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**Interaction of form and content in metalinguistic  
judgments**

**Abstract**

The paper presents empirical studies on the effects of formal, grammatical correctness and content correctness on metalinguistic judgments of Hungarian sentences while the self-consciousness of the subjects was varied by using a mirror during the task. The empirical study relates to the theoretical rivalry issue of primacy of form or pragmatics in sentence processing and metalinguistic judgements.

The aspect of content was less important than that of form. Even so, subjects only accepted 21% of the grammatically correct sentences with a semantic anomaly. There was a significant difference between perceptual vs lexico-semantic types of knowledge: we tend to accept sentences based on lexico-semantic knowledge more readily. We tend to accept everything we do not know for certain.

*Keywords:* form- and content-based processing, metalinguistic judgement, linguistic awareness, perceptual and conceptual knowledge

## **1 Form and content based models of sentence processing**

The question of relationships between form and content in language processing emerged to the center of attention several times during the past three decades of research conducted in psycholinguistics and linguistics. The pillars of these theories center around three concepts, whose numerous mutations use different terminology, but in an abstract level they raise the same questions. The textbook of Clark and Clark (1977) adopted this three-way division, which is valid even today: form-based theories, content-based theories and interactional theories. In the following sections, we shall describe each of these concisely (see Pléh 2000 for a discussion).

### ***1.1 Form-based theories***

Form-based theories were seen as the integration of the concepts of modern linguistics into psychology in the beginning of the 60es. According to the crux of these theories, thought has a peculiar organization that is based on linguistic forms, which are analogous to syntax in language. This formal organisation plays a central role in language processing. The scene was set by the famous example of Chomsky (1957): *Colourless green ideas sleep furiously* which, though grammatically correct, carries no well-interpretable meaning (or in our use of terms: content). Chomsky (2018) has upheld the idea about the centrality of form during the last half century, and

many psycholinguist followed him. According to devotees of form-based psycholinguistics the paucity of the role of content is reflected in sentence processing as well. All the different form-based theories focus on the following aspects:

*Syntax-based processing.* The syntactic analysis is independent of meaning (content). The results of the classic Miller and Isard (1963) study showed that syntactic errors (*Boy the bitten by was a dog*) pose a larger or at least a different type of difficulty for sentence processing than semantic rarities (*The dog was bitten by a boy*).

*Bottom-up direction in processing.* The leading principle is formal processing without semantic assistance (without support of content), and usually, in the architecture there can be no top-down effects found (Fodor 1983). This is true to such an extent that structural strategies work even when following them leads to an implausible or even impossible result. According to Ferreira and Clifton (1986, Clifton & Ferreira 1987) the two different possible interpretations pose a more serious difficulty to comprehension in example (2) than in example (1), even though as the asterisk shows in example (2) one of the interpretation is not possible because of the inanimate noun.

- |                                   |   |                        |
|-----------------------------------|---|------------------------|
| (1) <i>The defendant examined</i> | { | <i>was incoherent.</i> |
|                                   | { | <i>the papers.</i>     |
| (2) <i>The evidence examined</i>  | { | <i>was incoherent.</i> |
|                                   | { | <i>* the papers.</i>   |

*Modularity.* The proposed independence and primacy of form in processing suggests a fast, shallow, reflex-like (modular) processing suggested by Fodor (1983) and elaborated for language comprehension by Forster (1979, Forster & Olbrei 1973). The entire Cooper and Walker (1979) edited volume showed a clear exposition of this attitude.

*Secondary, delayed effect of meaning.* The modular architecture of processing suggests a secondary and slower involvement of content as contextual knowledge, the emphasis falls on the supposition that the effect of knowledge essentially follows automatic processing. This view is underpinned by the results of Thuma and Pléh (2000): in sentences containing ambiguous phrases (as in sentences (3) and (4)) up to an interval of 200-300 ms the associates of the irrelevant meaning are also activated. In the examples given below, the associate *crow* → *raven* is activated, even in (4) where it is an irrelevant nominal meaning not interpretable for the given sentence. This also happens even with suffixed forms in Hungarian when the suffixed form clearly indicates that the stem is not a nominal form (Gergely & Pléh 1994).

- (3) *In the village every morning the cocks crow.*  
 (4) *All I could hear was the cocks crowing.*

### 1.1 Content-based (pragmatic) theories

Content-based theories stress the leading role of pragmatic and semantic considerations: they emphasize that there are two basic hypotheses that guide comprehension (Clark & Clark 1977; Pléh 2000):

- i. The interlocutor co-operates and thus helps the hearer to find out what he/she is about to say.
- ii. He/she talks about whatever is relevant to him/her.

During four decades of their existence, these content-based theories have been characterized by a few basic principles.

- *Semantic start-off*: in comprehension the most important starting factor is meaning and conceptual relevance. We only resort to analyzing forms if our knowledge (our background knowledge and the context) does not provide a firm landing for interpretation.
- *Top-down information flow*: in comprehension, knowledge-based expectations meet the representation of the input in the early phase of processing.
- *The immediate effect of content*: this appears in content-based interpreting shortcut strategies. In the sentence *The biscuits were chewed by the boy* it is enough to identify the words *boy*, *chew* and *biscuit*, since there is only one way these can form a possible meaning, and to reproduce this there is no need for syntactic analysis, and the passive transformation does not create difficulties, as the classic study of Slobin (1966) showed it (Clark & Clark 1977).
- *Pragmatic benefit principle*: the co-operation principle of Grice (1975), and the relevance principle of Sperber and Wilson (1995) guides the process of comprehension as well and the mutual supposition of this principle helps comprehension. This gives the above process a social frame.

The effects themselves are different with respect to the source of the information, as shown in Table 1 based on Pléh (2000).

Pragmatic basis	Effect on comprehension
Knowledge	Effect of categorical information. E.g., the subject of a transitive sentence should be animate.
	Effect of specific information. E.g., knowledge about SPARROWS presupposes certain propositions (grey, city dwelling etc.).
Context	The context of the subject helps comprehension. E.g., knowledge about the topography of Paris helps the understanding of a Maigret novel.
Discourse	Previous utterances guide comprehension.
Conversation	Previous utterances evoke certain models and mutual schemata in the interlocutors (Pickering & Garrod 2004).

*Table 1. Pragmatic types of knowledge and their effect on comprehension*

### 1.2 Component interaction models

Component interactional views are openly eclectic: they advocate that both form and content-based processing is needed, one of them being responsible for the flexibility of human language, the other for the rapidity of comprehension. At the same time, interactional concepts suppose that computed representations themselves are adaptive, moreover the order of computations is not carved in stone, it is also flexible.

- *Dynamic information flow* characterizes comprehension. Effects from the direction of the stimulus and the expectations both appear in comprehension. They are weighed depending on the grade of expectedness of the verbal material.
- *Changing adaptive representations*. If content allows so, formal analysis recedes to the background. According to the classic concept of semantic irreversibility proposed by Slobin (1966) analyzing certain sentences the irreversibility, i.e. implausibility of grammatical roles can be a support in understanding. Example (6) is more difficult than (5) due to a more complicated syntactical structure, while there is no difference between examples (7) and (8) in difficulty, even though (8) is also in the more complicated passive voice structure, since in these latter two sentences the noun at the beginning of the sentence cannot be the subject of the sentence on the basis of our world knowledge.

(5) *The goat chases the lamb.*

(6) *The lamb is chased by the goat.*

(7) *The dog chews the bone.*

(8) *The bone is chewed by the dog.*

- *The timing of the activation of content is adaptive*. In the case of customary, coherent material, the activation of content is primary, whereas in cases of broken coherence we rather fall back on form-based strategies (Marslen-Wilson & Tyler 1980).

The basic characteristics of these three views are summarized in Table 2.

<p><b>Principle of close reading:</b> separate components of comprehension, late effect of knowledge</p> <p><b>Reading between the lines:</b> early activation of knowledge is a leading part of comprehension</p> <p><b>Flexibility principle:</b> the extent of formal and content-based processing depends on our goals</p>
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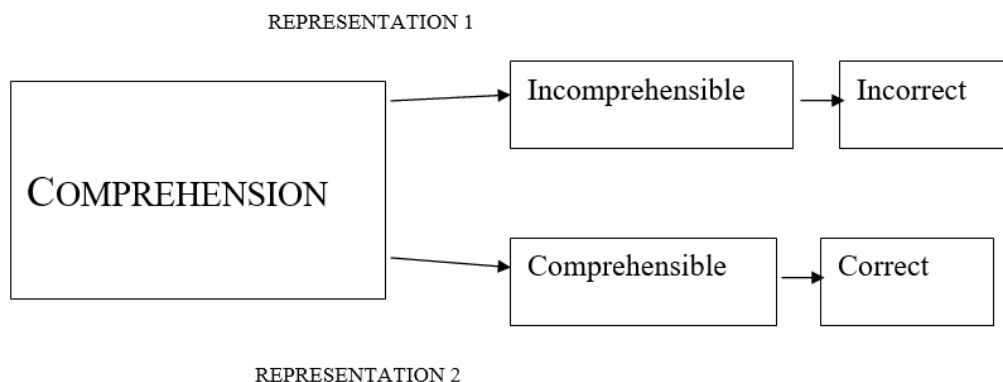
*Table 2. Three approaches about the role of knowledge in comprehension*

## 2 Relationships between comprehension and linguistic judgment

While the central problem in the field of sentence processing models was the relationship between form and content, the classical problem of sociolinguistics in the same period was formal determinism and how language variations affect grammaticality judgments. These two fields of study hardly contacted each other. Since the aim of our investigation is the creation of this bond, we try to define the relationships that would be possible connecting grammaticality judgment and models of comprehension. First, we outline speculative cognitive models for metalinguistic judgment tasks that are one of the basic tools of sociolinguistic research into the factors determining acceptability.

### 2.1 Consonant process, linear model

We could postulate a model between comprehension and judgment that would identify the two concepts as being in total harmony: if a string can be understood, it is assumed to be ‘correct’, and if it is not comprehensible we judge it to be ‘incorrect’. Moreover, on a temporal plane, grammaticality judgment would follow comprehension. This is shown on Figure 1.



*Figure 1. Model of judgment and comprehension as identical processes*

People, however, use form-based processes extensively in their everyday judgment. In the speech of foreigners, they note specific errors even if they do understand the sentence, as in cases (9) and (10).

(9) \* *I never did not say that.*

(10) \* *I did not went to home.*

On the other hand, they do not necessarily consider as faulty those sentences the comprehension of which poses a challenge to the cognitive system, or as Sperber (2010) claims are even rated as indicating sophisticated thinking as in examples (11) and (12).

(11) “*Consciousness is a being, the nature of which is to be conscious of the nothingness of its being.*” Jean Paul Sartre

(12) “*Beauty is a fateful gift of the essence of truth, and here truth means the disclosure of what keeps itself concealed.*” Martin Heidegger

## **2.2 Partner oriented double process theory**

This concept is based on considerations of a social psychological nature. *Self-serving bias* (Ross 1977) is a widely accepted phenomenon in social psychology, according to which people have a tendency to suppose that their attitudes, opinions, values and behavior falls in line with the attitude, opinion, value and behavior of the majority of the people. In an acceptability judgment (as that of grammaticality) this bias could launch two possible processes.

- SOCIAL IDENTITY: if I do not understand it, nor will others, therefore it is incorrect.
- SOCIAL POWER: if others claim this or have put this down, it must be right, therefore it is correct.

We suspect that the latter tendency would be stronger in situations similar to our investigation, because subjects in the experiment are university students, hence accustomed to intellectual authorities when working with complicated texts. This would of course presuppose that grammaticality judgment takes a considerably longer time compared to the rapid process of language comprehension. In the case of grammaticality judgments, a secondary, metalinguistic,

socially mediated process would be involved, concentrating on whether others would understand the sentence the subject is asked to give a grammaticality judgment about.

In other words metalinguistic (grammaticality) judgment is at the same time a social judgment and as such, it is affected by the social situation. The subject has to bear in mind the representation of others; they have to think something about what others think and has to compare this with the primary representation that is the result of sentence processing.

This process is shown in Figure 2 (R= Representation)

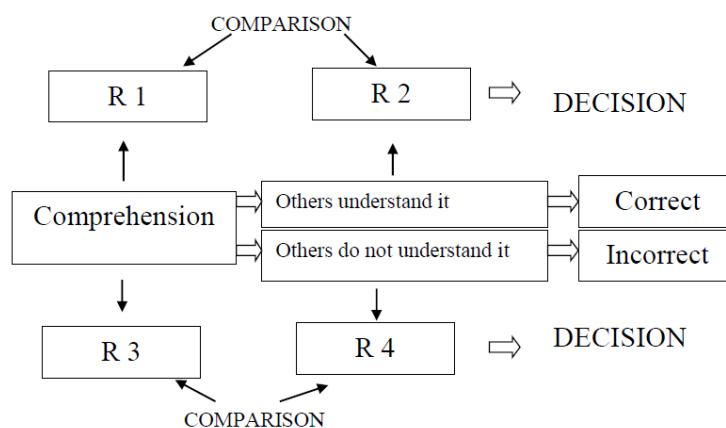


Figure 2. Socially based judgment model

### 2.3 The structural model of socially-based judgment

Two decades ago we have presented a model of linguistic judgment that was based on the social aspect of linguistic grammaticality (Pléh & Bodor 2000). The model was analogous in structure with the Freudian structural model, thus distinguishing between a linguistic Superego, which represents acquired social norms, and an Id which stands for spontaneous language production and linguistic abilities including non-academic grammatical rules (intuitive grammar). The model also includes an Ego, which is to make a final metalinguistic judgment. Rules of the normative language community are supposed to be internalized in this model to form the linguistic Superego, and it is out of the interaction of these internalized rules and the sentence processing mechanisms of the Id that metalinguistic (grammaticality) judgments made by the Ego emerge. According to this model, representative others are the sources of the concept of grammaticality.

According to the model, in certain situations (e.g. when one is looking into a mirror) the influence of the Ego is enhanced in the structure, because of the higher degree of self-consciousness. Yet the model restricts itself to the aspect of form and leaves open the question of content (see Figure 3).

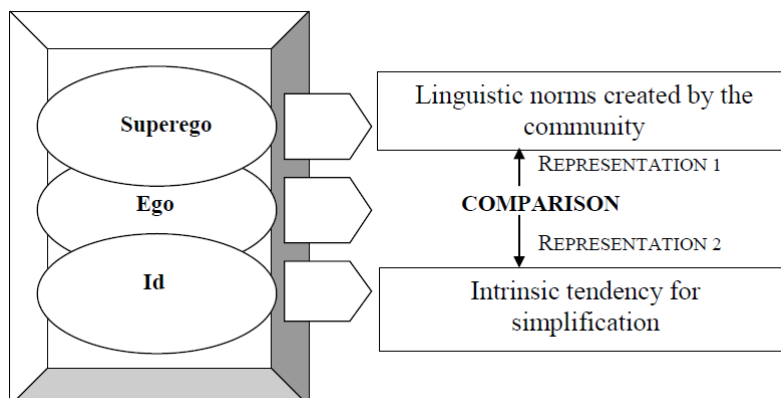


Figure 3. The structural model of Pléh and Bodor (2000)

## 2.4 Comparison of two representations

There is one assumption behind all these models: namely that all acceptability judgments are based on comparisons of different representations. When understanding a sentence, one creates a mental representation of it, and incorporates this into a system of representations that one already had in mind. When making a grammaticality judgment, there is one more step to be taken: we do not only create a representation of the incoming sentence, but we also compare it with former sentence representations, taking into consideration the social aspects we have seen above (i.e. *What would others say about this?*). If the two representations reach a certain level of similarity, we accept the sentence in question, but should the similarity fall below this level, we refuse it. This is shown schematically in Figure 4.

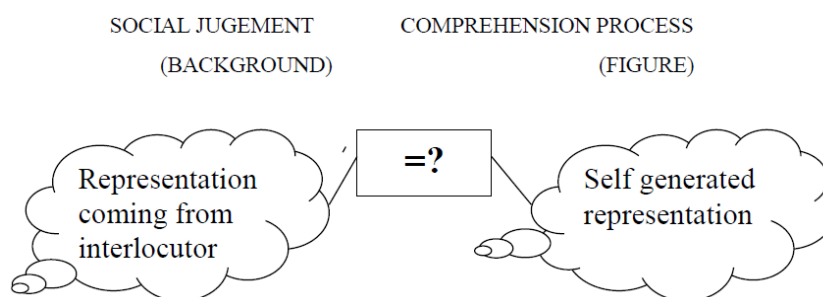


Figure 4. Acceptability judgment as a comparison of knowledge and actual input computations

## 3 Theoretical background of the experiment

In the experiment we combined two approaches: models of comprehension and models of linguistic judgments. In order to do this, one has to inquire into three much debated fields of cognitive science, which are the following:

- The effect of content and form on acceptability judgments.
- The differences between judgments of sentences with content based on different types of knowledge: lexico-semantic vs perceptual knowledge (see below).
- The effect of situational conditions that affect self-awareness on judgments.

### **3.1 Form and content**

If we are to take the early Chomskyan viewpoint seriously, which is highly grammar-centered, then we would expect that people should accept sentences that are nonsense, but grammatically perfectly constructed nonsense. At the same time in linguistic judgment grammaticality and sensibility are not completely independent. Considering something *to be correct* is not solely up to its *grammaticality* as is supposed by early Chomskyan theories (for a summary on the concepts of ‘correct’ and ‘grammatical’ see Fromkin & Rodman 1995).

We intended to find out what happens when grammatical sentences do not violate semantic categories (as in *ideas sleep furiously*), yet they are nevertheless inconsistent with everyday experiences of the world, as shown in Example (13).

(13) *Cats have wings.*

Chomskyan theory would be forced to consider these sentences grammatical and thus ‘correct’, but what happens if we ask native speakers of the language on whose knowledge this theory is supposed to be based?

### **3.2 Conceptual-semantic and perceptual based knowledge**

The original idea came from Andor (1998, 2003), who suggested that taking into consideration the organization of memory systems, we should postulate different knowledge bases underlying language, most typically the lexicon. He proposed three types of knowledge: background knowledge, frame knowledge and scripts. He suggested that the organization of the lexicon is like a system of nodes and connections (which is in accordance with most standard models), where activating a word implies activating all the different types of information connected to the word (including how we learnt the meaning of it.)

#### **3.2.1 Perception based knowledge**

This type of information is knowledge that all of us acquire individually by direct experience, such as information about stones being hard, sponges being soft, and that cats have no wings. This is what Russell (1921) traditionally called knowledge by acquaintance as opposed to knowledge based on descriptions. In the paper, we will call this type of knowledge *perceptual knowledge* to refer to the prototypical way of its acquisition.

#### **3.2.2 Semantic-conceptual knowledge**

Lexically grounded semantic-conceptual knowledge is what Andor (2003) refers to as frame knowledge and it is typically acquired via descriptions provided by others. People generally do not acquire this type of knowledge through personal perceptual experience. Most of the school



curriculum related generic knowledge belongs to this category: we do not usually observe a nuclear reaction ourselves, nevertheless, know the names and properties of particles, we do not travel to Africa, but still know about the savanna. Russell (1921) categorizes this as knowledge based on descriptions. We can consider it today to be semantic-conceptual type of knowledge.

### **3.2.3 Scripts**

These are typically vertically organized social event based knowledges that consist of actions that are sequential in time and have a fixed order in well-known situations. A typical example would be Schank and Abelson's (1977) restaurant script. (For further analysis of scripts see László 1986).

### **3.3 Effects of self-awareness and experimental contexts**

According to the model of Scheier and Carver (1983) the attention directed towards ourselves (often referred to as self-focus) influences our cognitive self-regulation level. We constantly compare actual realized behavior with intended behavior (Powers 1973). The level of self-focus is determined by two factors. First, it has a personality-based more or less permanent factor, which is the amount of attention we pay to our own behavior and expected norms in general. This varies from person to person. The second factor has a more transient nature as it depends on the actual situation: one can manipulate this factor by facing the subject with an audience or by introducing a mirror or a video camera into the experimental setting. Higher self-focus is supposed to enhance the working of the self-comparator in two ways: on the one hand, if self-focus is higher in a situation we feel the necessity to do things right. On the other hand, we also tend to approximate our behavior to the accepted norm, so we compare our actual behavior with what we think people expect us to do (Duval & Wicklund 1972; Scheier & Carver 1983). Low self-awareness on the contrary makes behavior accidental and less organized. One can observe this in people influenced by alcohol (Hull 1981) and in encounter groups in the state of depersonalization.

Higher self-awareness in front of a mirror used in our experimental setting is expected to result in a strong tendency to stick to the norm in metalinguistic judgements. The norm is clear for form/grammaticality, however, the aspect of content is not clear. The experiments by Pléh and Bodor (2000) showed over Hungarian sentence judgments the effects of increased self-awareness while facing a mirror. The question remained however: what norm is there for semantics? It still remained to be investigated whether such a situation had an effect on acceptability judgments from a content/semantic point of view.

## **4 Hypotheses**

In the experiment, the following expectations were tested:

1. On a higher self-awareness level (i.e. in front of a mirror) subjects will tend to be more severe in their judgment, as a consequence of trying to keep to the norm. This would be indicated by a higher acceptance of correct sentences and a lower acceptance of incorrect sentences, compared to a control group (without mirror).
2. Acceptability decisions will be influenced by the type of error in a sentence (i.e. formal {morpho-syntactic} vs content {semantic} errors) in the following manner: the experimental

group is going to judge formal errors more severely than the control group and we expect them to be less severe on the content side than the controls.

3. In the domain of content, greater uncertainty was expected regarding sentences that contain information appealing to our conceptual-semantic knowledge base than those sentences whose content addresses perceptual knowledge.

## 5 Experimental methods

### 5.1 Subjects

89 university undergraduates participated in the experiment. They were randomly divided into an experimental group and a control group, and then each group was further divided into four smaller groups because of the four types of sentence lists we used in the experiment (see below). Table 3 shows the number of subjects in each group.

Number of persons	Experiment	Control
1. List	13	12
2. List	12	9
3. List	13	9
4. List	12	9
Sum	50	29

*Table 3. The number of persons in the groups*

### 5.2 Procedure

Those in the experimental group were individually placed in a room that had a one-way-transparent mirror (of the size 2ms by 1,5m), horizontally aligned on the wall. The control group was placed in the same room, but with a blackboard placed in front of the one-way-transparent mirror, so that it could not be seen. They both had two sheets of paper in front of them, stuck onto the mirror or the blackboard, respectively. On the two sheets of paper we printed the sentences we used in the experiment (for English equivalents of the sample see the Appendix) in letters that were large enough to be seen from that distance even for people with slight eye problems, to make sure no one misread the sentences. The papers were stuck 15 cms above eye level and 10 cms apart so that the subjects in the experimental group were forced to see their own face in the mirror. We placed a desk in front of the mirror/blackboard with an answer sheet on top. According to the instructions (both printed on the paper and emphasized by the experimenters), the subjects had to give a judgment on how acceptable a sentence is, and not on how grammatical or correct it is, to support our hopes that the answers will be more subjective and less influenced by academically taught rules. In other words, our aim was to test the intuitive speaker and not the rule directed scholar. There was no temporal limit, as we wanted to avoid hasty and careless decisions in this highly conscious task.

The experimenters asked a few follow-up questions after subjects filled the sheet of paper, to find out if they noticed that a desk from another room was moved into the experimental room (which is usually used for giving seminars) right in front of the mirror and if they found it strange or had any conscious reflections about the situation. Few problems resulted from the settings, as most of the subjects were not acquainted with the usual equipment of the room. More

preoccupation arose from the fact that many participants noticed we used a one-way observation mirror and were distracted by the feeling of somebody watching them from the other side, which made them concentrate on other aspect of their behavior and not on their written output. However, we can consider the effect negligible, as the aim was to enhance self-awareness, so if the subjects were occupied about being watched, so much the better. There was one last question we asked the subject, to find out if the majority used any conscious strategy to tackle the problem.

### 5.3 *The sentences to be judged*

As a first step in the preparation, a list of 20 sentences was constructed, each of which had (in their original correct form) a clear-cut meaning and simple correct syntax. We intended to use sentences that were comprehensible and semantically transparent. After this, 4 versions of each sentence were created with 3 different errors of each initial sentence: incorrect form, incorrect content, incorrect both. An example for a given sentence is shown in Table 4, in English versions.

	Correct form	Incorrect form
Correct content	<i>Cats have whiskers.</i>	<i>Catsen have whiskers.</i>
Incorrect content	<i>Cats have wings.</i>	<i>Catsen have wings.</i>

*Table 4: Four versions of a typical sentence*

Grammatical errors were morpho-syntactic errors, some of which are strictly stigmatized in the Hungarian language community (Pléh & Bodor, 2000). We used three types of grammatical errors: words with a wrong morpheme on them (one that did not match with their thematic role in the sentence); words with the right morpheme, but the wrong allomorph of the morpheme (Hungarian vocal harmony dictates that front stems go with front suffixes, while back stems go with a back suffix); the third type of error was wrong orthography, misspelling.

*Semantic errors* were incompatible with either perceptual or conceptual-semantic knowledge of the world. As this was a post hoc category there were some sentences that were not easy to be grouped into these categories. Sentences like *Brooders hatch eggs* could be considered as perceptual error base, even if it is highly unlikely that the subjects had seen brooders; so the differences were not always clear-cut, and whenever in doubt we usually put these dubious sentences in the conceptual-semantic group.

The actual lists consisted of 20 sentences each, and contained in equal number the four types of errors, thus five tokens of each of the four sentence types of sentences in one list: 4\*5=20 sentences). We kept the order of the sentences throughout the four lists, but the same sentences in each list had a different type of error. Thus the four lists were counterbalanced regarding the substance of the sentence material. (Anglicized versions of the sentences used are illustrated in the *Appendix*.)

## 6 Results

### 6.1 Self-awareness and acceptability judgment

There was no difference in acceptability judgements between control (Mean=0.2955, SD=0.11097) and experimental groups (Mean=0.2981, SD=0.049755) indicating that self-awareness had negligible effect on acceptability judgments ( $t(87)=-0.118$ ;  $p=0.906$ ).

### 6.2 The content and formal errors

Any type of error was significantly less accepted than correct sentences. There were characteristic differences between the acceptance rate of the different types of errors, resulting in a sequence of Correct > Content > Form > Both. This trend is supported by repeated  $t$  tests, summarized in Table 5.

	Correct	Form error	Content error	2 errors
Correct				
Formal error	5.46***			
Content error	5.27***	2.42**		
Two errors	5.7***	0.27	2.18*	

Table 5. The differences between the four types of errors across the experimental and control groups  
 $t$  tests: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

At the same time, error differences between the experimental and control groups did not show the pattern sketched in the hypotheses: although the experimental group was slightly more strict in its decisions about form, there was still no difference whatsoever between the experimental and the control groups in the semantic (content) domain (see Figure 5).

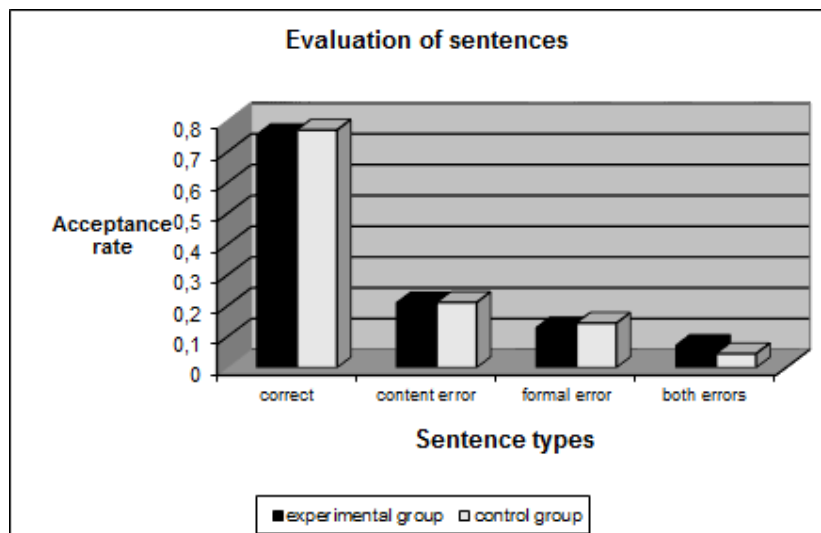


Figure 5. The acceptance of formal and content errors in the two groups

### **6.2.1 Perceptual and conceptual-semantic knowledge**

In this post hoc analysis we aimed at finding a difference between

- a. the acceptance rate of perceptual and conceptual- semantic acceptance in the entire sample,
- b. the pattern of the control and experimental groups in accepting these two types of sentences.

The acceptance rate of conceptual-semantic knowledge based sentences was higher both in the correct case (82% versus 68%,  $t=2,98$ ,  $p<0,004$ ) and in the case of incorrectness as well (24% versus 16%,  $t=2,00$ ,  $p<0,05$ ). This is to say that in an experimental setting sentences relying on perceptual knowledge are always more strictly judged, whereas we tend to accept sentences that appeal to our knowledge based on description. At the same time, there was no significant difference between control and experimental groups in this aspect.

### **6.2.2 Types of morphosyntactic errors**

There were no significant differences between the 3 types of errors (wrong morpheme, wrong allomorph, bad spelling), therefore we shall not go into the question in detail. For a detailed discussion see Ivády and Nagy-György (2005).

## **7 Discussion**

### **7.1 Self-awareness – effects of the mirror**

There was no significant difference between groups with different levels of self-awareness, which shows that by involving a semantic aspect in the experiment, the results obtained by Pléh and Bodor (2000) disappear. In our experiment, there was no significant difference between the experimental and control groups – not even on the grammaticality domain.

### **7.2 Content – semantics**

There was a significant difference between the two (perceptual vs conceptual-semantic) types of knowledge, with the interesting result that we tend to accept sentences based on conceptual-semantic knowledge more readily. This might be due to the social psychological aspect of the experiment mentioned in the introductory part: we tend to accept everything we do not know for certain.

### **7.3 Form**

Form was a strong determining factor in the experiment, it had nearly 10% more explanatory force than content regarding rejections. At the same time, the expected interaction between self-awareness and sentence error type (form vs. content) could not be detected.

All of this implies that it would be worthwhile to carry out a more balanced and careful experiment to find out more about the relationship between form and content in metalinguistic judgments, where the two types of knowledge are to be taken into consideration in designing the material, not only in post hoc examination of the results.

At the same time, as another study by Ivády and Nagy (2005) had shown the university students in this sample were much more permissive in general regarding acceptability judgements than high school students, and there were none trivial effects of the setting. In a group task,

subjects were more lenient than in an individual testing like in the present study. In reactions times in their study, the effects of content was clear. Content-based rejection was faster than grammar based rejection. That implies that our metalinguistic model might be indeed using a content-based approach.

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## Appendix

### *Sample sentences in a logical order*

These are not the original sentences used in the experiment as those were in Hungarian and could not be directly translated. (see them in Pléh, Ivády and Nagy-György 2001).

These are some examples of an analogous English version.

- 1.a. In Japan they speak Japanese.
- 1.b. In Japan they speak Japanish.
- 1.c. In Japan they speak Italian.
- 1.d. In Japan they speak Italish.
- 2.a. Chocolate is sweet.
- 2.b. Chocolates is sweet.
- 2.c. Chocolate is sour.
- 2.d. Chocolates is sour.
- 3.a. Oscar Wilde's drama, "The importance of being Earnest" is situated in England.
- 3.b. Oscar Wilde's drama, "The importance of being Earnest" is situation in England.
- 3.c. Oscar Wilde's drama, "The importance of being Earnest" is situated in China.
- 3.d. Oscar Wilde's drama, "The importance of being Earnest" is situation in China.
- 4.a. Cats have whiskers.
- 4.b. Cats have wings.
- 4.c. Catsen have whiskers.
- 4.d. Catsen have wings.
- 5.a. It can be seen that the airplane was flying high.
- 5.b. It can be sawn that the airplane was flying high.
- 5.c. It can be seen that the battleship was flying high.
- 5.d. It can be sawn that the battleship was flying high.
- 6.a. These days I often go to swim in the sea.
- 6.b. These days I often go to swim in the see.
- 6.c. These days I often go to walk in the sea.
- 6.d. These days I often go to walk in the see.
- 7.a. The charging of electrons is negative.
- 7.b. The chaajing of electrons is negative.
- 7.c. The charging of electrons is positive.
- 7.d. The chaajring of electrons is negative.
- 8.a. I cut the paper with a knife.
- 8.b. I cutted the paper with a knife.
- 8.c. I cut the paper with a napkin.
- 8.d. I cutted the paper with a napkin.
- 9.a. Snowwhite used to live in the forest with the seven dwarfs.
- 9.b. Snowwhite used to lived in the forest with the seven dwarfs.
- 9.c. Snowwhite used to live in the forest with the seven stepmothers.
- 9.d. Snowwhite used to lived in the forest with the seven stepmothers.
- 10.a. You should not kill the goose that lays the golden egg.
- 10.b. You should not kill the goose that lies the golden egg.
- 10.c. You should not kill the hen that lays the golden egg.
- 10.d. You should not kill the hen that lies the golden egg.