Mood selection in complement clauses

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1. Introduction

The purpose of the present paper is to investigate mood choice and mood variation in complement clauses in Hungarian and to argue that semantic factors play a crucial role in mood selection. Traditionally the notion of mood is restricted to a category expressed in verbal morphology; as Palmer (1986) observes, mood is formally a morphosyntactic category of the verb, but it has certain semantic functions that affect the meaning of the whole sentence. It has also been widely acknowledged in the literature that the meaning of the matrix predicate plays an important part in determining the mood of the complement clause.

The present analysis is aimed at exploring various semantic parameters related to the embedding predicate that may have an effect upon mood choice in complement clauses. However, the discussion is restricted to the indicative and non-indicative opposition in complement clauses, and thus I will not attempt to characterize the difference between the conditional and the subjunctive or the imperative; the latter moods are subsumed under the label “non-indicative”.

The discussion is organized as follows. Section 2 gives an overview of mood choice in Hungarian complement clauses and raises two fundamental questions related to mood phenomena in general, namely (i) what kinds of factors influence mood choice in complement clauses? (ii) what is the role of matrix negation? Section 3 presents a potential answer by proposing an account based on the semantic notion of veridicality in a Stalnakerian framework (Giannakidou, 1998). However, the study of veridicality still leaves certain questions about mood variation in complement clauses unanswered, for instance mood choice under epistemic predicates is not accounted for. For that reason epistemics are analyzed in detail in section 4. Section 5 then reexamines the open problems and explores a possible analysis in terms of Kratzer’s theory of modality (Kratzer 1981, 1991) and its adoption to mood choice by Giorgi & Pianesi (1997). Section 6 summarizes the findings of the article by arguing that semantic factors indeed are crucial to understanding mood distribution in Hungarian complement clauses.

2. The phenomenon

Research on mood traditionally focuses on the selection of finite verb forms in complement clauses depending on various features of the embedding predicate. Hence, in order to study mood distribution in Hungarian I had to classify matrix predicates taking into account their semantic characteristics and then examine the mood selection properties of the emerging classes. The classification of predicates

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presented below is based on the work of Terrell and Hooper (1974), Hooper (1975), and Haverkate’s (2002) paper on mood distribution in Spanish. The phenomena addressed in the present paper can be summarized in the tables below, which represent mood choice under various groups of predicates both in affirmative and negated matrix clauses. Table 1 and Table 2 show indicative and non-indicative licensing in complement clauses in Hungarian.¹

<table>
<thead>
<tr>
<th>Matrix predicates</th>
<th>Example</th>
<th>Affirmative</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. True factives</td>
<td>örül ‘be glad’</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2. Semifactives²</td>
<td>emlékszik ‘remember’</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3. Epistemics</td>
<td>hisz ‘believe’</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4. Assertives</td>
<td>mond ‘say’</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>5. Fiction verbs</td>
<td>álmodik ‘dream’</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>6. Directives</td>
<td>parancsol ‘order’</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. Permissives</td>
<td>megenged ‘allow’</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. Purposives</td>
<td>törékszik ‘strive’</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9. Desideratives</td>
<td>kíván ‘wish’</td>
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Table 1: Indicative licensing in complement clauses

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Table 2: Non-indicative licensing in complement clauses

¹ For the sake of simplicity I assume that the embedded clauses are neutral affirmative simple sentences, i.e., for the time being I do not deal with negation in the complement clause or with complement clauses where the focus position is filled.
² The anonymous reviewer suggested differentiating true factives from semifactives. In earlier versions of the paper only factives and perception verbs had been considered. As we will see later, the distinction turns out to be fruitful from the point of view of mood selection. Since semifactives include the class of perceptive verbs, in what follows I will use the label “semifactives”. The crucial difference between the aforementioned categories is that true factives presuppose their complements under any condition, however in the case of semifactives, factivity may be lost if the matrix verb is negated, questioned or embedded under it is possible that (cf. Karttunen, 1971b). When turning to matrix negation, we will examine this phenomenon in a detailed fashion.
³ In the case of semifactives, matrix negation may result in loss of factivity, and accordingly, mood variation may occur. We will return to this phenomenon later on in the discussion.
⁴ As we will see later, nonindicative moods are licensed under epistemic predicates with an inherently negative meaning, cf. (17); under assertives the same phenomenon may occur, for instance, under tagad ‘deny’.
The rows representing the mood selection properties of epistemics, assertives and fiction verbs are marked since these groups exhibit rather interesting behavior with respect to mood choice, i.e., under matrix negation mood variation occurs.\footnote{The fact that matrix negation influences mood choice in complement clauses serves as evidence in support of the assumption that semantic factors play a crucial role in mood selection.} Consider the following examples:

(1) Peti nem hiszi, hogy Mari meggyógyul/meggyógyulna/*meggyógyuljon holnap-ra.

   Peti not believes that Mari get well.PRES.IND/COND/*SUBJ tomorrow-BY
   ‘Peti does not believe that Mari will get well by tomorrow.’

(2) Peti nem állítja, hogy tegnap mozí-ban volt/lett volna.

   Peti NEG claims that yesterday IN be.PAST.IND/COND
   ‘Peti doesn’t claim that he went to the cinema yesterday.’

(3) Peti nem is álmodott ar-ról, hogy eljut/eljusson Ameriká-ba.

   Peti NEG even dreamt that-ABOUT go.IND/SUBJ America-TO
   ‘Peti has never dreamt about going to America.’

The data given in Table 1 and 2 make it clear that the traditional realis/irrealis view of mood choice – namely, that the indicative is licensed in clauses representing reality, while non-indicative moods are restricted to non-realis clauses (cf. Klemm 1931; Tompa 1962; Pataki 1984) – does not explain mood choice under predicates belonging to groups 3, 4 and 5: the predicates in question do not embed clauses describing real state of affairs, however, in case of affirmative matrix clauses the indicative is licensed in their subordinate clause. Moreover, under negated matrix predicates often mood variation occurs, as it is indicated by examples (1)–(3) above. Hence, the following questions arise:

(i) What kinds of factors influence mood choice in complement clauses?
(ii) How can we explain the effect of matrix negation upon mood choice?

I will investigate two hypotheses in order to address these questions. Both hypotheses explore the relation between certain semantic characteristics of the matrix predicate and the mood selected in the embedded clause. According to the first hypothesis, the veridicality of the matrix predicate is a crucial factor in mood choice (cf. section 3); the second hypothesis supposes that the modality of the predicate also has to be taken into consideration (cf. section 5).

3. \textit{First hypothesis}

3.1 \textit{Veridicality}

The concept of veridicality was introduced by Montague (1969), and in its present form was used by Asher (1987), Zwarts (1995) and Giannakidou (1998). The definition below is adapted from Giannakidou’s analysis of mood in Modern Greek. She defines (non)veridicality as follows (Giannakidou 1998:106):
Definition 1:
Let $F$ be a monadic propositional operator. $F$ is veridical just in case $F(p) \rightarrow p$ is logically valid. Otherwise, $F$ is non-veridical.\(^6\)

For instance, true factive predicates (örül ‘be glad’) and semifactives (lát ‘see’) are typical veridical operators, since the truth of (4) entails the truth of (5):\(^7\)

(4) Peti örül, hogy Mari átment a vizsgá-n.
   Peti is-glad that Mari pass.PAST.IND the exam-ON
   ‘Peti is glad that Mari passed the exam.’

(5) Mari átment a vizsgá-n.
    Mari pass.PAST.IND the exam-ON
    ‘Mari passed the exam.’

In contrast, epistemics (híz ‘believe’), assertives (mond ‘say’), fiction verbs (elképzel ‘imagine’), directives (megparancsol ‘order’) and desideratives (kíván ‘wish’) are nonveridical, since they do not entail the truth of their embedded proposition.

3.2 Mood choice and veridicality
The first hypothesis about mood choice in Hungarian complement clauses based on the notion of veridicality is the following:

Hypothesis 1:
(i) Veridical predicates license the indicative mood in their complement clauses.
(ii) Nonveridical predicates induce non-indicative moods in their complement clauses.

The veridicality properties of the predicate groups introduced above are summarized in Table 3.

As we can see, the first hypothesis explains the difference observed above with respect to mood choice between groups 1–2 and 6–9, the former are veridical, thus they license the indicative mood in their embedded clauses, while the latter are non-veridical, and accordingly, non-indicative moods are selected in their subordinate clauses. However, the first hypothesis fails to capture the difference between groups

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\(^6\) It must be noted here that veridicality is a weaker notion than true factivity, since there $\neg F(p) \rightarrow p$ also holds. If one compares the veridical, non-veridical distinction with Karttunen’s implicative, non-implicative contrast (Karttunen, 1971a), or with his true and semifactive opposition (Karttunen, 1971b), then it is easy to see that veridical predicates contain both factive (including true factives and semifactives) and implicative verbs, while non-veridical and non-implicative verbs coincide. This is obviously the result of regarding matrix negation as a differentiating factor. With respect to matrix negation, we must add that since veridicality has nothing to say about it, it is not surprising that when we turn to analysing mood choice under matrix negation we will run into difficulties, cf. section 3.4.

\(^7\) In the case of semifactives, the presence of the particle úgy ‘so’ in the matrix clause results in loss of veridicality. Consider the examples below:

\(\begin{align*}
(i) & \quad \text{Mari látta, hogy Peti sír.} & \text{(veridical)} \\
& \quad \text{Mari saw that Peti cry.PRES.IND} \\
& \quad \text{‘Mari saw Peti cry.’}
\end{align*}\)

\(\begin{align*}
(ii) & \quad \text{Mari úgy látta, hogy Peti sír.} & \text{(nonveridical)} \\
& \quad \text{Mari so saw that Peti cry.PRES.IND} \\
& \quad \text{‘Peti seemed to Mari to be crying.’}
\end{align*}\)
1–2 and 3–5, and it does not explain the mood selection properties of epistemics, assertives and fiction verbs. It is predicted that the predicates in question – being non-veridical – license non-indicative moods in their subordinate clauses, but this prediction is not borne out, because in the case of the affirmative matrices the indicative is licensed.

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</table>

Table 3: Veridicality

Hence, the first hypothesis has to be modified; we need the notion of truth relativized to an individual’s model. Farkas (1992a) restricted the notion of truth of a proposition to individuals, arguing that a proposition can be true or false as far as a particular individual is concerned. Giannakidou (1998:112) defines relativized (non)veridicality in a Stalnakerian framework as follows:

**Definition 2:**
Let $c = \langle$common ground: $P$, context set: $C(P)$, $M$, $s$, $h$, $w_0$, $f$, $\ldots$$\rangle$ be a context (assuming a Stalnakerian model of conversation).

(i) A monadic propositional operator $F$ is veridical iff it holds that $[[ F(p) ]] = 1 \rightarrow [[ p ]] = 1$ in some epistemic model $M(x) \in M$; otherwise $F$ is nonveridical.

(ii) An epistemic model $M(x)$ is a set of worlds associated with an individual $x$, representing worlds compatible with what $x$ believes, dreams or takes the reported conversation to be. Epistemic models are: belief models, dream models, models of reported conversation, and nothing else.

As we have seen above epistemics, assertives and fiction verbs were non-veridical on the basis of Definition 1, however, such predicates turn out to be veridical with

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8 According to Stalnaker (1979), who laid down the foundations of a dynamic model of conversation, assertions are made in the context of a conversation. When a speaker utters a sentence, he has certain presuppositions: propositions whose truth he takes for granted as part of the background of the conversation. He assumes that these propositions are true and he believes that his audience assumes them to be true as well. The speaker takes these propositions to be the common ground of the conversation. The common ground determines the context set of the conversation – the set of possible worlds compatible with the presupposed propositions in the common ground. Thus, the context set represents alternative possibilities relevant to the conversation.

9 $s$ stands for the speaker, $h$ for the hearer, $w_0$ is the world of the utterance and $f$ denotes a function assigning values to variables. Parameters representing the time and place of the utterance can also be added to the tuple.
respect to Definition 2, since their embedded proposition is true in the model associated with the matrix subject \( su \), the epistemic agent (x úgy véli p ‘x so thinks p’):

\[
[[x \text{ úgy véli } p ]]_x = 1 \rightarrow [[p ]]_{M(su)} = 1,
\]

but it may be false in the model anchored to the speaker.\(^{10}\) Consider (6):

(6) Peti úgy véli, hogy Mari megérkezett tegnap,
    Peti so thinks that Mari arrive.PAST.IND yesterday
de én tudom, hogy téved.
    but I know that is wrong.

‘Peti thinks that Mary arrived yesterday, but I know that he is wrong.’

In what follows, I will call such predicates relative veridical predicates. The
veridicality properties of the predicate groups examined above are summarized again
in Table 4, relying on the concept of relativized veridicality.

<table>
<thead>
<tr>
<th>Predicate Group</th>
<th>Veridicality</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>2. Semifactives</td>
<td>veridical</td>
</tr>
<tr>
<td>3. Epistemics</td>
<td>relative veridical</td>
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<td>5. Fiction verbs</td>
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Table 4: Veridicality reconsidered

As we can see, predicates in the marked groups turn out to be relative veridicals, thus,
we have gained natural classes of predicates that can accurately capture the mood
selecting properties of the matrices. The classes in question are the following:

**Class 1:** veridicals: true factives and semifactives

**Class 2:** relative veridicals: epistemics, assertives and fiction verbs

**Class 3:** nonveridicals: directives, permissives, purposives and desideratives

Veridical predicates are indicative inducing. In the case of relative veridicals,
affirmative matrices license the indicative, but non-indicative moods may appear
under negation. Finally, nonveridicals consistently select non-indicative moods both
in affirmative and non-affirmative contexts. Accordingly, Hypothesis 1 has been
retained and has the following form:

(i) Veridical and relative veridical predicates are indicative licensing.
(ii) Nonveridical predicates induce non-indicative moods in their complement clauses.

\(^{10}\) Please note that under Definition 2 predicate groups 1–2 still turn out to be veridical, while groups
6–9 are non-veridical.
3.3 Relative veridicality and discourse anaphora

If we consider data about discourse anaphora (Roberts 1989, 1997; Farkas 1992a), independent evidence is provided to differentiate the classes above, since indefinite NPs within the scope of nonveridical predicates cannot serve as antecedents for a definite NP appearing outside the scope of the predicate, while this observation does not hold for (relative) veridical predicates. Consider the following data.

In the case of elements of Class 1, veridicals, discourse anaphora is always possible as it is illustrated by the examples below:

**True factive predicates:**

(7) Peti örül, hogy Mari vett egy ház-at.
    Peti is-glad that Mari buy.PAST.IND a house-ACC
    A ház, szép és nagy.
    the house beautiful and big.
    ‘Peti is glad that Mari bought a house. The house is beautiful and big.’

**Semifactives:**

(8) Peti látta, hogy Mari egy új kocsi-val.
    Peti see.PAST that Mari a new car-INST
    jött. A kocsi kinn áll a ház előtt.
    arrive.PAST.IND the car outside is parked the house in-front-of
    ‘Peti saw Mari arrive in a new car. The car is parked in front of the house.’

Members of the second class, relative veridicals, behave in a slightly different way. Let us consider epistemics first.\(^{11}\) (9a), (9b) and (9c) are possible continuations of (9).

(9) Peti úgy véli/gondolja, hogy Mari vett egy ház-at.
    Peti so reckons/thinks that Mari buy.PAST.IND a house-ACC
    ‘Peti reckons/thinks that Mari bought a house.’
    a. #A ház, szép és nagy.
       the house beautiful and big
       ‘The house is beautiful and big.’
    b. Peti szerint a ház, szép és nagy.
       Peti according to the house beautiful and big
       ‘According to Peti the house is beautiful and big.’
    c. Peti úgy véli/gondolja, hogy a ház, szép .
       Peti so reckons/thinks that the house beautiful
       ‘Peti reckons/thinks that the house is beautiful.’

Since epistemics do not have discourse scope (cf. Roberts 1989, 1997), the default model, the speaker’s belief state, is activated in the case of (9a), and thus there is no appropriate antecedent for the definite NP. The anaphoric link can only be established if the individual model is explicitly introduced again, i.e., the second proposition is

\(^{11}\) The relevant reading here is when the indefinite NP has a de dicto reading, i.e., the embedding predicate takes wide scope over it.
interpreted with respect to the same model, Peti’s epistemic state, as in the case of (9b) and (9c).

With *assertives* accommodation can occur, i.e., the embedded proposition can be accommodated into the model of the subsequent utterance, into the representation of the actual world, as illustrated by (10a). Iterating the predicate again results in discourse anaphora, as in (10b):

(10) Peti az-t mondtta, hogy Mari vett egy ház-at.
Peti it-ACC say.PAST that Mari buy.PAST.IND a house-ACC
‘Peti said that Mari had bought a house.’

a. A ház szép és nagy.
the house beautiful and big
‘The house is beautiful and big.’

b. Peti az-t is mondtta, hogy a ház szép.
Peti it-ACC also say.PAST that the house beautiful
‘Peti also said that the house is beautiful.’

*Fiction verbs* are especially interesting:

(11) Peti az-t álmodta, hogy Mari vett egy ház-at.
Peti it-ACC dream.PAST that Mari buy.PAST.IND a house-ACC
A ház szép volt és nagy.
the house beautiful was and big
‘Peti dreamed that Mari bought a house. The house was beautiful and big.’

The indefinite NP introduces its referent only into Peti’s dream model; however, the definite NP of the following utterance can still refer back to it, just as in the case of simple assertions:¹²

(12) Mari vett egy ház-at. A ház szép.
Mari buy.PAST a house-ACC the house beautiful.
‘Mari bought a house. The house is beautiful.’

To sum up, in the case of veridicals (Class 1), discourse anaphora is always possible, while in the case of relative veridicals (Class 2), either the predicate has discourse scope (*fiction verbs*) or in some way the construction can be rescued (by iterating the matrix predicate, accommodation). *Nonveridical predicates* (Class 3) behave quite differently with respect to discourse anaphora. As the examples below show, an explicit modal or an opacifying predicate is required to be present in the second utterance in order to establish the anaphoric relation; otherwise the construction is not acceptable.

¹² However, there is a remarkable difference between fiction verbs and assertives/main assertions with respect to the tense of the second utterance: if we eliminate the past tense copula, the anaphoric link is lost in the case of fiction verbs and the utterances become incoherent. In my opinion, the past tense copula signals that the second utterance should still be interpreted in Peti’s dream model, i.e., it fulfils the same role as iteration of the matrix predicate.
Nonveridical predicates:

(13) Peti utasította Mari-t, hogy írjon egy esszé-ti.
    Peti order.PAST Mari-ACC that write.SUBJ a essay-ACC
    ‘Peti ordered Mari to write a composition.’

a. #Az esszé-1 öt oldalas lesz.
    ‘The composition will be of five pages.’

b. Az esszé-nek öt oldalas-nak kell len-í-e.
    ‘The essay will have to be of five pages.’

c. #Peti utasítás-a szerint az esszé-1 öt oldalas lesz.
    Peti order-POSS according to the essay five pages will be.IND
    ‘According to Peti’s order the composition will be of five pages.’

d. Peti utasítás-a szerint az esszé-nek öt oldalas-nak kell len-í-e.
    Peti order-POSS according to the essay-DAT five pages-DAT must be-INF-3SG
    ‘According to Peti’s order the composition will have to be of five pages.’

(14) Peti ar-ra vágyik, hogy legyen egy saját autó-j a.
    Peti it-ON desires that have.SUBJ a own car-POSS
    ‘Peti desires to have his own car.’

a. #Az-zal jár majd munká-ba.
    ‘Then he will go to work by car.’

b. Az a szándék-a, hogy az-zal jár majd munká-ba.
    that the intention-POSS that it-INST goes then work-TO
    ‘He intends then to go to work by car.’

c. *Peti vágy-a szerint, az autó-1 új lesz.
    Peti desire-POSS according to the car new will be.IND
    ‘According to Peti’s desire the car will be new.’

d. Peti vágy-a szerint az autó-nak új-nak kell len-í-e.
    Peti desire-POSS according to the car-DAT new-DAT must be-INF-3SG
    ‘According to Peti’s desire the car will have to be beautiful and new.’

We have seen that natural classes of predicates emerge with respect to mood choice based on the notion of (relative) veridicality. Moreover, the study of discourse anaphora provided independent evidence that further motivates the introduction of the classes in question. Thus, the first question has been answered appropriately, Hypothesis 1 accounts for the phenomena depicted by the affirmative columns of Table 1 and 2. The next section is devoted to examining how Hypothesis 1 can handle the second column, mood selection under negated matrix clauses.
3.4 Matrix negation

Let us turn now to the second problem, to the issue of matrix negation. As is shown in Tables 1 and 2, true factives under negation license only the indicative, while nonveridical predicates license non-indicative moods when negated. Hence, Hypothesis 1’s prediction is correct: true factive predicates (being veridical) select the indicative, while nonveridicals opt for non-indicative moods, thus the first and the last four cells in the second columns have been accounted for. However, as we have seen, matrix negation may influence the mood of the embedded clause in the case of semifactives, epistemics, assertives and fiction verbs – in the complements mood variation may occur. Let us examine whether this can be explained in the framework outlined above. Consider semifactive predicates first.

If a semifactive predicate is negated, the conditional may also surface besides the indicative in the complement clause (cf. Table 2). Thus, both (15) and (16) are grammatical:

(15) Peti nem fedezte fel/látta, hogy János és Mari veszekedtek.
  ‘Peti didn’t realize/see that János and Mari quarrelled.’

(16) Peti nem fedezte fel/látta, hogy János és Mari veszekedtek volna.
  ‘Peti didn’t realize/see that János and Mari quarrelled.’

The crucial difference between (15) and (16) is that when the indicative is selected, factivity is preserved, the truth of the complement is still taken for granted. However, when the conditional is licensed under negated semifactive matrices, factivity is lost, and the truth of the complement is no longer presupposed.

In the case of factive predicates there is a correspondence with respect to the mood selected under a negated matrix and the issue of factivity. True factives are not altered by matrix negation and, as expected on the basis of the relation just mentioned, only the indicative is grammatical in the complement. Semifactives may lose their factivity under negation, i.e., licensing the conditional signals that factivity is lost, while selecting the indicative is compatible both with preserving and losing factivity. Nevertheless, loss of factivity can be clearly indicated by the switch from indicative to non-indicative in the complement. This correspondence between factivity and mood selection explains the first two cells of the second columns in Table 1 and 2.

Let us turn now to the next three cells of the second columns of Tables 1 and 2. As an example, consider first the assertive predicate állít ‘claim’, which is relative veridical. It is obvious that under an affirmative matrix the embedded clause is true in the model of the matrix subject (x állítja p ‘x claims p’):

\[
[[x \text{ állítja } p]]_{c} = 1 \rightarrow [[p]]_{M(su)} = 1
\]

13 Certain predicates, for instance, emlékszik ‘remember’, may lose factivity even when the indicative is selected.

14 It is worth mentioning that the introduction of the úgy referring word into the matrix clause also results in loss of factivity in the case of semifactive predicates. Nevertheless, in such cases only the indicative is grammatical.
However, *nem állít ‘NEG claim’* as a composite operator is essentially nonveridical (*x nem állítja p ‘x NEG claims p’*):

\[
[[x \neg \text{allítja } p ]]_c = 1 \iff [[\neg(x \text{ állítja } p )]]_c = 1 \iff [[x \text{ állítja } p ]]_c = 0 \iff [[ p ]]_{M(su)} = 0
\]

i.e., \([[[x \neg \text{allítja } p ]]_c = 1 \iff [[ p ]]_{M(su)} = 1\)

In other words, from the truth of *x nem állítja p ‘x NEG claims p’*, the truth of *p* in \(M(su)\) cannot be inferred.\(^{15}\) According to the first hypothesis, under nonveridical predicates non-indicative moods are expected to be licensed. This prediction is borne out. However, the indicative is also grammatical under negation, which is problematic in the present framework and needs further explanation.

Another phenomenon to be analyzed is mood variation under epistemics, since predicates belonging to this group allow both indicative and non-indicative moods under negation. The problem is that these predicates do not differ with respect to veridicality, hence the mood variation is left unexplained. Consider the following examples of mood variation in the complement clauses of epistemics:\(^{16}\)

(17) Kizárt, hogy Mari ma megérkezik/megérkezzen.\(^{17}\)
out-of-the-question that Mari today arrive.PRES.IND/SUBJ
‘It is out of the question that Mari will arrive today.’

(18) Nem kizárt, hogy Mari ma megérkezik/megérkezzen.
NEG out-of-the-question that Mari today arrive.PRES.IND/SUBJ
‘It is not out of the question that Mari will arrive today.’

(19) Lehetséges, hogy időben megérkezik/*megérkezzen.
possible that on time arrive.PRES.IND/*SUBJ
‘It is possible that he will arrive on time.’

(20) Nem lehetőséges, hogy időben megérkezik/*megérkezzen.
NEG possible that on time arrive.PRES.IND/SUBJ
‘It is not possible that he will arrive on time.’

In a similar fashion, mood variation may occur under negated assertives and fiction verbs (consider (2) and (3) above). The first hypothesis cannot explain mood variation under relative veridicals, i.e., it cannot predict when the indicative is the only grammatical mood and when non-indicative moods may also appear in the embedded clause. In order to explore this phenomenon, I examined epistemics to a greater extent. The following section presents an overview of epistemic predicates and it also gives an outline of the phenomenon to be examined in section 5.

---

\(^{15}\) It is obvious that the embedded proposition may turn out to be true in the speaker’s epistemic model. In that case, *nem állít ‘NEG claim’* is relative veridical, and this has to be signalled explicitly by the speaker:

(i) Peti nem állítja, hogy űrben lenne a legjobb teniszező
Peti NEG claims that he be.IND/COND the best tennis player
az iskolában, de...
the school-IN, but…

‘Peti does not claim that he is/would be the best tennis player in the school, but…’

\(^{16}\) Mood variation under negated epistemics raises a very interesting problem, namely, whether there is a meaning difference signalled by the choice of the indicative, the conditional or the subjunctive in the subordinate clause. If there is indeed a meaning difference, future research should address the nature of the distinction.

\(^{17}\) Please note that the meaning of *kizárt ‘out of the question’* is inherently negative.
4. **Epistemics**

The mood selection properties of epistemic predicates are summarized in Table 5. The order of the predicates in the table is based on the “strength” of epistemic modality expressed by the predicate. Thus, Table 5 represents an epistemic scale, which is based on the results of an experiment I designed to assess the truth likelihood of the embedded proposition according to native speakers’ intuitions.

<table>
<thead>
<tr>
<th>Modality</th>
<th>Positive attitude</th>
<th>Negative attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Epistemic necessity</strong></td>
<td>szükség szerű ‘necessary’: IND/SUBJ (71)</td>
<td>nem szükség szerű ‘not necessary’: IND/ SUBJ</td>
</tr>
<tr>
<td></td>
<td>kell, muszáj ‘must’: SUBJ (81)</td>
<td>(not applicable)</td>
</tr>
<tr>
<td><strong>Epistemic possibility:</strong></td>
<td><strong>strong</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>biztos ‘certain’: IND (24.5)</td>
<td>nem biztos, bizonytalan ‘not certain’: IND</td>
</tr>
<tr>
<td></td>
<td>nem kétséges, kétségtelen ‘indisputable’: IND (34.5)</td>
<td>kétséges ‘doubtful’: IND/SUBJ</td>
</tr>
<tr>
<td></td>
<td>nem kéti ‘not doubt’: IND (79.5)</td>
<td>kéti ‘doubt’: IND/COND/SUBJ</td>
</tr>
<tr>
<td></td>
<td>valószínű ‘likely’: IND (85)</td>
<td>nem valószínű = valószínűtlen ‘unlikely’: IND/SUBJ</td>
</tr>
<tr>
<td></td>
<td>lehet, lehetséges ‘possible’: IND (150)</td>
<td>nem lehet = lehetetlen ‘impossible’: IND/SUBJ</td>
</tr>
<tr>
<td></td>
<td>nem kizárt, nincs kizárva ‘not out of the question’:</td>
<td>kizárt ‘of the question’: IND/SUBJ</td>
</tr>
<tr>
<td></td>
<td>IND/SUBJ (151.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hisz ‘believe’, gondol ‘think’: IND (154)</td>
<td>nem hisz/gondol ‘not believe/think’: IND/COND/SUBJ</td>
</tr>
<tr>
<td></td>
<td>elképzelhető ‘conceivable’: IND (158.5)</td>
<td>elképzelhetetlen ‘inconceivable’: IND/ SUBJ</td>
</tr>
<tr>
<td></td>
<td>hihető ‘believable’: IND (164)</td>
<td>hihetetlen ‘unbelievable’: IND/SUBJ</td>
</tr>
<tr>
<td></td>
<td>elvileg elképzelhető ‘theoretically conceivable’: IND</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SUBJ (179)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>elvileg lehetséges lenne ‘slightly possible’: IND/</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SUBJ (198)</td>
<td></td>
</tr>
<tr>
<td><strong>Epistemic possibility:</strong></td>
<td><strong>weak</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Epistemic scale reflecting speakers’ intuition

---

18 The negated predicates nem kell, nem muszáj ‘do not have to’ have a deontic meaning, which is why they are not included in Table 5.

19 The conditional may also surface under lehetséges ‘possible’, however, it has a special reading:

(i) Lehetséges, hogy elmennék.
   possible that go.PRES.COND
   ‘It is possible that I would go.’

therefore, it is not relevant for the present discussion. This was pointed out to me by the anonymous reviewer.
The experiment, which addresses only predicates expressing positive attitudes, was carried out in the following way. I made cards with a single predicate and an example sentence on them and asked native speakers of Hungarian to put the cards into order according to how sure they were in the truth of the embedded proposition. 20 university students participated in the experiment (their average age was 21 years), who were randomly selected. Subjects were allowed to rank the cards as equal if they did not feel any difference between the predicates in question. The first position was that of the “most certain” predicate, i.e., predicates expressing the highest epistemic possibility received the smallest scores in the experiment. If two predicates occupied the same position in the list, they received a score equal to the average of their ranks. For instance, if a speaker ranked nem kétséges ‘indisputable’ and biztos ‘certain’ as equal, and he assigned them to the first two positions, then both predicates received \((1+2)/2=1.5\) points. The scale was established on the basis of the mean of the scores received by the individual predicates.

Now, the question to be addressed is the following: how can we explain mood variation in the embedded clauses of epistemics? In order to provide an answer to this question, I turned to Kratzer’s theory of modality; the following analysis of mood choice in Hungarian has been motivated by Giorgi and Pianesi’s related work on Italian (Giorgi & Pianesi 1997).

5. **Second hypothesis**

5.1 **Modality**

The second hypothesis is based on Kratzer’s (1981, 1991) work on modality and its adoption to mood choice by Giorgi & Pianesi (1997). Before discussing how this account can explain mood variation, we need to outline the relevant notions.

As Kratzer (1981) argues, two kinds of conversational backgrounds are essential for the interpretation of modalized sentences, the *modal base* and the *ordering source*. A conversational background is an entity denoted by phrases like *in view of what we know*, *in view of what the law provides*, etc. and can be defined as a function. The modal base and the ordering source are both contextually determined functions.

**Definition 3:**

(i) a modal base: \(m: W \rightarrow P(P(W))\) is a function determining the set of possible worlds which are accessible from \(w\); i.e., the modal base determines the set of worlds where all propositions of \(m(w)\) are true, namely \(\cap m(w)\). This set of worlds is called the derived context set.\(^{22}\)

---

\(^{20}\) An alternate experiment should be carried out that varies the feature of co-reference between the speaker and the matrix subject. In the experiment outlined here I assumed co-reference, and the example sentences were construed accordingly.

\(^{21}\) It is rather surprising that biztos ‘certain’ and nem kétséges ‘indisputable’ received higher scores than szükségszerű ‘necessary’ and muszáj ‘must’. However, in Table 5 the linguistic means expressing epistemic necessity and possibility are treated separately.

\(^{22}\) In fact the modal base plays the role of an accessibility relation; it determines the set of worlds with respect to which the truth of the modalized proposition is evaluated. For instance, an epistemic modal base determines for a world \(w\) the set of worlds where what is known in \(w\) is true.
Modal bases can be expressed by linguistic means, for instance by phrases like *in view of the available evidence*, *in view of what we know*, or they can be specified by the context.

(ii) **an ordering source:** $o : W \rightarrow P(P(W))$ is a function assigning a set of propositions to a world $w$; these propositions represent what would be true under ideal circumstances. The propositions in question induce an ordering on the set of worlds accessible from $w$, i.e., on $\cap m(w)$ determined by the modal base: only those worlds of the derived context set that are closest to the ideal given by $o(w)$ will be in the domain of the modal operator.

Ordering sources can be thought of as entities denoted by phrases like *in view of what is normal/legal/rational, according to the law.*

According to Giorgi and Pianesi (1997), the following kinds of modal bases can be differentiated (assuming a Stalnakerian framework of context).

**Definition 4:**

(i) **totally realistic modal base:** given a common ground $P$ and its context set $C(P)$, a modal base $m$ is totally realistic iff $m(w) = P$, for every $w \in C(P)$. Here the derived context set coincides with the context set: $\cap m(w) = \cap P$.

(ii) **realistic modal base:** given a common ground $P$ and its context set $C(P)$, a modal base $m$ is realistic iff $m(w) \subseteq P$, for every $w \in C(P)$. Now the context set is a subset of the derived context set, since more worlds are compatible with less information: $\cap P \subseteq \cap m(w)$.

(iii) **weakly realistic modal base:** given a common ground $P$ and its context set $C(P)$, a modal base $m$ is weakly realistic iff $m(w) \cap P \neq \emptyset$, for every $w \in C(P)$. Here the only restriction is that the intersection of the derived context set and the context set must be nonempty.

5.2 **Mood choice and modality**

Let us examine now which parameter is decisive for the distribution of the indicative and non-indicative moods in Hungarian. The hypothesis is the following:

**Hypothesis 2:**

(i) Predicates with a nonempty ordering source license non-indicative moods.

(ii) In the case of predicates with an empty ordering source another factor becomes relevant, namely, the degree of reality of the modal base.

As Table 6 shows, directive, permissive, purposive, and desiderative contexts (elements of Class 3) have a nonempty ordering source, and as predicted, non-indicative moods are induced uniformly in affirmative and non-affirmative contexts.
However, the nature of the ordering source cannot explain the difference between Class 1 (factive verbs) and Class 2 (epistemics, assertives, fiction verbs): the members of the former license the indicative (more or less) consistently, but those of the latter exhibit mood variation under negation. In order to provide an explanation for this, the other factor has to be taken into account. As we have seen, according to Giorgi & Pianesi (1997) three kinds of modal bases can be differentiated: weakly realistic, realistic, and totally realistic. Let us consider each of the predicate groups in turn.

1 and 2. Since complements of true factive and semifactive predicates are presupposed under affirmative matrices, they have a totally realistic modal base. More specifically, the modal base assigns to each world in the context set exactly those propositions which are in the common ground, thus $\cap m(w)$ equals the context set: the worlds that are compatible with everything the participants know in the conversation in question. Hence, the indicative is expected in the embedded clauses. The same observation holds for true factives under negation: the modal base is still totally realistic, it coincides with the context set, hence the indicative is licensed in the complement. Semifactives, as we have seen above, may preserve or lose their factivity under negation, and accordingly, may select both the indicative and the conditional. When the conditional is licensed under negated semifactives, the modal base is no longer totally realistic, since the truth of the complement is no longer presupposed. I propose that negated semifactives behave similarly to predicates of wide epistemic possibility (cf. the discussion below), and this motivates the use of the conditional.

Kratzer (1991) suggests that a stereotypical ordering source may be present in the case of epistemic modals. The account outlined here assumes that the ordering source of epistemics is empty, but argues for introducing a partial ordering on the worlds of the derived context set, yielding an ordering quite similar to the one that would emerge on the basis of a stereotypical ordering source. The crucial difference is in the nature of the set of propositions forming the base of the ordering: a stereotypical ordering source orders worlds with respect to an ideal where things proceed normally, whereas the ordering pursued here orders worlds with respect to their similarity to the actual world. However, both analyses suggest that there is a crucial difference in the treatment of epistemic and deontic or bouletic modalities. In the case of the former, the ordering source may contain propositions that are not realistic at all, since in theory any propositions might be subject to desires, for instance. In contrast, epistemic modalities are never independent of reality.
3. Epistemics have an epistemic modal base that is usually realistic: \( m \) assigns to every possible world a set of propositions which are true in that world, thus the modal base captures portions of reality as described by the common ground. As Quer (1998) notes, the world representing the actual world is an element of the derived context set. However, due to partiality, the modal base may also contain propositions that are incompatible with facts known about the actual world.

Adopting Farkas’s proposal (1992b), two subclasses can be differentiated within the epistemic domain:

(i) narrow epistemic possibility: Farkas (1992b) claims that in this case the modal base is totally realistic. However, I weaken this claim and suppose only that it is realistic, i.e., the modal base contains almost all propositions that are taken as known of the actual world: \( m(w) \subseteq P \). Elements of the derived context set, as Farkas also notes, are close to the actual world, and they inherit almost all the facts of the actual world, and any of these worlds may turn out to be the actual world.

Predicates expressing positive attitudes with high degree of epistemic possibility belong here (such as lehetséges ‘possible’, etc.), and in the embedded clauses the indicative is expected.

\[
\text{(21)} \quad \text{Valószínű, hogy átmegy a vizsgá-n.} \\
\text{likely that pass.IND the exam-ON.}
\]

‘It is likely that he will pass the exam.’

(ii) wide epistemic possibility: here the modal base is weakly realistic, and the embedded proposition is allowed to be true in those worlds of the derived context set that depart from what is known of the actual world. Thus, the derived context set contains more distant worlds. In the embedded clauses, there is a tendency for non-indicative moods:

\[
\text{(22)} \quad \text{Alig elképzelhető, hogy #átmegy/átmenjen a vizsgá-n.} \\
\text{hardly conceivable that pass.IND/SUBJ the exam-ON}
\]

‘It is hardly conceivable that he could pass the exam.’

\[\text{Distance can be defined using Kratzer’s partial ordering that compares worlds with respect to a set of propositions (determined by the ordering source). The partial ordering in question decides whether a world } w \text{ is closer to a given set of propositions than } w', \text{i.e., } w \text{ is closer if and only if more out of the given propositions are true in } w \text{ than in } w'. \text{ Now we need to define distance from the actual world, in other words we need an ordering of worlds measuring the degree of similarity to the actual world. Since the actual world is itself a set of propositions – it contains all the propositions that are true in it – it is possible with the help of this partial ordering to decide which worlds of the derived context set are closer to the actual world. The definition is the following:}
\]

Let \( w_u \) be the actual world \( (w_u \in W) \). This world induces a partial ordering \( \leq \) on the derived context set of the speech act such that \( \forall w, w': w \leq w' \text{ if and only if} \)

\[
\{ p: p \in w_u \text{ and } w' \in p \} \subseteq \{ p: p \in w_u \text{ and } w \in p \}
\]

Thus, a world \( w \) is at least as close to the actual world as a world \( w' \) if and only if all propositions of the actual world which are true in \( w' \) are true in \( w \) as well. In other words, \( w \) is closer to the ideal than \( w' \) if and only if more propositions of the actual world are true in \( w \) than in \( w' \). Obviously, the actual world is never well defined in a given communicative setting; all we know is that it is an element of the context set.

\[\text{My informants are from the city of Debrecen and its surroundings, where the use of the subjunctive is more widespread than in other parts of the country.}\]
Finally, we have to consider predicates expressing *negative attitudes* (either inherently negative predicates or explicitly negated predicates). When an epistemic predicate is negated, the embedded proposition is true in the complement set of those worlds in which the embedded proposition of the corresponding affirmative sentence is true (in the derived context set), and this fact explains the appearance of non-indicative moods: the most distant worlds come into play.

(23) Lehetetlen, hogy átmenjen a vizsgá-n.
 impossible that pass.SUBJ the exam-ON
 ‘It is impossible that he will pass the exam.’

To sum up: mood choice within the class of epistemics depends on both the degree of reality of the modal base, and on the distance of those worlds where the embedded proposition is true from the actual world. Distance from the actual world is decided by the degree of compatibility with the actual world: the more compatible a world is with the information known about the actual world, the closer it is to the actual world. Thus, the epistemic scale of predicates provided by the experiment is reinforced. The indicative is licensed when we are closer to the actual world, while the subjunctive is related to more distant worlds (cf. Table 7).

<table>
<thead>
<tr>
<th>Epistemic scale</th>
<th>Modality</th>
<th>Examples</th>
<th>Mood selected</th>
<th>Modal base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epistemic likelihood: narrow epistemic possibility</td>
<td>biztos ‘certain’</td>
<td>INDICATIVE</td>
<td>realistic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>valószínű ‘likely’,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epistemic uncertainty: wide epistemic possibility</td>
<td>nem kizárt ‘not out of the question’</td>
<td>INDICATIVE/ NON-INDICATIVE</td>
<td>weakly realistic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>elképzelhető ‘conceivable’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative attitude</td>
<td>lehetetlen ‘impossible’,</td>
<td>INDICATIVE/ NON-INDICATIVE</td>
<td>not realistic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>elképzelhetetlen ‘inconceivable’</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7: Epistemic scale

The predicates are located on the epistemic scale according to the degree of reality of their modal bases. Predicates expressing narrow epistemic possibility are at the top of the scale. Moving down the scale, the embedded proposition turns out to be true in worlds that are further and further away from the actual world. At the top of the scale, when worlds that are close to the actual world play a role in the interpretation, the indicative is grammatical. As we move down the scale and worlds that are further and further away come into play, there is a tendency for non-indicative moods (besides the indicative) to appear. This is represented by the examples below:
(24) Lehet, hogy még ma megjön, készítsünk neki vacsorá-t!

‘It’s possible that he will arrive tonight, let’s make him dinner!’

(25) Elvileg lehetséges, hogy még ma megjön, készítsünk neki vacsorá-t?

‘It’s theoretically possible that he will arrive tonight, shall we make him dinner?’

(26) Lehetetlen, hogy még ma megjön/megjöjjön, ne is készítsünk neki vacsorá-t!

‘It’s impossible that he will arrive tonight, let’s not make him dinner!’

The linguistic means of epistemic necessity also have to be mentioned. As we saw in Table 5, such predicates license both the indicative and the subjunctive in their subordinate clauses. The fact that the subjunctive is also grammatical seems to be problematic for the current analysis, since in the case of epistemic necessity the embedded proposition has to be true in every world of the derived context set, thus we would expect only the indicative in the subordinate clause. However, there is a remarkable opposition between the indicative and the subjunctive in such contexts, as the examples below show:

(27) Szükségszerű, hogy kétszer kettő négy ʕ/*legyen.

‘It’s necessary that two times two is four.’

(28) Muszáj, hogy a munkahelyén *van/legyen.

‘He must be at his workplace.’

In order to interpret (27), we consider logical possibilities and hence the indicative is the preferred option. However, when we consider epistemic possibilities during the interpretation process of (28), the subjunctive is licensed, as it was predicted by our hypothesis.

4. Assertives, as Giorgi and Pianesi note, report on a conversation recalling another communicative setting where the propositions now embedded under the assertive matrices were independent assertions. In the reported conversation, the propositional content of these assertions was added to the common ground.

(29) János az-t mondta, hogy Géza meggyógyult.

‘János said that Géza had recovered.’
For that reason, the modal base of the present utterance is realistic to some extent, and as we saw earlier, accommodation may occur, and the propositional content of the embedded proposition may be accommodated into the current common ground. Since the modal base is realistic, the indicative is expected in the subordinate clauses, and this prediction is borne out.

Under negated matrices non-indicative moods may also surface:

(30) Nem állítja, hogy ott volt/lett volna.
‘He does not claim that he was there.’

In such cases, the modal base is not realistic, and the embedded proposition is not contained in the common ground of another conversation. According to our hypothesis, non-indicative moods are expected, again the most distant worlds come into play. Native speakers’ intuition also suggests that when the conditional is used, the truth of the negated embedded proposition is less taken for granted, whereas the indicative signals that the negated embedded proposition is true in those worlds that are closer to the actual world.

4. Modal bases of fiction predicates obviously cannot be realistic, thus such affirmative matrices license only the indicative in their embedded clauses:

(31) János az-t álmodta, hogy nyert a lottó-n.
‘János dreamt that he won the lottery.’

Thus, these predicates are problematic for the second hypothesis: their ordering source is empty, but the nature of their modal base cannot explain mood choice in complement clauses. As was pointed out earlier, fiction predicates show the same behavior with respect to discourse anaphora as simple assertions. As Farkas (1992a) claims, the only difference between simple assertions and utterances containing a fiction predicate is that the propositional content of the former is added to the representation of the actual world, while the propositional content of embedded clauses under fiction verbs is added to the representation of a special, fictitious world.

As we saw above, non-affirmative matrices allow both indicative and non-indicative moods in the subordinate clause. Licensing the indicative is again problematic, while non-indicative moods may be motivated by the presence of a modal base that is not realistic.

To conclude this section, we can state that the second hypothesis predicts mood choice in complement clauses in a satisfactory manner under affirmative matrices, the only exception being the group of fiction predicates. We saw that when the ordering source is empty the nature of the modal base is a crucial factor in determining mood choice and the further away a world where the embedded

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26 Giorgi and Pianesi (1997) argue that the modal bases of assertive predicates are weakly realistic, since the intersection of the common ground of the reported conversation and that of the current one cannot be empty.
proposition is true is from the actual world, the greater the tendency for the appearance of non-indicative moods. Under negated matrices the predictions are less clear, and the observed tendency is somewhat vague.

6. Conclusion

In this paper I have analyzed mood selection in Hungarian complement clauses. In particular, I have examined two hypotheses to show that various semantic characteristics play a crucial role in mood choice. First, it was shown that the veridicality properties of the matrix predicate indeed influence the mood of the embedded clause to a great extent in affirmative contexts. Moreover, natural classes of matrix predicates emerge with respect to mood choice on the basis of their veridicality properties. The existence of these classes was further motivated by the different behavior of the predicates in discourse anaphora. Second, the effect of matrix negation upon mood choice was examined within Kratzer’s framework of modality. We saw that there seems to be a relation between the emptiness of the ordering source and the degree of reality of the modal base, on the one hand, and mood choice in complement clauses, on the other hand, but the predictions are not sharp. Table 8 below shows how the two hypotheses cover the data examined: cells that have been accounted for are white, whereas cells that have received only partial explanation are shaded.

| Matrix predicates | Indicative | | | Non-indicative | | | |
|---|---|---|---|---|---|---|
| | Affirmative | Non-affirmative | Affirmative | Non-affirmative |
| 1. True factives | + | + | - | + |
| 2. Semifactives | + | + | - | +? |
| 3. Epistemics | + | + | - | + |
| 4. Assertives | + | + | - | + |
| 5. Fiction verbs | + | + | - | + |
| 6. Directives | - | - | + | + |
| 7. Permissives | - | - | + | + |
| 8. Purposives | - | - | + | + |
| 9. Desideratives | - | - | + | + |

Table 8: Summary

In the present paper I have concentrated only on the indicative-nonindicative opposition in Hungarian complement clauses. Exploring the semantic differences that may surface between the imperative, the subjunctive proper and the conditional is the task of future research.

References


