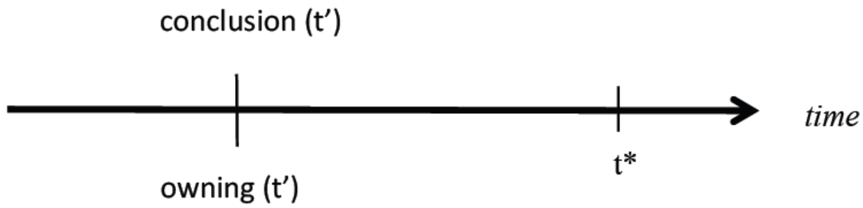


Figure 2.2: Simultaneous Reading

So we can see, that we have two different readings for one sentence and for each reading another Logical Form. The ambiguity originates from the tense operator. We can observe that in both LFs, (22) and (23), the matrix past tense is bound, and we only have past tense in the embedded structure for the LF in (22) corresponding to the earlier-than interpretation. We keep the following results in mind:

(24) Available Readings Are:
a. the simultaneous reading (√)
b. the earlier-than-matrix reading (√)
c. the later-than-matrix reading (*)

2.2.2 Tense in Relative Clauses

It is worth to look at relative clauses in order to widen the scope. According to the next example taken from Kusumoto (1999) the sentence, which is past tense embedded in relative clause under a past tense, has three possible readings.

(25) Eva talked to the boy who was crying.

a. Eva talked to the boy who was crying at *t*,
where *t* is at the time of her talking to him. (SIMULTANEOUS)

b. Eva talked to the boy who was crying at *t*,
where *t* is before her talking to him. (EARLIER-THAN-MATRIX)

c. Eva talked to the boy who was crying at *t*,
where *t* is after her talking to him. (LATER-THAN-MATRIX).

I would like to provide a context for the LATER-THAN-MATRIX interpretation, as it is the hardest one to get and most people have difficulties with it.
So let us imagine that last week Eva has met this boy and they were having a conversation and Mira observed this situation. Today, this very same boy just hurt himself, started crying, and stopped crying after 5 minutes - again Mira observed this event. Now Mira can make the right utterance: "***Eva talked to the boy who was crying.*** " This interpretation is called LATER-THAN-MATRIX because the embedded eventuality is understood to happen later than the matrix eventuality (Kusumoto 2005).
We have dealt with the SIMULTANEOUS and the EARLIER-THAN readings in the previous section (tense in Complement Clauses), but we have observed that the LATER-THAN-MATRIX interpretation is not available for Complement Clauses, which is seen by the earlier example in (24) *Mira concluded that Lara owned a Macbook.*

	Backward Shifted	Simultaneous	Later than Matrix
Relative Clauses	√	√	√
Complement Clauses	√	√	*X*

Table 2.1: Interpretations of Past-under-Past in Relative and Complement Clauses. (Beck and Hohaus 2010)

Before I explain the difference between Relative Clauses and Complement Clauses, I like to point out that I do not follow the ”one-past-tense-thesis” that for example Enç (1987) maintains. The ”one-past-tense-thesis” fails to capture the LATER-THAN-MATRIX interpretation. According to this system, we can derive the SIMULTANEOUS interpretation when we treat the matrix past operator as a bound variable, and we derive the EARLIER-THAN-MATRIX interpretation by treating the past operator as a free variable. A third interpretation is not available, although we clearly have the LATER-THAN-MATRIX reading in relative clauses.

> "The embedded past tense [..] is evaluated with respect to the time introduced by the matrix past tense (i.e., *t'*), not with respect to the original evaluation time (i.e., *t*). This is due to the properties of a system in which sentences are evaluated with respect to only one temporal index, and in

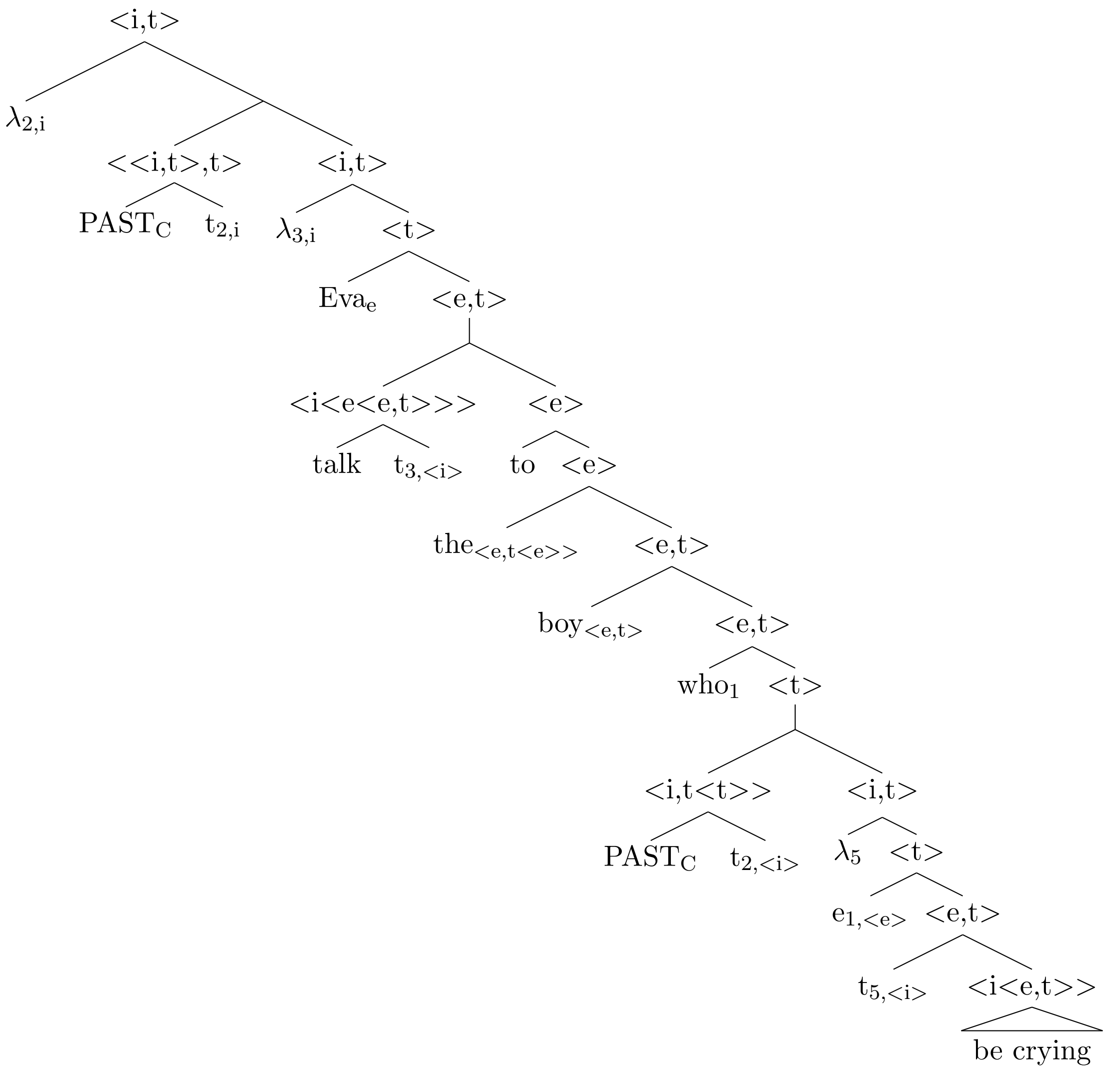
> which tense introduces a new time which replaces the original index and becomes the new evaluation time." (Kusumoto 2005)

A more adequate approach to deal with this problem, is to assume that for languages like English there are two sorts of past tense, one that is the actual past tense and another vacuous one. For English, the assumption is that past tense morphology in general does not carry the meaning of anteriority at all. The meaning of anteriority is carried by a phonetically null element. With this approach, it is possible to point out ambiguities. Recall from above that the sentence *Mira concluded that Lara owned a Macbook* has two PAST operators for the SHIFTED interpretation, one in the matrix sentence and the other one in the embedded sentence, and one PAST operator for the SIMULTANEOUS interpretation, for there is no PAST operator in the embedded sentence.

> "The embedded past tense [..] is evaluated with respect to the time introduced by the matrix past tense (i.e., *t'*), not with respect to the original evaluation time (i.e., *t*). This is due to the properties of a system in which sentences are evaluated with respect to only one temporal index, and in which tense introduces a new time which replaces the original index and becomes the new evaluation time." (Kusumoto 2005)

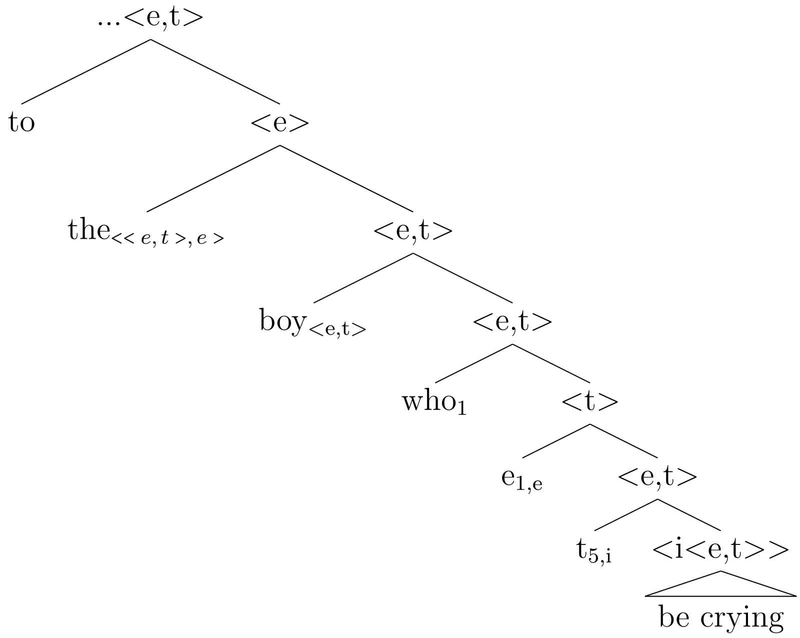
With this knowledge, we can now look at the three readings of relative clauses and the way semantics distinguishes them in the LFs.

(26) Logical From and Semantic Types



The LF above is a LF where the embedded PAST operator and the matrix PAST operator are bound with the same λ-abstractor. This gives us the LF for the EARLIER-THAN interpretation. Consequently, the abbreviated LF in (27), in which we do not have a PAST operator in the embedded sentence, corresponds to the simultaneous reading.

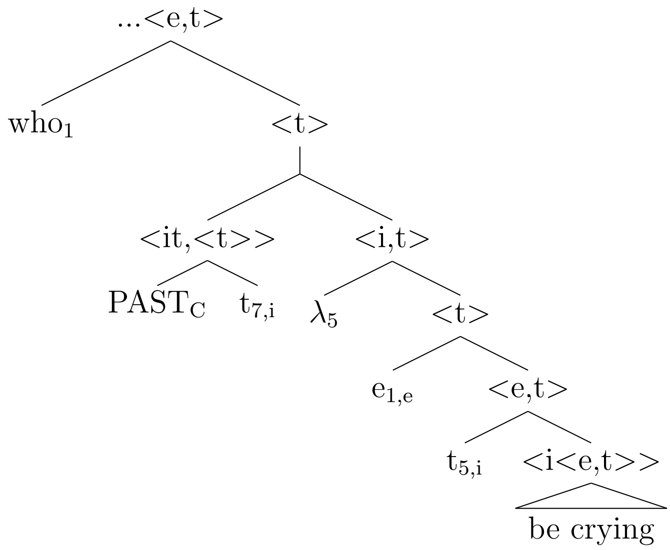
(27)



(28) $[\![$Eva talked to the boy who was crying$]\!]^{g}$(t*)=1
iff $\exists t'$ [$t' < t^*$ & Eva talks at t' to the unique x such that x is a boy & x is crying at t']

For the LATER-THAN-MATRIX interpretation, we have to treat the PAST operator in the embedded structure as being anchored to a contextually salient, hence, as a free varliable. The abbreviated LF for the LATER-THAN-MATRIX is given in (29).

(29)



The LF in (29) is the preferred LF for all of the readings, as the embedded past tense

is a free variable and context dependent, it could be before, after and at the same time as the matrix event time. The interpretation then depends on the assignment function.
Moreover, the difference between relative clauses and clausal complements is how they introduce their CP. The CP in relative clauses is of type <e,t> and the CP in Complement Clauses is of type <i,t>. This means, that the embedded clause in relative clauses can not be modified by the matrix tense operator, which allows to have the three readings (Kusumoto 1999).
Another example would be a present tense embedded in a relative clause under a past tense:

(30) *Eva talked to the boy who is crying.*

In this case, the embedded event is understood as an ongoing event at the speech time, which means that the boy must be crying while the speaker makes this statement, so corresponding to the speaker's 'now', but it does not have to be the case that he was crying at the time Eva talked to him. Hence, there is no double-access interpretation, which we, in contrast, have in embedded present tense in clausal complement of a past tensed verb (Kusumoto 1999).

2.3 Cross-linguistic Data

A cross-linguistic perspective has shown that not all languages behave in a manner as English with respect to their temporal interpretations of embedded structures. Moreover, one cannot assume that languages that do not behave like English, all behave the same. Before we look at other languages, recall from the previous sections that we have temporal ambiguities in relative clauses and clausal complements. In addition, the interpretations that are available depend on the sentence structure. We have observed the following (repeated from Table 1.):

	Backward Shifted	Simultaneous	Later than Matrix
Relative Clauses	$\surd$	$\surd$	$\surd$
Clausal Complements	$\surd$	$\surd$	X

Table 2.2: Interpretations of Past-under-Past in Relative and Complement Clauses (Beck and Hohaus 2010)

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Semanticists found out that for example Russian and Japanese are languages that behave different from English. Further research has proved that this is because English is a SOT-language (SOT= Sequence-of-Tense), a language that has tense-agreement, while Russian and Japanese are non-SOT-languages, non-agreement languages (Grønn and von Stechow 2010).

(31) The SOT-Parameter:

A language L is a SOT-language if and only if the verbal quantifiers of L transmit temporal features.

As we have seen in the previous chapters, the English temporal morphology of the embedded verb depends on the matrix tense. They can be bound via a binding chain through e.g. prepositional attitude verbs. In Russian, by comparison, these attitude verbs cut the binding chain and the morphology of the embedded verb must be locally defined by the embedded PAST-operator. Hence, SOT-languages have temporal ambiguities, whereas non-SOT-languages do not. We can therefore speak of SOT-ambiguities.

2.3.1 SIMULTANEOUS Interpretation in Contrast

The following instance in (32) exemplifies the difference between English and Russian with respect to their behavior sequence of tense regarding the simultaneous reading. (R=Russian, E=English)

(32) R On skazal$_{\text{PAST-PF}}$, čto živet$_{\text{PRES}}$ pod Moskovj.
E He said he was living just outside Moscow.(Grønn and von Stechow 2010)

While the English sentence "past under past" can have the SIMULTANOUS reading, the Russian sentence can only express the simultaneity with "present under past". This is because the past tense morpheme is semantically vacuous in English and can agree with the past tense operator in the matrix. Russian, in contrast, lacks this agreement, since "skazat" ("say") cuts the binding chain. Hence, the result is the determination of the morphology of the embedded verb by an embedded relative PAST or PRESENT (Grønn and von Stechow 2010).

2.3.2 LATER-THAN-MATRIX Interpretation in Contrast

(33) R Ja sprosil$_{\text{PAST-PF}}$, v kotorom času načnetsja$_{\text{FUT-PF}}$ ataka, i mne skazali$_{\text{PAST-PF}}$, čto kak tol'ko sovsem stemneet$_{\text{FUT-PF}}$.
E I asked what time the attack was to be and they said as soon as it was dark. (Ernest Hemingway, "A Farewell to Arms") (Grønn and von Stechow 2010)

Forward shifted interpretations under factives always works as "future under past" in Russian.

2.3.3 EARLIER-THAN-MATRIX Interpretation in Contrast

The backward shifted reading in Russian is received with the "past under past" construction, which means that the time of the complement precedes the matrix. The very same construction would produce a simultaneous interpretation in SOT-languages, although some contexts allow a shifted interpretation, as well (Grønn and von Stechow 2010).

(34) R Ona [...] sprosial$_{\text{PAST-PF}}$ spal$_{\text{PAST-IMPF}}$ lil on. (Lev Tolstoj, "Anna Karenina")
E She [...] asked him if he had slept.

The verbal quantifier "had" has the same semantics as the PAST operator. In (34), "had" is connected with the PAST in the matrix. Comparing this to Russian, we again see a difference, since the past tense morphology in the embedded clause points to a local semantic past operator (Grønn and von Stechow 2010).

2.4 Interim Summary and Concluding Remarks

This section shows that not all languages behave the same regarding to their temporal interpretations. Apparently, there is a connection between the past morpheme of the embedded clause and the matrix PAST-operator in SOT-languages like English. Non-SOT-languages do not have this connection, which causes different interpretations. The following table gives an overview of the contrasting behaviors of English, Japanese and Russian.
(von Stechow 2009)

	English	Japanese	Russian
Complements	√	*	*
Relatives	√	*	√

Table 2.3: Past Under Past SIMULTANEOUS Reading

The observation is that Japanese and Russian treat complements alike and English and Russian treat relatives alike.

2.5 The Turkish Language

2.5.1 General Introduction

Turkish, as a Turkic language, is spoken by around 90 million people and is a wide spread S-O-V type of language that is head-final. In this chapter, I will give a short introduction into Turkish syntax and semantics. First of all, I will introduce some sorts of dependent clauses that are common in Turkish.

(35)

[Ben	Ali'yi	gördüm.]
I.nom.sg.	Ali.dat.	see.1.sg.past.

"I saw Ali." (SINGLE CLAUSE)

(36)

[Ben	Ali'yi	okulda	gördüm]	ve	[*pro*	onunla
I.nom.sg.	Ali.dat.	school.loc.	see.1.sg.past.	and	pro	with-him
konuştum.]						
talk.1.sg.past.						

"I saw Ali at school and I talked to him." (TWO INDEPENDENT CLAUSES)

(37)

[Ben	[Ali'nin	gittiğini]	gördüm.]
I.nom.sg.	Ali.gen.	go.noml.3sg.acc.	see.1sg.past.

"I saw Ali leaving." (ONE DEPENDENT & ONE INDEPENTEND CLAUSE)

(38)

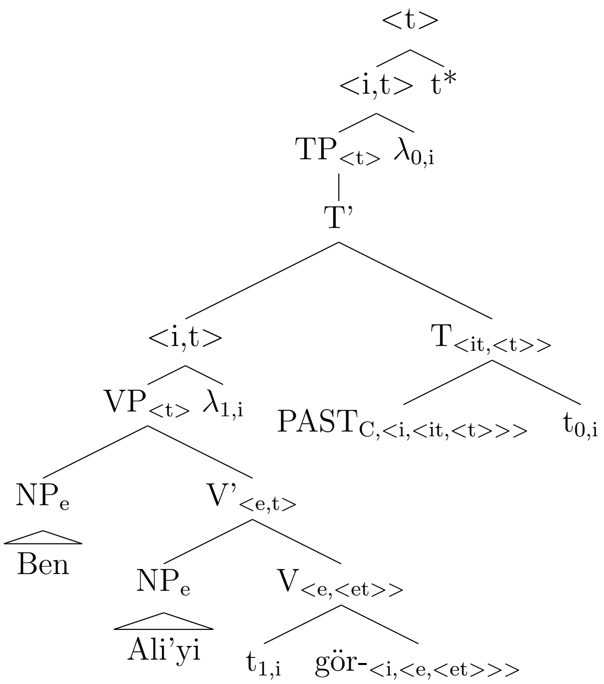
[Ben	[[Ali'nin	[*pro*	yeni	aldığı	kitabı]
I.nom.sg.	Ali.gen.	pro.	new	buy.noml.3sg.acc.	book.gen.
okuduğunu]	gördüm]]				
read.noml.3sg.acc.	see.1sg.past.				

"I saw Ali reading the newly bought book." (ONE INDEPENDENT & TWO DEPENDENT CLAUSES)

As one can see, coordination and subordination are two ways of generating sentences with more than one clause. The two clauses that are coordinated are of the same grammatical status, both are independent clauses known as matrix clauses, whereas, in subordination one clause functions as part of another, e.g. dependent clauses known as embedded clauses (Turan 2013). In (37), we can see that the clause in square brackets is dependent on the matrix clause, which is *Ben gördüm*. On the other hand, (38) includes three clauses: one relative clause, [*Ali'nin yeni aldığı*], one noun clause [*Ali'nin kitabı okuduğunu*], and the matrix clause [*ben gördüm*].

You can compare the following trees, which illustrate one simple sentence and one embedded sentence. The LF in (39) belongs to (35) and the LF in (40) to (37).

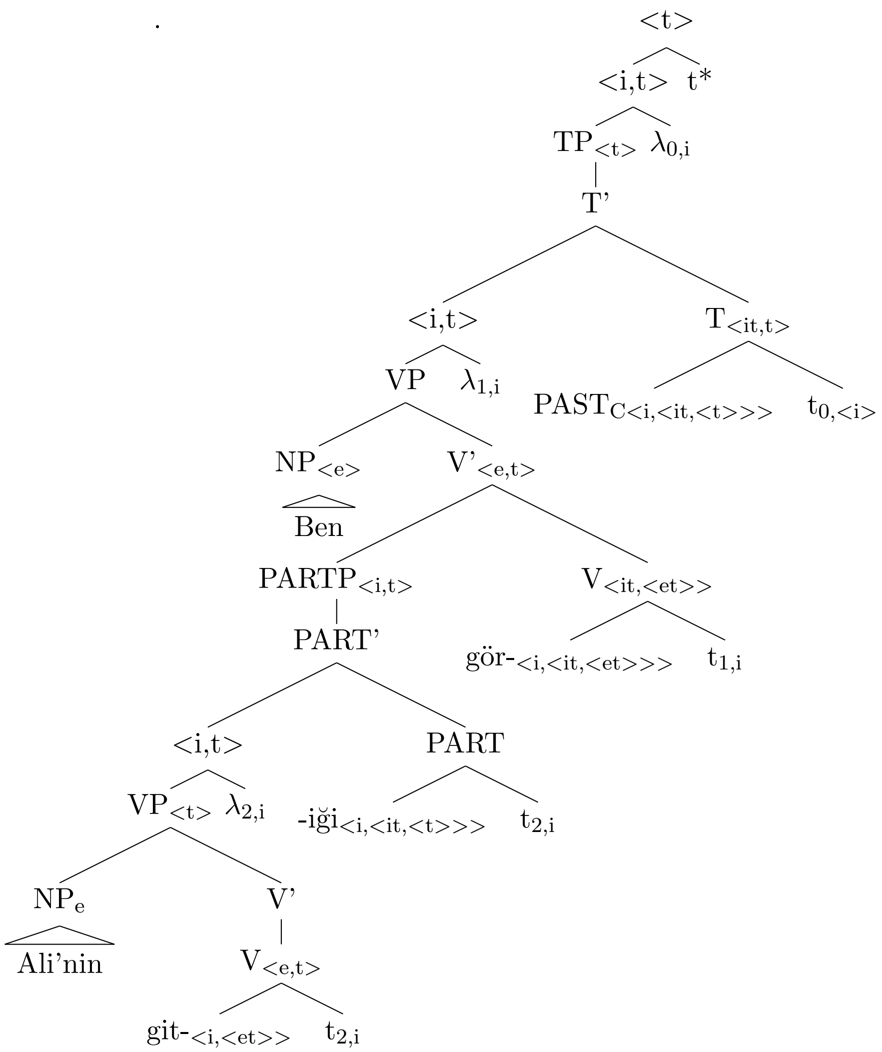
(39)



NP-VP Construction for an independent clause.

(40) The PARTP is the embedded clause and functions as the object of the main clause.

.



2.5.2 Subordination

In English, the embedded clauses are connected to the matrix clause by complementizers like *that, which, who, where,* etc. An example follows in (41). In Turkish, subordinate clauses are connected to the matrix clause by joining some bound morphemes at the stem of the embedded verb. The following examples respect the standard conventions in Turkish linguistics - capital letters represent underspecified vowels that undergo vowel harmony. Some examples of these morphemes, that are used to embed one clause under another are *-DIK, -yEcEk, -mE, -yIş, -mEk, -mIş, etc.*
These embedding morphemes are attached at the end of the verb stem in the embedded clause, such as *gör-DÜĞ-ümüz.* It is to note that these morphemes can also mark the future in matrix clauses (Turan 2013).

(41) Peter said that Mary is sick.

This subsection will give you a short overview about the kinds of subordination Turkish has, like Noun Clauses, Relative Clauses, and Adverbial Clauses. Noun Clauses and Relative Clauses will be the focus of this section, as these are the structures under discussion.

Noun Clauses

In this sentence construction, the subordinate clause has the same distribution as noun phrases and functions as subjects, objects, and objects of postpositions. There are some examples of subject noun clauses following:

(42) [$_{\text{NC}}$ Onun Fransızca konuş**tuğ**u] doğru.

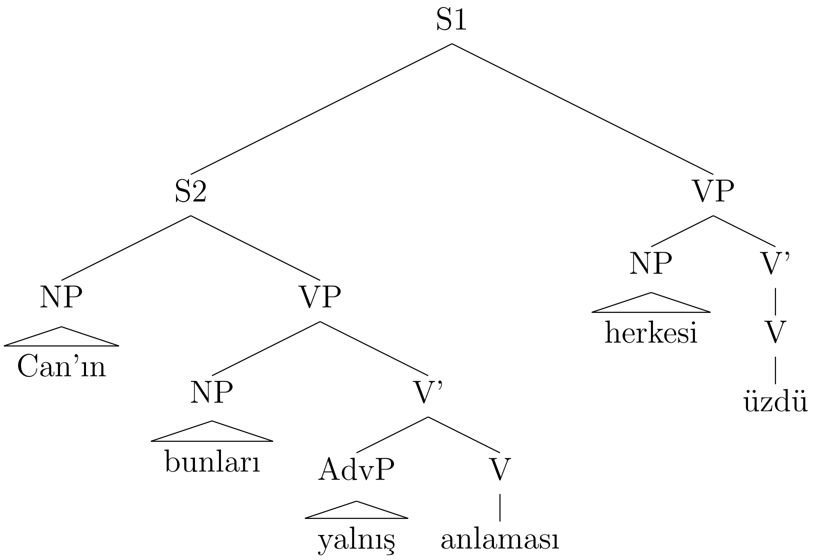
(43) [$_{\text{NC}}$ Ayşe'nin parti ver**eceğ**i] belli.

(44) [$_{\text{NC}}$ Can'ın bunları yalnış anla**ma**sı] herkesi üzdü.

(45) [$_{\text{NC}}$ Meral'in her gün yürü**yüş**ü] Ayhan'ı sevindiriyor.

You can see a simplified tree for (45) in (46):

(46)



Relative Clauses

A Relative Clause is used as NP modifier, since they provide additional information about the noun, but are not required for the completion of the noun's meaning. Relative Clauses are at the same level as adjectives in their relationship with the head noun (Turan 2013).

(47) [$_{\text{NP}}$[$_{\text{Adj}}$ sarı] [$_{\text{N}}$ kitap]] NP → Adj N
"Yellow book"

(48) [$_{NP}$[$_{RC}$ dün okuduğum] [$_{N}$ kitap]] NP → Relative Clause N
"The book that I have read yesterday."

The examples above show that both, a Relative Clause and an adjective, occupy the same position in a sentence. Moreover, one can see that in both cases the noun is head final. So a noun can either be modified by an adjective or a Relative Clause .

Relative Clauses in Turkish are formed by the morphemes *-En* and *DIk*, which are attached to the verb stem. This morpheme is a "free participle" (=FP).

(49) Peyniri yiy**EN** kedi.
Cheese.dat.sg. eat.FP. cat.nom.sg.
"The cat that is eating cheese."

When we have a copular underlying sentence in Turkish, the verbs *olmak* and *bulunmak* are used, such as in the following sentences.

(50) Kız çok güzel.
Girl.sg.nom. very beautiful.adj.
"The girl is very beautiful."

(51) Bu dolapta süt var.
This fridge.loc. milk.nom. exist.3sg.
"There is milk in this fridge."

In sentences like above, where the verb is a zero copula, or if it has existential *var/yok*, then the RC morpheme does not have a verb to attach to. In these cases, we have to use *olmak* and *bulunmak* to form a relative clause, so the RC morpheme can attach to the verb stems. Relativising the simple sentences in (51) and (50) gives the following sentences:

(52) Çok güzel olan bu kız.
very beautiful be.FP. this girl.sg.nom.
"This girl that is very beautiful."

(53) İçinde süt bulunan dolap.
Inside milk find.FP. fridge.nom.sg.
"The fridge that you can find milk inside."

There are stark differences between the Turkish and the English RC. The following differences are the major ones:

(54) a. the relative clause occurs to the left of its head noun, i.e. is prenominal as opposed to postnominal;
b. the predicate of the relative clauses is not a finite verb form, but a par-

ticiple;

c. the relative clause contains no element which could be construed as being coreferent with the head noun, i.e. nothing corresponding to the relative pronoun *who* (Haig 1998).

Participles in Turkish

According to Haig (1998) the definition for participles is the one below:

(55)

Participles are verbal nominals which may occur in attributive function

He further distinguished between **possessed participles (PPs)**, "which obligatory indicate the person of their subject with possessive marking", and non-possessed participles, or **free participles (FPs)**, which do not Haig 1998.
Free participles again can be divided into two types of free participles: the AN-participle, and the tensed FPs. ”An-participles display no overt morphological signals of tense and aspect. The exact temporal significance is ultimately dependent on the tense of the main clause.” (Haig 1998)
For the following analysis, it is worth to look at PPs more closely. Two suffixes create possessed participles: *-DIĞ-*, and *-(y)AcaĞ-*, which is a differentiation between a future versus non-future meaning with respect to the ”tense of the included sentence” (Haig 1998). According to Haig (1998) *-DIĞ-*

> ”is used to denote events which may be assumed to be taking place, or to have taken place, or which will under normal conditions happen. [...] Their defining feature is that they obligatorily take possessive morphology indicating the subject of the clause concerned. PPs therefore encode a relatively complete proposition, identifying both the nature of the event, its subject, and giving some information on the modal and temporal status of that event.”

(56)

1s	gel-diğ-im	that I come/came
2s	gel-diğ-in	that you come/came
3s	gel-diğ-i(n)	that he-she-it come/came
1pl	gel-diğ-imiz	that we come/came
2pl	gel-diğ-iniz	that you(pl) come/came
3pl	gel-dik-leri(n)	that they come/came

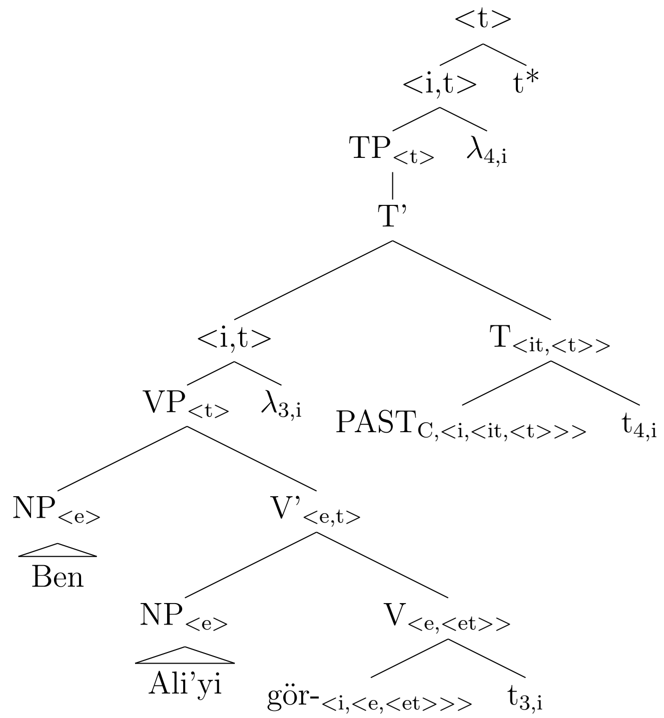
Table 2.4: Forms of the PP from *gel*-’come’

Compositional Interpretation

For a complete contrast, it is worth to see a compositional interpretation for the sentence in (57).

(57) [Ben Ali'yi gördüm.]
I.nom.sg. Ali.dat. see.1.sg.past.
"I saw Ali at school."

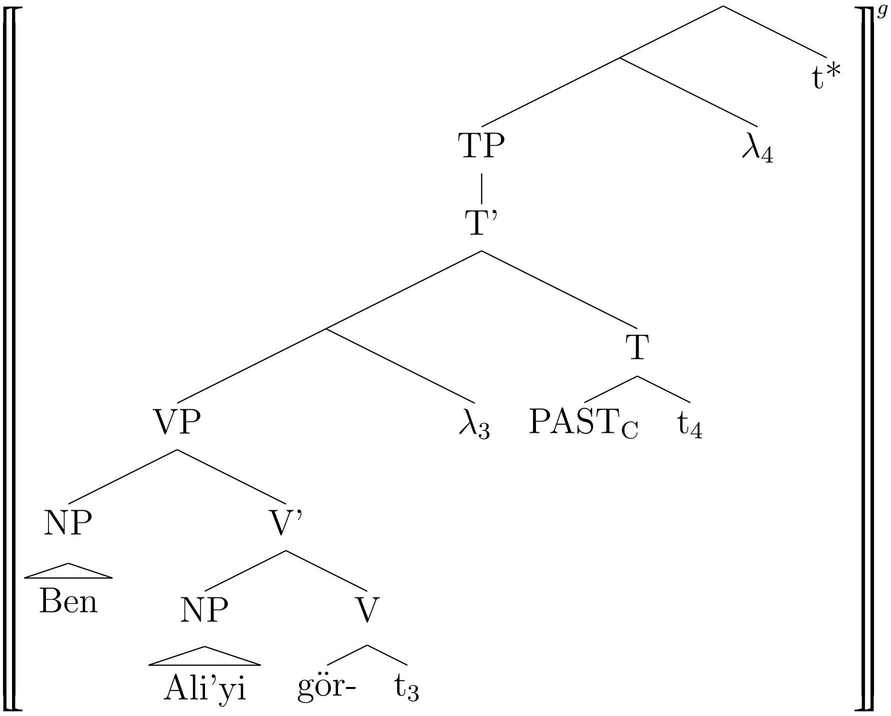
(58) I. Logical Form & Semantic Types
.



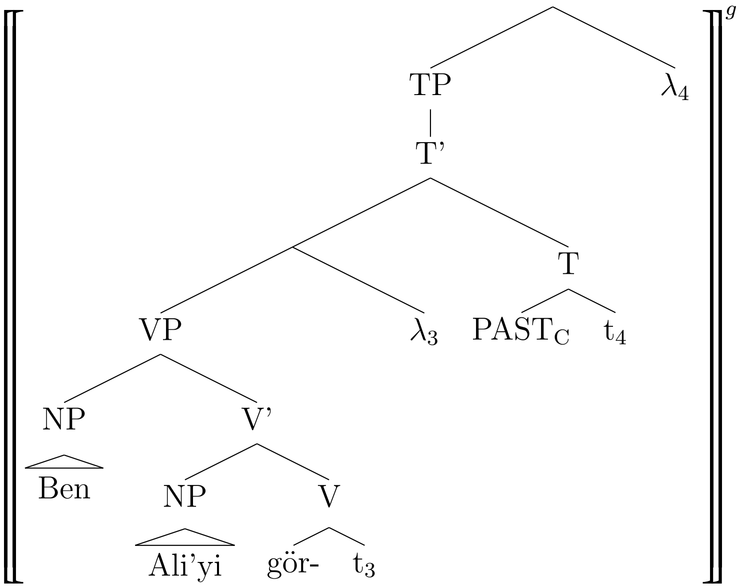
II. Lexical Entries

$[\![\text{Ben}]\!]^g = \text{I}$
$[\![\text{Ali'yi}]\!]^g = \text{Ali}$
$[\![\text{gördüm}]\!]^g = [\lambda t.\lambda b.\lambda a.\ \text{a saw b at t}]$
$[\![\text{PAST}]\!]^g = [\lambda t \in D_{<i>}.\lambda P \in D_{<i,t>}.\ \exists t'[t' < t\ \&\ P(t')=1]]$

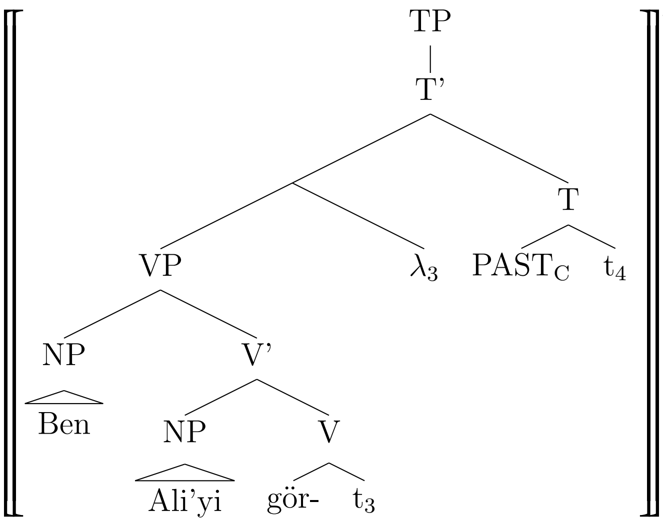
III. Step-by-Step Interpretation



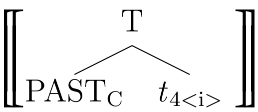
=1 iff FA

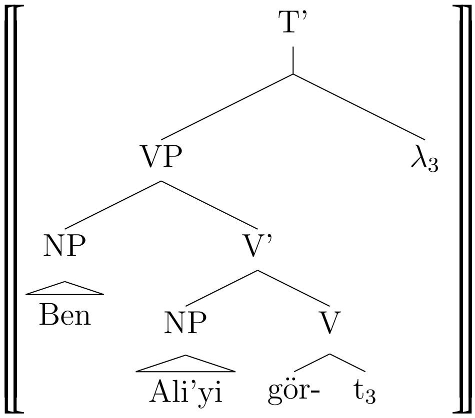


(t*) =1 iff PA

$[\lambda p \in D.$ 

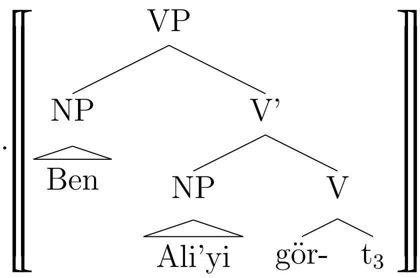
$]^{g[4\to p]}$] (t*) =1 iff FA, NN

$[\lambda p \in D.$ 

$^{g[4\to p]}$ (

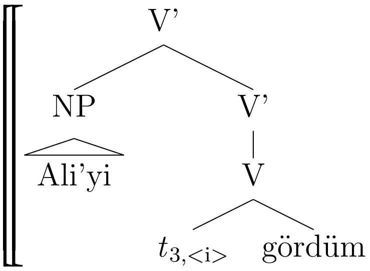
$^{g[4\to p]}$)](t*) =1 iff

FA, PA

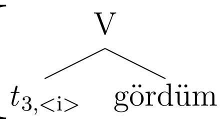
$[\lambda p \in D.[\![PAST]\!]^{g[4\to p]}([\![t_4]\!]^{g[4\to p]})$ ($[\lambda s \in D.$ 

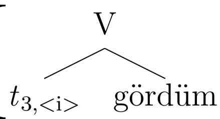
$^{g\begin{bmatrix}4 & \to & p\\ 3 & \to & s\end{bmatrix}}$])]=1

iff FA, P& T, NN

$[\lambda p\epsilon D.[\![\text{PAST}]\!]^{g[4\to p]}\ (g[4\to p](4))\ ([\lambda s\epsilon D.[\![$  $]\!]^{g\begin{bmatrix}4 & \to & p\\ 3 & \to & s\end{bmatrix}}$

$([\![\text{Ben}]\!]^{g\begin{bmatrix}4 & \to & p\\ 3 & \to & s\end{bmatrix}}\ )\ ]\ )\ ](t^*) =1$ iff FA, NN, TN

$[\lambda p\epsilon D.[\![\text{PAST}]\!]^{g[4\to p]}\ (p)\ ([\lambda s\epsilon D.[\![$  $]\!]^{g\begin{bmatrix}4 & \to & p\\ 3 & \to & s\end{bmatrix}}\ ([\![\text{Ali'yi}]\!]^{g\begin{bmatrix}4 & \to & p\\ 3 & \to & s\end{bmatrix}})$
$(I)\ ]\ )\ ](t^*)=1$ iff FA, NN, TN

$[\lambda p\epsilon D.[\![\text{PAST}]\!]^{g[4\to p]}\ (p)\ ([\lambda s\epsilon D.[\![$  $]\!]^{g\begin{bmatrix}4 & \to & p\\ 3 & \to & s\end{bmatrix}}\ (\text{Ali})\ (I)])](t^*)=1$ iff FA, TN

$[\lambda p\epsilon D.[\![\text{PAST}]\!]^{g[4\to p]}\ (p)\ ([\lambda s\epsilon D.[\![\text{gördüm}]\!]^{g\begin{bmatrix}4 & \to & p\\ 3 & \to & s\end{bmatrix}}\ ([\![t_3]\!]^{g\begin{bmatrix}4 & \to & p\\ 3 & \to & s\end{bmatrix}})\ (\text{Ali})\ (I)])](t^*) =1$ iff P&T, TN, TN

$[\lambda p\epsilon D.[\lambda t\epsilon D_{<i>}.\lambda P\epsilon D_{<i,t>}.\exists t'[\ t'< t\ \&\ P(t')=1]]\ (p)\ ([\lambda s\epsilon D.[\lambda t.\lambda b.\lambda a.\ \text{a saw b at t}]\ (g\begin{bmatrix}4 & \to & p\\ 3 & \to & s\end{bmatrix}(3))\ (\text{Ali})\ (I)])](t^*) =1$ iff simpl

$[\lambda p\epsilon D.[\lambda P\epsilon D_{<i,t>}.\exists t'[\ t'< p\ \&\ P(t')=1]]\ ([\lambda s\epsilon D.[\lambda t.\lambda b.\lambda a.\ \text{a saw b at t}]\ (s)\ (\text{Ali})\ (I)])](t^*) =1$ iff simpl

$[\lambda p\epsilon D.[\lambda P\epsilon D_{<i,t>}.\exists t'[\ t'< p\ \&\ P(t')=1]]\ ([\lambda s\epsilon D.[\lambda b.\lambda a.\ \text{a saw b at s}]\ (\text{Ali})\ (I)])](t^*) =1$ iff simpl

$[\lambda p\epsilon D.[\lambda P\epsilon D_{<i,t>}.\exists t'[\ t'< p\ \&\ P(t')=1]]\ ([\lambda s\epsilon D.[\lambda a.\ \text{a saw Ali at s}]\ (I)])](t^*) =1$ iff simpl

$[\lambda p\epsilon D.[\lambda P\epsilon D_{<i,t>}.\exists t'[\ t'< p\ \&\ P(t')=1]]\ ([\lambda s\epsilon D.\ \text{I saw Ali at s}])](t^*) =1$ iff simpl

$[\lambda p\epsilon D.\exists t'[\ t'< p\ \&\ [\lambda s\epsilon D.\ \text{I saw Ali at s}](t')=1]](t^*) =1$ iff simpl

$[\lambda p \in D.\exists t'[\ t' < p\ \&\ \text{I saw Ali at } t']](t^*) = 1$ iff simpl

we derive:

$[\![\textbf{Ben Ali'yi gördüm}\ ]\!]^g\mathbf{(t^*)} =$
$\exists\mathbf{t'[\ t' < t^*\ \&\ \text{I saw Ali at } t']}$

3 Temporal Interpretation of Embedded Structures in Turkish

The already existing data for languages like English with respect to the temporal interpretation of subordinated sentences, and especially, the different behaviors of these languages is the main motivation for my research in Turkish. This thesis aims to answer the question how Turkish embedded sentences are interpreted temporally. Therefore, a quantitative study was constructed with a large number of participants, who fulfilled the preconditions of speaking Turkish and German, whereas Turkish must have been learned until the age of five. The participants were asked to rate questionnaires that were constructed for this purpose, and were answered on-line. An example of the outline is shown in the upcoming pages.
Basically, the participant received one Turkish sentence and a corresponding German paraphrase. The German paraphrase was to be judged.
Before I conducted the study or started to gather any data, I have tested my own intuitions about the different readings that are available in Turkish. The resulted hypothesis is that the LATER-THAN-MATRIX interpretation is not available in relative clauses, and neither in Complement Clauses, whereas the EARLIER-THAN-MATRIX interpretation is available in both. The SIMULTANOUS reading is the most preferred one in both sentence structures.

	EARLIER THAN	SIMULTANEOUS	LATER THAN
Relative Clauses	$\surd$	$\surd$	X
Clausal Complements	$\surd$	$\surd$	X

Table 3.1: Hypothesis of The Temporal Interpretation of Subordinated Structures in Turkish

3.1 Method

3.1.1 Participants

The 45 participants were mostly members of the German-Turkish Club in Stuttgart, since we donated 5€ per participant to the Club. Some family members, friends and students of the University of Tübingen have also participated, which makes the group fairly heterogeneous. All of them were Turkish native speakers and L2-speakers of

German. This was necessary because the stimulus materials were partly in Turkish and partly in German. I had 15 participants for each list, which makes a total participants number of 45 people. The first run showed that some participants aborted the study, so later on, I had to gather eleven extra data.

3.1.2 Materials

The stimulus materials consisted of two sets of twelve sentences in Turkish each. The structures in the two sets were Complement Clauses and Relative Clauses, exemplified in (1) and (2). Each sentence is paired with one of three paraphrases differing with regards how the event described in the matrix clause (matrix event) temporally relates to the event described in the secondary clause (secondary event), as shown in (1a)-(1c) and (2a)-(2c).

(1) Kadın Detektifin Prağ'ta olduğunu söyledi
"The women reported that the undercover agent was in Prague."
   a. Die Frau machte ihre Aussage, bevor der Detektiv in Prag ist.
   b. Die Frau machte ihre Aussage, während der Detektiv in Prag ist.
   c. Die Frau machte ihre Aussage, nachdem der Detektiv in Prag gewesen war.

(2) Dondurmacı ağlayan çocukla konuştu.
"The ice cream man talked to the boy who was crying."
   a. Das Kind weinte, bevor der Eismann mit ihm sprach.
   b. Der Eismann sprach mit dem Kind, während es weinte.
   c. Das Kind weinte, nachdem der Eismann mit ihm sprach.

The German paraphrase contained a temporal conjunction, *bevor* 'before', *während* 'while', or *nachdem* 'after', which unambiguously conveyed how the matrix event relates to the secondary event. Dependent on the temporal conjunction in the paraphrase the Turkish sentence was paired with, the item variant instantiated the experimental condition EARLIER-THAN-MATRIX ('nachdem'), SIMULTANEAOUS ('while'), or LATER-THAN-MATRIX ('before'). Participants judged how well the paraphrase reproduces the meaning of the ambiguous Turkish sentence. A paraphrase reproducing the most prominent reading of the Turkish sentence is presupposed to score high; an inadequate paraphrase was presupposed to score low. The complete set of the three variants of the 24 stimuli can be found in the appendix.
In addition to the 24 experimental items there was a set of 12 Turkish sentences with a coordinate structure, as shown in (3). These sentences also came along with a German paraphrase with a disambiguating temporal conjunction and served as fillers, which were not included in the analyses.

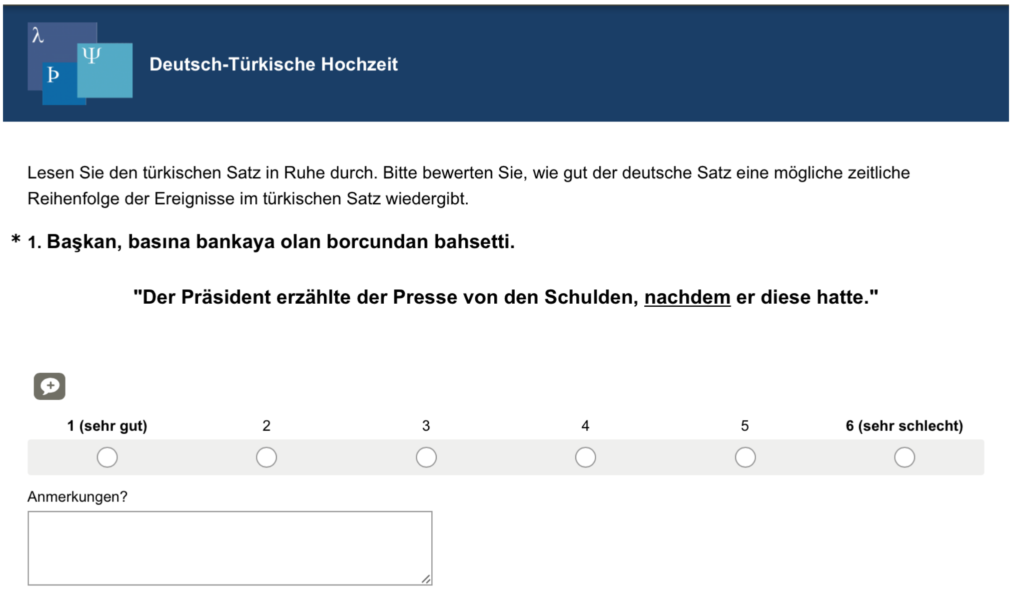
(3) Market sahibi fiyatı söyledi ve müşteri cüzdanını cıkardı.
"The shop keeper named the price and the shopper took out the purse."

For a detailed distribution information look at the next table. As previously mentioned, the coordinated sentences were only used as fillers of a different sentence structure and do not influence the outcome. Therefore they will not be analyzed in this paper. Note that the lists were pseudo-randomized to prevent habitual judging, which means that no more than two paraphrases of the same kind followed each other.

Name of the list	Relative Clauses	Compl. Clauses	Coordination	Total
Dt-Tr Hochzeit	12	12	12	36
Dt-Tr Hennaabend	12	12	12	36
Çiğ Köfte	12	12	12	36

Table 3.2: Composition of Lists

Moreover, the instructions had an example sentence and paraphrase with a rating scale (1 "sehr gut" - 6 "sehr schlecht") in order to prepare the participants for the form of the question. The scale of rating goes form 1 to 6, which forced the participants to chose at least a preference. This example is never used again in the study. In order to provoke the curiosity of the participants, I named the lists "Deutsch-Türkische Hochzeit", "Deutsch-Türkischer Hennaabend", "Çiğ Köfte". The following graphics show the setup of the survey by comparing all the lists "Deutsch-Türkische Hochzeit", "Deutsch-Türkischer Hennaabend", and "Çiğ Köfte". Thereby, the coordinated sentences are left out:



Deutsch-Türkische Hochzeit

Lesen Sie den türkischen Satz in Ruhe durch. Bitte bewerten Sie, wie gut der deutsche Satz eine mögliche zeitliche Reihenfolge der Ereignisse im türkischen Satz wiedergibt.

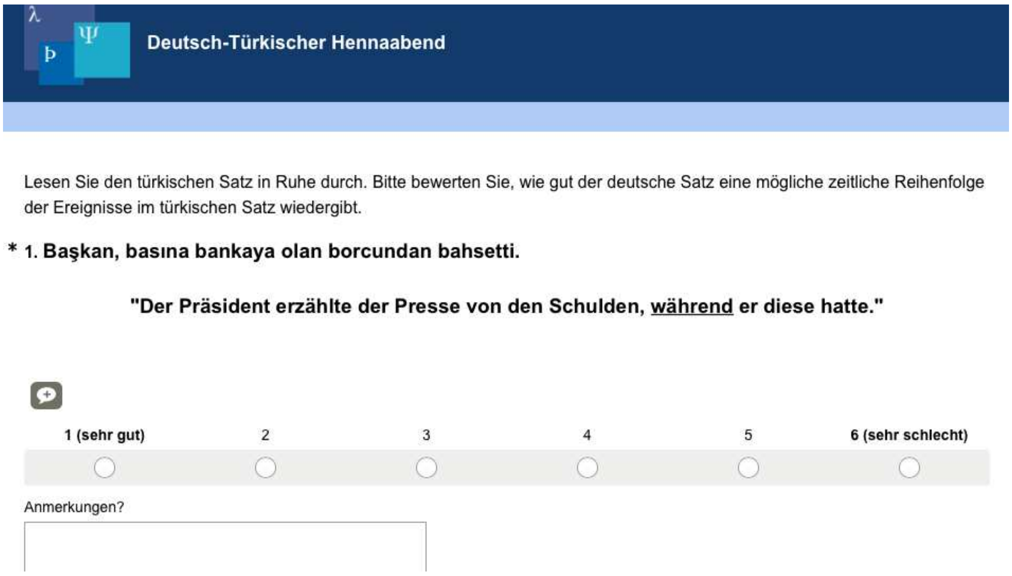
* **1. Başkan, basına bankaya olan borcundan bahsetti.**

"Der Präsident erzählte der Presse von den Schulden, nachdem er diese hatte."

1 (sehr gut)	2	3	4	5	6 (sehr schlecht)

Anmerkungen?

Figure 3.1: List "Deutsch-Türkische Hochzeit": Question 1



Deutsch-Türkischer Hennaabend

Lesen Sie den türkischen Satz in Ruhe durch. Bitte bewerten Sie, wie gut der deutsche Satz eine mögliche zeitliche Reihenfolge der Ereignisse im türkischen Satz wiedergibt.

* **1. Başkan, basına bankaya olan borcundan bahsetti.**

"Der Präsident erzählte der Presse von den Schulden, während er diese hatte."

1 (sehr gut)	2	3	4	5	6 (sehr schlecht)

Anmerkungen?

Figure 3.2: List "Deutsch-Türkischer Hennaabend": Question 1

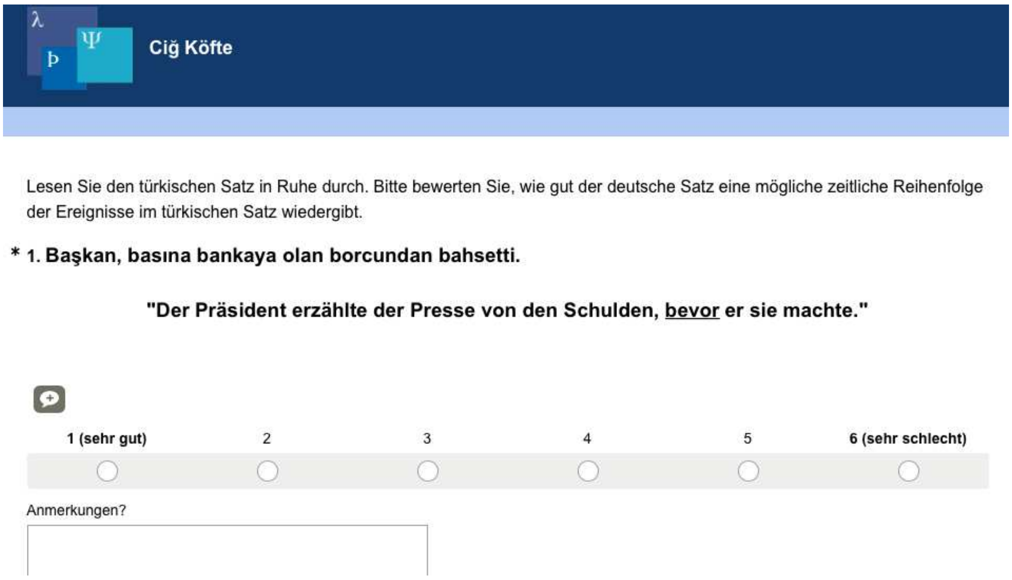


Figure 3.3: List ""Çiğ Köfte": Question 1

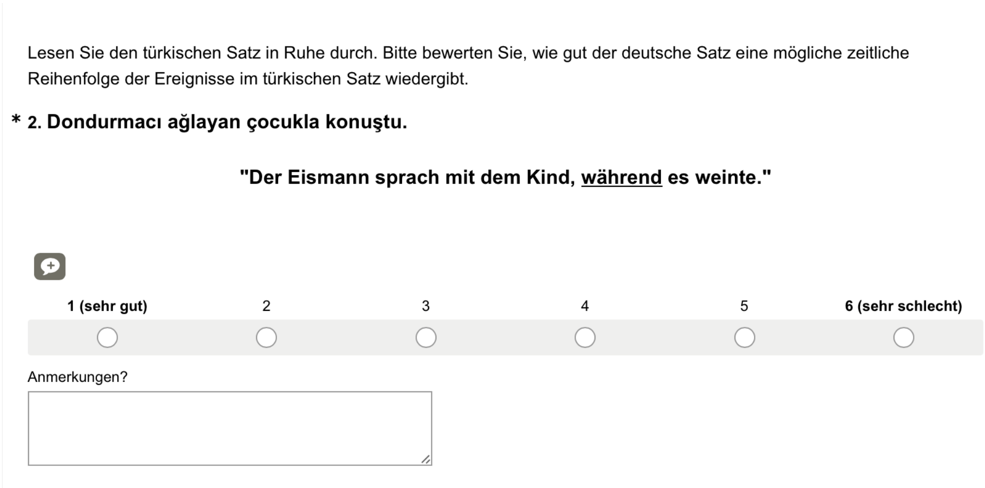
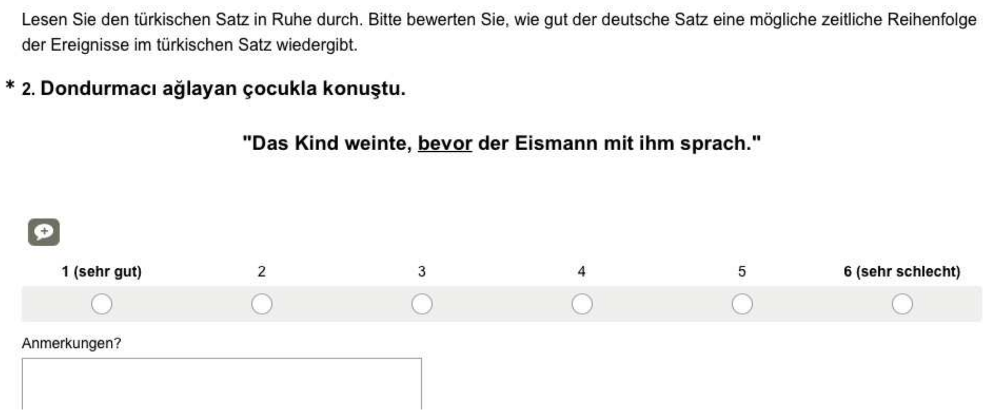


Figure 3.4: List "Deutsch-Türkische Hochzeit": Question 2



Lesen Sie den türkischen Satz in Ruhe durch. Bitte bewerten Sie, wie gut der deutsche Satz eine mögliche zeitliche Reihenfolge der Ereignisse im türkischen Satz wiedergibt.

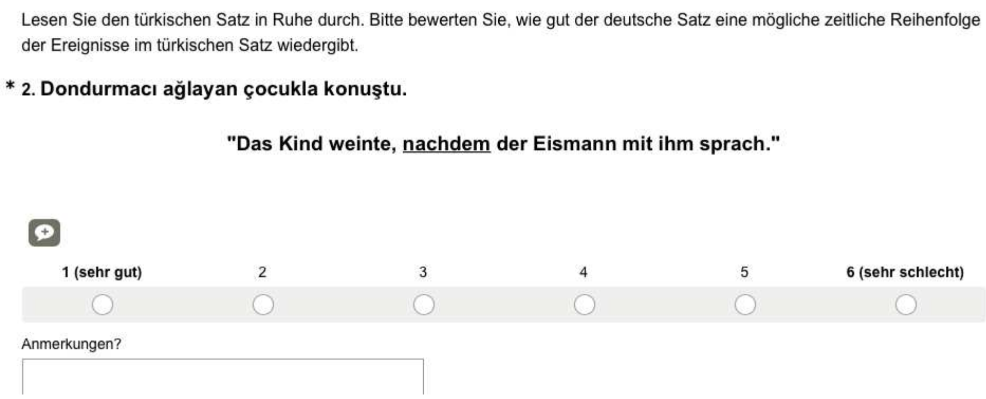
* 2. **Dondurmacı ağlayan çocukla konuştu.**

"Das Kind weinte, bevor der Eismann mit ihm sprach."

1 (sehr gut)	2	3	4	5	6 (sehr schlecht)

Anmerkungen?

Figure 3.5: List "Deutsch-Türkischer Hennaabend": Question 2



Lesen Sie den türkischen Satz in Ruhe durch. Bitte bewerten Sie, wie gut der deutsche Satz eine mögliche zeitliche Reihenfolge der Ereignisse im türkischen Satz wiedergibt.

* 2. **Dondurmacı ağlayan çocukla konuştu.**

"Das Kind weinte, nachdem der Eismann mit ihm sprach."

1 (sehr gut)	2	3	4	5	6 (sehr schlecht)

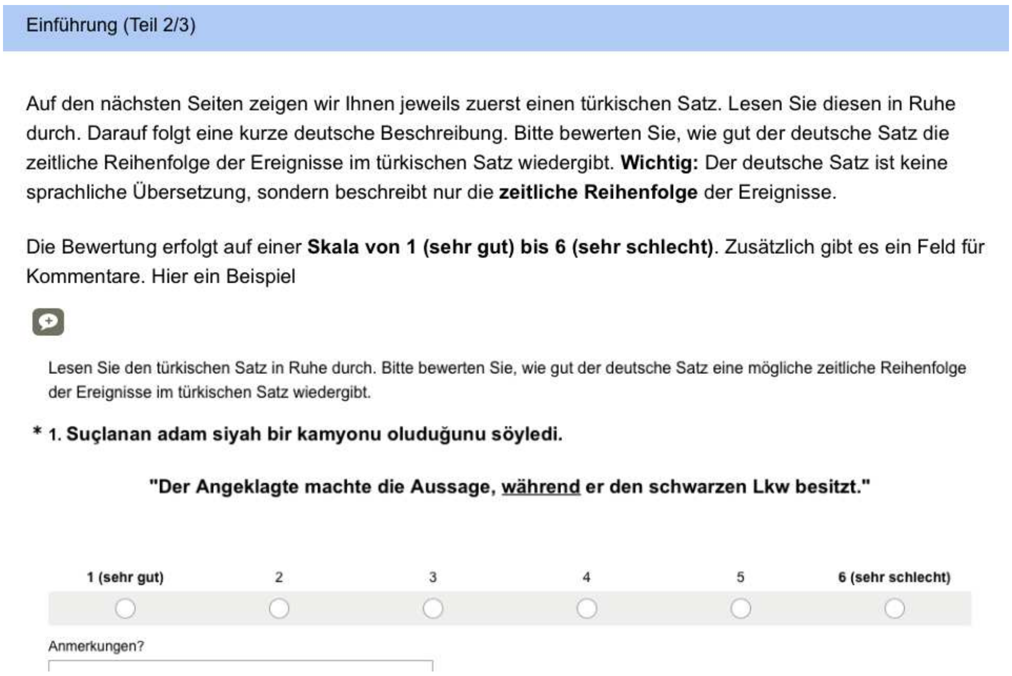
Anmerkungen?

Figure 3.6: List "Çiğ Köfte": Question 2

The list goes on like this and has 36 sentences in total to be rated. As you can see in the examples above, I have underlined the temporal subjunctions "während, nachdem, bevor" in the German paraphrase to emphasize the temporal order. In addition, comment boxes for each question were provided, which allowed the participants to give some remarks about their judgment. This was especially important, as they were only asked to rate one paraphrase without having a comparable other option. I also like to note that no alternative paraphrase, and neither a context was provided for the target-sentences, for the simple reason of not influencing readers in their intuitions.

3.1.3 Procedure

The experiment was conducted via the Internet (www.surveymonkey.net). One great argument for an on-line survey was the fact that I was not limited to participants that were immediately available. It allowed me to send around the links and ask people to share the survey with other possible participants. Hence, Participants were randomly assigned to one of the three lists and were sent the link to the corresponding version of the web experiment. The experiment started with instructions written in German, including one practice item with the conjunction *während* 'while' (cf. Figure 3.7 below). Then the experimental items, intermixed with the fillers, followed in a randomized order in a way that two consecutive trials never contained the same temporal conjunction. Each item was presented on a separate page with the instruction partly repeated on each page (see Figure 3.7). The Turkish target sentence and the single German paraphrase were accompanied by a rating scale numbered from 1 (meaning *sehr gut* 'very good') to 6 (meaning *sehr schlecht* 'very bad') (cf. Figure 3.7). Participants indicated their judgment by clicking with the mouse on the field under corresponding number. By clicking ileri, which is Turkish for "next", participants continued to the next sentence. It was not possible to return to previous pages.


Einführung (Teil 2/3)

Auf den nächsten Seiten zeigen wir Ihnen jeweils zuerst einen türkischen Satz. Lesen Sie diesen in Ruhe durch. Darauf folgt eine kurze deutsche Beschreibung. Bitte bewerten Sie, wie gut der deutsche Satz die zeitliche Reihenfolge der Ereignisse im türkischen Satz wiedergibt. **Wichtig:** Der deutsche Satz ist keine sprachliche Übersetzung, sondern beschreibt nur die **zeitliche Reihenfolge** der Ereignisse.

Die Bewertung erfolgt auf einer **Skala von 1 (sehr gut) bis 6 (sehr schlecht)**. Zusätzlich gibt es ein Feld für Kommentare. Hier ein Beispiel

Lesen Sie den türkischen Satz in Ruhe durch. Bitte bewerten Sie, wie gut der deutsche Satz eine mögliche zeitliche Reihenfolge der Ereignisse im türkischen Satz wiedergibt.

*** 1. Suçlanan adam siyah bir kamyonu oluduğunu söyledi.**

"Der Angeklagte machte die Aussage, während er den schwarzen Lkw besitzt."

1 (sehr gut)	2	3	4	5	6 (sehr schlecht)
○	○	○	○	○	○

Anmerkungen?

Figure 3.7: Instruction

3.2 Description of Results

One of the items turned out to be tested only for two instead of three different temporal readings and was excluded from the analyses. In addition, there were erroneous assignments of conditions to lists for two items leading to a slight deviation from a balanced design. Eight responses, all of them in the condition LATER-THAN-MATRIX, were not recorded, probably for technical reasons. Across lists, 525, 525 and 517 responses entered into analyses for the conditions EARLIER-THAN-MATRIX, SIMULTANEOUS, and LATER-THAN-MATRIX, respectively. The data were averaged within participants within conditions and were subjected to a repeated measures analysis of variance with the three-level factor Temporality (LATER-THAN-MATRIX, SIMULTANEOUSLY, EARLIER-THAN-MATRIX) crossed with the two-level factor Structure (complement clause versus relative clause).

The results for Complement Clauses and Relative Clauses are shown in figure 3.8.[1] The scale goes from 1 - very good- to 6 - very bad -.

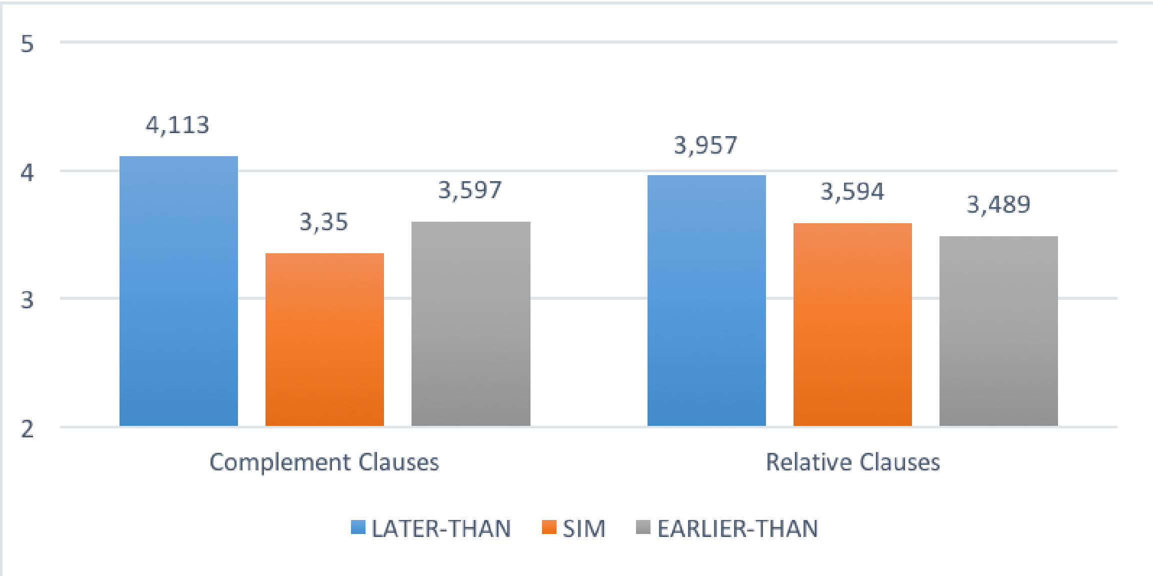


Figure 3.8: Results: Temporal Interpretation of Turkish Complement Clauses and Relative Clauses

The analysis yielded no main effect, neither for Temporality [F(2,88) = 1.74, p > .15] nor for Structure [F < 1]. The two factors, however, marginally interact [F(2,88) = 2.42, p = .095]. Although the interaction does not quite reach significance, I will present the statistics for the corresponding contrasts. The first contrast, comparing SIMULTANEOUS versus EARLIER-THAN-MATRIX, corroborates the interaction of Temporality with Structure [F(1,44) = 6.89, p < .05]; the second contrast, comparing SIMULTANEOUS with LATER-THAN-MATRIX yields no significant interaction [F(1,44) = 2.76, p = .10]. The significant first contrast supports a larger difference in acceptability between SIMULTANEOUS and LATER-THAN-MATRIX for Complement Clauses (4.11 versus 3.35) compared to Relative Clauses (3.96 versus 3.94).

[1]The results for the coordinated sentences are not listed here, as they were only used as fillers.

Corresponding t-tests show that relative clause structures are not rated differently with SIMULTANEOUS and LATER-THAN-MATRIX paraphrases [$t < 1$] but provide evidence that complement clause structures are rated better with SIMULTANEOUS than with LATER-THAN-MATRIX paraphrases [$t(44) = 1.98$, $p = .054$ with two-tailed significance test].
Consequently, all of the three readings are available for both structures, as none of the averages for each Temporality and Structure is voted to be extremely bad. In order to exclude one reading, the average should have been at least 5. Additionally, as there is no significant main effect of Temporality, there is not evidence that any of the tested paraphrases are completely odd for either structure. There is, however, at least some evidence in agreement with the hypothesis that the paraphrases differ in acceptability at least for Complement Clauses: the interpretation that the secondary event and the matrix event take place simultaneously is judged somewhat better than the interpretation that the secondary event occurs after the matrix event.
For a better understanding, I would like to provide some diagrams to illustrate the different readings. The diagrams hold for both sentence structures:

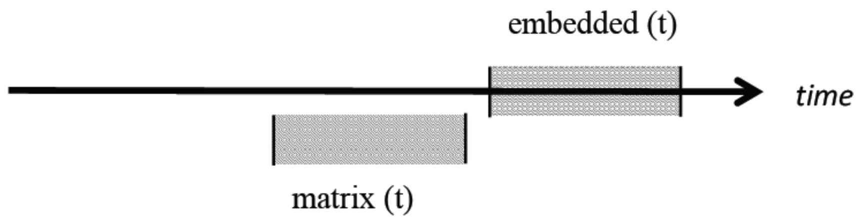


Figure 3.9: LATER-THAN-MATRIX Interpretation

Average result for Complement Clauses: 4,113
Average result for Relative Clauses: 3,957

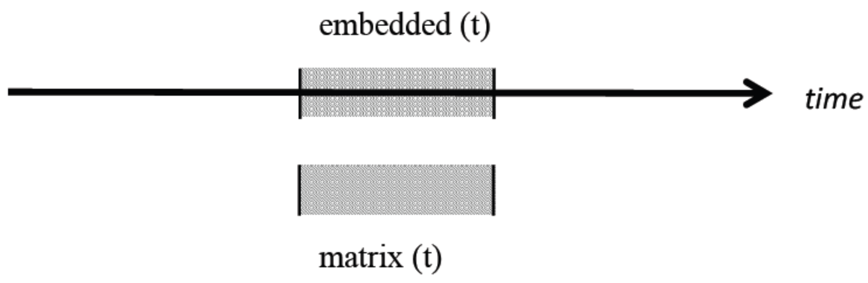


Figure 3.10: SIMULTANEOUS Interpretation

Average result for Complement Clauses: 3,35
Average result for Relative Clauses: 3,594

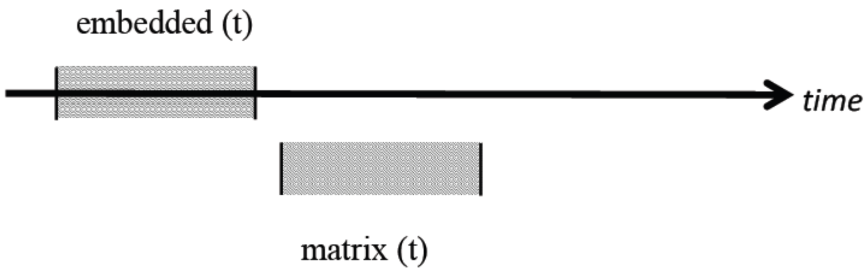


Figure 3.11: EARLIER-THAN-MATRIX Interpretation

Average result for Complement Clauses: 3,489
Average result for Relative Clauses: 3,489

3.3 Discussion & Evaluation of the Results

The investigation clearly shows that Turkish is a +SOT language. Recall from the background section that English is a +SOT language, too. I would like to contrast my results with the already existing assumptions for English.

	English	Turkish
Complements	√	√
Relatives	√	√

Table 3.3: EARLIER-THAN Reading in Contrast

	English	Turkish
Complements	√	√
Relatives	√	√

Table 3.4: SIMULTANEOUS Reading in Contrast

	English	Turkish
Complements	X	√
Relatives	√	√

Table 3.5: LATER-THAN Reading in Contrast

Turkish Complements

The results for Turkish Complement Clauses are not as expected, but gave rise to an interesting thought, especially regarding to the LATER-THAN-MATRIX interpretation at least for some sentences. More precisely said, for some sentences, I had a strong intuition that spoke against the LATER-THAN-MATRIX interpretation, but for other Complement Clauses the LATER-THAN-MATRIX reading seemed more available. The following sentences with the corresponding contexts serve to explain my intuitions regarding the LATER-THAN-MATRIX interpretation.

(4) The married couple Sabrina and Ben want to invite their best friends Laura and Chris for dinner tomorrow. Therefore, Sabrina calls Laura to invite both of them. Unfortunately, they find out that Chris will go to Prague tomorrow in the morning, so he cannot join them for dinner. Sabrina then turns to Ben and says:

(5) "Laura Chris'in Prağ'ta olduğunu söyledi."

(6) Laura Chris'in Prağ'ta olduğunu söyledi.
Laura Chris.akk.sg. Prague.loc. be.PP.poss.3sgl. say.past.3.sgl.acc.
"Laura said that Chris was in Prague."

With the provided context, the relevant time is determined and we do not need further information like an adverbial expressing time: "**tomorrow**" (e.g. *"Laura Chris'in yarin Prağ'ta olduğunu söyledi."*), to clarify the intended LATER-THAN-MATRIX reading. It is to add, that the LATER-THAN-MATRIX interpretation in this context clearly has a future reading, since the embedded time refers to a time after the utterance time.
On the other hand, there are Complement Clauses, for which the LATER-THAN-MATRIX interpretation seems to be not available, independent of context determining a relevant time.

(7) You are having a conversation with a journalist about a senator. This senator is a member of the Right-Wing Party at the moment, but the journalist is convinced that he will be a member of the Communist Party tomorrow, since he has changed some political views. The following sentence only can have a SIMULTANEOUS or EARLIER-THAN-MATRIX reading.

(8) *"Gazeteci senatörün komunist partiye üye olduğunu iddia etti."

(9)

Gazeteci	senatörün	komunist	partiye	üye
Journalist-nom.sgl.	senator-akk.	communist	party-dat.	member.nom.slg.
olduğunu	iddia	etti.		
be.PP.poss.3sgl.acc.	claim-past.3sgl.			

"The journalist claimed that the senator was a member of the Communist Party."

For this Complement Clause, there is no LATER-THAN-MATRIX interpretation, although the context determines the reference time. Consequently, I assume that the temporal interpretation of Turkish sentences not only depend on sentence structure. A possible further interpretation trigger might be the verb category.

Turkish Relatives

The results for Turkish Relative Clauses match my intuitions about the different available readings. Similar to Complement Clauses, the LATER-THAN-MATRIX interpretation is the most difficult one to get and respectively the dis-preferred reading. The following contexts help to reconstruct the different readings.

(10) Rupert is an ice-cream man who has an ice-cream van, which he is driving to the closest neighborhoods in order to please the kids. Further, Rupert likes to have a chat with the kids. Emma observes how one of the kids fells down, while running after the ice-cream van and the boy starts crying. Rupert walks to the boy and starts talking to him. When her friend asked Emma how the boy stopped crying again, then Emma says:

(11) "Dondurmacı ağlayan çocukla konuştu."

(12)

Dondurmacı	ağlayan	çocukla	konuştu.
Icecreamman.1sgl.nom.	cry-FP.	boy-with	speak-past.3.sgl.

"The ice-cream man talked to the boy who was crying."

In this context, the sentence of investigation clearly has a SIMULTANEOUS interpretation.

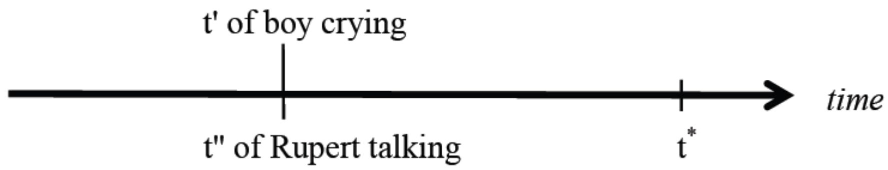


Figure 3.12: SIMULTANEOUS Interpretation

(13) Rupert is an ice-cream man who has an ice-cream van, which he is driving to the closest neighborhoods in order to please the kids. Further, Rupert likes to have a chat with the kids. Two days ago, one boy was crying a lot because there was no chocolate ice-cream left. Today, Rupert saved some chocolate ice-cream for him and therefore, he talks to him. One of the neighbors observed the whole happening and says the following to her friend:

(14) "Dondurmacı ağlayan çocukla konuştu."

(15) Dondurmacı ağlayan çocukla konuştu.
Icecreamman.1sgl.nom. cry.FP boy-with speak-past.3.sgl.
"The ice-cream man talked to the boy who was crying."

With this context, the very same sentence has an EARLIER-THAN-MATRIX interpretation. The reading becomes clearer when adding some temporal adverbial to the sentence like *"Dondurmacı iki gün önce ağlayan çocukla dün konuştu"*, which means *"Yesterday, the ice-cream man talked to the boy who was crying two days ago"*.

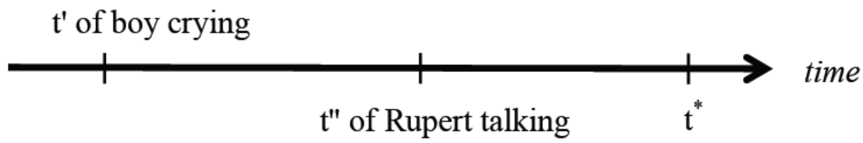


Figure 3.13: EARLIER-THAN-MATRIX Interpretation

(16) Rupert is an ice-cream man who has an ice-cream van, which he is driving to the closest neighborhoods in order to please the kids. Two days ago he had a conversation with a boy. Yesterday, this very same boy cried because the ice-cream man is not coming today. Emma is very surprised about the the

boy's crying, sine she assumed that the ice-cream man canceled on the boy. Today she talks with her friend about it and says:

(17) "Dondurmacı ağlayan çocukla konuştu."

(18) Dondurmacı ağlayan çocukla konuştu.
Icecreamman.1sgl.nom. cry-FP. boy-with speak-past.3.sgl.
"The ice-cream man talked to the boy who was crying."

For this context, we derive the LATER-THAN-MATRIX interpretation. Another example of phrasing this sentence would be: *"Dondurmacı dün ağlayan çocukla iki gün önçe konuştu"*. In this case, the **talking time** precedes the **crying time** and both of these times precede the utterance time.

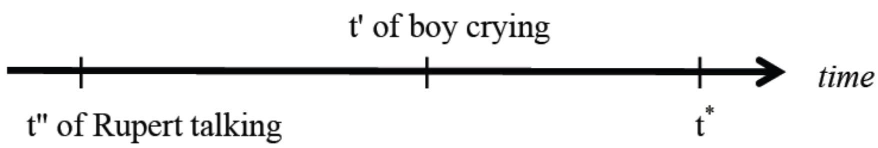


Figure 3.14: LATER-THAN-MATRIX Interpretation

Possible Influences

Moreover, I would like to mention one problematic aspect of the rating study, which might have affected the results. One serious problem was that some participants understood the German paraphrase to be a translation of the Turkish sentence of investigation. The instructions clearly emphasized the interest on the judgment in regard to the temporal order of matrix and subordinated clause, and were repeated for every sentence. Nevertheless, the overall setting of the study was a Turkish sentence vs. a German sentence. This might have led participants to intuitively judge the paraphrase badly. Since the German paraphrase only has the function to underline a possible temporal order of the Turkish sentence, it sounds different as the Turkish sentence. A solution would be to construct a study that is only in Turkish.
It was also interesting to read some comments that participants left, when they were not sure how to rate the sentence. The following lines are some comments that participants left:

P1: "In dem türkischen Satz erfährt man nicht, ob und wann der Bankräuber schoss."
P2: "oturduğu → kann andeuten Sie lebt immer noch dort, kann aber

auch Vergangenheit sein. Der Kontext im türkischen Teil müsste deutlicher sein, um die Vergangenheit deutlicher zu machen. Der Leser kann nicht unterscheiden, ob Sie noch darin wohnt oder nicht. Ich vermute im deutschen Satz handelt es sich um ein "Plusquamperfekt", diese Zeitform gibt es im Türkischen nicht. (Wiwi Student)"

4 Theoretical Consequences & Discussion

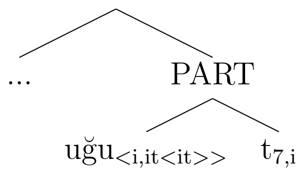
This section aims to semantically prove that all of the three readings for Complement Clauses and Relative Clauses can be semantically derived, as well. Therefore, I took the results of the rating study into account, and looked for the source of ambiguity, which clearly is the *PARTICIPLE* that causes subordination. The *PARTICIPLE* in Turkish can be used to refer to a present tense and at the same time to a past tense. As I mentioned in the previous sections, the temporal order of a Turkish Complement Clause and a Turkish Relative Clause, strongly depends on the contex. Hence, context disambiguates the sentence. For our semantics this means that we need a context variable that is free and can set the relation between the reference time of the matrix clause and the reference time of the embedded clause.

4.1 Turkish Complement Clauses

Let us consider the sentence (1) repeated from the previous chapter.

(1)	Laura Chris'in	Prağ'ta	olduğunu	söyledi.
	Laura Chris.gen.sg.	Prague.loc.	be.PP.poss.3sgl.	say.past.3.sgl.acc.
	"Laura said that Chris was in Prague."			

According to the results of the rating study, the sentence in (1) has three readings: back-shifted reading, simultaneous reading, and the future reading. My first attempt to derive these different readings, was to assume *PARTICIPLE* has a free time variable, which gets its time reference from the assignment function:
$[\![..]\!]^{g[7 \rightarrow t^*]}$

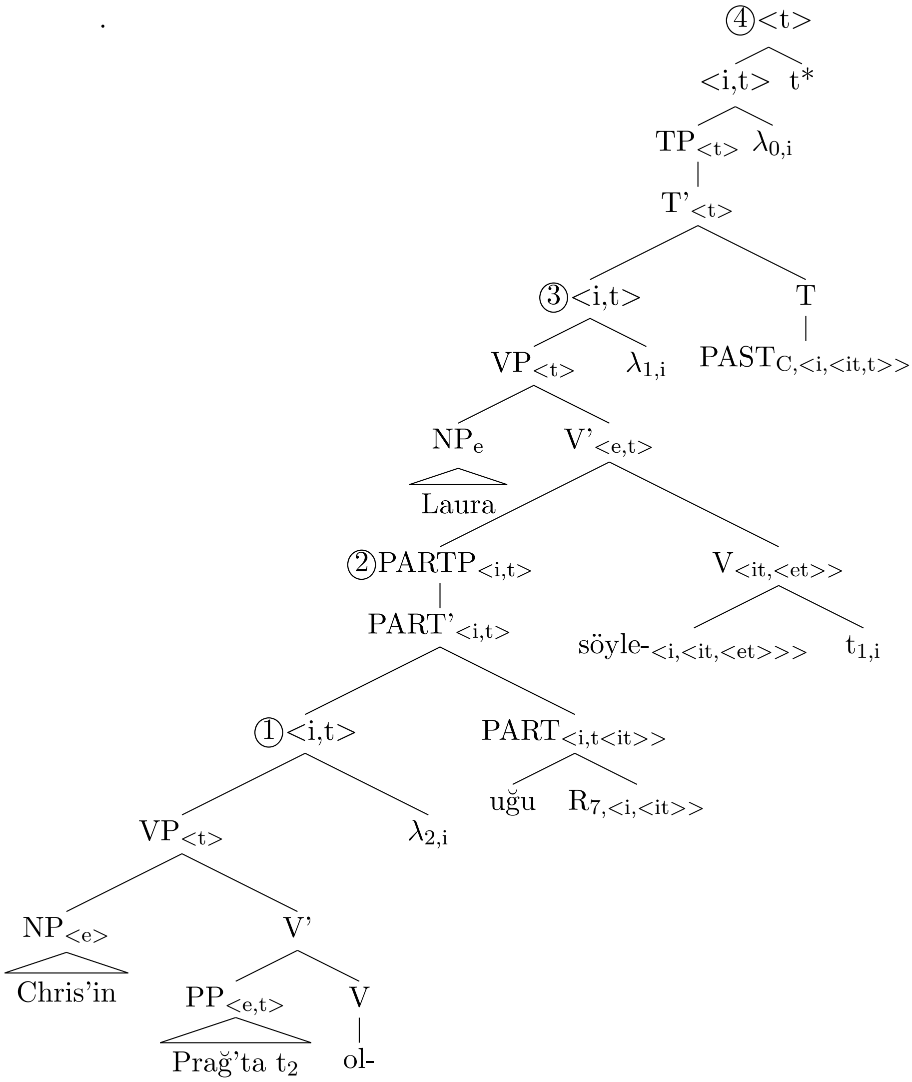


$[\![PART]\!]^g = \lambda t.\lambda S.\lambda q.\exists t'' \; [\; t'' < t \;\&\; S(t'') = 1 \;\&\; t'' < q \;]$

With this lexical entry, it is only possible to derive the EARLIER-THAN-MATRIX interpretation, since the lexical entry already determined the context given temporality to a shifted interpretation. The LF in (2) solves this problem.

(2) I. Logical Form & Semantic Types

.



(3) II. Lexical Entries

$[\![\text{Prağ'ta}]\!] = \lambda t'.\lambda a.$ a is in Prague at t'.

$[\![\text{söyle}]\!] = \lambda t^2.\lambda Q.\lambda x.$ x says at t^2 & $Q(t^2)=1$.

$[\![\text{PAST}]\!] = \lambda t.\lambda P.\ \exists t'[t'<t \ \&\ P(t')=1]$

$[\![\text{PART}]\!] = \lambda R.\lambda S.\lambda q.\ \exists t'' \ [R(t'')(q)=1 \ \&\ S(t'')=1] \ (<<i,<it,>><it,<it>>>)$

$[\![\text{Chris}]\!]$= Chris $[\![\text{Laura}]\!]$= Laura

The accessibility relation R_7 gets its meaning from the assignment function:

$[\![R_7]\!]=^{g[7 \rightarrow \lambda t.\lambda t'.\ t' < t]}$ for the EARLIER-THAN-MATRIX interpretation

$[\![R_7]\!]=^{g[7 \rightarrow \lambda t.\lambda t'.\ t' = t]}$ for the SIMULTANEOUS interpretation

$[\![R_7]\!]=^{g[7 \rightarrow \lambda t.\lambda t'.\ t' > t]}$ for the LATER-THAN-MATRIX interpretation

(4) III. Truth Conditions

$[\![(2)]\!]^{g[7 \rightarrow \lambda t.\lambda t'.\ t' < t]} = 1$ iff

① λt_2. Chris is in Prague at t_2.

② λq. $\exists t''[\ t'' < q$ & Chris is in Prague at $t''\ ]$

③ λt_1. Laura says at t_1 & $\exists t''[\ t'' < t_1$ & Chris is in Prague at $t''\ ]$

④ $\exists t'[t'<t^*$ & Laura says at t' & $\exists t''[t''<t'$ & Chris is in Prague at $t'']]$
⇒ **EARLIER-THAN-MATRIX**

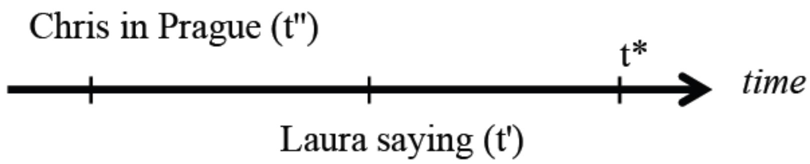


Figure 4.1: EARLIER-THAN-MATRIX Interpretation

(5) $[\![(2)]\!]^{g[7 \rightarrow \lambda t.\lambda t'.\ t' = t]} = 1$ iff

① λt_2. Chris is in Prague at t_2.

② λq. $\exists t''[\ t'' = q$ & Chris is in Prague at $t''\ ]$

③ λt_1. Laura says at t_1 & $\exists t''[\ t'' = t_1$ & Chris is in Prague at $t''\ ]$

④ $\exists t'[t'<t^*$ & Laura says at t' & $\exists t''[t''=t'$ & Chris is in Prague at $t'']]$
⇒ **SIMULTANEOUS**

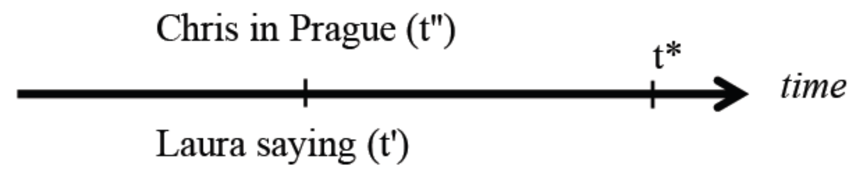


Figure 4.2: SIMULTANEOUS Interpretation

(6) $[\![(2)]\!]^{g[7 \to \lambda t.\lambda t'.\ t' > t]} = 1$ iff

① λt_2. Chris is in Prague at t_2.

② λq. $\exists t''[\ t'' > q$ & Chris is in Prague at $t''\ ]$

③ λt_1. Laura says at t_1 & $\exists t''[\ t'' > t_1$ & Chris is in Prague at $t''\ ]$

④ $\exists t'[t' < t^*$ & Laura says at t' & $\exists t''[t'' > t'$ & Chris is in Prague at t"]]
⇒ **LATER-THAN-MATRIX**
This truth condition only situates t" after t' but does not define the relation between t" and t*. This means, that a future reading (like example (18) from the previous section with the provided context) is not excluded.

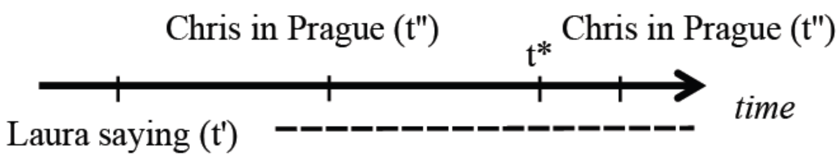


Figure 4.3: LATER-THAN-MATRIX Interpretation

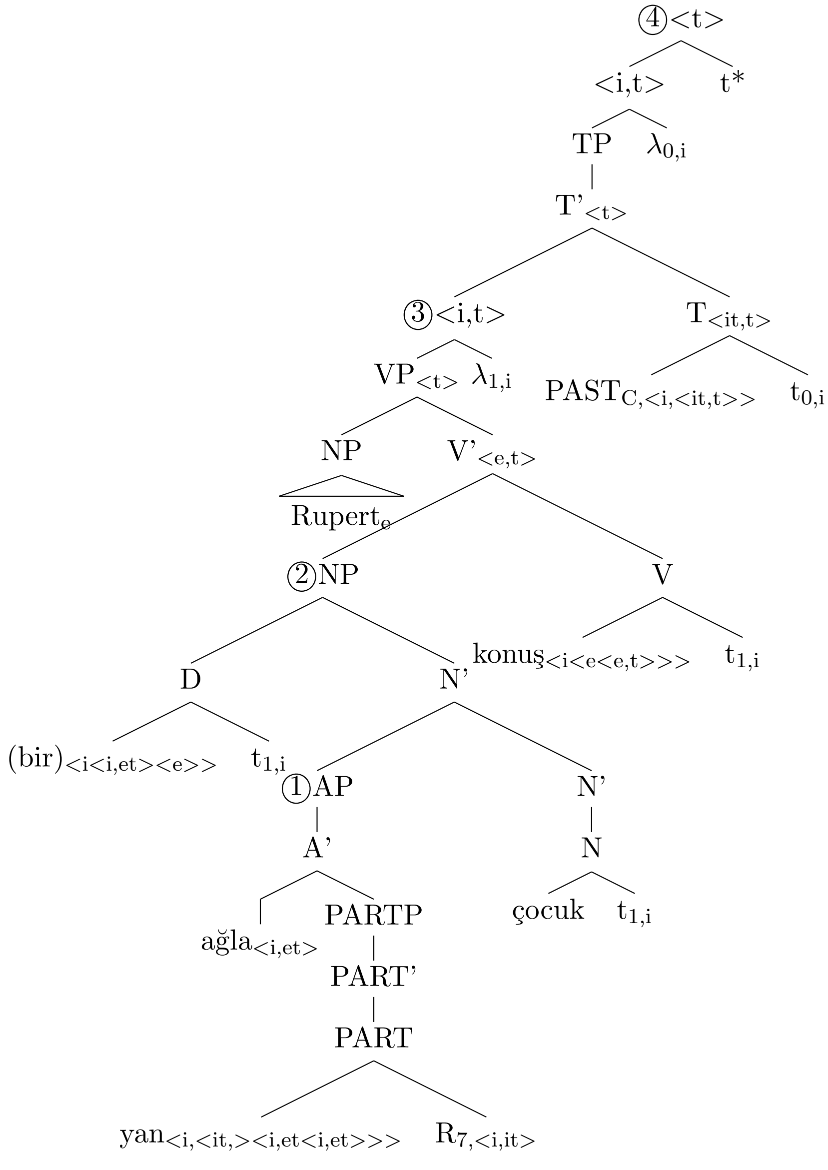
4.2 Turkish Relative Clauses

Let us consider the relative clause in (7).

(7) Rupert ağlayan çocukla konuştu.
Rupert cry-FP. boy-with speak-past.3.sgl.
"Peter talked to the boy who was crying."

The results of the rating study show that this sentence has three readings: the back-shifted reading, the simultaneous reading, and the later-than-matrix reading. The following analysis shows the LF and the truth condition for each reading.

(8) I. Logical Form & Semantic Types
.



(9) II. Lexical Entries

$[\![\text{Rupert}]\!]$=R

$[\![\text{ağla}]\!]=\lambda t.\lambda a.$ a cries at t.

$[\![\text{çocuk}]\!]=\lambda t.\lambda b.$ b is a boy at t.

$[\![\text{konuş}]\!]=\lambda t.\lambda b.\lambda a.$ a talks to b at t.

$[\![\text{bir}]\!]=\lambda t.\lambda f.\iota y[f(t)(y)=1]$.

$[\![\text{PAST}]\!]=\lambda t.\lambda P.\ \exists t'[t'<t\ \&\ P(t')=1]$
$[\![\text{PART}]\!]=\lambda R.\lambda S.\lambda q.\lambda x.\exists t''[R(t'')(q)=1\ \&\ S(t'')(x)=1]$

The accessibility relation R_7 gets its meaning from the assignment function:

$[\![R_7]\!]=^{g[7 \rightarrow \lambda t.\lambda t'.\ t' < t]}$ for the EARLIER-THAN-MATRIX interpretation
$[\![R_7]\!]=^{g[7 \rightarrow \lambda t.\lambda t'.\ t' = t]}$ for the SIMULTANEOUS interpretation
$[\![R_7]\!]=^{g[7 \rightarrow \lambda t.\lambda t'.\ t' > t]}$ for the LATER-THAN-MATRIX interpretation

(10) III. Truth Conditions

$[\![(8)]\!]^{g[7 \rightarrow \lambda t.\lambda t'.\ t' < t]}= 1$ iff

① $\lambda q.\lambda x.\ \exists t''[q < t''$ & x cries at t”]

② $\iota y[\exists t''[t_1 < t''$ & y cries at t”] y is a boy at $t_1]$

③ λt_1.R talks to $\iota y[\exists t''[t_1 < t''$ & y cries at t”] y is a boy at $t_1]$ at t’.

④ $\exists t'[t' < t^*$ & R talks to $\iota y[\exists t''[t' < t''$ & y cries at t”] y is a boy at t’] at t’.]
⇒ **EARLIER-THAN-MATRIX**

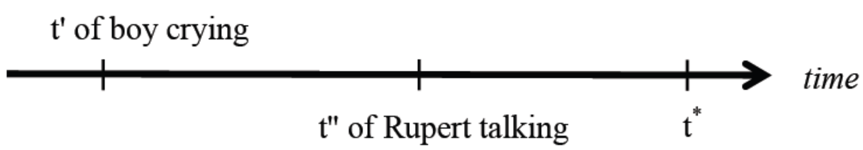


Figure 4.4: EARLIER-THAN-MATRIX Interpretation

(11) $[\![(8)]\!]^{g[7 \rightarrow \lambda t.\lambda t'.\ t' = t]}= 1$ iff

① $\lambda q.\lambda x.\ \exists t''[q = t''$ & x cries at t”]

② $\iota y[\exists t''[t_1 = t''$ & y cries at t”] y is a boy at $t_1]$

③ λt_1.R talks to $\iota y[\exists t''[t_1 = t''$ & y cries at t”] y is a boy at $t_1]$ at t’.

④ $\exists$t'[t' < t* & R talks to ιy[$\exists$t"[t' = t" & y cries at t"] y is a boy at t'] at t'.]
⇒ **SIMULTANEOUS**

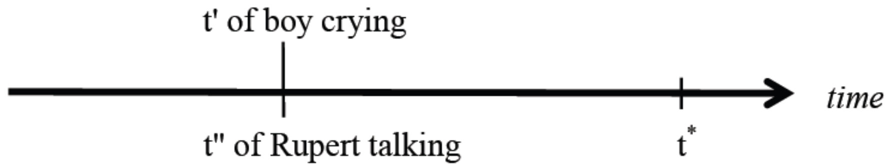


Figure 4.5: SIMULTANEOUS Interpretation

(12) $[\![(8)]\!]^{g[7 \rightarrow \lambda t.\lambda t'.\ t' > t]} = 1$ iff

① λq.λx. $\exists$t"[q > t" & x cries at t"]

② ιy[$\exists$t"[t_1 > t" & y cries at t"] y is a boy at t_1]

③ λt_1.R talks to ιy[$\exists$t"[t_1 > t" & y cries at t"] y is a boy at t_1] at t'.

④ $\exists$t'[t' < t* & R talks to ιy[$\exists$t"[t' > t" & y cries at t"] y is a boy at t'] at t'.]
⇒ **LATER-THAN-MATRIX**

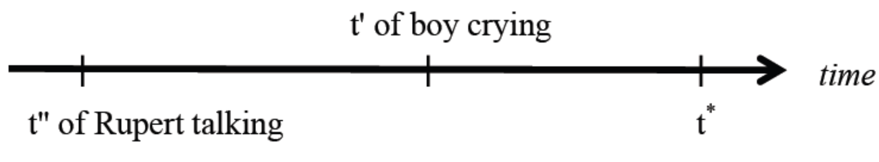


Figure 4.6: LATER-THAN-MATRIX Interpretation

5 Conclusion

The overall hypothesis of Turkish being a +SOT language is confirmed with this study. Nevertheless, there are still some questions that remain unanswered. This section draws attention to some critical issues of this study that should be reconsidered in future works, as they might have been influenced the results.
One aspect that requires further research is the LATER-THAN-MATRIX interpretation being available for some Complement Clauses but not for other Complement Clauses. As I have not considered aspect and verb categories, it can be assumed that these factors also influence the temporal order of interpretation. In addition, the LATER-THAN-MATRIX interpretation in relative clauses is slightly different, since with a provided context, it can have a future reading, as well. Despite this fact, the LATER-THAN-MATRIX interpretation is always the least preferred reading for both structures, it is never rated too bad. Hence, while this reading seems to be uncommon and clearly not preferred, the results are not bad enough to exclude this reading for both sentence structures.
It is remarkable, that a future reading is never possible in English past-under-past embedded clauses but Turkish allows this reading. English relatives only have a LATER-THAN-MATRIX reading, where the two events under discussion always precede the utterance time, but only differ in the relation to each other.

The result of the rating study is that all of the three readings are available in Relative Clauses and Complement Clauses, which makes Turkish a +SOT language. It is worth to mention that this is a pattern that is not observed in other languages so far, which makes Turkish exceptional.

Let me shortly remind you how Turkish and English contrast:

	English	Turkish
Complements	√	√
Relatives	√	√

Table 5.1: EARLIER-THAN Reading in Contrast

	English	Turkish
Complements	√	√
Relatives	√	√

Table 5.2: SIMULTANEOUS Reading in Contrast

	English	Turkish
Complements	X	√
Relatives	√	√

Table 5.3: LATER-THAN Reading in Contrast

As I mentioned in the previous sections, the rating study was constructed for native speakers of both Turkish and German, since the paraphrases were in German and the sentence to be rated was in Turkish. This setting might have led to confusions and should be avoided in future work. A pure Turkish study would be more adequate and effective.

Moreover, during my research I have followed some discussions in the literature about Turkish Relative Clauses and Complement Clauses. Some semanticists claim that Turkish does not even have Relative Clauses and indicate that they are rather Noun Phrases. Hence, although I have not included this discussion to this paper, it is an unsolved area in the semantic field, which requires further research. Nevertheless, I would like to repeat the semantic analysis of this paper: The temporal ambiguity in Turkish embedded structures originates from the participles. For both, Relative Clauses and Complement Clauses, it holds that the context determines the reference time of the embedded clause and the matrix clause. Therefore, the participle always has a free relation R variable that obtains its value from the assignment function. Depending on the reading, R receives the following denotation:

$[\![R_7]\!]=^{g[7 \rightarrow \lambda t.\lambda t'.\ t' < t]}$ for the EARLIER-THAN-MATRIX interpretation

$[\![R_7]\!]=^{g[7 \rightarrow \lambda t.\lambda t'.\ t' = t]}$ for the SIMULTANEOUS interpretation

$[\![R_7]\!]=^{g[7 \rightarrow \lambda t.\lambda t'.\ t' > t]}$ for the LATER-THAN-MATRIX interpretation

Crucially, the denotation type for the participle changes with the sentence structure: In Complement Clauses the denotation type of the participle is <<i,<it,>><it,<it>>> and has lexical entry below:

$[\![PART]\!]^g = \lambda R.\lambda S.\lambda q.\ \exists t''\ [R(t'')(q)=1\ \&\ S(t'')=1]$

The denotation type of the participle in relative clauses is <<i,<it,>><i,et><i,et>> and has the lexical entry below:

$[\![PART]\!]^g = \lambda R.\lambda S.\lambda q.\lambda x.\ \exists t''[R(t'')(q)=1\ \&\ S(t'')(x)=1]$

All in all, this approach allows to derive all three readings with only one LF for one sentence, which map the results of the rating study. Although the later-than-matrix interpretation leaves room for discussion, as it is the least preferred reading, there are at least two temporal readings for Turkish Complement Clauses and Turkish Relative Clauses. We can conclude that Turkish is a +SOT language, as there is definitely a temporal ambiguity between the shifted and the simultaneous reading.

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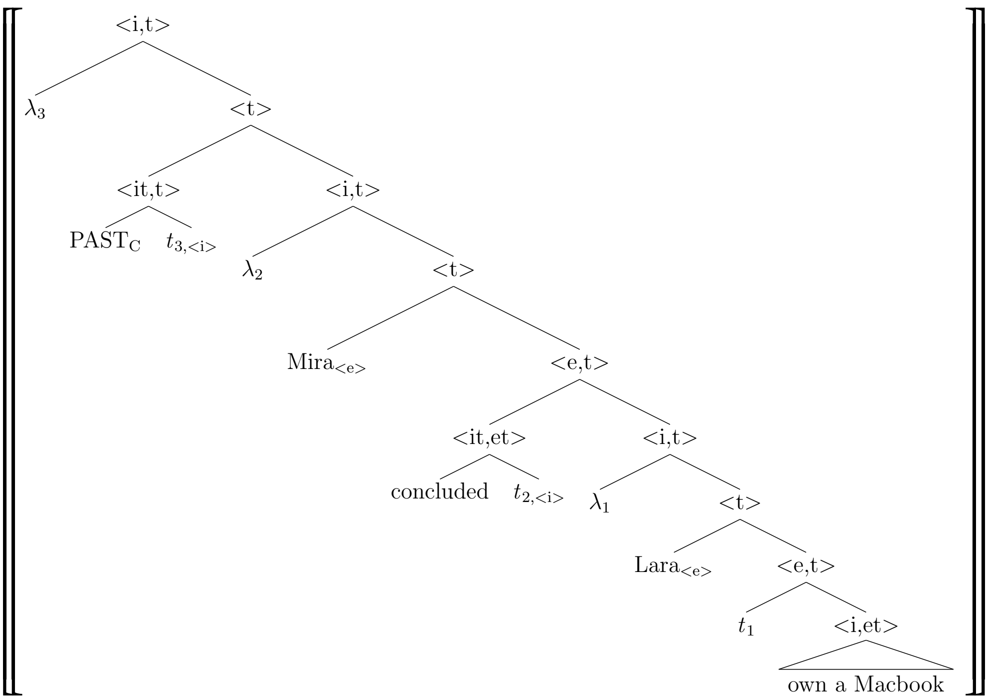
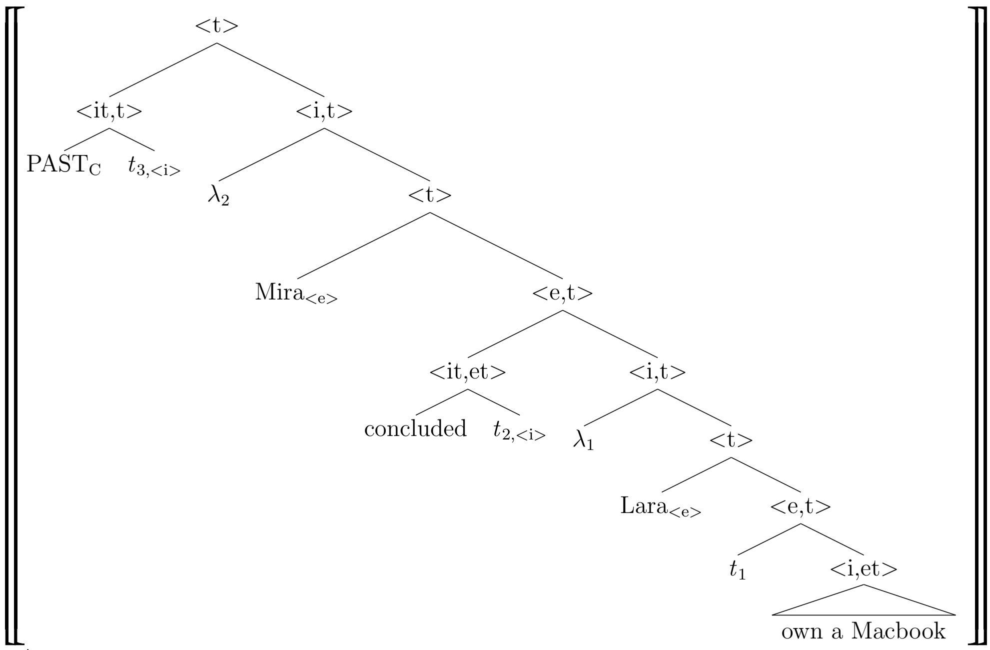
7 Appendix

Full Compositional Interpretation of LF (21) in Chapter 2, Section 2.2 (p. 25)



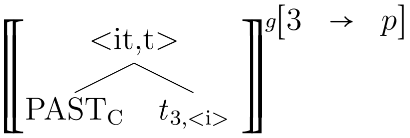
^{g}(t*)=1 iff PA

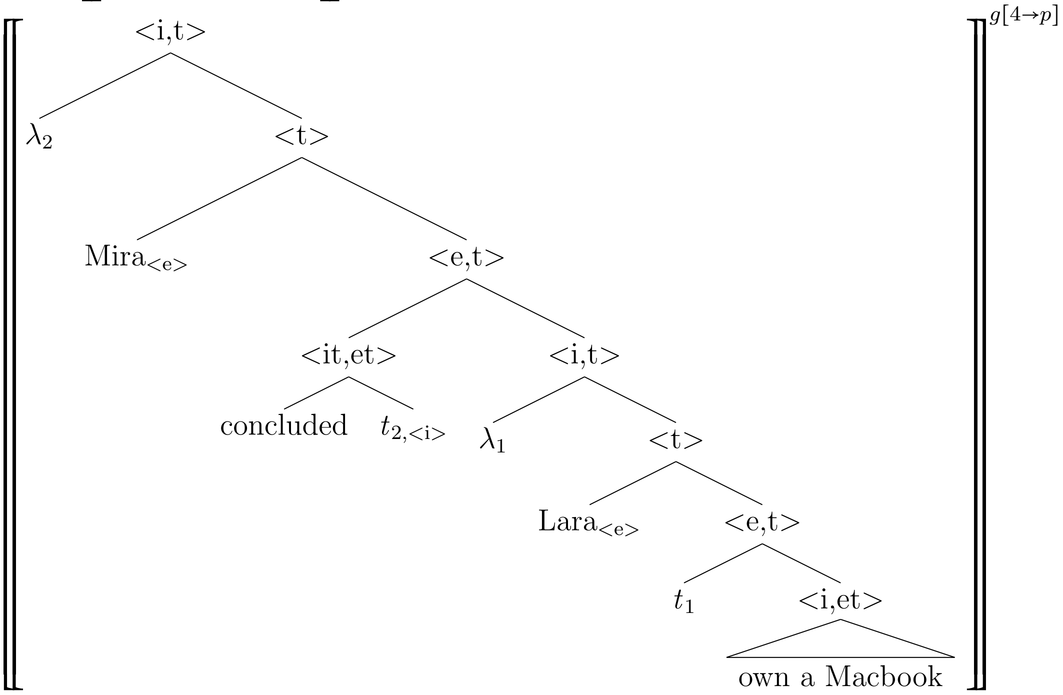
[λp∈D.



$^{g[3 \to p]}$](t*)

=1 iff FA

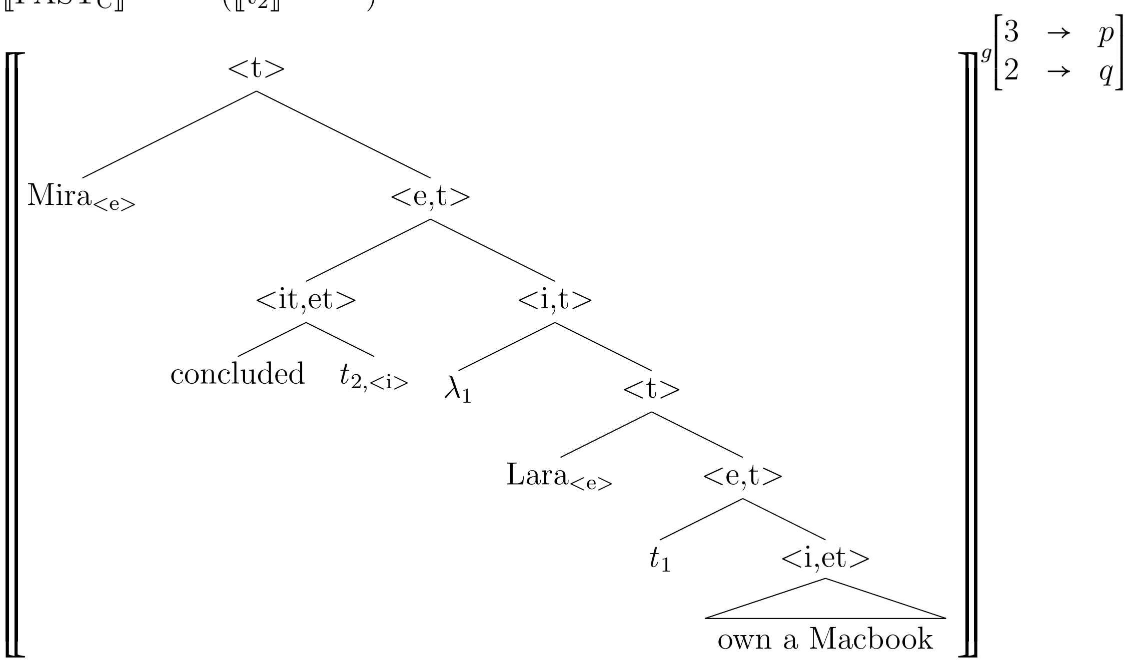
[λp∈D. 

(

)](t*) =1

iff FA, PA

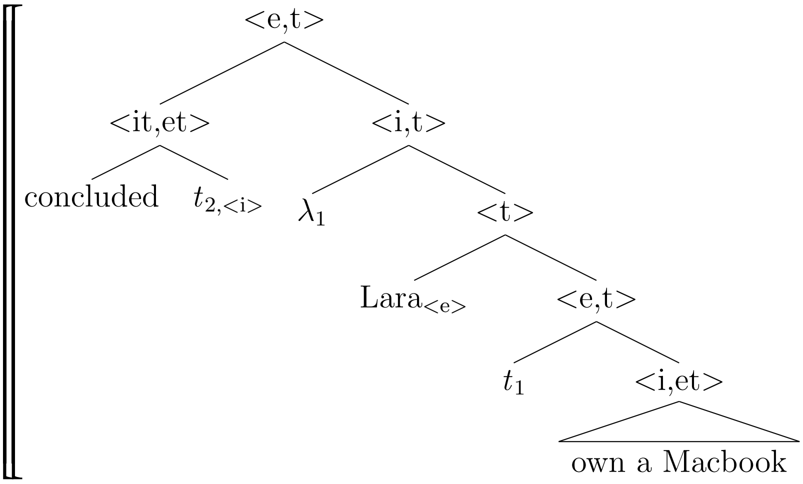
[λp∈D. $[\![\mathrm{PAST_C}]\!]^{g[3 \to p]}$ ($[\![\mathrm{t_2}]\!]^{g[3 \to p]}$)

([λq∈D. 

])](t*)=1 iff Trace, FA

[λp∈D. ⟦$PAST_C$⟧$^{g[3 \to p]}$ (g[3 → p](3))

([λq∈D. ⟦

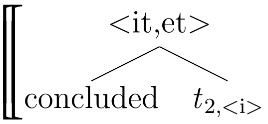


⟧$^{g\left[\begin{smallmatrix}3 & \to & p\\ 2 & \to & q\end{smallmatrix}\right]}$ (⟦Mira⟧$^{g\left[\begin{smallmatrix}3 & \to & p\\ 2 & \to & q\end{smallmatrix}\right]}$)]

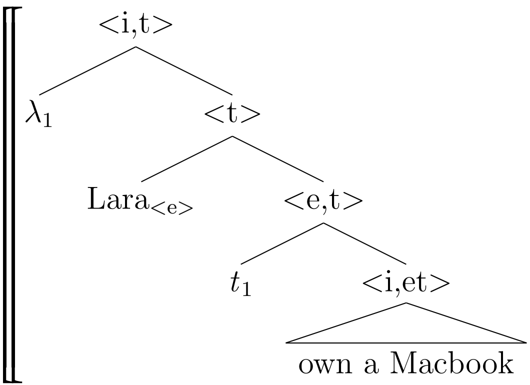
)](t*) =1 iff FA, TN, FA

[λp∈D.[λt∈ $D_{<t>}$.λP∈$D_{<i,t>}$. ∃t'[t'< t & P(t')=1]](p)([λq∈D.

⟦



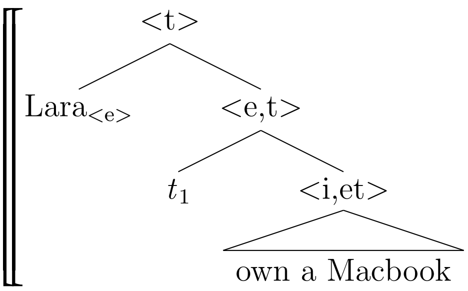
⟧$^{g\left[\begin{smallmatrix}3 & \to & p\\ 2 & \to & q\end{smallmatrix}\right]}$ (⟦



⟧$^{g\left[\begin{smallmatrix}3 & \to & p\\ 2 & \to & q\end{smallmatrix}\right]}$

) (MIRA)])](t*)=1 iff FA, PA

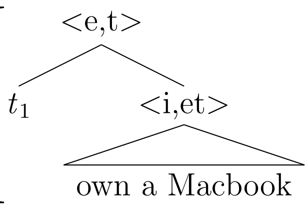
[λp∈D.λP∈$D_{<i,t>}$.∃t'[t'< p & P(t')=1]([λq∈D. ⟦concluded⟧$^{g\left[\begin{smallmatrix}3 & \to & p\\ 2 & \to & q\end{smallmatrix}\right]}$ (⟦t_2⟧ $^{g\left[\begin{smallmatrix}3 & \to & p\\ 2 & \to & q\end{smallmatrix}\right]}$)

(λs∈D. ⟦ 

$⟧^{g\begin{bmatrix}3 & \rightarrow & p\\ 2 & \rightarrow & q\\ 1 & \rightarrow & s\end{bmatrix}}$)(MIRA)])](t*)

=1 iff Trace, FA

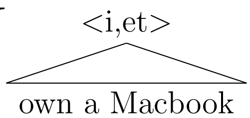
[λp∈D.λP∈$D_{<i,t>}$.∃t'[t'< p & P(t')=1]([λq∈D. $⟦\text{concluded}⟧^{g\begin{bmatrix}3 & \rightarrow & p\\ 2 & \rightarrow & q\end{bmatrix}}$ $(g\begin{bmatrix}3 & \rightarrow & p\\ 2 & \rightarrow & q\end{bmatrix}(2))$

(λs∈D. ⟦ 

$⟧^{g\begin{bmatrix}3 & \rightarrow & p\\ 2 & \rightarrow & q\\ 1 & \rightarrow & s\end{bmatrix}}$ $(⟦\text{Lara}⟧^{g\begin{bmatrix}3 & \rightarrow & p\\ 2 & \rightarrow & q\\ 1 & \rightarrow & s\end{bmatrix}})$)(MIRA)])](t*)

=1 iff TN, FA

[λp∈D.λP∈$D_{<i,t>}$.∃t'[t'< p & P(t')=1]([λq∈D. $⟦\text{concluded}⟧^{g\begin{bmatrix}3 & \rightarrow & p\\ 2 & \rightarrow & q\end{bmatrix}}$ (q)

(λs∈D. ⟦ 

$⟧^{g\begin{bmatrix}3 & \rightarrow & p\\ 2 & \rightarrow & q\\ 1 & \rightarrow & s\end{bmatrix}}$ $(⟦t_1⟧^{g\begin{bmatrix}3 & \rightarrow & p\\ 2 & \rightarrow & q\\ 1 & \rightarrow & s\end{bmatrix}})$(LARA))(MIRA)])](t*)=1 iff TN, TN, Trace

[λp∈D.λP∈$D_{<i,t>}$.∃t'[t'< p & P(t')=1]([λq∈D. [$\lambda t_{<i>}$.$\lambda P_{<i,t>}$.$\lambda x._{<i>}$. x draws a conclusion at t, and if this conclusion is correct, then P(t)] (q) (λs∈D. [λt∈$D_{<i>}$.λx∈$D_{<i>}$. x owns a Macbook at t]($\begin{bmatrix}3 & \rightarrow & p\\ 2 & \rightarrow & q\\ 1 & \rightarrow & s\end{bmatrix}$(1))(LARA))(MIRA)])](t*)=1 iff simpl

[λp∈D.λP∈$D_{<i,t>}$.∃t'[t'< p & P(t')=1]([λq∈D. [$\lambda P_{<i,t>}$.$\lambda x._{<i>}$. x draws a conclusion at q, and if this conclusion is correct, then P(q)](λs∈D. [λt∈$D_{<i>}$.λx∈$D_{<i>}$. x owns a Macbook at t](s)(LARA))(MIRA)])](t*)=1 iff simpl

[λp∈D.λP∈$D_{<i,t>}$.∃t'[t'< p & P(t')=1]([λq∈D. [$\lambda P_{<i,t>}$.$\lambda x._{<i>}$. x draws a conclusion at q, and if this conclusion is correct, then P(q)](λs∈D. [λx∈$D_{<i>}$. x owns a Macbook at s](LARA))(MIRA)])](t*)=1 iff simpl

[λp∊D.λP∊$D_{<i,t>}$.∃t'[t'< p & P(t')=1]([λq∊D. [$\lambda P_{<i,t>}$.λx.$_{<i>}$. x draws a conclusion at q, and if this conclusion is correct, then P(q)]([λs∊D. Lara owns a Macbook at s])(MIRA)])](t*)=1 iff simpl

[λp∊D.λP∊$D_{<i,t>}$.∃t'[t'< p & P(t')=1]([λq∊D. [λx.$_{<i>}$. x draws a conclusion at q, and if this conclusion is correct, then [λs∊D. Lara owns a Macbook at s](q)](MIRA)])](t*)=1 iff simpl

[λp∊D.λP∊$D_{<i,t>}$.∃t'[t'< p & P(t')=1]([λq∊D. MIRA draws a conclusion at q, and if this conclusion is correct, then Lara owns a Macbook at q])])](t*)=1 iff simpl

[λp∊D.∃t'[t'< p & [λq∊D. MIRA draws a conclusion at q, and if this conclusion is correct, then Lara owns a Macbook at q](t')=1]](t*)=1 iff simpl

[λp∊D.∃t'[t'< p & MIRA draws a conclusion at t', and if this conclusion is correct, then Lara owns a Macbook at t']](t*)=1 iff simpl

∃t'[t'< t* & MIRA draws a conclusion at t', and if this conclusion is correct, then Lara owns a Macbook at t']

Items

(1) Başkan, basına bankaya olan borcundan
chariman.nom.sg. press.dat.sg. bank.akk.sg. be.FP. debt.gen.sg.
bahsetti.
tell.past.1sg.
"The chairman told the press about the money the company owed the bank."

(2) Dondurmacı ağlayan çocukla konuştu.
Icecreamman.1sgl.nom. cry-FP. boy-with speak-past.3.sgl.
"The ice-cream man talked to the boy who was crying."

(3) Polis silahını çekdi ve banka soyguncusu ateş
police.nom.sg gun.gen.sg draw.past.3sgl. and bank robber fire
etti.
make-past.3sgl.
"The police officer drew his gun and the bank robber fired."

(4) Basın sekreteri başkanın sürpriz ziyaret için Irak'ta
Press secretary-Nom. president.gen.sgl. surprise visit-Nom. for Iraq-loc.
olduğunu duyurdu.
be-noml.past.3slg. announce.past.3sgl.
"The Press Secretary announced that the President was on a surprise visit to Iraq."

(5) Kadın, ünlü yazarın oturduğu evin yanından
Woman.nom.1sg. famous author-gen. live-noml.-3sg. house-gen. next-to
geçti.
pass-past.
"The woman walked past the house the famous author lived in."

(6) Baba çilek tarlasının otlarını temizledi ve
Father strawberry patch-gen. weed.poss-gen. clean-past.3.sgl. and
kızı çicekleri topladı.
daughter-gen. strawberry-pl. pick-past.3.slg.
"The father weeded the strawberry patch and his daughter picked flowers."

(7) Gazeteci senatörün komunist partiye üye
Journalist-nom.sgl. senator-gen. communist party-dat. member.nom.slg.
olduğunu iddia etti.
be-noml.past.3sgl. claim-past.3sgl.
"The journalist claimed the Senator was a member of the Communist Party."

(8) Kadın detektifin Prağ'ta olduğunu
woman.nom.sgl Undercover-agent.akk.sgl. Prague.loc. be-gerund.past.3.sgl.
söyledi.
say.past.3.sgl

"The woman said that the undercover agent was in Prague."

(9) Hukuk öğrencisi senatör olan adamla evlendi.
Law student-gen. senator be-gerund. man-with marry-past.
"The law student married a man who was a Senator."

(10) Kadın dedesinin oturduğu evin yanından gecti
Woman grandfather-poss.gen. house-poss. next-to pass-past.
"The woman walked past the house her grandfather lived in."

(11) Alarm çaldı ve hırsız arka kapıdan kaçtı.
Alarm go-off-past.3sgl. and burglar back door-from escape-past.3sgl.
"The alarm went off and the burglar escaped through the back door."

(12) Oğlan piyanoyu çaldı ve kız arya söyledi.
Boy piano-acc. play-past.3sgl. and girl aria sing-past.3sgl.
"The boy played the piano and the girl sang an aria."

(13) Öğrenci bir kaç tane mektup yazdı
Student several letter write-past.3sgl. and friend-gen.sgl.
ve arkadaşı postaya gitti.
post-office-acc. go-past.3sgl
"The student wrote several letters and her friend went to the post office."

(14) Başkan sürpriz ziyaret için Irak'ta olduğunu
President.nom.sgl surprise visit.nom.sgl for Iraq-loc. Be-noml.past.3slg.
açıkladı.
Announce.past.3sgl
"The President announced that he was on a surpise visit to Iraq."

(15) Müşteriler tatlılarını yediler ve garson hesabı
Customer-pl. dessert-poss.pl. eat-past.pl. and waiter bill-gen.
getirdi.
bring-past.3.sgl.
"The customers ate their dessert and the waiter brought the bill."

(16) Hoça çocukların sınav yüzünden heyecanlı olduklarını
Teacher child-pl.gen. exam.nom.sgl because-of nervous be-gerund.pl.
söyledi.
say-past.3sgl.
"The teacher said that the children were nervous about the exams."

(17) Profesör projektörü kapattı ve öğrenciler
Professor projector-acc. turn-off-past.3sgl. and student-pl.nom.
kitaplarlarını topladılar.
book-pl.poss.gen pack-past.3pl.
"The professor switched the projector off and the students packed their text-books away."

(18) Yaşlı kadın ameliyat için hastanede olduğunu
Aunt-nom.slg. operation for hospital.loc. be-noml.3slg. say.past.3slg.
söyledi.

"The aunt wrote that she was in hospital for an operation."

(19) Öğrenciler destekledikleri siyaset adamını tartıştılar.
Student-pl. support-pl-poss.gen. politician man.gen. discuss-past.pl.
"The reporter discussed the politicians the singer supported."

(20) Market sahibi fiyatı söyledi ve müşteri cüzdanını
Shop keeper price-acc. say-past.3sgl. and shopper purse-poss.gen.
cıkardı.
take-out-past.3sgl.
"The shop keeper named the price and the shopper took out her purse."

(21) Hizmetçi, Ali Bey'in sahip olduğu atlardan
Maid, squire-poss. own have.gerund horse-pl-from talk-past.
bahsetti.

"The old woman talked about the horses she owned."

(22) Genç kadın üye olduğu tarikatla ilgili bir kitap yayınladı.
young woman, member be-gerund. cult-with about one book publish-past.
"The journalist published a book about the cult the actor belonged to."

(23) Anne hoçaların çok fazla çalıştığını ima etti.
Mother teacher-gen.pl. too much work-gerund.3sgl. Suggest-past.3sgl.
"The mother suggested that the teachers were overworked."

(24) Şov, başkanla ilişkisi olan kadinin
Show, President-with affair-poss.be-gerund. woman-gen. who
kim olduğunu açıkladı.
have-noml.-3sg reveal-past.
"The show revealed the identity of the woman who had an affair with the President."

(25) Üniversite, Irak'ta asker olan öğrenciyi tebrik etti.
University, Iraq-loc. soldier be-gerund. student-acc. honor make-past.
"The university honored the student who was a soldier in Iraq."

(26) Kurum yazarların grevde oluklarını söyledi.
Union writer-pl.gen. strike-on be-pl.3pl. say-3sgl.past
"The union declared the writers were on strike."

(27) Yaşlı kadın sahip olduğu atlardan bahsetti.
Old woman own have-gerund. horse-pl-from talk-past.
"The old woman talked about the horses she owned."

(28) Işıklar kırmızı yandı ve taxi hızlandı.
Lights red turn-past.3sgl. and cab accelerate-past.3sgl.
"The lights turned red and the cab accelerated."

(29) Genç oğlan babasına arkadaşına olan borcundan
young boy father-poss.3sg. friend-poss.3sg. be-gerund. debt-about
bahsetti.
talk-past.
"The teenager told her father about the money she owed her friend."

(30) Yazar kitabı imzaladı ve hayranı ona teşekkür
Author book-gen. Sign-past.3sgl. and fan-gen. him thank
etti.
make-past.3slg.
"The author signed the book and the fan thanked him."

(31) Hoça çok fazla çalıştığını ima etti.
Teacher-nom.sgl too much work-gerund.3sgl suggest-psat-3sgl
"The teachers suggested they were overworked."

(32) Yazarlar grevde olduklarını duyurdular.
writer-pl.nom. Strike-on be-noml.3pl. announce.past.3sgl
"The union declared the writers were on strike."

(33) Memur telefon konuşması yaptı ve sekreter mektup
Clerk phone call-acc. do-past.3sgl. and secretary letter
yazdı.
write-past.3.sgl.
"The clerk made a phone call and the secretary typed a letter."

(34) Anne patatesleri yıkadı ve kızı patateslerı
Mother potatoes-pl.acc. wash-past.3sgl. but daughter-gen. potatoes-pl.acc.
soydu.
peel-past.3sgl.
"The mother washed the potatoes but her daughter peeled them."

(35) Çocuklar sınav yüzünden heyecanlı olduklarini söylediler.
children.nom. exam.akk.sgl because-of nervous be-gerund.pl. say-past.3pl.
"The children said that they were nervous about the exam."

(36) Kiz arkadaşına esrar bağımlısı olduğunu itraf
Girl-nom.slg friend-dat.sgl. drug addict-gen.slg be-noml.past.3sgl. admit
etti.
make-past.3sgl.
"The girl confided to her friend that she was a drug addict."