

Intensional profiles and different kinds of human minds. “Case studies” about Hungarian imperative-like sentence types

Gábor Alberti, Judit Kleiber, Zsuzsanna Schnell, Veronika Szabó
University of Pécs, Hungary

Abstract

The paper offers such description of some imperative-like sentence types in potential well-formed Hungarian utterances which includes a parallel representation of the linguistically encoded intensional profiles of the sentence types and actual information states in potential interlocutors' minds. In our representational dynamic pragmaseantics framework \Re ALIS, we demonstrate the intensional profiles of the five basic and two “fine-tuned” sentence types as members of a system enabling addressers' of utterances to express their beliefs, desires and intentions concerning the propositional content of the given utterances as well as the addressees' and other people's certain beliefs, desires and intentions (concerning the propositional content, too, or each other's thoughts). We also provide “case studies” in which actual beliefs, desires and intentions in potential interlocutors' minds are compared to the linguistically encoded intensional profiles of Hungarian imperative-like sentence types. In this context, the listener's task is to calculate the speaker's intentions (and hidden motives) on the basis of the mismatches that this comparison reveals. The paper concludes with an insight into our attempts to model the mind of individuals living with Autism Spectrum Disorder. This latter subproject is relevant since our framework provides solutions to pragmaticosemantic phenomena “at the cost” of undertaking the complex task of actually representing the structure of the human mind itself – which is not impossible but requires an adequate decision of the level of abstraction and the components to be used.

Keywords: discourse representation/markers, mind representation, dynamic pragmatics, autism

1. Introduction

This paper is part of a series of papers in which we describe in our discourse-semantic framework \Re ALIS¹ the intensional profiles of the basic (Hungarian) sentence types and those of sentence types modified by peculiar stress patterns, discourse particles and what are referred to in Leiss (2014: 50) as ATMM-categories (Aspect, Tense, Mood, and different kinds

¹ See Alberti (2009, 2011, 2012), Alberti and Károly (2012), Alberti and Kleiber (2012, 2014), and Alberti, Vadász and Kleiber (2014).

of Modality).² This part offers such description of some imperative-like³ sentence types in potential well-formed Hungarian utterances which includes a parallel representation of the linguistically encoded intensional profiles of the sentence types and actual information states in potential interlocutors' minds – in harmony with the distinguished topic of the 2015 Lublin conference *Mind, language, society: towards a unified theory of language structure and use*. The paper can thus be regarded as an immediate continuation of Alberti, Vadász and Kleiber's (2014) analysis on "ideal and deviant interlocutors."

ℜeALIS can be characterized as a discourse-representation-based⁴ formal semantic theory. It is intended to make it possible to evaluate, through pattern matching between linguistic forms and world models (Dowty *et al.* 1981), not only the propositional content of sentences, but – as a generalization of pattern-matching-based interpretational calculus – also all pragmatic factors which can be captured in Oishi's (2014) Austinian (1975/1962) approach essentially as follows (see also Labinaz and Sbisà's (2014) program). It is to be evaluated from clause to clause whether the speaker is acting legitimately, sincerely, and/or adequately, while, in the on-going discourse, (i) playing the addresser's role of the expositive speech act (encoded linguistically in the given utterance) and (ii) giving the listener the addressee's role in the same speech act and (iii) qualifying the speech situation to be a licensed context of the given speech act. The sum of acts (i-iii) will be referred to as *Oishi-matching*.

The paper is organized as follows. Further information will be given on ℜeALIS in section 2. Section 3 sketches the intensional profiles of the system of sentence types assumed traditionally as the five basic sentence types in Hungarian and those of two sentence types based on the basic imperative-like one but "fine-tuned" by a discourse particle and by a special intonation. Section 4 provides "case studies" in which actual beliefs, desires and intentions in potential interlocutors' minds are compared to the linguistically encoded intensional profiles of Hungarian imperative-like sentence types. It is demonstrated in section 5 that ℜeALIS actually intends to account for the functional structure of the human mind, by presenting how ℜeALIS can account for a few chief criteria of autism. A short summary concludes the paper (section 6).

2. ℜeALIS: the theory which offers the same kind of formal representation for linguistically encoded expositive speech acts and for actual beliefs, desires, intentions and other kinds of fictions in potential interlocutors' minds

It was the task of other papers⁵ to enumerate arguments for ℜeALIS and against the "Kripke/Montague-inspired possible-worlds semantics," as this latter is referred to by Pollard

² On this latter topic, see Farkas and Ohnmacht (2012), Alberti, Dóla and Kleiber (2014), and Alberti and Nóthig (2015).

³ In Gärtner and Gyuris's (2012) cross-linguistic approach, it is claimed that "what has been called 'imperative' in Hungarian is actually some kind of 'proto-imperative'" (or proto-imperative-hortative, with Subjunctive morphology on verbs (Kaufman 2012: 7)).

⁴ Such theories belong to this family as DRT (Kamp and Reyle 1993, van Eijck and Kamp 1997, Kamp *et al.* 2011), UDRT (Reyle 1993), SDRT (Asher and Lascarides 2003, Schlangen *et al.* 2003), PDRT (Venhuizen *et al.* 2015).

⁵ The relevant papers are: Alberti and Kleiber (2012), Alberti (2012), and Alberti and Nóthig (2015).

(2007), according to whom “the idea of taking worlds as a primitive of semantic theory is a serious misstep.” He calls it “a framework known to have dubious foundations” (Pollard 2007: 2).

The only stance we should sketch here because of the special topic of this paper is Judge’s (2014: 222) opinion, who works in the standard, Kratzerian (e.g., 2012) framework of modality (based on the Kripke/Montague-inspired possible-worlds semantics); she designates the pertinent relationship between formal semantics and pragmatics as follows: “...ideally a linguistic theory will account for how natural language works in real conversational contexts, and not be restricted to only accounting for logical output, (not least because extricating the core/logical meaning of a linguistic expression from the contributions of context is highly problematic). Indeed, modality is an area of semantics where understanding the systematic interactions of context and underlying form is particularly pertinent.”

In \Re ALIS, the (pragmatic) generalization of pattern-matching-based interpretational calculus, referred to in section 1, is possible. It is not only the discourse representation of utterances that is carried out by means of Kamp’s well-known partially ordered “boxes of information” but also information states of human minds are represented in this way, on the basis of the principle of lifelongness, according to which the human mind, permanently fed by discourses, can also be modeled as a gigantic discourse representation structure (Alberti 2000). A proposition, thus, can be evaluated not only in the world model, in order to decide whether it is true or false, but also against the current content of the speaker’s information state, on the basis of which it turns out whether the speaker has told the truth or a lie or probably bluffed⁶ (Alberti, Vadász and Kleiber 2014), as well as against the listener’s information state, or against the listener’s mental model constructed by the speaker. It is this latter evaluative comparison, for instance, on the basis of which it turns out whether the listener gets relevant information, at least according to the speaker’s expectations (Alberti and Kleiber 2014), and hence the listener can be considered to serve as an ideal addressee.

All in all, the way in which information is represented in \Re ALIS is not only *lifelong* (Alberti 2000) but also *reciprocal* (Alberti 2005); this serves as a basis for the name *Reciprocal and Lifelong Interpretation System* and the abbreviation \Re ALIS.

The crucial property of \Re ALIS that ensures its descriptive and explanatory adequacy is that a clause performed in an on-going discourse is assumed to convey a piece of information that uniformly belongs to an *intensional profile*, which is an element of the set $\mathcal{P}((M \times \mathcal{P}(I) \times R \times T \times \mathcal{P}(P))^*)$: the power set of the set of finite sequences of a particularly specialized set of *level labels*. The clause is to be interpreted against the (possible-world-like but finite) components of this intensional profile, called *worldlets* in \Re ALIS, in order to obtain its truth conditions and other semantic and/or pragmatic well-formedness conditions in the given context.

M is the set of modal labels that say whether a piece of information serves to someone as some kind of belief (B), or desire (D), or intension (I). Set I provides degrees for expressing the intensity of the given modality, from “maximum” (M) up to “some” (s). Associated with the modality B, for instance, this scale ranges from sure knowledge to weak conjecture. The

⁶ In the latter two cases, the speaker is playing the addresser’s role insincerely, deceitfully, illegitimately.

muss/soll/will triplet of German epistemic modal auxiliary verbs can be regarded as evidence for the existence of at least three non-maximal degrees (Leiss 2014: 53); deciding the linguistically relevant number of degrees, however, requires much future research. The power set $\mathcal{P}(I)$ of I is used in the formula above because certain modal words may be associated with more than one degree of intensity of a given modality. Set R is responsible for referring to the host of the given piece of information, who can primarily be the addresser (AR) or the addressee (ae). Worldlets are also assigned polarity values, which are members of the eight-element powerset $\mathcal{P}(\{+,-,0\})$ of the two traditional polarity values “true” (+) and “false” (–) and a not so accustomed value “non-specified” ($P=\{+,-,0\}$). The Kleene-star in the formula above manifests the “reciprocal” character of \mathfrak{ReALIS} by offering, instead of quintuples of the above-discussed labels, finite series of such quintuples. Finally, the power set symbol in the initial position of the formula requires some explanation. The point is that a piece of information can simultaneously be associated with more series of worldlet labels (in the human mind), which can be called a “prism effect”.

Section 3 will provide a detailed illustration, including two visualized representations consisting of the aforementioned Kampian “boxes of information”.

3. The five basic intensional profiles and two further profiles

The five columns in the table below show five intensional profiles (see section 2), which are claimed by Alberti and Kleiber (2014) to serve as a coherent system of (the) five basic profiles (in Hungarian).

Table 1: *The intensional profiles of the five sentence types assumed traditionally*

Declarative	Imperative	Interrogative	Optative	Exclamative
$\langle B,M,AR,\tau,+ \rangle$	$\langle B,M,AR,\tau,- \rangle$	$\langle B,M,AR,\tau,0 \rangle$	$\langle B,M,AR,\tau,- \rangle$	$\langle B,M,AR,\tau,+ \rangle$ $\langle B,M,AR,\tau,0 \rangle$
$\langle B,gr,AR,\tau,+ \rangle$	$\langle B,gr,AR,\tau,+ \rangle$	$\langle B,gr,AR,\tau,+ \rangle$		
$\langle B,M,ae,\tau,0 \rangle$	$\langle B,M,ae,\tau,- \rangle$	$\langle B,M,ae,\tau,+ \rangle$		
$\langle B,gr,AR,\tau,+ \rangle$	$\langle D,M,AR,\tau,+ \rangle$	$\langle D,M,AR,\tau,+ \rangle$	$\langle D,M,AR,\tau,+ \rangle$	$\langle D,M,AR,\tau,+ \rangle$ $\langle D,M,AR,\tau,+ \rangle$
$\langle D,gr,ae,\tau,+ \rangle$		$\langle B,M,AR,\tau^+,+ \rangle$		
$\langle B,M,ae,\tau^+,+ \rangle$				
$\langle I,M,AR,\tau,+ \rangle$	$\langle I,M,AR,\tau,+ \rangle$	$\langle I,M,AR,\tau,+ \rangle$		
$\langle B,M,ae,\tau^+,+ \rangle$	$\langle I,M,ae,\tau,+ \rangle$	$\langle I,gr,ae,\tau,+ \rangle$		
		$\langle B,M,AR,\tau^+,+ \rangle$		

The content of the components in Figure 1 below, applied to the Hungarian declarative sentence illustrated in (1a), is as given in (1b-e), from left to right. This analysis is fundamentally based on the Gricean maxims of conversation (Grice 1975, see also Alberti and Kleiber 2014). The visual representation is essentially a conglomerate of (S)DRS boxes (Kamp *et al.* 2011), but, instead of parts of segmented logical formulas, it is immediately the referents (constants/variables) contained that are placed in the partially ordered boxes, augmented with the aforementioned level labels. It is just this system of labels that can be regarded as the characteristic innovation of \mathfrak{ReALIS} compared to other discourse representation theories (see

footnote 5): the partial ordering hierarchy of “boxes” containing information is arranged not (only/primarily) by logical relations but by sequences of the quintuples of labels.

- (1) a. Péter Marihoz költözött.
Péter Mari.Ade move.Past.3Sg
'Péter moved to Mari's.'
- b. $\langle B, M, AR, \tau, + \rangle$ "I, (the addresser: AR) know that Péter moved to Mari's (I refrain from telling lies or bluffing)."
- c. $\langle B, gr, AR, \tau, + \rangle \langle B, M, ae, \tau, 0 \rangle$ "I think that you (the addressee: ae) do not know this."
- d. $\langle B, gr, AR, \tau, + \rangle \langle D, M, ae, \tau, + \rangle \langle B, M, ae, \tau^+, + - \rangle$ "I think that you would like to be aware of this fact at a later point τ^+ in time (otherwise, I would not have uttered the sentence, since it is important for me to be relevant)."
- e. $\langle I, M, AR, \tau, + \rangle \langle B, M, AR, \tau^+, + \rangle$ "(Being cooperative, too) I intend to help you to acquire the piece of information in question."

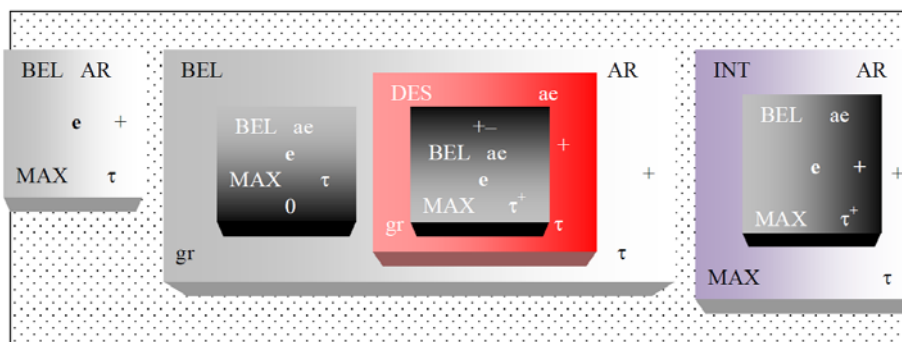


Figure 1: The intensional profile of the Hungarian declarative sentence

As is argued in Alberti and Kleiber (2014), the intensional profile of the basic Hungarian imperative-like sentence type (as well as that of *yes/no* questions) is almost a permutation of the labels making the intensional profile of the declarative sentence type (see (2a-e) and Figure 2 below; and compare Figure 2 to Figure 1). As for the distribution of knowledge, in the declarative profile, the addresser knows something which the addressee is assumed not to know, the interrogative profile (see (3) below) contains the opposite distribution of knowledge (Zuczkowski *et al.* 2014), while in the imperative profile, the addresser knows that something has not come true (at least so far) and (s)he assumes that the addressee thinks the same.⁷

- (2) a. Költözzön Péter Marihoz!⁸
move.Subj.3Sg Péter Mari.Ade
'Péter should move to Mari's.'

⁷ Note that both in (1a) and in (2a) the piece of information concerned is Péter's moving to Mari's, which is an eventuality *e*. In (1a), the truth of *e* is conveyed, and in (2a), its coming true is the object of instruction. In (2a), however, at least according to the most preferred interpretation, what the addresser longs for is not *e* itself (a tiring flit) but the result state $\varphi_{res}(e)$ of *e* (Péter and Mari's living together).

⁸ The question whether the term *imperative* should be limited to second-person forms, is controversial; see also the footnote 4. Third-person forms are labelled as *jussives* in Jary and Kissine (2014), for instance.

- b. $\langle B, M, AR, \tau, - \rangle$ “I, (the addresser: AR) am sure that the result phase $\varphi_{res}(e)$ (see Farkas and Ohnmacht 2012) of the given eventuality e does not hold (i.e., Péter and Mari still live in different flats, that is, Péter has not moved to Mari yet)”
- c. $\langle B, nM, AR, \tau, + \rangle \langle B, M, ae, \tau, - \rangle$ “I think that you (the addressee: ae) are also aware of this negative fact.”⁹
- d. $\langle B, M, AR, \tau, + \rangle$ “I long for the aforementioned result phase $\varphi_{res}(e)$.”
- e. $\langle I, M, AR, \tau, + \rangle \langle I, M, ae, \tau^+, + \rangle$ “I want you to intend the action, too.”

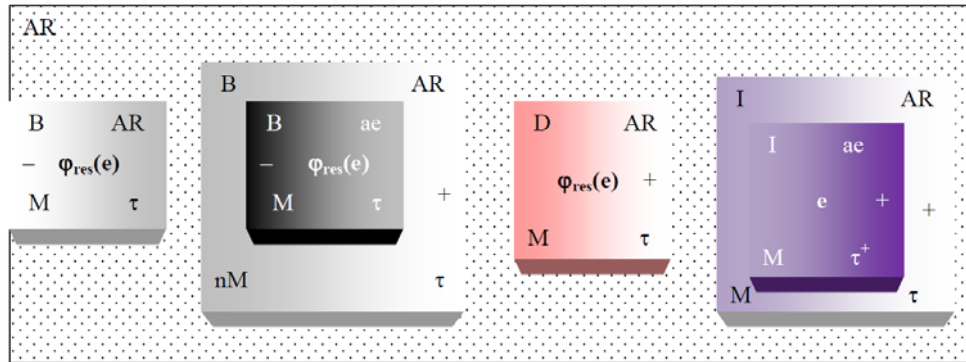


Figure 2: The intensional profile of the basic Hungarian imperative-like sentence type

As for desires, in the declarative profile (Figure 1), the addressee is assumed to long for something, namely, some information, while in the imperative (Figure 2) and the interrogative profiles, it is the addresser who longs for something. As for intentions, in the declarative profile, the addresser intends to serve as a cooperative partner by giving some information, while in the other two profiles, the addresser expects cooperative behavior from the partner. As is formulated in Jary and Kissine (2014: 58), “an utterance which is mutually recognised by both speaker and hearer as providing the hearer with a reason to act is a directive.”¹⁰

- (3) a. Péter Marihoz költözött?
Péter Mari.Ade move.Past.3Sg
‘Did Péter move to Mari’s?’
- b. $\langle B, M, AR, \tau, 0 \rangle$ “I, (the addresser: AR) do not know whether the given eventuality e holds or does not hold (i.e., whether Péter moved to Mari’s)”
- c. $\langle B, gr, AR, \tau, + \rangle \langle B, M, ae, \tau, +- \rangle$ “I think that you (the addressee: ae) know the truth.”
- d. $\langle D, M, AR, \tau, + \rangle \langle B, M, AR, \tau^+, +- \rangle$ “I wish I (also) knew the truth (in the future).”
- e. $\langle I, M, AR, \tau, + \rangle \langle I, gr, ae, \tau, + \rangle \langle B, M, AR, \tau^+, +- \rangle$ “(That is why I have started the conversation.) I intend to help you to intend to help me to acquire the piece of information in question.”

As can be seen in Table 1 above, we attribute similar complexity to the above-discussed three intensional profiles, while the optative profile, exemplified in (4), and the exclamative profile,

⁹ The certainty of the assumption is given as ‘nM’, that is, ‘non-maximal’={some, great, almost maximal}).

¹⁰ Jary and Kissine (2014: 51) define imperatives “as a sentence type whose prototypical function is to issue directives.”

exemplified in (5), are considered to be simpler. This latter evaluation is due to the fact that in the latter two cases no addressee seems to be involved in the addresser's thoughts.

- (4) a. Bár Péter Marihoz költözne!
I_wish Péter Mari.Ade move.Cond.3Sg
'I wish Péter moved to Mari's.'
- b. ⟨B,M,AR,τ,-⟩ "I, (the addresser: AR) am sure that the result phase $\varphi_{res}(e)$ of the given eventuality e does not hold (i.e., Péter and Mari still live in different flats, that is, Péter has not moved to Mari yet)"
- c. ⟨B,M,AR,τ,+⟩ "I long for the aforementioned result phase $\varphi_{res}(e)$."

The optative sentence (4) simply expresses that the addresser longs for something that does not hold, while the exclamative sentence (5) expresses that the addresser has a new piece of knowledge, which (s)he was not aware of somewhat earlier (τ) and which (s)he finds either very desirable or very undesirable. In the case of the Hungarian exclamative sentence type, thus, the type itself does not reveal the polarity of the speaker's strong affected status ('+-').¹¹

- (5) a. Péter Marihoz költözött!
Péter Mari.Ade move.Past.3Sg
'Péter moved to Mari's.'
- b. ⟨B,M,AR,τ,+⟩ "I, (the addresser: AR) know that Péter moved to Mari's."
- b'. ⟨B,M,AR,τ,0⟩ "I was not aware of this somewhat earlier."
- c. ⟨D,M,AR,τ,+⟩ "I find this very desirable or very undesirable."

A special intonation like the one presented in (6a) (in which the first syllable of the verb is ridiculously lengthened) or a discourse particle like *hadd* (cca. 'let') in (6b) is assumed in our theory to "fine-tune" the intensional profile that the matrix sentence type, here the imperative-like one, basically expresses. Table 2 below gives the modified intensional profiles, compared to the intensional profile of the matrix sentence type.¹²

- (6) a. *Köööhtözzön* Péter Marihoz! (see column (b) in Table 2)
move.Subj.3Sg Péter Mari.Ade
'Péter can move to Mari's, I do not mind.'
- a'. *Köööhtözz* Marihoz!
move.Subj.2Sg Mari.Ade
'You can move to Mari's, I do not mind.'

¹¹ Note at this point that the "definitions" of (linguistically encoded) intensional profiles belonging to speech acts are *underspecified* partial representations of potential roles of addressers, so speakers (and listeners) with different information states can adequately play the given addressers' (and addressees') roles. In the case of the utterance presented in (5), for instance, the underspecified polarity label licenses that a happy speaker ('⟨D,M,AR,τ,+⟩') can serve as its addresser as adequately as a sad speaker ('⟨D,M,AR,τ,-⟩'). In (2c), the label of intensity is underspecified in a similar way, and in Table 2, the use of referent r^* licenses underspecification in respect of distribution of roles in the given expositive speech acts.

¹² Our pragmatico-semantic analyses are chiefly inspired by and partly based on Szücs's (2010) empirical observations and systematization, besides a few observations by Turi (2009) and Péteri (2012) and the methodological clarification by Gärtner and Gyuris (2012).

- b. *Hadd* költözzön Péter Marihoz! (see column (c) in Table 2)
 let move.Subj.3Sg Péter Mari.Ade
 ‘Let Péter move to Mari’s.’

It is common in the three types presented in Table 1 (see the first two rows) that the addresser of the chosen speech act is sure that the result phase $\varphi_{\text{res}}(e)$ of the given eventuality e does not hold (i.e., Péter and Mari still live in different flats and more or less assumes that the addressee is also aware of this fact.)

As for the differences, in the type illustrated in (6a), it is not the addresser who is declared to long for the given action—(s)he is rather against its coming true, as is shown by the label $\langle D, M, AR, \tau, 0- \rangle$ —but a person r^* who preferably coincides with the addressee or the Agent of the action, in this order (see the last row of the table); by the way, the Agent preferably coincides with the addressee (see (6a') and the last but two row in Table 2). As for intentions, the addresser remains neutral, and does not want the addressee to do anything against e . The given speech act, thus, is practically giving permission.

Table 2: *The intensional profiles of three imperative-like sentence types in Hungarian*

	a. Basic	b. CVVVC...	c. <i>hadd</i>
AR's knowledge conc. $\varphi_{\text{res}}(e)$	$\langle B, M, AR, \tau, - \rangle$	←	←
ae's knowledge conc. $\varphi_{\text{res}}(e)$	$\langle B, nM, AR, \tau, + \rangle$	←	←
(acc. to AR)	$\langle B, M, ae, \tau, - \rangle$		
AR's, ae's and/or Ag's desire conc. $\varphi_{\text{res}}(e)$	$\langle D, M, AR, \tau, + \rangle$	$\langle D, M, AR, \tau, 0- \rangle$	$\langle D, M, AR, \tau, 0+ \rangle$
		$\langle B, nM, AR, \tau, + \rangle$	$\langle D, M, ae, \tau, 0- \rangle$
		$\langle D, M, r^*, \tau, + \rangle$	$\langle B, nM, AR, \tau, + \rangle$
			$\langle D, M, r^*, \tau, + \rangle$
AR's intention conc. e and/or ae's intention	$\langle I, M, AR, \tau, + \rangle$	$\langle I, sm, AR, \tau, 0 \rangle$	$\langle I, M, AR, \tau, - \rangle$
	$\langle I, M, ae, \tau^+, + \rangle$	$\langle I, M, AR, \tau, - \rangle$	$\langle I, M, ae, \tau^+, - \rangle$
		$\langle I, M, ae, \tau^+, - \rangle$	
Pref'd.: Ag=	ae	ae	AR
Dispr'd.: Ag≠	AR	AR	ae
Pref'd.: $r^*=$		ae > Ag	AR > Ag

In the type in which the hortative discourse particle *hadd* ‘let’ appears (6b), it is the addressee who is assumed not to long for $\varphi_{\text{res}}(e)$ while the addresser and the Agent long for it. The latter two participants preferably coincide (predominantly, the addresser asks for permission by this speech act), while this time it is the coincidence of the addressee and the Agent that is excluded, as is presented in column (c) of Table 2.

4. “Case studies” about Hungarian imperative-like sentence types

This section is devoted to a detailed illustration of how *ReALIS* can capture in a formal way what was referred to as *Oishi-matching* in section 1 (essentially, the connection between what is encoded linguistically and what is actually in interlocutors’ minds). First of all, however, let us make some words on Oishi’s (2014) objectives.

Oishi intends to revisit and develop Austin's (e.g., 1975) speech act theory, to put forward the idea that expositive verbs bring about effects on the on-going discourse, and that evidentials and epistemic modals play discursive functions by indicating those acts. She argues that to indicate (i) the information source of a thing, event, or situation by an evidential, and (ii) the speaker's epistemic attitude toward it by an epistemic modal is to indicate what illocutionary act the utterance performs. Especially, evidentials and epistemic modals indicate a particular type of *expositive* illocutionary act, which is one of Austin's categories of illocutionary acts. We intend to complete this list of indicators with miratives (e.g., *gee* in English and its Hungarian counterpart *jé*) and with special stress patterns, beyond the choice of sentence type itself (see section 3).

Oishi argues that in performing one of the various types of expositive act, the speaker expounds her/his communicative engagement with the hearer, while inviting him to react to it in a specific way. There are various types of communicative activities that the speaker can provide: in saying an utterance, the speaker does something with a thing/event/situation in the world, with a statement, with the hearer, with knowledge about a thing/event/situation in the world, with the statement that has been imported, and/or with a thought.¹³

All this can be captured in the theory proposed by Oishi (2014) in a surprisingly simple way: in the case of each speech act, the speaker is to be distinguished from the addresser of the act, and the hearer from the addressee of the act, and the situation from the context of the act. The dynamism of performing the illocutionary act and the corresponding perlocutionary act, thus, is explained as complex interrelations between the speaker and the addresser, the hearer and the addressee, and the situation and the context (on this latter relationship, see footnote 12 again).

4.1. Ideal matching between roles defined in intensional profiles of speech acts and interlocutors of discourses

Table 3 below sketches a case in which the generalized truth-conditional evaluation produces *yes* in each relevant area.

Let us consider the details. The utterance presented in (6a') in section 3 is performed. The first column presents its linguistically encoded intensional profile (see column (b) in Table 2). The second column shows the speaker's thoughts about Péter's moving to Mari's. As can be seen, the speaker (s) can readily serve as the addresser (AR) in the given speech act, since it is true that (i) she is sure that Péter and Mari live separately, (ii) and she thinks that the listener

¹³ The clause *he beats it*, for instance (known from the classics of DRT (see Kamp 1981)), can undergo Oishi-matching (a generalization of truth-conditional evaluation) in different ways. If an interlocutor is pointing at a farmer who is beating his donkey, it is a successful matching between some representation of the given utterance and the model of the world to pair the referents belonging to the pronouns *he* and *it* with the farmer and the donkey, respectively. If the clause in question, however, is part of a conditional sentence [*If a farmer owns a donkey...*], then in the matching required, the aforementioned referents must correspond to certain referents in the *worldlet* (i.e., partial discourse representation) that belongs to the premise clause (namely, to the referents whose introduction is triggered by the indefinite expressions *a farmer* and *a donkey* (see also Alberti 2011)).

(l) also thinks so, (iii) she is definitely against the shift in question (which is a stance compatible with the role of an addresser who is *neutral or negative*), but (iii') she thinks, indeed, that the listener wants to move to Mari's, and (iv) she intends, indeed, to remain passive, partly by (iv') not attempting to make the listener to change his mind. As for the listener (see the third column), (i) he is naturally aware of the fact that he does not live together with Mari, but (ii) he wants to live with her, indeed. As for the real situation in the world (see the fifth column), (i) it is assumed that the speaker and the listener are friends, so the conjugation (*költözz*) used in (6a'), instead of the informal alternative *költözzön*, does fit the close relationship; (ii) the listener and Mari, indeed, live separately, but (iii) at a later moment, they already live together. This latter fact can be regarded as the realization of the listener's desire, which is compatible with the speaker's decision to remain passive (but is undoubtedly against the speaker's desire).

Table 3: Ideal Oishi-matching between $\langle \text{ADDRESSER, addressee, context} \rangle$ and $\langle \text{speaker, listener, situation} \rangle$

Speech act belonging to (6a')	Speaker	Listener	Listener's conclusion	Situation
$\langle B, M, AR, \tau, - \rangle$	$\langle B, M, s, \tau, - \rangle$			
$\langle B, nM, AR, \tau, + \rangle$	$\langle B, gr, s, \tau, + \rangle$			(i) Close relationship between s and l
$\langle B, M, ae, \tau, - \rangle$	$\langle B, M, l, \tau, - \rangle$	$\langle B, M, l, \tau, - \rangle$		
$\langle D, M, AR, \tau, 0- \rangle$;	$\langle D, M, s, \tau, - \rangle$;			(ii) Person l has not moved to Mari's yet
$\langle B, nM, AR, \tau, + \rangle$	$\langle B, gr, s, \tau, + \rangle$	$\langle D, M, l, \tau, + \rangle$		
$\langle D, M, r^*, \tau, + \rangle$	$\langle D, M, l, \tau, + \rangle$			
$\langle I, sm, AR, \tau, 0 \rangle$;	$\langle I, sm, s, \tau, 0 \rangle$;			(iii) At a certain point of time in the future, l moves to Mari's
$\langle I, M, AR, \tau, - \rangle$	$\langle I, M, s, \tau, - \rangle$			
$\langle I, M, ae, \tau^+, - \rangle$	$\langle I, M, l, \tau^+, - \rangle$			

The fourth column is left empty, because, as will be seen in subsections 4.2-4.4, the listener's conclusion about the speaker's real intention, on the basis of mismatches between what is encoded in the message and what can reasonably be thought about the speaker's hypotheses, desires and intentions, is worth considering if there *are* such mismatches. In the absence of such mismatches, the listener can reasonably retain his anterior hypotheses and accept what has been heard.

4.2. Mismatches among worldlets and/or the world

Let us keep on considering the utterance presented in (6a') in section 3 but consider potential speakers and listeners who do not fit the "description" given in the six axioms that the corresponding intensional profile consists of, or whose knowledge does not suit the real world.

As for this latter case, suppose, for instance, that the listener and Mari have already lived together in secret for a month. The speaker, thus, sincerely performs (6a') but it is based on an erroneous belief. Thus, there is a mismatch between the speaker's input hypothesis according to they live separately and the world, in which they have already lived together, and there is

another mismatch between the speaker's input hypothesis concerning the listener's knowledge (they live separately) and the listener's actual knowledge.

Let us now consider another scenario in which Mari and the listener, who is now a son of a widower, who is the speaker, still live separately, and the mismatch concerns the third "axiom" in the intensional profile ($\langle D, M, AR, \tau, 0- \rangle$): the speaker longs for his son's going away from his flat as soon as possible due to his new lover, but he does not want to face unpleasant questions. The father, thus, pretends as if his son's leaving served his son's interest.

Table 4 below presents a third scenario, in which the speaker and the listener are also father and son, and the son has lived together with Mari in secret for a month, before which the son lived in a dorm. Further relevant facts are that (i) the father knows the secret from Mari's best friend, (ii) his son is aware of the fact that he knows the secret, (iii) the father does know, however, that his son is aware of the fact that he knows the secret.

Table 4: Deception

Speech act belonging to (6a')	Speaker	Listener	Listener's conclusion	Situation
$\langle B, M, AR, \tau, - \rangle$	$\langle B, M, s, \tau, + \rangle$		(a) Person s does not want to reveal his "source".	The listener and Mari have already lived together in secret for a month.
$\langle B, nM, AR, \tau, + \rangle$		$\langle B, M, l, \tau, + \rangle$;	(b) Person s intends to protect his face.	
$\langle B, M, ae, \tau, - \rangle$		$\langle B, M, l, \tau, + \rangle$		
$\langle D, M, AR, \tau, 0- \rangle$;		$\langle B, M, s, \tau, + \rangle$		
$\langle B, nM, AR, \tau, + \rangle$				
$\langle D, M, r^*, \tau, + \rangle$				
$\langle I, sm, AR, \tau, 0 \rangle$;				
$\langle I, M, AR, \tau, - \rangle$				
$\langle I, M, ae, \tau^+, - \rangle$				

Let us analyze this intricate situation from the listener's aspect. The listener is now aware of a mismatch between (i) the intensional profile used, in which it is declared that the addresser thinks so that the addressee still does not live together with Mari, and (ii) the fact that the speaker knows the opposite, but without knowing that the listener is aware of this latter fact.

The listener, thus, is in a situation in which he can "create" his conclusion concerning the speaker's real intentions on the basis of two packages of information, which are now in conflict, in contrast to the case considered in 4.1. Obviously, it depends on further interpersonal knowledge to what conclusion the listener will be led by the given mismatches. The crucial point here is that *ReALIS*, due to its uniform representations, can offer a toolkit to decide listeners' "benefit" from utterances on the basis of the simultaneous consideration of linguistically encoded intensional profiles belonging to speech acts and actual information states.

In the particular case, the mismatches can lead the son to the conclusion that (a) his father wants to avoid Mari's friend from "getting caught" (he wants to avoid unpleasant questions as to how it is possible that she has served as his spy), or (b) the father attempts to

protect his face by pretending as if it depended on his permission whether his son live together with a girl.

4.3. Irony, calculated on the basis of mismatches

This subsection offers a development and expansion of Alberti, Vadász and Kleiber's (2014: section 5) approach to irony, which will be investigated not only in declarative sentences, like (7a) below, but also in imperative-like ones, like the *hadd*-sentence in (7b) (see column (c) in Table 2). In the \mathfrak{R} eALIS framework, irony can obviously be captured on the basis of, on the one hand, mismatches between what someone assumes to hear as an addressee and what (s)he considers likely as a listener, and, on the other hand, the speaker's expectations concerning the listener's such careful attitude (based on their close relationship).

- (7) a. „Megdolgozott” a sikerért.
Perf.work.Past.1Sg the success.Cau
'He has "worked" for the success.'
- b. *Hadd* mosogassak el utánatok!
let wash.Subj.1Sg away after_you_{PI}
'Let me do the dishes you have left here.'

As is demonstrated in the third three columns of Table 5, we follow Meibauer (2005: 1394) in definitely distinguishing telling a lie from using an ironical pattern, in spite of the fact that, quite frequently, the two cannot be discerned on the basis of the phonetic form of the utterance.

Telling a lie, at least in its most obvious form, which is the most immoral variant at the same time, can be captured as the violation of the first, and only the first, "axiom" of the declarative intensional profile (Alberti, Vadász and Kleiber 2014: 3.7.3): the speaker says *e* while knowing that *not e* is true (compare the second column to the first one). The crucial point is that such a speaker wants to implant a false piece of information in the listener's mind, in contrast to an ironical speaker (cf. the last rows in the first three columns).

Table 5: Irony and lying

Declarative	Lying	Irony in decl.	<i>hadd</i>	Irony in <i>hadd</i> -s.
$\langle B, M, AR, \tau, + \rangle$	$\langle B, M, s, \tau, - \rangle$	$\langle B, M, s, \tau, - \rangle$	$\langle B, M, AR, \tau, - \rangle$	$\langle B, M, s, \tau, - \rangle$
$\langle B, gr, AR, \tau, + \rangle$	$\langle B, gr, s, \tau, + \rangle$	$\langle D, gr, s, \tau, + \rangle$	$\langle B, nM, AR, \tau, + \rangle$	$\langle B, aM, s, \tau, + \rangle$
$\langle B, M, ae, \tau, 0 \rangle$	$\langle B, M, l, \tau, 0 \rangle$	$\langle B, gr, l, \tau, + \rangle$	$\langle B, M, ae, \tau, - \rangle$	$\langle B, M, l, \tau, - \rangle$
$\langle B, gr, AR, \tau, + \rangle$	$\langle B, gr, s, \tau, + \rangle$	$\langle D, gr, s, \tau, + \rangle$	$\langle D, M, AR, \tau, + \rangle$	$\langle D, gr, s, \tau, - \rangle$
$\langle D, gr, ae, \tau, + \rangle$	$\langle D, gr, l, \tau, + \rangle$	$\langle B, M, l, \tau, + \rangle$	$\langle B, nM, AR, \tau, + \rangle$	$\langle B, gr, s, \tau, + \rangle$
$\langle B, M, ae, \tau^+, + \rangle$	$\langle B, M, l, \tau^+, + \rangle$	$\langle B, M, s, \tau, - \rangle$	$\langle D, M, ae, \tau, 0- \rangle$	$\langle D, gr, l, \tau, + \rangle$
$\langle I, gr, AR, \tau, + \rangle$	$\langle I, gr, s, \tau, + \rangle$	$\langle I, gr, s, \tau, + \rangle$	$\langle I, M, AR, \tau, - \rangle$	$\langle I, gr, s, \tau, + \rangle$
$\langle B, M, ae, \tau^+, + \rangle$	$\langle B, M, l, \tau^+, + \rangle$	$\langle B, M, l, \tau, + \rangle$	$\langle I, M, ae, \tau^+, - \rangle$	$\langle B, M, l, \tau, + \rangle$
		$\langle B, M, s, \tau, - \rangle$		$\langle D, gr, s, \tau, - \rangle$

The third column sketches our analysis of the type of irony illustrated in (7a) above.¹⁴ The second “axiom” (in the third column) expresses that the speaker expects to a certain extent ($\langle D, gr, s, \tau, + \rangle$) that the listener consider it likely that *not e* is true. His or her desire and aim (see the last two rows) are nothing else but reaching (by performing the given utterance) that the listener be sure that (s)he knows that the opposite of *e* is true. The speaker is practically testing the listener, by putting their close relationship to the test. The listener can calculate the desirable conclusion if, and only if, (s)he knows the speaker well enough. The listener should decide whether *e* is true, which (s)he has heard, or *not e* is true, which is more likely on the basis of their interpersonal knowledge. Hence, (s)he should make a decision on the basis of such a mismatch as those discussed in 4.2.

Note in passing that according to an alternative analysis what is presented in the third column (modified in a way that *s* and *l* are replaced with *AR* and *ae*) is the intensional profile of an ironical declarative speech act.

The two analyses are not in conflict with each other; rather, they show the two sides of the same coin. If the listener is able to “hear” the irony in the case of an utterance and/or is accustomed to the speaker’s ironical utterances, the listener can accept him- or herself as the addressee of a special ironical speech act. This acceptance can be regarded as a stage of (their) communication, which is preceded by an earlier stage in which the calculation of the intended message rests upon noticing mismatches between a non-ironical speech act and their shared knowledge. It is hypothesized, thus, that it takes time to acquire different kinds of ironical speech acts.

The utterance presented in (7b) above exemplifies an imperative-like ironical speech act, which can also be acquired by means of noticing mismatches between the intensional profile of a “matrix” speech act (see the fourth column in Table 5) and natural assumptions about rational speakers. The particular speaker’s mind is characterized as follows in the fifth column of Table 5: (i) she is aware of the fact that the dishes have not been washed yet, (ii) she assumes that the speaker is also aware of this fact (NB: (i-ii) suit the intensional profile presented in column (c) in Table 2); in contrast to an ideal addresser, (iii) she does not long for what has been referred to (i.e., the speaker does the dishes in the future), (iii’) which is rather longed for by the listener, and (iv) she wants the listener to grasp that she does not intend to do the dishes at all. Thus, the listener is expected to notice (iii), in order to be led to (iv). As for (iii), it is not difficult to figure out that someone does not long for doing the dishes instead of other people.

4.4. Politeness, calculated on the basis of mismatches

In this subsection, a polite use will be sketched of the basic imperative-like speech act, defined in column (a) in Table 2 in section 3.

¹⁴ The literature distinguishes among different kinds of irony, not only as for their pragmatic uses but also as for their structures (Gibbs and Colston 2007). It is postponed to future research to verify that \Re eALIS theory can be applied to all of them.

Let our point of departure be that the utterance presented in (8) can be used “normally” in a situation in which it can be continued as follows: “You are so tall that I cannot see the stage.” In a case like this, thus, the speaker behaves as an ideal addresser in that (s)he wants the addressee to sit down.

- (8) Ülj le!
 sit.Subj.Sg2 down
 ‘Sit down.’

Table 6 below presents another kind of situation, in which the speaker and the listener are standing and there is only one seat free, which both long for taking. If the listener (say, a woman) realizes that the speaker (a man) is not likely to really long for $\varphi_{res}(e)$ (a result state in which the listener is sitting), she can understand due to the mismatch that she is not an ideal addressee, at least according to the basic imperative-like speech act. As for $\varphi_{res}(e)$, it is *her* wish, which is easy to figure out. What she can calculate on the basis of these two factors is that (i) the speaker is likely to have recognized her wish, which is in obvious conflict with his similar wish, but is prepared for preferring her wish, being a polite person, so (ii) she should accept the offer, by deciding to take the given seat.

Table 6: *Politeness*

Speech act belonging to (8)	Speaker	Listener	Listener's conclusion	Situation
$\langle B, M, AR, \tau, - \rangle$				
$\langle B, nM, AR, \tau, + \rangle$				
$\langle B, M, ae, \tau, - \rangle$				
$\langle D, M, AR, \tau, + \rangle$	$\langle B, gr, s, \tau, + \rangle$ $\langle D, M, l, \tau, + \rangle$	$\langle B, gr, l, \tau, - \rangle$ $\langle D, M, s, \tau, + \rangle$; $\langle D, M, l, \tau, + \rangle$	$\langle B, gr, l, \tau^+, + \rangle$ $\langle B, gr, s, \tau, + \rangle$ $\langle D, M, l, \tau, + \rangle$	Persons s and l are standing. There is only one seat free. Person s intends to be polite.
$\langle I, M, AR, \tau, + \rangle$ $\langle I, M, ae, \tau^+, + \rangle$			$\langle I, M, l, \tau^+, + \rangle$	

Just like in 4.3, noticing deviation from the intensional profile of a “matrix” speech act can be construed not only as a point of departure for the listener to calculate the speaker's real beliefs, desires and intentions, but also as another speech act systematically belonging to the same phonetic forms.

5. Explanations of six distinctive traits of autism in the \Re ALIS framework

Since \Re ALIS provides a model of the human mind (primarily in order to explain pragmatic phenomena), it can, and hence it *must*, provide models on minds impaired in different ways. This section is devoted to the demonstration of the first results of our research into modeling the mental disorder of autism, a neuropsychiatric disorder whose leading symptom is deficient social cognition and atypical communication. We argue for the following thesis: individuals living with Autism Spectrum Disorder (ASD) demonstrate a reduced system of

worldlet structure to a milder or greater extent, even up to the absolute lack of this structure of worldlets. In order to defend this thesis, six characteristic and distinctive features of autism can be derived from it (of the ten features discussed in Alberti, Schnell and Szabó (to appear)).

Our point of departure is the model of the hypothesized intact worldlet structure presented in sections 3-4, which is assumed to serve the ability to *mentalize*, that is, to rely on a cognitive strategy that integrates background knowledge, mental states and actual signals of the other mind. In terms of the intensional profile belonging to the addresser-addressee-context triad (linguistically encoded, not related to any concrete situation) in the long-term memory model proposed by Leiss (2014), we can claim that it is stored in the semantic memory, while the intensional profile anchored to space, time, speaker's Self, listener, and (typically) to items of the external world (which may however be isomorphic, in ideal cases, see subsection 4.1), is generated in the episodic memory.

5.1. Deficient or absent social cognition

This leading feature of Autism is a direct consequence of the reduced worldlet structure present in the disorder. In support of this claim it is enough to take a look at Figures 1-2 and the intensional profiles presented in sections 3-4.

The successful interpretation of the simplest declarative utterance of even the most sincere speaker requires the integration and decoding of four different worldlets, each of which may involve several levels themselves, as can be seen in Figure 1 in section 3. That is, one has to conceive that the addresser has made an assertion that they definitely believe to be true, whose truth content, they suppose, the addressee does not know, but has a desire to know it. Therefore, the addresser cooperates in a way that they share their knowledge of this information with the addressee. Furthermore, as we have mentioned several times, it shall be useful for the listener, ready to take on the addressee's role, to consider what the real intensional profile of the speaker (ready to take on the addresser's role) may be, and also, if the listeners themselves are ideal addressees of the content conveyed. These steps of mentalistic considerations concerning internal representations of the conversational partners may triple the number of worldlets to be considered. The ability to successfully read and denote such mental states is what determine our behavior, mental states, thoughts and communication, that is, our social cognition, and interpersonal relations. In autism the functions of the nervous system that are responsible for communication and social relations are affected. Living with a reduced worldlet structure (i.e., with a reduced number of internal representations of others' mental states and minds) means the loss of an enormous amount of information, for the above reason, which yields an increasing number of disadvantages, thus a cascade of difficulties in the field of interpersonal and efficient communication.

5.2. Scales

Autism has a very versatile symptomatology which can be captured in a continuum and a spectrum rather than strictly defined as fitting every ASD patient. It ranges from severe cases

to outright mild forms where intellectual and linguistic abilities are almost intact. But even these cases involve atypical patterns in social bonding and stereotypical behavior rich in perseveration in movements or verbal phenomena.

The presence of these symptoms is fully accountable by the *ReALIS* framework. Györi *et al.* (2002) demonstrates that high functioning autistic individuals are able to handle two or three embedded mental states, while severe forms of the disorder mean that even one embedded mental state (e.g., ‘John thinks that the house is big’) is impossible to coordinate. In the *ReALIS* framework this is viewed as the hierarchy of mental spaces represented as boxes, and the levels of representations correspond to the levels of such mental boxes. Both approaches correlate with grammatical subordination. In the lower part of Figure 1 in section 3, the declarative speech act’s three-level and thus most complex structure can be transformed into a sentence involving subordinate clauses: “[Addresser strongly predicts that [addressee wishes [to obtain the truth value of the piece of information involved in the message]]].

Of course it is a topic of future research to map if the most severe cases of ASD mean that all the information is mixed in the same mental space or worldlet (i.e., speaker’s knowledge, somebody’s desires, someone else’s intentions, and so forth).

Even highly functioning individuals living with autism have difficulty with the previously mentioned three-level box-hierarchy of embedded representations, obviously due to its high complexity. Particularly, as speakers, they often do not consider if the listener is an ideal target, that is, if they are interested in the topic at hand, if the topic is relevant for them. They thus give the impression of a chatterbox, given that their grammatical competence and performance is almost intact, while the pragmatic aspects of language use (i.e. social-cognitive aspects if something is appropriate or not) are not in place. This dissociation is fairly well described in ASD symptomatology. Also, as listeners, they do interfere with conversations where they were not intended to be addressed, which is normally considered to be impolite and nosy.

5.3. Reduced interpretation

As was thoroughly presented in sections 3-4, a sentence does not gain its information content based on sheer truth value (if it has a truth value at all), but may convey information in several different ways.

- I. The sequence of words presented in (1a) in section 3, for instance, uttered with an exclamative intonation, as is shown in (3a), conveys the message that the speaker has just learned this information, and is not indifferent concerning the content of the sentence. These subtle contextual traits are a lot more important for the hearer who already knows the information conveyed than the information or message itself.
- II. The imperative-like sentence presented in (2a) in section 3 also allows a number of inferences, depending on intonation. With a regular, calm intonation it suggests that the speaker wants the Agent to move to Mari’s. If, however, the first syllable of the verb was given emphasis and a lengthy intonation, then it designates an “I don’t mind, Péter can move to Mari’s, in spite of my aversion” meaning, which in fact builds on an opposite

presupposition: that the listener wants Péter and Mari to live together, and the speaker only gives permission with the “I don’t mind” tone.

- III. The utterances in (7a-b) and (8) in section 4 also exemplify that gaining the propositional content itself may give the listener a definitely opposite message under certain circumstances.
- IV. Note also that the information conveyed by the situational context may also be of a crucial importance. A question, for instance, may have strikingly different goals if a teacher (who obviously knows the answer) asks it in the context of an exam or a detective asks it during cross-examination, based on mixing real questions with those to which he exactly knows the answer (cf. (3b) in section 3; see also section 4 in Alberti and Kleiber 2015).

All in all, the propositional content of the message received is only an initiative factor of the calculation of speaker’s intent. Those living with autism, depending on the severity of their condition and symptoms, fall short of capturing some or all of such additional pieces of information, as a result of their reduced worldlet structure not capable of incorporating other minds’ mental representations. They cannot fully capture information conveyed by sentence type (see I above). They cannot grab meanings that are conveyed by such suprasegmental linguistic cues as specific intonation patterns and discourse particles, which serve the goal of “fine-tuning” (II). Nor can they rely on monitoring that seems to be essential in the successful decoding of speaker’s intent (III). Furthermore, they cannot grab the information conveyed by the situational context (IV).

5.4. *Reduced communication toolkit*

It is well described in autism research that individuals living with the disorder cannot efficiently read metacommunicative signals. They have difficulty understanding facial mimics, gestures, body-language, and they do not use these in their repertoire either. Even those who seem to have their linguistic abilities in place and are competent language users do demonstrate atypical prosody and intonation patterns, their speech is often not structured, segmented, and often monotonous.

This latter trait is fully explained in our framework, revealing that the core problem is the reverse of the interpretation problem: those who as addressees cannot digest the multiplied amount of information resulting from the prism effect (see section 2), cannot multiply this as an addresser either. Thus they do not understand and hence do not use specific intonation patterns, or discourse particles (that many believe to be only fillers in language), which, however, act as tools and vehicles of the prism effect. The same refers to pieces of information conveyed by body-language, since those, too, transmit the information-state of the speaker, hence, mirror surface cues that may modify meanings.

5.5. Fear of competing alternatives

For people living with autism it is extremely difficult to prepare for unexpected contents, therefore, they often demonstrate panic, anger and rage. The constancy of their environment and the predictability of those around them is essential in making sense of their surroundings. They often prefer monotonous activities based on repetition. This is sharply the opposite of the flexible healthy human mind ready to react to every twist of event, who build on the ability of having a “plan b” ready in case “plan a” falls short.

Storing alternatives require the existence of mental spaces or worldlets, which are stored in order in a fine-tuned system. Let us see what complex mental structures are required in the following story involving a number of alternatives (see Kleiber 2005).

“I immediately need a car because of the excursion. I can ask for Mary’s car, but then I have to invite her as well. I may invite her and hint at the awful weather that can be expected and that the most boring acquaintances will join me... Or I just honestly tell Mary that I’d like to have an excursion with Julia, just the two of us, though in this case the next day everyone will know that I have a crush on Julia. Of course we could go with Julia’s car, but then how will I explain that the car that swept her off her feet was at my place only for repair?”

People living with autism are not efficient and often not able to manage such alternative worldlets and representations, thus everything strikes them as unexpected. If they want to store pieces of information that are outright opposite to each other or implicitly incompatible, they will have a contradiction at hand that practically explodes their single worldlet, which may generate rage and panic. This is because a worldlet needs to be consistent in the inside, just like the possible worlds of model-theory semantics.

5.6. Genius traits?

In two-thirds of the cases, ASD involves some mental retardation, but this can often be difficult to define due to communication problems present in the disorder. Beyond some normal cognitive abilities, however, some abilities (like memory, numerical skills) may be extremely developed, hence some movies portray people living with autism as geniuses (Gyarmathy 2009).

The explanation in the \Re ALIS framework suggests that an ASD patient, if their cognitive abilities are close to normal, will use the “bites” that serve for the creation, monitoring and manipulation of the structure of worldlets in a typical normal individual, to the creation, maintenance and manipulation of their single worldlet’s contents. That is, they will fill this single mental space with myriads of pieces of information in the same domain, instead of keeping track of who knows what, who thinks what the other believes to be true or untrue, who desires something and who not, who has no desire of someone knowing that the other person has no knowledge of something, etc.

5.7. Why is it difficult to diagnose autism before age three?

It is fairly obvious from the simultaneously recursive mathematical definition of the \Re eALIS model of interpretation (see Alberti 2000, 2009, 2011) that in both phylogenesis and in ontogenesis, a gradual differentiation of the worldlet structure takes place, and parallel to this, the gradual refinement of the labeling system. This is in harmony with Leiss's (2014: 49-50) stance, who points out that a cognitive quartet differentiates *Sapiens* from animals, namely: the aspect of intensional-profile creating (Farkas and Ohnmacht 2012), time, manner and modality (Alberti, Dóla and Kleiber 2014, Alberti and Nóthig 2015). The same theory proposes that the age of acquisition (i.e. productive use and comprehension) of modal adverbs like "maybe" is around age 8, while that of modal verbs and particles takes place around age 9).

In developmental psychology, Wimmer and Perner (1983) and Astington (1993) did extensive research in the development of the understanding of mental terms of the Self and others, and for this a number of classic tests have been coined, among them the well-known false belief test based on unseen displacement, known as the theory of mind test, mirroring children's mentalizing ability at a sophisticated, verbalized level (for more on this, see Schnell 2007).

At the beginning of ontogenetic development, a basic "root-structure" forms the basic world of representations. There is a symbiosis between the child and the caregiver (mother). At this stage it is therefore not differentiated whose worldlet is the one at hand. Fiction and reality are mixed in the same mental dimension. The age at which children are competent enough to differentiate these two worlds at a verbal level which is also capable of driving behavior, is around ages 4-5, when children commonly pass standard false-belief tasks. Therefore, the modality of the worldlet does not function as a factor for differentiation.

6. Summary

This paper offered such description of some imperative-like sentence types in potential well-formed Hungarian utterances which includes a parallel representation of the linguistically encoded intensional profiles of the sentence types and actual information states in potential interlocutors' minds.

Section 2 outlined the theoretical framework that makes this parallel representation possible. In Section 3, we demonstrated the intensional profiles of the five basic and two "fine-tuned" sentence types as members of a system enabling addressers' of utterances to express their beliefs, desires and intentions concerning the propositional content of the given utterances as well as the addressees' and other people's certain beliefs, desires and intentions (concerning the propositional content, too, or each other's thoughts). Section 4 provided "case studies" in which actual beliefs, desires and intentions in potential interlocutors' minds are compared to the linguistically encoded intensional profiles of Hungarian imperative-like sentence types. In this context, the listener's task is to calculate the speaker's intentions (and hidden motives) on the basis of the mismatches that this comparison reveals. Section 5 offered

an insight into our attempts to model the mind of individuals living with Autism Spectrum Disorder.

This latter subproject is relevant since our framework provides solutions to pragmaticosemantic phenomena “at the cost” of undertaking the complex task of actually representing the structure of the human mind itself—which is not impossible but requires an adequate decision of the level of abstraction and the components to be used.

References

- Alberti, G. 2000. Lifelong Discourse Representation Structures. *Gothenburg Papers in Computational Linguistics* 00–5: 13-20.
- Alberti, G. 2005. Accessible referents in “opaque” belief contexts. In H. van Ditmarsch and A. Herzig (eds.), *Proceedings of the 9th ESSLI Belief Revision and Dynamic Logic Workshop*, 1-7. Edinburgh: University of Edinburgh.
- Alberti, G. 2011. \Re ALIS: An Interpretation System which is Reciprocal and Lifelong, Paper presented at *Focus on Discourse and Context-Dependence*, Amsterdam, September 16, 2009. <http://lingua.btk.pte.hu/realispapers>.
- Alberti, G. 2011. *\Re ALIS: Interpretálók a világban, világok az interpretálásban*. Budapest: Akadémiai Kiadó.
- Alberti, G. 2012. Where are Possible Worlds? II. Pegs, DRSs, Worldlets and Reification. In G. Alberti et al. (eds.), *Vonzásban és változásban*, 308–323. Pécs: Doctoral School of Linguistics at University of Pécs.
- Alberti, G., M. Dóla, and J. Kleiber. 2014. Mood and modality in Hungarian: Discourse Representation Theory meets Cognitive Linguistics. *Argumentum* 10: 172-191.
- Alberti, G., and M. Károly. 2012. Multiple Level of Referents in Information State. In A. Gelbukh (ed.), *Computational Linguistics and Intelligent Text Processing*, 349-362. Berlin, Heidelberg: Springer.
- Alberti, G., and J. Kleiber. 2012. Where are Possible Worlds? Arguments for \Re ALIS. *Acta Linguistica Hungarica* 59: 3-26.
- Alberti, G., and J. Kleiber. 2014. \Re ALIS: Discourse Representation with a Radically New Ontology. In L. Veselovská, and M. Janebová (eds.), *Complex Visibles Out There*, 513-528. Olomouc: Palacký University.
- Alberti, G., and L. Nőthig. 2015. \Re ALIS2.1: The Implementation of Generalized Intensional Truth Evaluation and Expositive Speech Acts in On-Going Discourse. *International Journal on Advances in Intelligent Systems* 8/1-2: 85-106.
- Alberti, G., Z. Schnell, and V. Szabó. to appear. Autizmussal élni: más elmével élni [Living with Autism: Living with a Different Mind]. Budapest: L’Harmattan.
- Alberti, G., N. Vadász, and J. Kleiber. Ideal and Deviant Interlocutors in a Formal Interpretation System. In A. Zuczkowski et al. (eds.), *The communication of certainty and uncertainty*, 59-78, Amsterdam: Benjamins, 2014.
- Asher, N., and A. Lascarides. 2003. *Logics of Conversation*. Cambridge: Cambridge Univ. Press.
- Astington, J. 1993. *The child’s discovery of the mind*. Cambridge, MA: Harvard University Press.
- Austin, J.L. 1975. *How to Do Things with Words*. Oxford: Clarendon Press.
- Dowty, D., R.E. Wall, and S. Peters. 1981. *Introduction to Montague Semantics*. Dordrecht: Reidel.
- Farkas, J. and M. Ohnmacht. 2012. Aspect and Eventuality Structure in a Representational Dynamic Semantics. In G. Alberti, J. Kleiber, and J. Farkas (eds.), *Vonzásban és változásban*, 353-379. Pécs: PTE BTK Nyelvtudományi Doktori Iskola.
- Gärtner, Hans-Martin and Beáta Gyuris. 2012. Pragmatic markers in Hungarian: Some introductory remarks. *Acta Linguistica Hungarica* 59: 387-426.
- Gibbs, R.W., and H.L. Colston (eds.) 2007. *Irony in Language and Thought*. Lawrence Erlbaum Associates.
- Grice, P. 1975. Logic and Conversation. In P. Cole, and J.L. Morgan (eds.), *Syntax and Semantics* 3, 41-58. New York: Academic Press.

- Gyarmathy, É. 2009. Atipikus agy és a tehetség I. – Tehetség és a neurológia hátterű teljesítményzavarok valamint az Asperger szindróma. *Pszichológia* 29: 377-390.
- Győri, M., K. Gy. Stefanik, I. Kanizsai-Nagy, and A. Balázs. 2002. Naiv tudatelmélet és nyelvi pragmatika magasan funkcionáló autizmusban: reprezentációs zavar, performanciakorlát, vagy kompenzáció? In M. Racsmány and S. Kéri (eds.), *Architektúra és patológia a megismerésben*, 11-39. Budapest: Osiris.
- Jary, M. and M. Kissine. 2014. *Imperatives*. Cambridge: Cambridge University Press.
- Judge, K.E. 2014. Epistemic uncertainty and the syntax of speech acts. In S. Cantarini *et al.* (eds.), *Certainty-uncertainty – and the attitudinal space in between*, 217-237. Amsterdam: Benjamins.
- Kamp, H. 1981 A theory of truth and semantic representation. In J. Groenendijk, T.M.V. Janssen, and M. Stokhof (eds.), *Formal Methods in the Study of Language*, 277-322. Amsterdam: Mathematical Centre.
- Kamp, H., and U Reyle. 1993. *From Discourse to Logic*. Dordrecht: Kluwer.
- Kamp, H., J. van Genabith and U. Reyle. 2011. Discourse Representation Theory. In D.M. Gabbay, and F. Guenther (eds.), *Handbook of Philosophical Logic*, 125-394. Berlin: Springer.
- Kaufman, M. 2012. *Interpreting Imperatives*. Dordrecht: Springer.
- Kleiber, J. 2005. Across world(let)s in a representationist interpretation system. In J. Gervain (ed.), *Proceedings of the 10th ESSLLI Student Session*, 112-121.
- Kratzer, A. 2012. *Modals and Conditionals*. Oxford: OUP.
- Labinaz, P., and M. Sbisà. 2014. Certainty and uncertainty in assertive speech acts. In Andrzej Zuczkowski *et al.* (eds.), *The communication of certainty and uncertainty*, 31-58. Amsterdam: Benjamins.
- Leiss, E. 2014. Modes of modality in an Un-Cartesian framework. In Sibilla Cantarini *et al.* (eds.), *Certainty-uncertainty – and the attitudinal space in between*, 47-62. Amsterdam: Benjamins.
- Meibauer, J. 2005. Lying and falsely implicating. *Journal of Pragmatics* 37: 1373-1399.
- Oishi, E. 2014. Discursive functions of evidentials and epistemic modals. In S. Cantarini *et al.* (eds.), *Certainty-uncertainty – and the attitudinal space in between*, 239-262. Amsterdam: Benjamins.
- Péteri, A. 2012. The Hungarian Imperative Particle *Hadd*. *Acta Linguistica Hungarica* 59: 439-463.
- Pollard, C. Hyperintensions. *An ESSLLI 2007 course*. Accessed January 12, 2016 <http://www.ling.ohio-state.edu/~hana/hog/>
- Reyle, U. 1993. Dealing with Ambiguities by Underspecification: Construction, Representation and Deduction. *Journal of Semantics* 10: 123-179.
- Schlangen, D., A. Lascarides, and A. Copestake. 2003. Imperatives in dialogue. In P. Kühnlein, H. Rieser, and H. Zeevat, *Perspectives on Dialogue in the New Millennium*, 287-305. Amsterdam: Benjamins.
- Schnell, Z. 2007. Metaphor Processing and the Acquisition of Idioms – A mentalistic model. *Acta Linguistica* 54: 73-104.
- Szücs, M. 2010. A *hadd* problémaköre. In Z. Gécseg (ed.), *LingDok 9, Nyelvész-doktoranduszok dolgozatai*, 193-210. Szeged: University of Szeged.
- Turi, G. 2009. Kötőmód a mai magyar nyelvben. *Argumentum* 5: 25-38.
- van Eijck, J. and H. Kamp. 1997. Representing discourse in context. In J. van Benthem, and A. ter Meulen (eds.), *Handbook of Logic and Language*, 179-237. Amsterdam: Elsevier, and Cambridge: MIT Press.
- Venhuizen, N., J. Bos, P. Hendriks, and H. Brouwer. 2015. Differentiating projection phenomena in a unified semantic framework. Paper presented at *Redrawing Pragmasemantic Borders*, University of Groningen, March 19-20, 2015.
- Wimmer, H., and J. Perner. 1983. Beliefs about beliefs: representation and the containing function of wrong beliefs in young children's understanding of deception. *Cognition* 13: 103-128.
- Zuczkowski, A., R. Bongelli, L. Vincze, and I. Riccioni. 2014. Epistemic stance. Knowing, Unknowing, Believing (KUB) positions. In A. Zuczkowski, R. Bongelli, I. Riccioni, and C. Canestrari (eds.), *Communicating Certainty and Uncertainty*, 115-135. Amsterdam: Benjamins.