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Mood and modality in Hungarian[*]

Discourse Representation Theory meets Cognitive Linguistics

Abstract

This paper is devoted to a thorough formal semantic and pragmatic analysis of the Modality + Tense + Mood marker combinations of Hungarian verbs. Earlier pragmatico-semantic results in the area rely on possible-worlds semantics. We, however, intend to use a different formal semantic framework: one which is grounded in DRT-based representationalist dynamic discourse-semantics but exploits several observations and analytical comments due to Cognitive Linguistics. Another starting point is an essentially syntactic analysis, which is based on the following syntactic hierarchy: Mood > Tense > Modality. We claim that any further scopal permutations can be "evoked" with the aid of certain adverbial expressions (e.g., *bárcsak* 'if only', *mintha* 'as if'), and that the entire system of all possible readings can be accounted for in our approach.
Keywords: Hungarian tense, mood, modality; representational dynamic discourse semantics; cognitive linguistics

1   Introduction

This paper is devoted to a thorough formal semantic and pragmatic analysis of the Modality + Tense + Mood marker combinations of Hungarian verbs (abbreviated as M, t, m, respectively). Let us start with a basic set of relevant cases (where T1 refers to the first table in the Appendix):

(1)   ILLUSTRATION OF THE POLYSEMY OF MODALITY + TENSE + MOOD MARKER
       COMBINATIONS OF HUNGARIAN VERBS
       a.   Anna   haza-me-het-ett.
             Anna   home-go-can-Past
                 1. deontic meaning: t>M (Tense > Modality), i.e., permission in the past
                    'Anna was allowed to go home.' (→T1.b)
                 2. epistemic meaning: M>t (possibility for a past event)
                    'Anna may perhaps have gone home.' (→T1.c)
       b.   Anna   haza-me-het-ett   vol-na.
             Anna   home-go-can-Past be-Cond
                 1. deontic meaning: t>M (permission in the past) and negation[1] (due to m?)
                    'Anna was allowed to go home, but she did not go home.' (→T1.e)

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    2. bouletic meaning: desire (due to m⊕M?) pertaining to a past event
        'I really wish Anna had gone home.' (→T1.g")
b'. Bárcsak Anna   haza-me-het-ett   vol-na.
    if_only Anna   home-go-can-Past   be-Cond
       meaning: m>t>M (desire pertaining to some permission in the past)
        'If only Anna would have been allowed to go home.' (→T1.g)
b". Mintha Anna   haza-me-het-ett   vol-na.
    As_if   Anna   home-go-can-Past be-Cond
       meaning: m>t>M (possibility for some permission in the past)
        'As if Anna had been allowed to go home.' (→T1.g')

Bartos's (2000) analysis serves as a starting point. It is based on the syntactic hierarchy shown in (2a) below, according to which certain semantic (scopal) hierarchies can be qualified as regular (2b). Bartos observes that further semantic possibilities are also available in Hungarian. He attributes their appearance to the fact that the syntactic presence of a mood or a modality marker may occur without the syntactic presence of the other one, and in a case like this, a mood or a modality marker is permitted to occupy the syntactic position of the other kind of marker (modality / mood). This makes it possible (2c) that a mood or a modality marker takes a scope order relative to tense, which is the reverse of their canonical order (2a).

(2)   REGULAR AND IRREGULAR SCOPE ORDERS ACCORDING TO BARTOS (2000), AND FURTHER
       POSSIBILITIES FOR SCOPE ORDERS
    a. Rigid syntactic hierarchy of functional projections (based on Cinque's (1999) Universal Hierarchy of Functional Projections and Baker's (1985) Mirror Principle):
       Mood > Tense > Modality (m > t > M)
    b. Scope orders qualified as "regular":
       m > t > M: T1.g-g' (see also (1b'-b") above)
       m > t: T1.f-f'
       t > M: T1.b (see reading (1a.1) above)
    c. Scope orders qualified as "irregular" but possible (due to the fact that m and M can occupy each other's position if they are not simultaneously present:
       t > m: T1.d
       M > t: T1.c (see reading (1a.2) above)
    d. Scope orders qualified as impossible by Bartos (2000):
       t > M + negation (t>M>m?): T1.e (see reading (1b.1) above)
       t>m>M (?):   T1.e' (see also (3a) below)
       M>t>m: T1.e" (see also (3b) below)
       $m_{speaker's\ desire}$ > t (m>M>t or M>m>t?): T1.g" ((1b.2), (3c))

We claim that there are readings (2d) which can be attributed to further scopal permutations or are not easy to associate with any scopal order; they can be "evoked" (or disambiguated) with the aid of such adverbial expressions as *bárcsak* ((1b'), (3a)), *boldogan* 'happily' (3b), *igazán* 'really' (3c), or *mintha* 'as if' (1b").

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[1]   Why is negation mentioned here? See the corresponding translation.

(3)　ILLUSTRATION OF THE "IMPOSSIBLE" SCOPE ORDERS
　　a. Arra　　　vágytam,　　　bárcsak Anna　haza-me-het-ett　　vol-na.
　　　　that.Sub　wish.Past.1Sg　if_only　Anna　home-go-can-Past　be.Cond
　　　　'I wished Anna had been allowed to go home.' (→T1.e')
　　b. Anna　boldogan haza-me-het-ett　　　vol-na.
　　　　Anna　happily　home-go-can-Past　be-Cond
　　　　'Anna could have gone home happily.' (→T1.e")
　　c. Anna　igazán haza-me-het-ett　　vol-na.
　　　　Anna　really　home-go-can-Past　be-Cond
　　　　Anna should have really gone home.' (→T1.g")

In contrast to Bartos's syntactic approach, our pragmatico-semantic approach is able to account for these cases (2d). A crucial element in our proposal is that it attributes the appearance of such meaning factors as negation (in reading T1.e (1b.1) above) and the speaker's desire (in reading T1.g" ((1b.2), (3c)) above) to two different kinds of "semantic blending" between the contribution of mood and modality (see (1b.2), for instance; to be detailed in Figures 1-2 in section 3).

As for other model-theoretic semantic approaches to the topic, Eszes's findings (2005), relying on Kratzer's (1991) possible-worlds semantics, are available in the area. We, however, intend to use another, a DRT-based (Kamp *et al.* 2011) "representationalist" dynamic discourse-semantic framework in our approach. This is because we accept Pollard's (2007: 33) criticism on mainstream Kripke/Montague-inspired possible-worlds semantics: "the idea of taking worlds as a primitive of semantic theory is a serious misstep" (see Alberti & Kleiber 2012). We also exploit several observations and analytical comments on deontic, bouletic and epistemic meaning factors due to Cognitive Linguistics (Pelyvás 1998, 2001, 2013).

2　　Foundations of ℜeALIS

The pragmatico-semantic theory that our analyses are based upon is ℜeALIS: *REciprocal And Lifelong Interpretation System* (Alberti 2005, 2009, 2011, Alberti & Kleiber 2012, Alberti, Vadász & Kleiber 2014, Kleiber & Alberti 2014, Farkas & Ohnmacht 2012). It can be introduced as a new "post-Montagovian" (Dowty et al. 1981) theory concerning the formal interpretation of sentences which constitute coherent discourses (Asher & Lascarides 2003, Kamp et al. 2011). It has in its center a *lifelong* model of lexical, interpersonal and cultural/encyclopedic knowledge of interpreters, which also includes their *reciprocal* knowledge on each other. The forty-page-long formal definition of the theory is available here: http://lingua.btk. pte.hu/realispapers.

In this approach, Kamp-style DRSs—gigantic ones, of course—are used as *lifelong* representations of the interpreters' *information states*. What in (post-) Montagovian discourse-semantic analyses serve as objects with the role of *possible worlds* are in this model embedded DRS boxes, which are practically finite information pools not closed under logical operations. Due to an unbounded embedding of "boxes", we can express interpreters' beliefs / desires / intentions (BDI) including the hearer–speakers' / interpreters' BDI's concerning the BDI's (concerning the BDI's)* of each other. An interpreter's information state, thus, is

captured formally as a labeled tree-system of "worldlets" (the above mentioned finite information pools), and can practically be construed as the description of his/her mind.

This is the point where model-theoretic formal semantics can meet Cognitive Linguistics due to our new ontology (i.e., due to our radical re-arrangment of the components of DRT). We have learnt from Pelyvás's papers (1998: 118, 2001: 11-12, 2013: 270, 273-274) that language system cannot be described without considering its human use in communication, and prominently the speaker's and the hearer's role in this, including their subjective construal concerning these roles, that is, the often highly complex speaker-oriented perspective. We should consider, thus, all the "objective" forces relevant in a relationship and associate them with the participants of a situation. Compared to model-theoretic possible-worlds semantics, ℜeALIS follows Cognitive Linguistics in assuming that propositions are to be tested not against arbitrary possible worlds but against specific possible-world-like constructions determined in the interlocutory situation.

We can implement this approach within a complete model of interpreters' minds in communication with each other as follows: A "worldlet index" γ (see (4a') below), or rather, a set Γ of worldlet-indices (4a), is assigned to each referent within the DRS-style "box structure" of their discourse-semantic representations in order to show the position(s) / level(s) of that worldlet index in this "box structure". We will discuss what this set Γ of sequences of quadruples consists of, and how this construction can capture intensionality, for instance, in such (Hungarian) linguistic expressions as the irregular adjective *állítólagos* 'alleged', the modal adverb *valószínűleg* 'likely', the modal verbs *sajnál* 'be sorry', *bevesz* 'buy/swallow/accept' and *rájön* 'realize' (see also Alberti & Károly 2012), or the discourse markers *ugye* (e.g., 'he is..., isn't he?'), *is* 'also' and *vajon* 'if' (see also Kleiber & Alberti 2014).

As for how the particular elements forming a sentence contribute to the meaning of the given sentence, two kinds of elements should be distinguished. The contribution of certain elements is some semantic "content" (which can practically be captured by simple first-order formulas); while other elements are responsible for the (pragmatico-semantic) placement—embedding—of these pieces of information into certain worldlets within certain interpreters' information states, i.e., for capturing their intensional character. Note that there are words / morphemes which provide both semantic content and intensional information at the same time. It is also worth saying in advance that surprisingly many linguistic elements trigger what might be called a "prism effect": one and the same piece of information can belong to more than one, or to even a great number of, worldlets.

Let us start with the analysis of clitics, which can be regarded as the principal means of the above-mentioned intensional embedding. A straightforward starting point can be the pragmatico-semantic analysis of a simple interrogative sentence containing no clitics, like the one in (4b) below. As it is established by Kleiber and Alberti (2014), the worldlets mentioned in (4b'-b") are required to capture the intensional framework of the interrogative situation, under the assumption that it happens in an ideal way (essentially in the sense intended to be captured by Grice (1975) and his followers; see also Asher & Lascarides 2003).

The label provided in (4b') expresses that the (ideal) questioner is not aware of (BELieves) either the positive fact that the hearer is at home, or its negative variant (i.e., she is not at home); he simply lacks the relevant piece of information (0), at least at time τ. That is why he is an ideal questioner: he asks a question because he needs some information. The same piece of information also belongs to the worldlet with label (4b"), which means that the ideal

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questioner considers it likely ($\text{BEL}_{\text{great}}$) that the selected answerer is aware of the truth-conditional polarity (true or false: θ) of the given piece of information (that is why he is asking his partner). Further elements of Γ_s, the profile of the ideal speaker's ideal information state, will not be discussed here.

(4)   THE PRAGMATICO-SEMANTIC CONTRIBUTION OF CERTAIN HUNGARIAN CLITICS
   a. $\Gamma = \{\gamma^1, \gamma^2, ..., \gamma^N\}$, where...
   a'.   ... for each $n \in \{1, 2, ..., n\}$, $\gamma^n = \langle\langle \mu^n_1, \iota^n_1, \tau^n_1, \pi^n_1 \rangle, \langle \mu^n_2, \iota^n_2, \tau^n_2, \pi^n_2 \rangle, ..., \langle \mu^n_k, \iota^n_k, \tau^n_k, \pi^n_k \rangle\rangle$
   b.   Otthon vagy?   'Are you at home?' (state s: "you are at home")
          home   be.2Sg
   b'. $\langle\langle \text{BEL}, r_{\text{questioner}}, \tau, 0 \rangle\rangle \in \Gamma_s$
   b". $\langle\langle \text{BEL}_{\text{great}}, r_{\text{questioner}}, \tau, + \rangle, \langle \text{BEL}, r_{\text{answerer}}, \tau, \theta \rangle\rangle \in \Gamma_s$
   c.   Ugye   otthon   vagy?   'You are at home, aren't you?'
          aren't_you?   home   be.2Sg
   c'. $\langle\langle \text{BEL}_{\text{great}}, r_{\text{questioner}}, \tau, + \rangle\rangle \in \Gamma_s$
   d.   Otthon is   vagy?   'Are you at home, like you wanted?'
          home   also   be.2Sg
   d'. $\langle\langle \text{BEL}, r_{\text{questioner}}, \tau, + \rangle, \langle \text{INT}, r_{\text{answerer}}, \tau', + \rangle\rangle \in \Gamma_s$, where $\tau' < \tau$ (earlier point of time)
   e. $^{??}$Vajon otthon   vagy?   cca. 'I am interested if you are at home.'
          if   home   be.2Sg
   e'.   Ili vajon   otthon   van?   cca. 'I am interested if Ili is at home.'
          Ili if   home   be.3Sg
   e". $\langle\langle \text{BEL}_{\text{great}}, r_{\text{questioner}}, \tau, 0 \rangle, \langle \text{BEL}, r_{\text{answerer}}, \tau, + \rangle\rangle \in \Gamma_s$

The worldlet label provided in (4c') above exhibits the pragmatico-semantic contribution of the particle *ugye* (4c) to the interpretation of sentence (4b), which is the questioner's "bias" towards the positive truth value: the speaker declares that (s)he considers it likely ($\text{BEL}_{\text{great}}$), though (s)he is not sure, that the hearer is at home.

   The particle *is* 'also' (4d) pertains to the temporal parameter value of a worldlet. The questioner conveys that (s)he knows that the fact that the hearer is at home is to be regarded as the realization of an earlier (τ') intention (INT) of the hearer.

   The particle *vajon* 'if' (4e-e') serves the questioner's purpose of indicating that (s)he is aware of the fact that the interrogative situation is not ideal, since the truth value of the piece of information in question is not assumed (see '0' in the worldlet label provided in (4e")) to be at the potential answerers' disposal (cf. 4b"). That is this "reflective" or "dubious" character (Gärtner & Gyuris 2012: 401-402, 415-418; Gyuris 2013: 165-167) why question (4e) above is infelicitous: it is not likely that someone does not know if they are at home.

   It is instructive to take a cross-linguistic look at the issue. The pragmatico-semantic contribution of the Hungarian particle *ugye* (4c), for instance, can be compared to that of the selection of the accusative case, instead of the partitive, in certain Finnish question types (5). The piece of information in question, eventuality or *infon* e (Seligman & Moss 1997), concerns the potential fact of Pekka's knowing Marja. Infon e is not at the questioner's disposal as a piece of sure knowledge (5b)—that is exactly why the questioner asked his question at all—but the selection of the accusative case is an indication of the questioner's bias towards the positive truth value of e (5c).

(5) THE PRAGMATICO-SEMANTIC CONTRIBUTION OF FINNISH CASE ALTERNATION IN QUESTIONS

    a. Tunteeko   Pekka   Marja-*n*   /   Marja-*a*?
        know-3Sg-Q Pekka   Marja-*Acc* /   Marja-*Part*
        'Does Pekka know Marja?' (state s: "P. knows M.")

    b. $\langle\langle \text{BEL},r_{questioner},\tau,0\rangle\rangle \in \Gamma_s$

    c. $\langle\ \langle \text{BEL}_{great},r_{questioner},\tau,+\rangle\ \rangle \in \Gamma_s$

Not only particles contribute to the intensional dimension of the pragmatico-semantic content of sentences. The adjective *állítólagos* 'alleged' (in Hungarian), for instance, is qualified as an *irregular* adjective (Kiefer 2000: 188) on the basis of its anomalous—intensional—properties compared to regular adjectives like *old*, as is shown in (6b-b') and (6c-c') below.

(6) *ÁLLÍTÓLAGOS* 'ALLEGED': AN IRREGULAR / MODAL ADJECTIVE

    a. Tegnap   Mari   találkozott egy   állítólagos kémmel.
        yesterday Mari   met   an   alleged   spy.Ins
        'Yesterday Mary met an *alleged* spy.'

    a'. infon e (an event): "Mary met somebody."

    a". infon s (a state): "He is a spy."

    b. An *alleged spy* is a spy.   → *not (necessarily) true*

    b'. An *old spy* is a spy.   → *necessarily true*

    c. *He is *alleged*.   → *ill-formed*

    c'. He is *old*.   → *well-formed*

    d. $\langle\langle \text{BEL},r_{speaker},\tau,+\rangle\rangle \in \Gamma_e$

    d'. $\langle\langle \text{BEL},r_{speaker},\tau,0\rangle\rangle \in \Gamma_s$

    d". $\langle\ \langle \text{BEL},r_{speaker},\tau,+\rangle,\langle \text{BEL},r^*,\tau,+\rangle\ \rangle \in \Gamma_s$

The straightforward solution offered by our approach to this problem is that the difference between regular and irregular adjectives lies with the fact that the discourse-semantic representation of a regular adjective is a predicate providing some semantic content (*old*, for instance provides some content (6c') on the basis of which the subset of old spies is obtained relative to the set of spies (6b')), while the contribution of *alleged* concerns the modal label of a worldlet. Here the speaker makes reference to a person by a piece of information to the truth of which he does not commit himself (6a",d')—while he commits himself to the truth of the statement that Mary met somebody (6a',d).[2] The speaker can refer to him, nevertheless, by expressing that he is "a person who is such that there is a person r* (probably among others) who believes that the former is a spy" (6d"). In this way we could account for both the fact that the sentence *He is a spy* is no correct implication in the sense intended in (6b) (since the speaker has not committed himself to the truth of this statement), and also for the fact that the sentence *He is alleged* (6c) is ill-formed (since *alleged* is not a predicate but the source of a modal label).

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[2] Pelyvás (2001: 20-22) provides a review of further linguistic tools at the speakers' disposal by means of which they can express if they commit themselves to the truth or certain likelihood of their statements or they can convey, for certain points of time, if they were aware of the truth of something at those particular points of time.

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Example (7) below illustrates the relevant fragment of the ideal speaker's information state arising as a result of the dynamic interpretation of a sentence containing the modal adverb *valószínűleg* 'likely'. What makes the performance in (7a) fascinating from the viewpoint of truth evaluation is that it cannot be qualified as a lie even if infon s ("Ili is at home") is false (7b). The information that the hearer can obtain pertains rather to the speaker's information state (at least to that of an ideal speaker in the Gricean (1975) sense). This information state can be sketched as follows: the speaker considers Mary to be likely (BEL_{great}) to be at home (7c), while he declares that he can neither see (or EXPerience in any direct way) that Mary's at home (7d), nor is he sure that that is the case (7d').

(7)   *VALÓSZÍNŰLEG*: 'IT IS LIKELY THAT': A MODAL ADVERB
        a. Ili   valószínűleg   otthon   van.
            Ili   likely   at-home   is
            'Ili is likely to be at home.'
        b. It is irrelevant if state s ("Ili is at home") is true in the external world.
        c. $\langle\,\langle BEL_{great},r_{speaker},\tau,+\rangle\,\rangle \in \Gamma_s$
        d. $\langle\,\langle EXP,r_{speaker},\tau,0\rangle\,\rangle \in \Gamma_s$
        d'. $\langle\,\langle BEL_{max},r_{speaker},\tau,0\rangle\,\rangle \in \Gamma_s$
        d". $\langle\,\langle INT,r_{speaker},\tau,+\rangle,\langle BEL,r_{heaer},\tau',+\rangle,\langle BEL_{max},r_{speaker},\tau,0\rangle\,\rangle$

Thus, if Ili is actually at home and the speaker is together with her, sentence (7a) might be regarded as a logically true statement, but the speaker can reasonably be accused of deception. Hence, he does not prove to be an ideal (profoundly sincere, correct and cooperative) speaker. His deceitful intention in this case can be captured by attributing to him an information state where infon s (7b) (also) belongs to a worldlet with the label provided in (7d"): the speaker wants to persuade the hearer that he is not sure if Ili is at home, that is, he is not together with her.

The following three illustrations exhibit the potential complexity of the intensional profile of verbs. The Hungarian verb *sajnál* 'be sorry' shows a triple "prism effect":

(8)   *SAJNÁL* 'BE SORRY': A MODAL VERB
        a. Mari sajnálja, hogy Pál nős.
            Mari is_sorry that   Pál married
            'Mary is sorry that Pál is married.' (state s: "Pál is married.")
        b. $\langle\,\langle BEL,r_{speaker},\tau,+\rangle\,\rangle \in \Gamma_s$
        c. $\langle\,\langle BEL,r_{speaker},\tau,+\rangle,\langle BEL,r_{Mari},\tau,+\rangle\,\rangle \in \Gamma_s$
        d. $\langle\,\langle BEL,r_{speaker},\tau,+\rangle,\langle DES,r_{Mari},\tau,-\rangle\,\rangle \in \Gamma_s$

Infon s (Pál's potential married status) is claimed to be a fact known by the speaker (8b) as well as the subject, Mari (8c). The speaker also attributes a negative desire to the subject (Mari) in respect of the given infon (8d).

The intensional profile of another Hungarian modal verb, *bevesz* 'buy', shows an even richer "prism effect", as is demonstrated in (9) below. Here again, infon s expresses Pál's potential married status.

Infon s is claimed (and thought) to be false at time τ (9b), but the speaker thinks that, at time τ, Mary believed that it was true (9b'). At an earlier point of time, however, Mary had not

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yet believed so (9b"). This change is "due" to a wily person r*, who is not necessarily known (9c-e"). This viper—let us suppose she is a woman wanting to seize Pál from Mari...—precisely knew that s was false at τ' as well as at τ (9c-c'), and she also knew that Mary was not thinking it was true (9d); this ill-willed person, however, wanted to convince Mary of s (9d')—and with success, as was shown in (9b'). Moreover, it is also claimed that Mary believed at τ that the wily person held the same belief as she did at both τ' (9e) and at τ (9e'), that Paul was married. Mary did not realize that r* had wanted to make her believe that infon s held (9e").

(9)   *Bevesz* 'buy/swallow/accept': another modal verb
   a.   Mari bevette,   hogy Pál nős.
        Mari buy.Past that Pál married
        'Mary bought that Paul is married.' (state s: "Pál is married.")
   b. $\langle\, \langle \text{BEL},r_{\text{speaker}},\tau,-\rangle \,\rangle \in \Gamma_s$
   b'. $\langle\, \langle \text{BEL},r_{\text{speaker}},\tau,+\rangle, \langle \text{BEL},r_{\text{Mari}},\tau,+\rangle \,\rangle \in \Gamma_s$
   b". $\langle\, \langle \text{BEL},r_{\text{speaker}},\tau,-\rangle, \langle \text{BEL},r_{\text{Mari}},\tau',+\rangle \,\rangle \in \Gamma_s$, where $\tau' < \tau$ (earlier point of time)
   c. $\langle\, \langle \text{BEL},r_{\text{speaker}},\tau,+\rangle, \langle \text{BEL},r^*,\tau',-\rangle \,\rangle \in \Gamma_s$
   c'. $\langle\, \langle \text{BEL},r_{\text{speaker}},\tau,+\rangle, \langle \text{BEL},r^*,\tau,-\rangle \,\rangle \in \Gamma_s$
   d. $\langle\, \langle \text{BEL},r_{\text{speaker}},\tau,+\rangle, \langle \text{BEL},r^*,\tau',-\rangle, \langle \text{BEL},r_{\text{Mari}},\tau',+\rangle \,\rangle \in \Gamma_s$
   d'. $\langle\, \langle \text{BEL},r_{\text{speaker}},\tau,+\rangle, \langle \text{INT},r^*,\tau',+\rangle, \langle \text{BEL},r_{\text{Mari}},\tau,+\rangle \,\rangle \in \Gamma_s$
   e. $\langle\, \langle \text{BEL},r_{\text{speaker}},\tau,+\rangle, \langle \text{BEL},r_{\text{Mari}},\tau,+\rangle, \langle \text{BEL},r^*,\tau',+\rangle \,\rangle \in \Gamma_s$
   e'. $\langle\, \langle \text{BEL},r_{\text{speaker}},\tau,+\rangle, \langle \text{BEL},r_{\text{Mari}},\tau,+\rangle, \langle \text{BEL},r^*,\tau,+\rangle \,\rangle \in \Gamma_s$
   e". $\langle\, \langle \text{BEL},r_{\text{speaker}},\tau,+\rangle, \langle \text{BEL},r_{\text{Mari}},\tau,0\rangle, \langle \text{INT},r^*,\tau',+\rangle, \langle \text{BEL},r_{\text{Mari}},\tau,+\rangle \,\rangle \in \Gamma_s$

All this information is evoked by the very expressive modal verb *bevesz* 'buy', and it all can be captured formally in our approach, due to our principle, learnt from Cognitive Linguistics (e.g. Pelyvás 1998: 118), that propositions are to be tested not against arbitrary possible worlds but against specific possible-world-like constructions determined in the interlocutory situation. As Pelyvás mentions elsewhere (Pelyvás 2006: 196-197), traditional (model-theoretic) semantics is insufficient since they primarily work with reference anchored directly to the actual world, and—as they must not deal with the use of language— they do not qualify as their task to decide which "possible worlds" of which participants of the text and/or the situation should also be taken into account[3].

   The sentence in (10a) below is also quite easy to interpret in the approach of ℜeALIS, due to the carefully defined coexistence of some model of the external world and the appropriate models of the subject's information states at different points of time, within a complete matrix model.[4] The analysis relies on the same facilities available in the cognitive linguistics framework used by Pelyvás (2006: 204-205), who follows Langacker's (2004) approach to nominal grounding. The most important tenet of this view is that all nominals are grounded in the "reality" of the Idealized Conceptul Model(s) evoked in the discourse, which is relative to

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[3]   "Cognitive grammar, which is different from traditional grammars in its natural reliance on active speaker participation in conceptualization processes and its interest in larger contexts for analysis (conceptual domains, idealized cognitive models—ICMs—, mental spaces) may be a better framework for finding systematic answers..." (Pelyvás 2006: 197).

[4]   See example (1a) in Alberti & Kleiber (2012) and the discussion on it; and see also Alberti (2012) fur further examples.

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speaker and hearer, rather than directly in objective reality. From the point of view of linguistic analysis the reality that we could call "objective" (i.e., independent of speakers' and hearers' beliefs) is only of marginal importance. This is true of proper names as well. Pelyvás adds that grounding a proper name in one ICM does not necessitate the referent's successful identification.

The main verb in sentence (10a), *realize* (similar to its Hungarian counterpart *rájön*), is also a factive verb, similar to *sajnál* 'be sorry' (8) and *bevesz* 'buy' (9). Hence, it is a precondition of interpreting the sentence as true (or rather, as "well-formed") that the Evening Star should coincide with the Morning Star in (the model of) the external world. This means that the entity referred to as the Evening Star by the given astronomer should be the same entity he refers to as the Morning Star. In the approach of ℜeALIS, this relation is captured formally as demonstrated in (10b) below: the internal entity $r_{EveningStar}$ should be anchored to the same external entity as the internal entity $r_{MorningStar}$. The astronomer himself is not (necessarily) aware of the co-anchoring of the two internal entities at his disposal (in his appropriate worldlet); but the fact of co-anchoring is an external requirement due to the factive character of the verb.

(10) THE INTERPRETATION OF *REALIZE* AND THE PHILOSOPHERS' *VENUS*-PROBLEM
  a. An ancient astronomer realized that the Evening Star is the same as the Morning Star.
  b. $\alpha(r_{EveningStar})$ is-the-same-as $\alpha(r_{MorningStar})$ (since u_{Venus} is-the-same-as u_{Venus})
  b'. It does not hold that $r_{EveningStar}$ is-the-same-as $r_{MorningStar}$ at τ in the astronomer's worldlet of astronomic hypotheses
  b". It holds that $r_{EveningStar}$ is-the-same-as $r_{MorningStar}$ at τ', which is a later point of time in the astronomer's worldlet of astronomic hypotheses

Two further requirements to be satisfied in order for sentence (10a) to qualify as true concern two information states of the astronomer at different points of time, independently of the external world: what is to be checked is whether there is a "same-as" relation between the internal entity $r_{EveningStar}$ and the internal entity $r_{MorningStar}$ in the one information state (10b") while they do not stand in the "same-as" relation in the other one (10b').

All in all, three competing world(let) models should be considered simultaneously, which is another manifestation of the "prism effect", and three entities—an external one and two internal ones—should be inspected. As the three models are all parts of the one complete model of the history of the external world and all internal reflections associated with it, in this matrix model three facts should be checked: if both internal entities are anchored to the external entity, if the two entities are not anchored to each other in one internal model, and if they are anchored to each other in another internal model.

3 The intensional profile of Mood and Modality in Hungarian

Having elucidated the (independent) motivation behind the proposed structure and the features of worldlet labels (see (4a-a') in section 2), it is high time we turned to the examination of the intensional profiles to be attributed to markers of mood and modality in Hungarian. They are obviously similar to particles in that they make a contribution to the structure of the intensional matrix. That is, their role is exactly exhibiting the particular connection between some semantic content and its use in communication, which connection was mentioned to

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deserve a prominent attention of cognitive linguistists (e.g., Pelyvás 1998: 118, 2001: 11-12, 2013: 270, 273-274).

The conditional mood (11a)—primarily / without the aid of any additional expressions—expresses the subject's desire pertaining to infon s.

(11) Illustration of the primary meaning factor of the conditional mood, the modal suffix of permission, and the modal auxiliary of obligation

    a.   Anna   otthon len-*ne*.   'Anna desires to be at home.' (state s: "A. is at home.")
        Anna   home be-*Cond*

    a'. $\langle \langle \text{BEL}, r_{\text{speaker}}, \nu, + \rangle, \langle DES, r_{\text{Anna}}, \nu, + \rangle \rangle \in \Gamma_s$ (cf. T1.d); ν: "now"

    b.   Anna otthon le-*het*.   'Anna may be at home.'
        Anna home be-can

    b'. $\langle \langle \text{BEL}, r_{\text{speaker}}, \nu, + \rangle, \langle INT, r, \tau', 0 \rangle \rangle \in \Gamma_s$ (cf. T1.b)

    b". $\langle \langle \text{BEL}_{\text{med}}, r_{\text{speaker}}, \nu, + \rangle \rangle \in \Gamma_s$ (cf. T1.c)

    c.   Annának otthon *kell*   lenni-*e*.   'Anna must be at home.'
        Anna.Dat home   *must* be.Inf-*3Sg*

    c'. $\langle \langle \text{BEL}, r_{\text{speaker}}, \nu, + \rangle, \langle INT, r, \tau', + \rangle \rangle \in \Gamma_s$ (cf. T2.b)

    c". $\langle \langle \text{BEL}_{\text{amax}}, r_{\text{speaker}}, \nu, + \rangle \rangle \in \Gamma_s$ (cf. T2.c)

    d.   Annának otthon kell   lenni.   'Anna must be at home.'
        Anna.Dat home   must be.Inf

    d'. $\langle \langle \text{BEL}, r_{\text{speaker}}, \nu, + \rangle, \langle INT, r, \tau', + \rangle \rangle \in \Gamma_s$ (cf. T2.b)

The suffix of the permissive modality (11b) is ambiguous. It can express an authority's (r) permission (11b'), that is, the fact that (s)he is neither definitely for, nor definitely against the realization of infon s (feature '0'). It can also express that the speaker attributes a medium degree of likelihood to infon s (11b"). This is called the epistemic reading.

It is worth comparing this double intensional profile to the double intensional profile of the deontic auxiliary verb *kell* 'must' (11c). *Kell* can express an authority's (r) will (11c'), that is, the fact that (s)he is definitely for the realization of infon s ('+'). It also has an epistemic reading, according to which a high degree of likelihood is attributed to infon s (11c").

It must be noted that, if the infinitival argument of the deontic auxiliary shows no agreement with the subject in the third person (11d), the epistemic reading disappears (at least according to the majority of speakers we have tested). What remains is the deontic reading ((11d') = (11c')). A potential explanation can be based on the following approach: The lack of agreement between the dative case-marked noun phrase and the infinitive suggests that the noun phrase belongs to the auxiliary *kell* 'must' as an argument. To this connection can be assigned the meaning that the denotatum of the noun phrase is ordered by an authority to do what is denoted by the infinitival phrase. In the case of agreement, however, what is denoted by the infinitival phrase is claimed to be inevitable; now the ambiguity (11c-c') can be accounted for by considering an authority's will to be a preferred potential reason for this inevitability.

What is the shared meaning-element between the permissive/deontic meaning (11b',c') and the corresponding homophonous epistemic meanings (11b",c")?

The zero / positive polarity of someone's intention as a shared factor, provided in T1.b-c / T2.b-c in the appendix, is one key to our proposal. The other key is the two potential scopal orders between the past tense and the modal element, raised by Bartos (2000). The following

proposal should be added to his observation on scopes: If t>M (T1.b, T2.b), we are speaking of a permission or will in the past, which are real things. If, however, M>t (T1.c, T2.c), we have obtained such nonsense cases as a current permission or will pertaining to the past. What can be permitted / ordered then? A straightforward possibility is that it is the hearer who is permitted / ordered to believe something, and a straightforward source of the permission / order is who else than the speaker—who, anyway, is a preferred choice for the non-specified "authority" referred to in T1.b / T2.b as referent r.

Note that such an explanation for the common root of the epistemic and the other meaning proves to be readily available in our "cognitive" pragmatico-semantic approach, where the speaker and the hearer are always "present" and, moreover, "salient", as was shown in (4c), (4e'), (5) and (7) in section 2. This does not hold for Bartos's (2000) syntactic approach, where it is not clear how participants not mentioned explicitly in the sentence would be available.

The series of examples in (12) below illustrates the basics of a potential compositional treatment of the essentially cognitive idea that a performed sentence with a deontic element evokes 4+k semantic roles (k=0, 1, 2,...) among which interpreters should decide identity relations on the basis of such linguistic cues as inflection and sentence type. Two roles are those of the speaker and the hearer, and further two roles (due to the aforementioned deontic feature) are those of an authority and the obligee who receives some order or permission from the authority. The last k roles are those of arguments/complements of the verb or deverbal element that the deontic element is associated with. There may be, for instance, an Agent and a Patient.

In (12a), the inflection (with pro-drop) suggests the identity of the obligee and the Agent with the hearer ('2') and the identity of the Patient with the speaker ('1'). In this approach it appears as an ambiguity if the authority coincides with the speaker (12a.1), or the speaker only announces another else's permission (participant 3 in (12a.2)).

(12) DISTRIBUTION OF THE SPEAKER AND THE HEARER $\langle 1 \rightarrow 2 \rangle$ IN THE FOLLOWING ROLES:
  $\langle$**Authority $\rightarrow$ Obligee**, *Agent $\rightarrow$ Patient*$\rangle$
  a. Megcsókol-hat-sz.   'You can kiss me.'
      kiss-can-2Sg
      1. $\langle \mathbf{1{\rightarrow}2}, 2{\rightarrow}1 \rangle$
      2. $\langle \mathbf{3{\rightarrow}2}, 2{\rightarrow}1 \rangle$
  a'. Megcsókol-hat-l-ak?   'Can I kiss you?'
      kiss-can-2Sg-1Sg
      1. $\langle \mathbf{2{\rightarrow}1}, 1{\rightarrow}2 \rangle$
      2. $\langle \mathbf{3{\rightarrow}1}, 1{\rightarrow}2 \rangle$
  b. Megcsókol-hat-od   Ili-t. 'You can kiss Ili.'
      kiss-can-2Sg   Ili-Acc
      1. $\langle \mathbf{1{\rightarrow}2}, 2{\rightarrow}3 \rangle$
      2. $\langle \mathbf{4{\rightarrow}2}, 2{\rightarrow}3 \rangle$
  b'. Peti megcsókol-hat.   'Peti can kiss me/you.'
      Peti kiss-can.3Sg
      1. $\langle \mathbf{1{\rightarrow}3}, 3{\rightarrow}1 \rangle$ 1'. $\langle \mathbf{1{\rightarrow}3}, 3{\rightarrow}2 \rangle$
      2. $\langle \mathbf{4{\rightarrow}3}, 3{\rightarrow}1 \rangle$ 2'. $\langle \mathbf{4{\rightarrow}3}, 3{\rightarrow}2 \rangle$
  c. Peti megcsókol-hat-ta Ili-t. 'Peter could kiss Ili.' / 'P. may have kissed Ili.'
      Peti kiss-can-Past.Sg   Ili.Acc

1. ⟨**1→3**, 3→4⟩　　2. ⟨**5→3**, 3→4⟩
3. ⟨**1→2**, 3→4⟩

d. Havaz-hat-ott.　　　　　　　'It may have snowed.'
  snow-can-Past.3Sg
  1. ⟨**1→2**, —⟩

e. Peti megcsókol-hat-ta Ili-t? 'Could Peter kiss Ili?' / 'May P. have kissed Ili?'
  Peti kiss-can-Past.Sg Ili.Acc
  1. ⟨**2→3**, 3→4⟩　　2. ⟨**5→3**, 3→4⟩　　3. ⟨**2→1**, 3→4⟩

Example (12a') shows that the sentence type also counts; the interrogative character renders the obligee and the Agent to be identical with the speaker and the Patient to be identical with the hearer. The preferred authority is the hearer (12a'.1); but someone else can also receive the role of the authority (12a'.2).

In (12b) above, a new Patient appears, compared to (12a). Hence, the difference between the identity relations that belong to sentence (12b), compared to those that belong to (12a), is as follows: the Patient does not coincide with the hearer, independently of the authority's coincidence with the speaker (12b.1) or their distinction (12b.2).

The sentence in (12b'), in which an explicit Agent is mentioned compared to (12a), can be associated with four readings. This can be regarded as evidence for the compositional cumulation of meaning factors: their cumulation yields a doubly underspecified meaning, in the course of the specification of which such salient participants are preferred as the speaker and the hearer. What is determined, thus, alike in all cases discussed so far, is that the Agent (who, here, coincides neither with the speaker nor with the hearer) should be the same as the obligee (12b'.1-2'). The authority can be chosen to be the speaker (12b'.1,1') or someone else (12b'.2,2'), and the Patient can be chosen to be the speaker (12b'.1,2) or the hearer (12b'.1',2').

If both the Agent and the Patient is mentioned explicitly (12c), these roles cannot be occupied by the speaker or the hearer. The only remaining uncertainty lies with the identity of the authority (12c.1-2). The shared element of all the readings discussed so far (12a.1-12c.2) is that the obligee coincides with the Agent, that is, the Agent receives some kind of permission. This element is to be regarded as the definitive factor of the deontic interpretation.

Before discussing the reading demonstrated in (12c.3) above, let us consider sentence (12d). It contains no Agent or Patient, so the obligee cannot be identified with anyone, at least according to some deontic interpretation. That is, who is permitted to do what, that is the question. It could be the case that (12d) is ill-formed, but language seems to "choose" another strategy: the hearer is assigned the role of the person who is permitted to do something. And what action is permitted? As the hearer is not an Agent, the action to be permitted can be to *accept* the truth or likelihood of the content of the sentence (12d.1). This is an epistemic reading, *per definitionem*.

Now the reading demonstrated in (12d.3) can be held as follows: as it is possible to distinguish the obligee from some Agent, sentence (12d) may also be associated with such an epistemic interpretation, in which the obligee is chosen to be the hearer and the permitted action is nothing else but to accept the truth or likelihood of the content of the given sentence.

The reader can check in connection with the interrogative sentence shown in (12e) above that the difference of (12e) from (12c) is the same as the difference of the interrogative sentence in (12a') from its declarative counterpart in (12a).

Now let us turn to the further elements of the intensional profiles provided in T1.b-c and T2.b-c in the appendix.

The (b) meanings, in addition to an authority's intention, also express a piece of knowledge available to the speaker: "infon s took place due to someone's permission / will".

In the case of the epistemic (c) meanings, where the hearer is permitted / ordered to believe in the truth of infon s by the speaker, the pieces of knowledge at the speaker's disposal are obviously weaker than in the case of sentence (a) in T1/T2, which contains no modal element. As it is also demonstrated in Figure 2 below, the speaker's abstract "permission" or "order" is claimed to rely on information with lower levels of certainty (medium belief / almost maximum belief) and indirect information. The modal label BEL-ASI ('associated belief') is intended to capture indirect information in the following way: As ℜeALIS is a "lifelong" interpretation system, infons are regarded to form a rich network in interpreters' information states. Each infon s, hence, is associated with infons which corroborate / license, or are corroborated / licensed by, its truth.

At this point it is worth discussing a third kind of epistemic meaning, which appears in (f') in both tables in the appendix. This meaning can be triggered through the insertion of the expression *mintha* 'as if' in an otherwise desire-expressing conditional sentence (*Anna hazament volna* 'Anna would have gone home'). The primary meaning associated with this conditional sentence relies on the tense>mood scope order (T1.d / T2.d). The concrete sentence, thus, compositionally expresses one of Anna's earlier desires. As for the inverse scope order (m>t; see T1.f / T2.f), the compositional meaning should express a current desire pertaining to the past. Is not it in vain to long for an alternative past? Well, language enables us to express this rather abstract meaning. First of all, however, presumably due to the marked status of this meaning, an explicit help is required, which is offered by the expression *bárcsak* 'if only'. Second, the resulting sentence will not pertain to the subject's desire but to the speaker's desire. The particular sentence means that *I wish Anna had gone home*. Note that in Bartos's (2000) approach this meaning is not available since the speaker is not mentioned in the sentence. In our pragmatico-semantic approach, however, the speaker is always as much available in the representation of meaning, as the (most salient) participants mentioned in the sentence under interpretation.

Let us return to meaning T1.f'. Another auxiliary expression, namely *mintha* 'as if', helps to trigger a meaning which conveys another approach of the speaker to what might have happened in the past. Now it is the speaker's belief that is expressed due to the combination of the conditional mood with the expression *mintha* 'as if'. After the epistemic meanings T1.c and T2.c, a third epistemic meaning is obtained.

In language, different constructions are typically associated with different meanings. This third epistemic meaning, in contrast to the other two, expresses that the speaker's uncertain belief is due to his/her uncertain memory (*As if Anna had gone home; I cannot remember...*), and not to the fact that only indirect pieces of information are at his/her disposal. That is why in Figure 1 below the three epistemic meanings are ordered ('>') according to their degrees of certainty: Relative to the certain information associated with T1.a / T2.a, both T2.c and T1.f' / T2.f' express less certain information, these two epistemic readings, however, cannot be ordered relative to each other, due to the different sources of uncertainty. Meaning T2.c is ordered over meaning T1.c.

In square T1.f', label 'OBS$_{some}$' refers to the fact that the speaker's current information state contains only a low-level "faint memory" (in spite of the fact that it was) originally based on direct observation.

No MOD/MOOD	MOD or MOOD	MOD $\oplus$ MOOD
+BEL >	+BEL$_{kell}$ > +BEL$_{-hAt}$ +BEL$_{-nA}$	> $-$BEL ($\rightarrow$ +DES$_{kell}$ > +DES$_{-hAt}$)

Figure 1: The System of Epistemic Meanings

MOD *(INT; +BEL)*	*MOD $\otimes$ MOOD* ?	**MOOD** **(+DES; $-$BEL)**
INT$_{kell}$ > INT$_{-hAt}$		**+DES**
+BEL	**$-$BEL**	

Figure 2: The System of Deontic Meanings

As T1.d / T2.d and T1.f / T2.f express desires, they are associated with the speaker's certain (current) knowledge that Anna did not go home ('$\langle$BEL$_{MAX}$,s, ν,$-\rangle$'). Desires pertain to alternatives of what is real.

This connection may serve as an explanation for the rightmost square in Figure 1. Are there two further epistemic meanings due to the two possible combinations of the conditional mood and the two levels of modality?

No, there are no two further epistemic readings which would express even lower (but positive) levels of certainty. This is possibly because of the incompatibility of the different sources of uncertainty expressed by the conditional mood, on the one hand, and expressed by the two modalities, on the other (see above). Instead, variants T1.g" and T2.g" are associated with meanings where the speaker's belief factor is that, in the particular case, Anna did not go home ($\langle$BEL$_{MAX}$,s,ν,$-\rangle$). As this negative piece of knowledge is readily compatible with the primary meaning factor of the conditional mood, which is desire, T1.g" and T2.g" mean that the speaker would have been glad, or actually very glad, respectively, if Anna had gone home. The insertion of the expression *igazán* 'really' is not obligatory but it helps to enforce the given meanings. Note also that, again, our pragmatico-semantic approach is capable of accounting for the speaker's desire even though the speaker is not mentioned in the sentence.

Remember (2b) that Bartos's syntax-based approach implies that the co-occurrence of a mood and a modality marker can yield a single meaning, which relies on this scope order: m > t > M. The variants in T1.g and T2.g demonstrate these meanings, which are available in the presence of either an *if* clause (Bartos 2000) or the expression *bárcsak* 'if only'. These meanings, indeed, can be calculated in a compositional manner (e.g., *I wish$_m$ Anna had$_t$ been allowed$_M$ / ordered$_M$ to go home*).

We argue, however, partly in contrast to Bartos (2000), that the other five permutations of possible scope orders (see T1.e-e",g-g", T2.e-e",g-g") can also be associated with meaning. We say 'partly' because it is undoubtedly true that certain scope orders can only prevail, first, in the presence of special expressions, and second, at the cost of reinterpreting the combined action of the partially incompatible meaning factors arising from the mood marker and the modality marker.

We argue that an adequate explanation for the complete system of meaning variants does require the inspection of all the scopal permutations; and we consider the results elaborated in our "holistic" approach to be the most important contribution of this paper.

Thus, let us return to the analysis of the scope order m>M>t (T1.g", T2.g"), which we consider to coincide with that of the scope order M>m>t. We consider these two scope orders to coincide because, as was suggested above, the semantic contribution of the mood marker and that of the modality marker blend if they are next to each other in the scope hierarchy.[5] The formula m⊕M in squares T1.g" and T2.g" denotes the semantic contribution of blending. As was discussed in connection with Figure 1 above, the blend in question can be regarded as a blend of two partially incompatible complex semantic factors (CSF). Incompatibility of complex structures would yield blends which would either qualify as linguistically ill-formed, or as such well-formed structures where certain parts of the input CSF's prevail.

In the particular case (T1.g"-g''', T2.g"-g'''), the epistemic semantic factor of the modality marker is essentially compatible with the epistemic semantic factor of the mood marker since both express that the speaker does not think that it is *certain* that Anna went home. We consider it a cumulated effect of uncertainty that the semantic blend straightforwardly implies that the speaker thinks that Anna did not go home. This negative meaning factor is incompatible with the primary meaning factor of the modality markers shown in T1.b and T2.b ($\langle \text{BEL}_{\text{MAX}}, s, \nu, + \rangle$) but is compatible with that of the mood marker shown in T1.f / T2.f ($\langle \text{BEL}_{\text{MAX}}, s, \nu, - \rangle$). This latter fact makes it possible for the conditional marker to enforce its meaning factor concerning the speaker's desire (see also T1.f / T2.f ($\langle \text{DES}, s, \nu, + \rangle$).

As for the scope order t>M>m (T1.e, T2.e), another kind of semantic blend takes place, which is demonstrated in Figure 2 above. Here the modality marker enforces its permissive / deontic factor ($\langle \text{INT}, r, \tau, 0 \rangle$ / $\langle \text{INT}, r, \tau, 0 \rangle$) (see T1.b, T2.b) while the mood marker enforces its negative label $\langle \text{BEL}_{\text{MAX}}, s, \nu, - \rangle$, known from T1.f and T2.f. This semantic blend means that, in the particular case, Anna was allowed / ordered to go home, but she did not do so. The formula m⊗M denotes this type of unification of the incompatible input complex semantic factors.

The fifth scope order is shown in T1.e' and T2.e': t>m>M. This also blends, resulting in the scope order t>(m⊗M), discussed in connection with variants T1.e and T2.e. The (e)- and (e')-cases, thus, coincide in this approach.

Note that the (e')-cases can also be regarded as the past counterparts ("the speaker had a desire pertaining to an even earlier event...") of the (g)-cases, which pertain to present desires attributed to the speaker ("now the speaker has a desire towards an alternative past... "). In this approach, however, m and M are not next to each other in the scope hierarchy since the complete scope order can be formulated as follows: t>m>t'>M.

Finally, the scope order M>t>m (T1.e", T2.e") seems to be associable with the two meanings which can be triggered by the expression *boldogan* 'happily'. The resulting readings pertain to Anna's past desire (t>m), in connection with which it is predicated that the speaker's stance (expressed by the combination of *boldogan* 'happily' and the modality marker) is that Anna should have been glad about the possibility to go home.

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[5] The method of *blending* complex semantic contents is also an effective tool borrowed from Cognitive Linguistics (see, for instance, Pelyvás (2006, 2013)).

4   Summary

In this paper, we provided a thorough formal semantic and pragmatic analysis of the Modality + Tense + Mood marker combinations of Hungarian verbs, taking into account all the six possible scope orders. We chose to set out from Bartos's (2000) essentially syntactic analysis, which is based on the following "fixed" syntactic hierarchy: Mood > Tense > Modality. We claimed that further scopal permutations can be "evoked" with the aid of certain adverbial expressions (e.g., *bárcsak* 'if only', *mintha* 'as if'), and that the complete system of all possible readings should be accounted for. They, too, can be accounted for in our approach, in which such pragmatico-semantic factors can be considered as the speaker's beliefs and desires, in addition to the factors of meaning with explicit sources in the sentences under investigation.

The system of our results, formalized in a semantic framework which is grounded in DRT-based representationalist dynamic discourse-semantics but exploits several observations and analytical comments due to Cognitive Linguistics, is summarized in the two tables in the appendix. What we consider the most important idea is the proposal concerning two ways of blending the (partially incompatible) meaning factors of the conditional mood and those of the modality markers.

These are the points—to cease attempting to describe he language system without considering its human use in communication (and prominently the speaker's and the hearer's role in this), and to have recourse to such operations as blending complex semantic representations—where ℜeALIS intends to blend Discourse Representation Theory with Cognitive Linguistics.

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Modality (M) → ↓ Mood (m)	*haza·megy + -(Vt)t* home-go + PAST		*haza·megy + -(Vt)t + vol- + -nA* home-go + PAST + COPULA + COND	
	Anna haza·ment.		*Anna ... haza·ment volna.*	
∅	a. t (Tense) $\langle BEL_{MAX},s,\nu +\rangle$ (ν: now)		d. t>m (+*boldogan* 'happily') $\langle DES,a,\tau,+\rangle$; $\langle BEL_{MAX},s,\nu,-\rangle$	f. m>t (+*bárcsak* 'if only') $\langle DES,s,\nu,+\rangle$; $\langle BEL_{MAX},s,\nu,-\rangle$
				f. <u>m</u>>t (+*mintha* 'as if') $\langle BEL_{some},s,\nu,+\rangle$; $\langle OBS_{some},s,\nu,+\rangle$
	Anna haza·me·het·ett.		*Anna ... haza·me·het·ett vol·na.*	
-hAt 'can/may'	b. t>M $\langle INT,r,\tau,0\rangle$ (often, r=s; τ: point of time in the past); $\langle BEL_{MAX},s,\nu,+\rangle$	c. M>t $\langle INT,s,\nu,0\rangle\langle BEL,h,\nu,+\rangle$ $\langle BEL_{med},s,\nu,+\rangle$ $\langle BEL\text{-}ASI_{great},s,\nu,+\rangle$	e. t>M>m →t >(m⊗M) $\langle INT,r,\tau,0\rangle$ $\langle BEL_{MAX},s,\nu,-\rangle$	g. m>t>M (+*bárcsak* 'if only') $\langle DES,s,\nu,+\rangle\langle INT,r,\tau,0\rangle$; $\langle BEL_{MAX},s,\nu,-\rangle\langle INT,r,\tau,0\rangle$
			e'. t>m>M; see e. (t >(m⊗M)); or t>m>t'>M (+*arra vágytam,* *bárcsak...* 'I wished if only') → g. $\langle DES,s,\tau,+\rangle\langle INT,r,\tau,0\rangle$; $\langle BEL_{MAX},s,\nu,-\rangle\langle INT,r,\tau,0\rangle$	g'. m>t>M (+*mintha* 'as if') $\langle BEL_{some},s,\nu,+\rangle\langle INT,r,\tau,0\rangle$; $\langle EXP_{some},s,\nu,+\rangle\langle INT,r,\tau,0\rangle$
			e''. M>t>m (+*boldogan* 'happily') $\langle DES_{amax},s,\nu,+\rangle\langle DES,a,\tau,+\rangle$; $\langle BEL_{MAX},s,\nu,-\rangle\langle DES,a,\tau,+\rangle$	g''. m>M>t; g'''. M>m>t = g''. → (m⊕M)>t (+*igazán* 'really') $\langle BEL_{MAX},s,\nu,-\rangle$; $\langle DES_{great},s,\nu,+\rangle$

Table 1. Permutations of scopal hierarchies: Conditional Mood + Past Tense + -hAt *Modality*

Modality (M) → ↓ Mood (m)	*haza·megy + -(Vt)t* home-go + PAST		*haza·megy + -(Vt)t + vol- + -nA* home-go + PAST + COPULA + COND	
∅	*Anna haza·ment.*		*Anna ... haza·ment volna.*	
	a. t (Tense) $\langle BEL_{MAX},s,\nu +\rangle$ (ν: now)		d. t>m (+*boldogan* 'happily') $\langle DES,a,\tau,+\rangle$; $\langle BEL_{MAX},s, \nu,-\rangle$	f. m>t (+*bárcsak* 'if only') $\langle DES,s,\nu,+\rangle$; $\langle BEL_{MAX},s,\nu,-\rangle$
				f. <u>m</u>>t (+*mintha* 'as if') $\langle BEL_{some},s, \nu,+\rangle$; $\langle OBS_{some},s, \nu,+\rangle$
kell 'must'	*Annának haza kell·ett ↙men·ni / menni(e) ↘.*		*Annának ... haza kell·ett vol·na ↙men·ni / menni(e) ↘.*	
	b. t>M $\langle INT,r,\tau,+\rangle$ (often, r=s; τ: point of time in the past); $\langle BEL_{MAX},s,\nu,+\rangle$	c. M>t $\langle INT,s,\nu,+\rangle\langle BEL,h,\nu,+\rangle$ $\langle BEL_{amax},s, \nu,+\rangle$ $\langle BEL\text{-}ASI_{MAX},s, \nu,+\rangle$	e. t>M>m → t> (m⊗M) $\langle INT,r,\tau,+\rangle$ $\langle BEL_{MAX},s,\nu,-\rangle$	g. m>t>M (+*bárcsak* 'if only') $\langle DES,s,\nu,+\rangle\langle INT,r,\tau,+\rangle$; $\langle BEL_{MAX},s,\nu,-\rangle\langle INT,r,\tau,+\rangle$
			e'. t>m>M; see e. (t >(m⊗M)); or t>m>t'>M (+*arra vágytam, bárcsak...* 'I wished if only') → g. $\langle DES,s,\tau,+\rangle\langle INT,r,\tau,+\rangle$; $\langle BEL_{MAX},s,\nu,-\rangle\langle INT,r,\tau,+\rangle$	g'. <u>m</u>>t>M (+*mintha* 'as if') $\langle BEL_{some},s, \nu,+\rangle\langle INT,r,\tau,+\rangle$; $\langle EXP_{some},s, \nu,+\rangle\langle INT,r,\tau,+\rangle$
			e". M>t>m *boldogan* $\langle DES,s, \nu,+\rangle\langle DES,a,\tau,+\rangle$; $\langle BEL_{MAX},s, \nu,-\rangle\langle DES,a,\tau,+\rangle$	g". m>M>t; g'". M>m>t = g". → (<u>m</u>⊕M)>t (+*igazán* 'really) $\langle BEL_{MAX},s,\nu,-\rangle$; $\langle DES_{amax},s, \nu,+\rangle$

Table 2. Permutations of scopal hierarchies: Conditional Mood + Past Tense + kell *Modality*