The World is Built with our Words to Each Other Basic and Fine-Tuned Intensional Profiles in Hungarian

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Abstract: Our paper provides some theoretical background to a program which operates on a continuously changing world-model with possible speakers and listeners speaking about the world and each other. The agents' information states are also continuously changing depending on changes of the model of the outer world, including their messages sent to each other, and each other's information states. As a groundwork, we identify the pragmasemantic components of some basic sentence types and discourse markers compositionally. Then we present how speakers with their psychological egos can be separated from linguistically conventionalized addresser roles and how many pragmasemantic phenomena can be captured through pattern matching between addressers' conventional profiles and the corresponding speakers' information states, including a few elements of politeness. In short, the program is ultimately designed to simulate human intelligence through modeling human communication and language-based cognition in order to improve our theoretical background on the basis of the functioning of the program. And *vice versa*, we intend to improve the "machine" by building in its information treatment mechanisms as much language-based human intelligence as possible.

Keywords: formal pragmasemantics, discourse representation, discourse markers, pattern matching, politeness

1 Introduction

This paper investigates the five basic sentence types and their possible "fine-tuning" by discourse markers in Hungarian, also taking into consideration the effect of the utterances on the world-model and on the interlocutors. In any given situation, an utterance can only be performed by a speaker who is in an appropriate information state to perform it, and, most of the time, a suitable listener is also required. There is a program in preparation—based on ReALIS—which aims to present how the success of the conversation is influenced by conventional meaning and the information state of the speaker and of the listener (see Section 5). First, we describe the roots of the Austinian model [1] felicity conditions and their relevance to the formal evaluation of utterances, then we introduce the theoretical framework ReALIS 'Reciprocal And Lifelong Interpretation System' [2]. The framework is based on Kamp's Discourse Representation

Theory [3]. It provides an expansion of the Kampian discourse representation to mind representation and is capable of a compositional handling of the linguistically relevant data.

Our primary goal is to define the pragmasemantic content, or 'intensional profile', of different sentence types and discourse markers, and – since intensional profiles can disambiguate between similar meanings or functions of the same utterances – we also aim to establish the relationship between the various linguistic elements under analysis. We claim that this task requires a formal dynamic discourse and mind-representation.

The software itself can be regarded as an improved version of Anton Benz's [4] multi-agent system [5]. Benz argues that the general apparatus for multi-agent system provides us with a natural representation of the information of dialogue participants on events in the outer world, but each participant should be assumed not only to update his own DRS if he gets some new information, but also to update a DRS representing the knowledge of different groups which *commonly* got this information. According to the even more sophisticated approach that ℜeALIS offers, each dialogue participant should potentially have asymmetrical information on others' knowledge, hypotheses, desires, intentions, and not only on the outer world but also on others' continuously changing information states, recursively. This way ℜeALIS captures what cognitive scientists call mentalization [6].

As our software application inherently belongs to a radically new and holistic "pragmalinguistics" theory, it is uneasy to compare its background to software applications based on some different theoretical foundation. An exception is the SDRT-based [7] experimental software dialogue system, RUDI [8], primarily due to its distinguished attention to the relationship between pragmatic phenomena and the external-world model. RUDI ("Resolving Underspecification with Discourse Information") automatically computes some aspects of the content of scheduling dialogues, particularly the intended denotation of the temporal expressions, the speech acts performed and the underlying goals. Following SDRT, it is assumed that a dialogue is coherent just in case every proposition (and question and request) is *rhetorically connected* to another proposition (or question or request) in the dialogue (NB: virtually anomalous conversations can be regarded as conversations with parts linked by very special rhetorical relations partially based on implicit knowledge in the background). The rhetorical relations are viewed as *speech act types* in the RUDI project—that is the point where our ℜeALIS-based project can be regarded as an extension of RUDI, given that in the ℜeALIS theory further relations among pieces of information stored in minds, addressers, addressees, contexts and the external world are (intended to be) taken into account in a completely uniform system.

ℜeALIS essentially follows SDRT, which represents discourse content as a "segmented discourse representation structure", which is a recursive structure of labelled DRSs, with rhetorical relations between the labels. In contrast to traditional dynamic semantics, SDRT attempts to represent the *pragmatically preferred* interpretation of a discourse—just like ℜeALIS. The rule schema used in RUDI contrasts with the plan-recognition approach to computing speech acts [9], which uses *only* the goals of the antecedent utterance, rather than its compositional and lexical semantics directly, to constrain the recognition of the current speech act.

2 Pattern-Matching in Extensional and Intensional Evaluation

Already Austin [1] pointed out that no sequence of utterances can be either true or false, they can only be regarded as "felicitous" or "infelicitious" according to given sets of conditions. Following Oishi [10], we make a distinction between the information that is linguistically encoded in the utterance and which elaborates a complex relation between the addresser's (AR) and the addressee's (ae) conventional beliefs (B), desires (D) and intentions (I) from what the speaker of the utterance actually believes, desires and intends to do in the real world. Every single time when the flesh-and-blood speaker (sp) with his/her information state makes an utterance, he/she takes on the role of the addresser and hands over the role of the addressee to the listener (li).

Thus, our framework makes a clear distinction between the addresser and the speaker of the actual discourse. Similarly, the addressee is distinguished from the listener, and so is the linguistically defined appropriate context from the factual situation in which the interlocutors are talking to each other.

In the theoretical framework ℜeALIS [11] the speaker's information state and the representation of the discourse are defined in the speaker's mind, which is contained in the world-model. Thus, separating the addresser role from the speaker's information sate is not a simple "technical" separation of variables from values but this is the way how the framework can treat numerous complex pragmasemantic phenomena such as lying or withholding information [12].

The implementation of the compositional meanings and the pattern-matching mechanism should be able to present, in a simulated world-model which contains possible speakers and listeners, that the discourse representation of ℜeALIS can capture new properties of a basic discourse.

3 Multiple Worldlets of the Interpreter

Let us present the pragmasemantic point of view above in a more formalized way according to ℜeALIS [11][13]. The *eventuality* (e) or the *propositional content* of an utterance is encapsulated in an intensional profile, which consists of worldlets. Wordlets are labeled DRS-like structures, and all of them can be captured by the prism-effect formula:

$$\mathscr{R}[\mathscr{P}(M\times I\times R\times T\times P)]^*)$$

The five labels indicate the modality (M), the intensity (I), the referent (R) that is the host of the worldlet, the time parameter (T), and the polarity value (P={+,–,0}).

The modality, that is, the attitude to the given content, can be a belief (B), a desire (D), an intention (I), authority (A), experience (E) or a mixture of these as the inner power set symbol '$\mathscr{P}$' shows.

Intensity can be maximal (M) or non-maximal (nM). Non-maximal intensity can be, for example, almost maximal (aM), great (gr) or some (sm). The number of the linguistically encoded intensity degrees can differ in various languages, and we often formulate the values with a number between 0 and 1, as customary in probability theory.

The referent who has the worldlet is mostly the addresser (AR) or the addressee (ae) or both. The set R contains this/these referent(s).

Set T contains the moments at which the worldlet is in the interpreter's mind.

The P={+,–,0} component of the formula (true (+), false (–), not specified (0)) yields eight possible polarity values, as a result of the above mentioned power set symbol.

The Kleene-star indicates the possibility of recursion, because, for example, the interlocutor can desire to acquire a piece of information about the content which is a belief on someone's intention to persuade another person to do something... Finally, the first power set symbol indicates that the interlocutor may have beliefs, desires, intentions etc. about the content at the same time.

4 Amplified Felicity Conditions Encoded in Intensional Profiles

In this part we introduce the ideal intensional profiles and show a few points in the speaker's and in the listener's information state where the failure of pattern-matching points out that the success of the conversation is impossible; which means that it cannot change the world-model in the intended way.

Let us first consider two basic intensional profiles and a fine-tuned one presented in Table 1. First of all, however, it should be noted that it would go far beyond the scope of this paper to attempt to argue for the pragmatic perfection of the profile elements presented. It is in the ℜeALIS-papers referred to in this paper that the establishment of the profiles is a systematically completed task, at least according to the introspective tradition. Here the reader is expected to accept on the basis of the symbols explained in Section 3 that

(i) both the basic sentence types and those fine-tuned by certain discourse markers are conventionally associated with definite information on definite interlocutors' definite beliefs, desires and intentions on definite things that the given sentence decides,

(ii) it is possible to formally capture these linguistically conventionalized pieces on information practically on the ideal circumstances (of the outer world and, primarily, the speaker's information/mental state), and

(iii) as the worldlet labels responsible for capturing this knowledge are nothing else but sequences of quintuples of the symbol types demonstrated in Section 3, it is realistic to write a computer program in which agents' mental/information states are represented as mappings (which are changing from state to state) between a few eventualities in the outer world and sets of worldlet labels.

The exclamative sentence is analyzed as the one which *ab ovo* does not depend on the addressee, as presented in the first column of Table 1. It shows the relation between the addresser's belief and desire states, which are required to appear with different polarity values and there must be a strong desire concerning to the eventuality. The actual belief should be positive (negation is regarded as a discourse marker fine-tuning the hosting basic types). The addresser knows that the eventuality has happened, but in a former moment (s)he did not know about its content, or thought that it had not happened yet. On the other hand, it is "enough" to perform the exclamative sentence if (s)he is very (un)happy because of the fulfillment of the propositional content. In short, coming to know something upsets the addresser.

The ideal purpose of the speaker with taking on the addresser's role of the basic declarative sentence type is stating facts. This follows from the Cooperative Principle of Paul Grice [14] because the Maxim of Quality specifies that the addresser should have enough evidence and should not make a statement if (s)he thinks that it is false. There are two axioms which show the characteristics of the ideal addressee. The addresser should be relevant, so (s)he can state a fact if (s)he thinks that the addressee does not know about it, and, as the third axiom says, one of them should have a relevant desire. The first possibility is that the addressee is assumed to intend to learn the fact, but in the current version of ℜeALIS [13][15], this formula has been generalized in order to capture the case when the addresser is interested in forcing the given piece of knowledge on his partner. (S)he wants her to learn the given fact. In both cases the intention of the addresser is to tell the fact. Moreover, there is an authority axiom encoded in the declarative utterance: the addressee thinks that (s)he can make a statement about fact e, because it is not a secret or there are no moral barriers. As we demonstrated, there are some conditions which depend on the addressee. Hence, the first pattern-matching is between the addresser's factual thoughts on the listener and the role (s)he attributes to her. If we want to know more about the success of the conversation, there should be a second pattern-matching between the applied intensional profile of the addressee and the factual information state of the listener.

The other declarative intensional profile contains a discourse marker *szerintem* which "fine-tunes" the basic sentence-type. The background of the alteration is that the addressee does not have direct evidence about fact e. There are sentences – for example *Szerintem Péter otthon van.* 'In my opinion, Peter is at home.' – in which the predicate is evaluable in the world-model, but in other sentences – for example, *Mari gyönyörű.* 'Mary is beautiful.' – the basis of the inference is very complex and depends on the speaker's mind; it is rather a judgment [15]. The Maxim of Quality dictates that the lack of evidence should be indicated in the profile, so the intensity of the belief is ι and the tripartite components in the second column show that the addresser does not supply the ultimate knowledge but presents that it is her/his ι-strong belief. With the communicative success of the addresser, the addressee will have a belief that *according to the addresser/the addresser states that: the fact is true*, and not a belief that the *fact is true*. We should note at this point that the listener can hold the result-belief of a basic declarative sentence also in these two ways.

Let us continue the review of profiles given in Table 1 by considering the interrogative sentence type and its two related profiles. In contrast to the declarative sentence, a speaker can take the addresser's role of the interrogative one when (s)he does not have the maximal belief about the fact. As the second axiom shows, (s)he should have a belief that the addressee does not believe about her/him that the content is well known for her/him. It is a higher level of mentalization, but the encoding was very motivated, because if the addresser thinks that according to the addressee (s)he should know about the content, (s)he should explain why (s)he does not know about it. Then (s)he knows that (s)he wants to learn the fact, or (s)he thinks that the addressee wants to tell her/him it. (S)he supposes that the addressee can tell the answer and the required axiom for this is that (s)he believes that the addressee knows the answer. The stricter, sufficient axiom is that the addressee has the maximal authority to tell the truth. The intention of the addresser is to arouse the intention of the addressee to tell her/him the right polarity value (i.e. truth value) of the propositional content. If a speaker asks a listener in the

world-model who does not know the fact, it is a failure of the pattern-matching between the listener's mind and the addressee-profile. In this particular case, the speaker cannot improve her/his knowledge about the eventuality.

The discourse marker *ugye* improves the profile without any conflict with the basic intensional profile [13], which is the ideal realization of pragmasemantic compositionality. There is a worldlet, underspecified in its modality, which expresses that the addressee has a strong belief and/or desire that the eventuality is true, but her/his belief is not maximal.

There is another discourse marker, *vajon*, which can have an *ab ovo* addressee-independent profile without the *italicized* axioms. The addresser is speculating, (s)he does not know the truth about the fact, and (s)he knows that (s)he also will not know it in the next moment (τ^+). If (s)he takes an addressee, by eye contact, for instance, (s)he thinks about her that she has not got any knowledge either. It is a failure of the pattern-matching between the speaker's mind and the profile if (s)he asks someone who must know the truth on a high level about the fact with "fine-tuned" by *vajon*.

In Table 2 there is another Janus-faced sentence type which can be interpreted without the *italicized* axioms. The optative sentence expresses that the belief of the addresser has a negative polarity value but (s)he has a positive desire and no authority [16]. If an addressee is taken (by eye contact, for instance), the intention will be to present the addresser's desire, and there appears a presupposition that the addressee also knows that the eventuality has not happened.

The imperative sentences all have these two presuppositions, which stand in the first and the second row of the table. Sentences which are not imperative compositionally but have these presuppositions due to other elements can begin to be functioning as imperatives.

We claim that, in addition to the pattern-matching mechanism sketched above, there is a potential accommodation-process available to the listener, which also influences the perlocution and in this manner the statements in the following ways. (i) The central element of the addresser's profile is the conventionalized intention, and its fulfillment is trivially satisfied if the given process of pattern-matching is successful. (ii) There are pattern-matching problems which can be solved through the accommodation of the missing premises. For example, if the addresser says *Open the door*, the addressee can draw the conclusion that it is closed. Moreover, (iii) any axiom of the profile sent implicitly to the addressee as part of the whole intensional profile of the message can be interpreted as follows: *the addresser intends the addressee to learn that…* In the case of a declarative sentence, for instance, the addressee can freely construct conclusions such as *the addresser intends me to learn that (s)he knows this fact* ((s)he is proud of the fact that (s)he is so clever and well informed) or *(s)he intends me to learn that (s)he knows that I do not know this* ((s)he recalls that (s)he is precisely aware of my unfamiliarity with certain issues). Finally, symmetrical to the former case, (iv) some kind of reduction of the intention is also possible for the addressee. For example, in the sentence *Peti szerint Mari otthon van* 'In Peti's opinion, Mari is at home,' *szerint* 'in someone's opinion' should primarily be interpreted as *the addresser has said that Peti believes something*, but if the listener thinks that (s)he can calmly rely on Peti (and on the addresser), (s)he can directly accept the piece of information that *Mari is at home* as a

fact. This way the addressee has undertaken the risk of accepting a false piece of information but if one wants to exploit information coming from others, (s)he should trust in others.

5 Summary, loose ends, and some remarks on implementation

The paper is devoted to provide some theoretical background to a program which operates on a continuously changing world-model with possible speakers and listeners speaking about the world and each other, and in which the agents' information states are also continuously changing depending on changes of the model of the outer world, including their messages sent to each other, and each other's information states [18].

In Section 1, we presented the representationalist theoretical framework we use, and argued that its implementation promises to provide a lot of information on discourse mechanisms and linguistically relevant phenomena. We claim that, on the basis of truth-evaluation and pragmatically relevant felicity conditions, a program based on ℜeALIS is able to simulate the process of discourse interpretation in a more sophisticated way then earlier systems based on DRT-style theories.

The crucial innovation of ℜeALIS is that the traditional pattern-matching based truth-evaluating mechanisms of formal semantics can and should be generalized in a way that each sentence sent as a message should undergo a multiple mechanism of simultaneously extensional and intensional interpretation (Sections 2 and 3).

Section 4 is devoted to a detailed demonstration of the generalized method of interpretation of the five basic sentence types and a few sentence types constructed from the basic ones by augmented them with certain discourse markers.

Finally, some words on future versions of our program. In the current, first, phase of the project [18], the eventualities considered in the model of the outer world are only such simple states (or at least handled as such) which are just holding true in a given moment of the "game", or do not hold. For instance, Peter is married in certain moments while he is not married in other moments. Bea is working, or not working. In certain moments, Peter adores Bea, while in other moments, he does not adore her. Snowing has also two phases: it is snowing in a certain moment, or not. In the ℜeALIS-framework, there exists a much more sophisticated description of the general internal event structure of eventualities [17]: the temporal axis is cut into five intervals. In the first and the last intervals, the eventuality does not hold true. The second one is the interval of preparation. *He is about to travel home* – by a sentence like this one can refer to this interval, when the agent is packing his suitcases, buying tickets, saying good-byes. The third interval is the cumulative phase. An illustration: *he is just traveling home*. The fourth one is the result state: e.g., *he has traveled home*, that is, *he is at home*. One might think at first glance that it is only a question of quantity whether eventualities are considered only with two phases, or they are regarded as having five states in the above sense, of which in two phases the given eventuality does not hold true while in three other intervals it is being carried out, which manifests itself in different, truth-evaluable, forms from time to time. However, that is not the case. Let us consider, for instance, the type of Hungarian imperative sentence fine-tuned by the discourse marker *csak* 'only'. Thus, *Utazz haza!* 'Travel home' is considered to be augmented as follows:

Utazz csak haza! While this fine-tuned variant, which, depending on intonation, can express encouragement or intimidation, is preferably be performed in the preparatory phase of the eventuality (when the agent seems to be about to travel home), the basic imperative type can readily be performed in the earlier, first, interval, when the agent is likely not to think about traveling home.

All in all, we claim that the implementation of our formal system can be regarded as taking the first steps towards simultaneously representing the outer world in its double role [19]: as (possible) world-models which our words should be aligned to in the course of a post-Montagovian style of dynamic interpretation [3] [7] [9] (words→world) and as world-states (including states of human minds) that the acts of/in/by saying our words result in (world→words).

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	Exclamative (basic type)	*Szerintem*-Declarative	Declarative (basic type)	Interrogative (basic type)	*Ugye*-Interrogative	*Vajon*-Interrogative
BELIEF	$\langle B,\gamma_{B\tau-},AR,\tau^{-},0-\rangle$	⟨E,M,AR,τ,0⟩				$\langle B,M,AR,\tau^{+},0\rangle$
	$\langle B,\gamma_{B\tau},AR,\tau,+\rangle$	⟨B,ι,AR,τ,+⟩ M ≥ ι ≥ s ι = ι' · ι''	⟨B,M,AR,τ,+⟩	⟨B,M,AR,τ,0⟩	⟨B,M,AR,τ,0⟩	⟨B,M,AR,τ,0⟩
	$\gamma_{B\tau}=1$ $(\gamma_{B\tau}-\gamma_{B\tau-})+\lvert\gamma_D\rvert$	λ^⟨B,ι''',ae,τ,+–⟩			$\langle BD,\gamma_u,AR,\tau,+\rangle$ $\gamma_u \geq gr$	
		λ^⟨B,M,ae,τ,0⟩ ^⟨B,ι,AR,τ,+⟩	λ ^⟨B,M,ae,τ,0⟩	λ^⟨B,γ'',ae,τ,+⟩ ^⟨B,M,AR,τ,0⟩	λ^⟨B,γ'',ae,τ,+⟩ ^⟨B,M,AR,τ,0⟩	*λ^⟨B,γ'',ae,τ,+⟩* *^⟨B,M,AR,τ,0⟩*
DESIRE	$\langle D,\gamma_D,AR,\tau,+-\rangle$	λ^λ' $\hat{}\langle B,M,ae,\tau^{+},+-\rangle$ ^⟨B,ι,AR,τ,+⟩	λ^λ' $\hat{}\langle B,M,ae,\tau^{+},+-\rangle$	λ^λ' $\hat{}\langle B,M,AR,\tau^{+},+-\rangle$	$\lambda\hat{}\lambda'\hat{}\langle B,M,AR,\tau^{+},+-\rangle$	λ^λ' $\hat{}\langle B,M,AR,\tau^{+},+-\rangle$ r*=AR
AUTHORITY		⟨A,M,AR,τ,+⟩ $\hat{}\langle B,M,ae,\tau^{+},+\rangle$ ^⟨B,ι,AR,τ,+⟩	⟨A,M,AR,τ,+⟩ $\hat{}\langle B,M,ae,\tau^{+},+\rangle$	λ^⟨A,γ',ae,τ,+⟩ $\hat{}\langle B,M,AR,\tau^{+},+-\rangle$ stricter axiom of λ^⟨B,M,ae,τ,+–⟩	λ^⟨A,γ',ae,τ,+⟩ $\hat{}\langle B,M,AR,\tau^{+},+-\rangle$ stricter axiom of λ^⟨B,M,ae,τ,+–⟩	*λ^⟨A,γ',ae,τ,0⟩* *$\hat{}\langle B,M,AR,\tau^{+},+-\rangle$* *consequence of* *λ^⟨B,M,ae,τ,0⟩*
INTENTION		λ'' $\hat{}\langle B,M,ae,\tau^{+},+\rangle$ ^⟨B,ι,AR,τ,+⟩	λ'' $\hat{}\langle B,M,ae,\tau^{+},+\rangle$	λ''^λ''' $\hat{}\langle B,M,AR,\tau^{+},+-\rangle$	λ''^λ''' $\hat{}\langle B,M,AR,\tau^{+},+-\rangle$	*$\lambda''\hat{}\langle B,M,ae,\tau^{+},+\rangle$* *$\hat{}\lambda'\hat{}\langle B,M,AR,\tau^{+},+-\rangle$* *pref.: r*={AR}*

Table 1. Intensional profiles in ℜeALIS (BEL: +/0): λ=⟨B,γ,AR,τ,+⟩; $\lambda'=\langle D,\gamma_{r^*},r^*,\tau,+\rangle$, where $\Sigma\gamma_x \geq 1$ ($x \in r^*$) and preferred: r*={AR,ae}; λ''=⟨I,M,AR,τ,+⟩; $\lambda'''=\langle I,M,ae,\tau^{+},+\rangle$

	Interrogative (basic type)	Conditional (-nÁl) **re**quest*ion*	Imperative (basic type)	*Nyugodtan*-Imperative	Optative (basic type)
BELIEF	⟨B,M,AR,τ,0⟩	⟨B,M,AR,τ,–⟩; *⟨B,M,AR, τ,0⟩^⟨D,M,ae,τ,+– ⟩*	⟨B,M,AR,τ,–⟩	⟨B,M,AR,τ,–⟩	⟨B,M,AR,τ,–⟩
		λ^⟨B,M,ae,τ,–⟩	λ^⟨B,M,ae,τ,–⟩	λ^⟨B,M,ae,τ,–⟩	*λ^⟨B,M,ae, τ,–⟩*
	λ^⟨B,γ'',ae,τ,+⟩ ^⟨B,M,AR,τ,0⟩	*λ^⟨B,γ'',ae, τ,+⟩^ ⟨B,M,AR,^τ,0⟩^⟨D,M,ae,τ,+–⟩*			
DESIRE	λ^λ' ^⟨B,M,AR,τ^+,+– ⟩	**⟨D,M,AR,τ,+⟩**; ⟨D,M,AR,τ,+⟩^⟨B,M,AR,τ^+,+⟩ ^⟨D,γ_{ae},ae,τ,+–⟩	λ^λ'	λ^λ'	⟨D,M,AR,τ,+⟩
AUTHORITY	λ^⟨A,γ',ae,τ,+⟩ ^⟨B,M,AR,τ^+,+– ⟩ stricter axiom of λ^⟨B,M,ae,τ,+– ⟩	trivially satisfied: λ^⟨B,M,ae,τ,+–⟩ ^⟨D,M,ae,τ,+– ⟩; λ^⟨A,γ',ae,τ,+⟩	λ^⟨A,γ',ae,τ,+⟩; λ^⟨A,M,AR,τ,+⟩ ^⟨I,M,ae,τ^+,+⟩	λ^⟨A,γ',ae,τ,0⟩	⟨A,M,AR,τ,0⟩
INTENTION	λ''^λ''' ^⟨B,M,AR,τ^+,+– ⟩	*λ''^λ'''^⟨B,M,AR,τ^+,+⟩ ^⟨D,M,ae,τ,+– ⟩;* **λ''^λ''' λ''^λ'''^⟨B,M,AR,t^+,+⟩ ^⟨D,M,ae,τ^+,+–⟩**	λ''^λ'''	λ'' ^⟨A,M,AR,τ^+,+⟩	*λ'' ^⟨B,M,ae, τ^+,+⟩ ^⟨D,M,AR, τ,+⟩*
NOTE	Ag=ae	Ag=ae	Ag=ae		Ag=ae
	Ag≠AR	Ag≠AR	Ag≠AR		Ag≠AR

Table 2. Intensional profiles in ℜeALIS (BEL: –/0): λ=⟨B,γ,AR,τ,+⟩; λ'=⟨D,γ_{r*},r*,τ,+⟩, where $\Sigma\gamma_x \geq 1$ (x∈r*) and preferred: r*={AR,ae}; λ''=⟨I,M,AR,τ,+⟩; λ'''=⟨I,M,ae,τ^+,+⟩