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Substance and Its Place in a Model of the Linguistic Expression[1]

Abstract
Among a number of formal grammatical accounts especially two of them, the grammatical triple account and the partial algebra account, seem to attract the attention of linguists and philosophers of language. The main difference between the two lies in the fact that it is only the triple-account where the material form of an expression is directly taken into consideration. This turns out to be an all-important factor that opens up an interesting path for both theoretical and methodological analysis. The aim of this paper is to argue against the algebraic account and to give a stronger and more explicit version of grammatical triples. The offered approach is more general than the standard one in that it leaves room for non-oral forms of speech and allows defining the lack of material form as a grammatically informative argument.

Keywords
grammatical triples, substance, oral speech, writing, inner speech

Streszczenie
Spośród szeregu formalnych ujęć gramatycznych dwa z nich, tj. koncepcja uporządkowanych trójek gramatycznych oraz koncepcja algebry częściowej zdają się zyskiwać szczególnie dużo uwagi wśród językoznawców i filozofów języka. Kluczowa różnica pomiędzy tymi dwoma ujęciami polega na tym, iż tylko koncepcja trójek gramatycznych bezpośrednio uwzględnia materialny kształt wyrażeń językowych. Fakt ten okazuje się szczególnie istotny, jako że umożliwia nowe ścieżki w analizie teoretycznej i metodologicznej. Celem niniejszego artykułu jest polemika z koncepcją algebry częściowej oraz zaproponowanie silniejszej i bardziej doprecyzowanej koncepcji uporządkowanych trójek gramatycznych. Zaproponowane tu ujęcie jest ogólniejsze od standardowego z uwagi na fakt, iż uwzględnia ono niemówione formy językowe i umożliwia zdefiniowanie materialnego kształtu wyrażeń językowych jako gramatycznie relewantnego argumentu.

Słowa kluczowe
uporządkowane trójki gramatyczne, substancja, formy mówione, pismo, mowa wewnętrzna

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1. Introduction

There is a current debate in the literature (cf. Pagin and Westerståhl 2010a, 2010b) over grammatical accounts that allow us to calculate the meaning of expressions in a compositional way. The results presented in the present paper are meant to serve as arguments in favour of the grammatical triple account, as well as arguments against the standard partial algebra account. The paper consists of four main parts. In section 2 I discuss some linguistic expressions whose physical shape appears to be especially important with regard to the linguistic analysis. In sections 3 and 4 I link some logical findings with certain linguistic data in order to establish logical foundations for my account of grammatical triples. In sections 5 and 6 I discuss the problem of abstracting over the elements of grammatical triples.

1.1. Terminology

Let us first define certain terms that will be used throughout the text. First of all, every linguistic expression may become an object of linguistic interpretation. The interpretation process can be defined as a function I that maps particular material objects onto grammatical triples. Thus, each linguistic expression σ that becomes an output of I can be conceived of as a triple $\langle \mathcal{F}_m^\sigma, C^\sigma, M^\sigma \rangle$. $\mathcal{F}_m^\sigma$ (material features) stands for a finite and denumerable set of functions that are defined for σ. The functions correspond to all and only those material features that determine the physical shape of σ, either phonological, written (hence *graphemic*), gestural, or other. To illustrate, in oral speech $\mathcal{F}_m^\sigma$ corresponds to a set of features that determine particular phoneme(s), e.g. being bilabial, being voiced, etc. C^σ stands for a syntactic category of σ, understood in terms of categorial grammars. M^σ corresponds to semantics. It can stand for: (i) a truth value {0,1}, if σ is a sentence; (ii) an object, if σ is a term; (iii) a mapping from n-tuples of objects to the truth values {0,1}, if σ is a predicate.

Moreover, there exist various linguistic operations defined on expressions that generate different expressions. I take *recoding* (D) to be a cognitive operation that can be defined as a function from triples to triples (the identity function is excluded). The value of D is computable on the exclusive basis of a finite and denumerable set of grammatical rules and a finite and denumerable set of lexical terms. Thus, D can be conceived of as a map from one interpreted syntactic tree to another, such that at least one argument of the initial triple is replaced by another. The shift must exemplify some grammatical rule, so that the value is computable via that rule. The way the argument differs from the value determines the operation. To illustrate, if the operation consists in translation from one language to another, D is in general expected to be

a meaning-preserving (viz. M^{σ}-preserving) map, but the material form and the syntax may change. On the other hand, the process of reading aloud a written text is, in general, meant to be a meaning-syntax-preserving map, while the material form is being changed.

It is the first argument of the triple ($\mathcal{F}_m^{\sigma}$) that is the main object of the present analysis. $\mathcal{F}_m^{\sigma}$ is meant to correspond to a set of features that are imposed by the material used to formulate the expression. Therefore, I use a catch-all term *substance* to refer only to those metaphysical objects that are actually used in the process of formulating linguistic expressions.

1.2. A plea for triples

The triple account as given above is not altogether new. It may be traced back in different forms to a number of authors, e.g. Jacobson (2002: 604–605; 2007: 193), Kracht (2007: 58–59), Potts (2007: 408), Maier (2010: 3–4). Definitions of the first and the second argument are quite standard, so that they do not contribute directly to the semantics or to the syntax either. $\mathcal{F}_m^{\sigma}$ is meant to cover a somewhat wider area of linguistic expressions, leaving some room for non-oral alphabets, e.g. writing, gestures, etc.

Now the problem of why one should prefer the triple account to the partial algebra account, as given in Pagin and Westerståhl (2010b: 388–389) or Hodges (2001: 8–9) is not obvious. Here the grammar is defined as a triple that consists of a set of expressions, a set of atoms, and a set of functions that generate the expressions (grammatical terms) from the atoms. That kind of grammar generates strings bound by syntactic functions. Thus letting $^{-}$ be a name of some syntactic operation α, and *walk*, *a* and *dog* instantiate three atoms, one obtains a grammatical term *t*:

(t) $t = \overline{\alpha}(\overline{walk}, \overline{\beta}(\overline{a}, \overline{dog}) = walk\ a\ dog$

The partial algebra account is primarily aimed at coping with the syntax-semantics interface. While it allows to encode subsequent features imposed by the actual shape of expressions, it can also do without it. By contrast, in terms of the triple account the description given above is simply incomplete, for the first argument of the triple remains undefined. Thus, *t* might be a term formulated in oral speech, so that $t_o = \langle /\,\text{wɔːk ə dɒg}\,/, S/_L NP, \|walk\ a\ dog\| \rangle$. It might also be a term formulated in written English, so that $t_w = \langle walk\ a\ dog, S/_L NP, \|walk\ a\ dog\| \rangle$. As a matter of fact, one might also think of situation where the term remains undefined with respect to the first argument, so that $t_{\varnothing} = \langle \mathcal{F}_m \subset \varnothing, S/_L NP, \|walk\ a\ dog\| \rangle$. But a triple cannot remain completely undefined with regard to its arguments.

It is my claim that the partial algebra account is primarily a generalization over material features of expressions. In what follows I shall show that (i) that kind of account leads to certain grammatical ambiguities (section 2), (ii) it is questionable on logical grounds, especially in light of the operation of enquotation (section 4). This, in turn, provides an argument in favour of the triple-account.

2. Writing and oral speech – discrepancies between kinds of substance

In what follows I shall compare subsequent forms of utterances formulated in different substances (oral speech and writing), as well as subsequent forms possessing different material features within one substance. The analysis is aimed at showing the inadequacy of linguistic analysis in which $\mathcal{F}_m^\sigma$ is not made explicit enough.

2.1. Affecting pragmatic mechanisms

To begin with, let us have a look at the mechanism in which particular material features affect the pragmatics of an expression. Consider the phrases *only*, *not only* and the problem of intonation. As Bogusławski (2013) points out, there is a clear distinction between stressed and unstressed occurrences of *only*. Criticizing Mel'čuk (1974) and Ippolito (2007) for dealing exclusively with the unstressed *only* the author points out that 'in the vast majority of uses of *only* there is no real possibility of applying (pure) negation to it'. He also states that *not* ***only*** (where bolding corresponds to rhematic stress) stands for a regular negation of the stressed *only*. Therefore a difference in intonation appears to be meaningful. Consider the following examples:

(1) Peter not **only** smiled.
(2) Peter not only **smiled**.

In (1) *only* is negated in an ordinary way; the speaker simply states that, apart from smiling, Peter did also something else. By contrast, in (2) we find a rhematization operation that implies a certain complementation of what is meant by the speaker. The intonation proper to (2) simply triggers an implicature. Its content can be interpreted as the speaker's imputing to the person he is talking about her not only smiling, but doing something that belongs to a vast range of acts that can be judged good or bad. Note, however, that it is only the proper choice of what is meant that is determined by the context. The very fact

that the semantic value of VP coming after *not only* gets affected is context-independent. To illustrate:

(3a) Peter not only **smiled**. He also gave me a dressing-down!
(3b) Peter not only **smiled**. He also gave me a kiss and said I was his true love!

As we can see, the special intonation – by definition limited to oral speech – provides separate pragmatic mechanisms of conveying certain content. In contrary to what happens when one has to do with a written utterance, one does not need any context to identify the very existence of that range of qualification as soon as one is confronted with the '*not only* + rhematic stress' configuration. But of course it is only a certain direction of how the hearer is supposed to handle the relevant range of acts which is in a way identified by the context. Put more precisely, let *J(x, y)* stand for the function 'x is judged to be better or worse than y'. Here it is the rhematic stress that imposes further constraints on the meaning of the whole sentence. While in the first case it suggests the existence of further actions, in the second it suggests certain features of the action in question. Therefore the meaning of the second part of (1) and (2) seems to look as follows:

1.

$$\|\text{not only}\|(\text{Peter})(\text{smiled}) =$$

$$= [\lambda f \in D_{<e,t>}.[\lambda x \in D.\ (\forall z)(\exists\, g)(z = x \rightarrow (g \neq f\ \wedge\ g(z) = f(z) = 1))](Peter)](smiled)] =$$

$$= 1, \text{ iff Peter not only smiled } \&\ \left\langle \mathcal{F}_m^{only}, C^{only}, M^{only} \right\rangle \wedge F_{\text{rhematic stress}} \in \mathcal{F}_m^{only}$$

2.

$$= [\lambda f \in D_{<e,t>}.[\lambda x \in D.(\forall z)(\exists\, g)(z = x \rightarrow (g \neq f\ \wedge\ g(z) = f(z) = 1\ \wedge J(f(z), g(z)))](Peter)](smiled)] =$$

$$= 1, \text{ iff Peter not only smiled } \&\ \left\langle \mathcal{F}_m^{smiled}, C^{smiled}, M^{smiled} \right\rangle \wedge F_{\text{rhematic stress}} \in \mathcal{F}_m^{smiled}$$

Therefore, it is the unstressed *not only*, together with a stressed VP being the argument of *not only,* that imposes further semantic and pragmatic constraints. Consequently, the denotation of '*not only* + rhematic stress' becomes the subset of *not* ***only***. And it is the proper intonation that determines the inclusion relation.

The examples above exemplify a situation in which a certain pragmatic mechanism is triggered by relevant material features of an utterance. How this relates to our problem? Note that this works in normal situation only in oral speech. There are no written exponents of rhematic stress that are encoded into the written sign system of English. While such exponents may be contin-

gently defined, they are not a part of the common code.[2] In other words, the graphemic substance does not allow to specify the semantics of the expressions discussed above, quite contrary to their phonological equivalents. Therefore if one lets *D* map oral speech onto writing, one obtains a map that returns semantically ambiguous triples; they do not allow to specify linguistic conditions under which the semantic value is clear.

2.2. Pronouns and the problem of indexing

It is far from obvious what actually is the scope of material features. In the discussion given above I examined examples, where $\mathcal{F}_m^\sigma$ triggered certain pragmatic mechanism. An even stronger account may be found in House (2006: 1544), according to which intonation may also construct a context, e.g. a context of discourse. Indeed, it seems to be true that intonation can yield such exponents that play the role of certain elements of the context. Among others, it allows to index some pronouns. These kind of examples are discussed in House (2006: 1550) from the pragmatic point of view. However, the discussion can be extended to semantics, if one encodes certain material features into the expression in question. Let us have a look at the following examples:

(4a) MARY hugged LUCY and then JACK hugged her.
(4b) MARY hugged LUCY and then JACK hugged HER.

Here the capital font corresponds to the stress accent that additionally indicates foregrounded information, quite apart from particular phonological features of all units. Standardly, pronouns are said to be unsaturated expressions that need some input from the situational context. In situation like (4a), the lack of accent imposes no constraints on the reference of *her*. Therefore it is normally indexed by the most salient element in the linguistic context (), viz. the closest (grammatically acceptable) NP. But the indexing procedure appears to be different when the pronoun is marked as in (4b). It directs the hearer's attention to the referent different than the one picked out by the unmarked *her*. How about the semantics of the two pronouns? In both cases the reference of *her* can be computed via standard pronoun rule (cf. Heim and Kratzer 1998:

[2] An anonymous referee suggested that we could accept a convention that, for instance, bolding corresponds to the same function as the rhematic stress. This is of course true. Still, two comments are in order. First, there is no such convention encoded into standard written English. Second, one would then deal with different grammar including an additional rule. Moreover, this does not weaken the argument in favour of the triple account. We would still need to explicate the difference between stressed and unstressed argument, although the speech-writing discrepancy would disappear.

111). However, in each case the assignment procedure is based on different information (for a similar discussion on pronouns, see e.g. Jacobson 2007):

3.

$$\left\|her_1\right\|^{1\rightarrow\text{the closest element in } c_l} = [1 \rightarrow \text{the closest element in } c_l](1)^{c_l} = Lucy,$$

$$\text{iff } her = \left\langle \mathcal{F}_m^{her}, C^{her}, M^{her} \right\rangle \wedge F_{accent} \notin \mathcal{F}_m^{her}$$

4.

$$\left\|her_1\right\|^{1\rightarrow\text{an element different from the closest one in } c_l} = [1 \rightarrow \text{ an element different from the closest one in } c_l](1)^{c_l} = Mary,$$

$$\text{iff } her = \left\langle \mathcal{F}_m^{her}, C^{her}, M^{her} \right\rangle \wedge F_{accent} \in \mathcal{F}_m^{her}.$$

Similarly to the previous case, none of the exponents allowing to index the variables is represented (in normal situation) in writing. Accent is not marked in standard written English, unless it is conventionally defined. Grammatical triple being the value of both *D* and *I* and corresponding to written expressions appears to be semantically ambiguous.

2.3. Ideographic writing system

As soon as one encounters an ideographic system one touches upon problems dramatically different from those pertaining to the oral mode of making utterances. The reason why writing differs so fundamentally from oral speech is that graphemic substance imposes its own semiotic features. Graphemic substance, in contrast to phonetic substance often serves as an intermediary between the speaker and the recipient who are separated in space and time. The recipient frequently exhibits by far more intensive intellectual activity than in the case of oral speech where she can verify her tentative interpretation of the message, e.g. by asking questions. As Hayashi (2009: 185) points out, reception of written utterances knows no limitation on the speed of interpreting or on choosing arbitrary parts of the text for examination, as well as on non-linearity in the interpretation process. It also allows to re-read the same text more than one time[3]. Thus, both *D* and *I* may be conceived of as two-place functions that also bind a context. As we will see in the next section, the last two observations play a crucial role in understanding the *kundoku* phenomenon.

I take ideograms to be writing signs that can remain in semantically non-vacuous relations with oral speech, alphabetic writing, light-flashed Morse code, gestures, etc. This means that the function *D* mapping from ideograms to other signs is, more often than not, defined on grammatically relevant units. The nonvacuousness of those relations distinguishes the ideographic writing system from other ones. In general, signs of alphabetic writing systems can

[3] This point was suggested by an anonymous referee.

represent in isolation only themselves or sounds corresponding to them in oral speech. Moreover, their syntactic relations are rather simple, since they dependent almost exclusively on the linear order. While some Japanese or Chinese ideograms can be semantically vacuous, these are a drop in the bucket compared to the whole graphemic system.

Even more must be said about the semantic value of an ideogram: in spite of its being established by convention, more often than not it remains the same in all languages using the writing system involved, i.e. in Chinese, Japanese, Korean, and Vietnamese[4]. Although the syntactic rules are different in all those languages, the order of the signs can be changed while preserving the text-meaning, provided the proper order of one system is correctly mapped onto the order of another one. Thus, the receiver must know the original order, the destination order and the rule of transformation.

And here we touch upon the essence of the *kundoku* phenomenon. I will briefly discuss it, while illustrating the phenomenon with a simple example. Consider the following written expression 読書. Consider also its two allographic forms 讀書 and 读书 which are proper to the classical Chinese or Taiwan and the modern Chinese, respectively, but can be used in all the four abovementioned languages. This allography carries with it no semantic or syntactic distinctions. Three basic questions have to be answered:

(a) What is the language concerned?
(b) What is its phonological representation?
(c) What does the sign mean?

Actually, the only question we can instantly answer is (c): the whole expression means, depending on context, "to read a text" or "reading a text". But the other two questions cannot be solved by reference to the context. The expressions in question can be recoded in each language in which the Chinese ideographic writing system has been adopted. In the present paper I shall limit the discussion that follows to Chinese and Japanese, for the reason given above (see footnote 3). Thus, the answer to question (a) is: Chinese or Japanese. Question (b) appears to be even more complicated. While in Chinese the whole expression is read as *dúshū,* there are several possibilities of recoding it from Chinese into Japanese,

(b1) *dokusho* 'reading a text'
(b2) *dokusho su* (contemporary *dokusho suru*) 'to read a text'
(b3) *sho o doku su* (contemporary *sho o doku suru*) 'to read a text'
(b4) *sho o yomu* or 'to read a text'.

[4] At present almost exclusively in Chinese and Japanese.

In (b1) the phonological order corresponds to the original Chinese syntax, but the phonological representation is Sino-Japanese. In (b2) the phonological order remains the same as in the original Chinese syntax; however, there is a purely Japanese auxiliary verb *su* (for classical Japanese), meaning 'to do', or (for contemporary Japanese) *suru* which are added to the Sino-Japanese verbal nouns. In (b3) the phonological representation remains the same as in (b2): the Sino-japanese for the stem and purely Japanese for the auxiliary verb; still, we can observe here a different order compared to the original graphemic shape corresponding to the Chinese syntax. What is particularly significant is the fact that, despite that kind of change, the meaning remains the same as in (b2). The expression 'to read a text' consists of the predicate 'to read' (読) and the complement 'text' (書). Although the order of these sentence parts can be different depending on language, the syntactic role and the meaning are constant. Despite the fact that the standard word order of Chinese has the predicate-complement sequence, the reverse of it is true of Japanese. Consequently, one who knows the syntactic role of those parts can change the word order, thus correlating it with a different syntax. That kind of oscillation compels us to add the particle and the auxiliary verb; but this is indispensable only in the case of recoding the text to oral speech or to different graphemic system and not in the case of the primary act of interpreting the graphemic text. What is more, such a syntactic change does not entail a semantic one.

In (b4) the situation is clearly similar to that of (b3); merely the Sino-Japanese phonological representation *doku*, together with the auxiliary verb *su*(*ru*), has been replaced by the purely Japanese verb *yomu.*

Clearly, Chinese writing systems allows certain linguistic ambiguity provided the text remains in the graphemic form. The ambiguity disappears when a given expression is recoded into oral speech. This interesting feature of Chinese characters gave rise to a unique inter-linguistic communication system called *kundoku*. I shall now pause for briefly describing the phenomenon in the next subsection.

2.4. The *kundoku* phenomenon

In the traditional Japanese linguistic studies the *kundoku* was classified as an activity – as doing something. Such a traditional approach is presented by, e.g. Hirayama et al. (1980: 253). Other authors, e.g. Kamei et al. (1996: 321), presented an even more convincing label: they defined *kundoku* as translation. Generally speaking, it was equated with recoding Chinese classics in Japanese in oral speech. However, in that kind of approach no difference was made between the system (represented by the rules of such recoding) and pragmatics (i.e. the process of implementation of those rules). Here I would like to recall important points concerning our issue made by Kamata and Tabe (1994: 3–4),

where *kundoku* is treated as an act of translation. Their approach is clearly cognate to mine; still, a reservation is in order – in view of certain ambiguities in their presentation. First of all, in my opinion *kundoku* should be characterized as a system of rules, to keep the phenomena apart from acts of translation whose nature seems to be entirely different. Moreover, it seems to better grasp the nature of the phenomenon. It is a procedure of recoding (*D*) written Chinese texts in Japanese. Therefore, it is a set of rules that allow mappings from syntactic trees of Chinese to syntactic trees of Japanese. It follows the procedure of interpretation (*I*) that maps a sequence of written signs onto syntactic trees of Chinese. What is especially important here is that neither *D* nor *I* entail the substance switch, i.e. a mapping from material features that determine writing onto material features that determine oral speech. That kind of mapping goes beyond the *kundoku*; it may be cognitively important, but nonetheless it materializes a separate operation. In this regard the sub-vocalization process, pointed out by an anonymous referee, also falls out of the scope of *kundoku*. This fact was already stated by Hjelmslev (1961: §21) when he said that no phonological mediation is necessary in order to understand the written text. The whole system rests upon two crucial features: the features of graphemic substance and ideography.

By features of the graphemic substance I mean a class of features where the existence of a set of forms of utterance is presupposed. Although a written text is generally linear, the graphemic substance enables a receiver to change an original collocation in the process of recoding it. Oral speech, because of the instability of its phonological substance (what I have in mind is of course a situation where no audio-recording device is used), offers that kind of opportunity only in theory, unlike writing, which is by definition free from such limitations.

By ideography I mean here the fact that in their vast majority Chinese characters correspond to triples different from $\sigma = \left\langle \mathcal{F}_m^{\sigma}, C^{\sigma} = NP, M^{\sigma} = \{'\sigma'\} \right\rangle$, so that an ideographic expression may become an input for non-trivial grammatical operations. Crucially, it is knowledge about the *whole triple* that enables one to make that kind of operation. Such an operation delivers different syntactic trees, interpretable on the basis of grammar of the target language. Let us have a look at the following example of the Chinese text *Book of Rites*:

(5a) The Chinese original text (numbers correspond to the order of interpreting subsequent characters):

侍坐	於	長者、履		不	上	於	堂
0 1	2	3 4、	5	6	7	8	9
serve	in	lord,	with.shoes.on	not	enter	PART.	quarters

'If one serves at lord's side, one should not enter the quarters with shoes on.'

(5b) The word order in Japanese recoding (*kundoku*)

長	者	於	侍	坐、履	堂	於	上	不
3	4	2	0	1、5	9	8	7	6

Three comments are in order at this point. First, the output of *D*, viz. (5b) is only one possible way of recoding the initial expression. One and the same Chinese text may be recoded into Japanese in many ways. Thus, letting *D* be a two-place function $D:\langle\sigma,c\rangle\rightarrow\phi$, where *c* stands for standard Kaplanian contexts and σ for the syntactic tree, one obtains a set of possible operations realized in particular contexts $c_1,c_2,\ldots$. Each operation, it bears repeating, may deliver grammatically different trees. Second, the final output is the value of the function $D(I(\pi),c)$, where *c* stands for the initial sequence of written characters. Thus it is by definition determined by grammatical rules, so that the final output cannot be a bosh. Moreover, as stated above, the whole operation is (possibly) meaning-preserving. Third, since *D* may deliver a number of different syntactic trees, the operation that maps onto units of oral speech may deliver a number of possible variants. Of course, the plurality of possible final outputs is caused, in the first place, by graphemic substance that allows a number of *D*-mappings. Obviously, this is not allowed by phonological substance.

The example given above illustrates what was stated in the previous subsection. A text written by means of Chinese characters, provided it is interpreted in its written form, allows a number of mappings within the framework of more than one grammatical system. The ambiguity is of a systemic character, meaning that it is not a contingent feature of a given expression. Surprisingly, those two features were made use of to produce even more linguistically complex expressions; these shall be briefly discussed in the following subsection.

2.5. *Man'yōshū* and the graphemic-grammatical ambiguity

The abovementioned example from *Book of Rites* is by far not an extreme case of linguistic ambiguity we can find in texts written in ideographic writing systems. One of the most illuminating texts in this respect is the first Japanese anthology of poetry *Man'yōshū* ("Collection of Ten Thousand Leaves") compiled in the second half of the 8th century. Even though the poetry is being recoded into oral speech in a purely Japanese way, the written text seems to be grammatically ambiguous. Let us have a look at Pierson's translation of two lines of poem no. 3202, scroll no. XI:

(6)	如何毛君之	Nanika mo kimi ga	Why my lord
	所見不来将有	Miekozaruramu	Doesn't seem to appear

Although the first line is grammatically coherent (the collocation is purely Japanese), the second line represents a Sino-Japanese grammatical contamination. The whole line consists of one compound verb "miekozaruramu". *Mie-* 見え (from *miyu*) 'to be seen' is in the intransitive (unaccusative) verb (notwithstanding the fact that from the purely graphemic point of view there is a Chinese exponent of passive voice, viz. 所; on the other hand, in Japanese the passive voice as well as verb's intransitivity were often used as an appreciative marker) corresponding to *miru* 見る 'to see'. As one can see, in the graphemic form 見 *mi-* is the stem and its intransitivity is marked by the prepositional character. This exemplifies a Chinese collocation, where a separate morpheme *suǒ,* written with the ideogram 所 and put before the verb, was used as an exponent of passive voice. By contrast, in Japanese such a compound expression corresponds to a single verb. Consequently, in the first part of the compound verb, we have a verb 'to be seen' that is written in the Chinese order, but recoded in oral speech in a different, purely Japanese order. The whole analysis turns out to be even more complicated in the case of the second verb *kozaruramu* 'doesn't seem to appear' (literary 'will not come'). The relevant morphological analysis proceeds as follows:

(a) ko– stands for the stem from *ku* 'to come'; in writing it corresponds to the ideogram 来;
(b) –zaru– the morpheme of negation in attributive form (from *zu*) represented in writing with the ideogram 不;
(c) –ramu the conditional mood morpheme, here used in a rhetorical question; represented in writing with the ideograms 将有.

Let us once again have a look at the whole verb *kozaruramu* 不来将有. As one can see, the Japanese order (a)(b)(c) is represented in writing by (b)(a)(c). This is because the order of the stem and the marker of negation is different. Although in Japanese, which is an agglutinative language, negation is marked by means of an ending (by definition succeeding a verb), in Chinese the word-order is the reverse of this and the marker of negation precedes the verb. Consequently, in the case of negation we have the Chinese order in writing, as opposed to the Japanese order in oral speech. But the whole expression turns out to be even more complicated since, in addition, we have the ending *–ramu* marking the conditional mood which corresponds to 将有in writing. Clearly enough, the presence of an ending (here both in writing and in oral speech) represents Japanese, not Chinese, but, on the other hand, the syntax of the written ending is Chinese, not Japanese. What we can observe here is a kind of reinterpretation of the meaning of the Japanese marker and of coding it with Chinese syntax. The literal meaning of the written expression 将有 is

a rhetorical question "is it really going to happen".[5] Therefore, what in Chinese is expressed by means of the morpheme 将 which precedes the verb, in Japanese is expressed by means of the ending. Thus, we can observe here the following situation: the ending of the verb (which is generated by the grammatical rules of Japanese, but absent from Chinese) is written in Chinese syntax.

To sum up, let us have a look at the collocation types of *miekozaruramu* 所見不来将有. Take *R* to be a relation such that reads: 'the collocation between *x* and *y* is generated by the grammar of language R'. Let 'Ch' stand for Chinese and 'J' for Japanese. The description of the expression in question reads as follows:

(7) 所Ch見∧¬(所J見)
不Ch来 ∧¬ (不J来)
来J(将有) ∧¬ (来Ch(将有))
将Ch有 ∧¬ (将J有)

As can be seen, it is impossible to give an unequivocal answer to the question of which language the abovementioned written expression belongs to, quite unlike a similar question concerning its phonological representation.

Let us take stock. The discussion given above shows clearly that certain linguistic phenomena cannot be described properly without taking into account a number of constraints imposed by material features of linguistic expressions. Certain features imposed by material features may affect not only semantic features within a given language. The examples drawn from the Sino-Japanese data show that the expression in question may be classified in different languages, depending on the first argument of the triple. Although the text written by means of Chinese ideograms may be conceived of as undefined (or even mixed) with respect to language (Chinese, Japanese, etc.), that kind of ambiguity is no longer observable in oral speech. I shall now move to more theoretical points and show how the triple account may be defended on logical grounds.

3. We know how we say things. Language as an epistemic object

While the fact that the three elements of grammatical triples affect one another does not seem to be controversial, the fact that all of them must be bound by an epistemic functor tends to be neglected. To cite an illustration from Levinson (2003: 54–55), he compares two, in fact completely different, situations

[5] In Pierson's interpretation it corresponds to 'doesn't seem to'. The ideogram 将 stands for the conditional mood marker of a rhetorical question; 有 stands for 'to be'.

where one party is not able to interpret an indexical properly. His first example concerns the well-known situation when someone posts a notice on the door saying: *I'm coming back in 5 minutes.* The other one is as follows. Someone says: *Listen, I'm not disagreeing with you, but with you, and not about this, but about this.* The very moment the light suddenly went out. From the viewpoint of knowledge of our utterances as interpreted above, the two situations are completely different; they cannot be lumped together. The former example is infelicitous because the speaker is ignorant about the results following the standard way of using graphemic substance, i.e. the fact that the time of utterance is not contextually salient. The receiver of the written text *I'm coming back in 5 minutes* is not able to identify the time denoted by *in 5 minutes*. By contrast, the latter simply embodies a pure coincidence; its infelicitousness has nothing to do with speaker's linguistic knowledge. However, Levinson leaves his examples without any comment concerning the difference between them.

I shall make the discussion more explicit making use of Bogusławski's (2007) concept of the epistemic functor *know that*. The functor $K(s,o,a,\neg(\neg a))$ binds four arguments standing for: an agent, an object, an attribute and its logical complement, to be read: *s* knows about *o* that *a*, not: not *a*.

This is the crucial point concerning the main problem of this paper. One who utters $\sigma = \left\langle \mathcal{F}_m^{\sigma}, C^{\sigma}, M^{\sigma} \right\rangle$ necessarily knows the way each argument of the triple relates to others with respect to the semantics of σ. In other words, she knows how the relationship between the arguments affects the semantics of her utterance. Otherwise the speaker is not a competent user of σ. Put more precisely, let *U* stand for the three-place function that maps from speakers, expressions and contexts (including time, place and world) to utterances, and $R_{\|\sigma\|}$ for the catch-all notion for the relation that is non-vacuous with respect to the semantics of σ. Then the whole rule governing the competent use of any expression reads as follows:

(EXPR-USE)
$$(\forall s,\sigma,c)((\sigma = \left\langle \mathcal{F}_m^{\sigma}, C^{\sigma}, M^{\sigma} \right\rangle \wedge U(s,\sigma,c)) \rightarrow (\forall \alpha,\beta)((\alpha,\beta \in \sigma) \rightarrow K(s,\{\alpha,\beta\},\alpha R_{\|\sigma\|}\beta,\neg(\neg \alpha R_{\|\sigma\|}\beta))))$$

Otherwise the speaker is not competent to use the particular expression. To illustrate, in contrast to (1), the speaker of (2) simply knows that the hearer will expect further explanation with regard to the additional semantic load encoded by means of that kind of intonation contour. Of course, (EXPR-USE) excludes, among others, Levinson's examples.

One could object that in spite of the fact that we do know how we say things, this circumstance does not justify taking substance of an utterance into consideration. Substance might have been conceived of as an argument the scope of which is determined by the semantics and syntax. My argument against such an account comes from the logical properties of the second-order language. I shall make this explicit by making use of Reach's study of quotation.

4. Reach's concept of quotation

Let us first put the problem more strictly. While it goes without saying that knowledge about any expression entails speaker's ability to quote the expression, it is far from obvious whether it necessarily entails the presence of $\mathcal{F}_m^\sigma$ in (EXPR-USE). Theoretically speaking, one could make use of two well-known accounts, viz. the partial algebra account of grammar and Tarski's concept of quotation-functions. Then enquotation would be a map from abstract grammatical terms (i.e. undefined with respect to material features) to quoting expressions, viz. $Q(e)='e'$, where e is the value of functions corresponding to grammatical rules defined on atoms. This was, in general, the view given in Pagin and Westerståhl (2010b). In a similar vein, Cappelen and Lepore (2007) argue that expressions taken as classes may be quoted, quite apart from quotation defined on actual tokens. It is my claim, however, that Reach's findings made in the late thirties show that both accounts are untenable.

As Reach (1938) points out, if one wishes to express the relation between a word and its denotation, one should first name the word; this is because "we cannot speak of what is nameless". Therefore one has to give some name to the word and then state that the word called by a specific name picks out the specific denotation. Consequently, it is not the sentence *His name is Peter* that tells us what the word *Peter* refers to, but the sentence *His name is 'Peter'*. This is because the name in question is not used but mentioned (this is how it is different from, say, *Peter is reading a book*.; for a more detailed discussion, see Geach (1980), Read (1997)). Thus we are not saying the name, but the name of this name. By the same token, if one tries to express the relation between the quoting expression and the quoted expression, one always refers to the name of the expression in question, not to the very expression.

Reach's proposal goes as follows. If mentioning the expression does not allow a speaker to say the name of expression, the expression in question must be shown directly. This, in turn, is not possible as long as one uses only extensional mappings, for the reasons given above. Thus, the argument must be given directly, not via extensional function, in the form of an intensional argument. In formal notation, Reach expresses it as F[x, y, …](u, v, …). The square brackets stand for the intensional argument in material supposition (thus the expression "dog"[6] displays the particular utterance *dog*). The round parentheses enclose the extensional description: 'the name', 'the expression'. Thus, to take an example given by Reach, if one refers to semicolon, she does so in the following way:

[6] I use single quotes to marks expressions of the metalanguage that denote expressions of the object language. Consequently, double quotes mark expressions of the metametalanguage that denote expressions of the metalanguage.

(NAME RELATION) Nm[;](Semicolon)

to be read; *has the name Semicolon*. And as Bogusławski points out (2007: 51–52) when commenting on Reach, the absolute necessity of linguistic expressions playing the part of an immediate object of uncontroversial knowledge manifests itself precisely in the process of quotation (material supposition).

The crucial point concerning the present discussion is given both by Read (1997) and Geach (1980), according to whom Reach's findings show that quotation cannot be a function from expressions of the first-order language to the expressions of the metalanguage. It must, for purely logical reasons, be defined on the material shape exemplified by the token actually being used in the quoting utterance. Gaskin and Hill (2013) argued that every metalanguage that systematically denotes expressions of the first-order language would be satisfactory. Thus, they provide a solution without making use of an intensional argument. However, the authors fail to see that any metalanguage except pure quotation, no matter how systematic, needs defining. And when one tries to define the relation between some artificial metalanguage and the expressions of the first-order language, the initial problem reappears.

In light of Reach's comments, the concept of abstract grammatical terms generated within the scope of partial algebra, as well as the functional approach to quotation, is untenable. On the other hand, as soon as one refers to an expression in terms of quotation, one necessarily refers to its material side. Therefore the aspect of substance utilized in uttering it appears automatically. The very nature of quotation, which consists in reference to the shape of an utterance, implies the presence of some kind of substance. This shows that any act of eliminating the first argument from grammatical triples can be conceived of as a handy simplification, untenable in the case of a general model. Consequently, Reach's findings concerning quotation show that the presence of material features follows from logical, not only empirical, observations.

5. Grammatical triples and empty sets

Does this mean that all linguistic expressions must have a physical form? No, it does not. After all, our everyday life is full of meaningful intrinsic contents[7] that we all may even find hard to verbalize. This, however, does not mean that grammatical triples that correspond to those contents are undefined with respect to the first argument. And this is the all-important point in the present approach.

The problem, however, is not trivial. Since intrinsic contents are meaningful, they must consist at least of the second and the third argument that correspond to (some) syntactic type and the denotation. Let $\sigma = \langle \mathcal{F}_m^\sigma, C^\sigma, M^\sigma \rangle$ be the general form of every linguistic unit. Then for intrinsic contents one obtains $\sigma = \langle \mathcal{F}_m^\sigma, C^\sigma, M^\sigma \rangle$ and $\mathcal{F}_m^\sigma \subset \varnothing$. Then the relevant formula would have read as follows:

(INT. CONT) $(\forall \sigma)((\sigma \text{ is an intrinsic content} \rightarrow (\mathcal{F}_m^\sigma \in \sigma \wedge \mathcal{F}_m^\sigma \subset \varnothing))$.

This seems to be true, but it is quite puzzling from the point of view of linguistic description. If $\mathcal{F}_m^\sigma \subset \varnothing$, then why one should take it into consideration in a general model?

What seems to be crucial here is that the empty set corresponding to the first argument is relevant with regard to linguistic knowledge expressed in (EXPR-USE). An interesting discussion may be traced back to the criticism given by Jakobson and Halle (2002) concerning Hjelmslev's approach to the role of substance in his general model. Hjelmslev (1961: §21) claimed that two expressions formulated in different substances, say written signs and oral speech, may embody the same form. In such view substance becomes a passive addition to the systemic structure. Jakobson and Halle (2002: 27) paid close attention to the purely phonological aspect of words and formulated a universal conclusion:

> If the sound substance were a mere variable, then the search for linguistic invariants would indeed have to expunge it. But the possibility of translating the same linguistic form from a phonological substance to a graphic substance, e.g. into a phonetic notation or into an approximately phonemic spelling system does not prove that the phonological substance, like other 'widely different expression substance', is a mere variable.

[7] For the sake of the present paper I take "intrinsic content" to be equal with its numerous, more or less accurate, synonyms, such as "internal speech", "inner speech", "soliloquy", "psychological objects", etc.

As one can see, even in a systemic approach to language, such as the one Jakobson and Halle were representatives of, the problem of substance figures high on the agenda.

It is at this point that the functor *know that*, the crucial importance of which was stressed by Bogusławski (2007), allows to formalise the whole phenomena without getting involved into epistemic inconsistencies. The point lies not in the fact that every linguistic expression, including intrinsic contents, necessarily consists of all three arguments, while $\mathcal{F}_m^\sigma$ may appear to be an empty set. The point lies in the fact that for all competent users of language the semantic relevance of the relation between all three arguments is the epistemic object. The arguments must be bound by the epistemic predicate. And this fact is perfectly covered by (EXPR-USE). Every competent user of language simply knows about intrinsic contents that the relationship between the empty set represented by $\mathcal{F}_m^\sigma$ and other arguments is semantically relevant. It is not just the case that $\mathcal{F}_m^\sigma \subset \varnothing$; $\mathcal{F}_m^\sigma$ is known to be a semantically relevant empty set.

Now if intrinsic contents are said to be structurally equal to all other linguistic expressions, how do they differ from all lexical units? The point, as I see it, lies in analysability; intrinsic contents are unanalysable. The reason why I take them to be unanalysable comes from quotability. Let me recall what Żytkow (1998) had to say on that account. For any analysis to be possible, the object to be analysed must be isolated from other objects. In order to isolate a unit of intrinsic contents, one first has to point to something that is not a part of inner speech and that is independent of it. The argument is twofold. First, this will never be possible, since the only "cognitive tools" we possess are exactly those intrinsic contents. Second, as Żytkow points out (1998: 90), those "intrinsic contents" cannot be defined verbally. According to him, the only possible definition is the ostensive one. And this is perfectly cognate with the abovementioned concept given by Reach. Intrinsic contents fall out of the scope of any analysis because they are not quotable. And they are not quotable because they escape the scope of Reach's intensional argument, flanked by square brackets.

To close this section, it is worth pointing out that I do not maintain that substance plays the role of a functor that generates a full linguistic expression from an ordered pair of the form $\langle C^\sigma, M^\sigma \rangle$. The crux of the matter lies in the fact that such units are purely theoretically construable concepts. All actual units of language (including the language of thought) must be known by the speakers to be defined with respect to all three arguments, including $\mathcal{F}_m^\sigma$. This also concerns empty sets. Empty sets, e.g. $\mathcal{F}_m^\sigma \subset \varnothing$ or $M^\sigma \subset \varnothing$, simply correspond to possible scenarios that are relevant for communication. In the case of the former the expression in known to be intrinsic; in the case of the latter it is known to lack the denotation. Note, however, that this fact is neither covered by the standard partial algebra account, nor is it given explicitly within all above-mentioned accounts that make use of grammatical triples.

6. Internal irreducibility of grammatical triples

The all-important idea of the concept presented here is that grammatical triples of the form $\sigma = \left\langle \mathcal{F}_m^{\sigma}, C^{\sigma}, M^{\sigma} \right\rangle$ cannot be reduced to any ordered pair. In other words, there exist no linguistic expressions that can become epistemic objects while being undefined with respect to the linguistic features of all three elements of grammatical triples. Put more precisely, if $\sigma = \left\langle \mathcal{F}_m^{\sigma}, C^{\sigma}, M^{\sigma} \right\rangle$ then the following is true:

$$(\text{LING.EXPR.})(\forall \sigma)(\sigma \text{ a linguistic expression} \leftrightarrow (\exists s)(\forall \alpha)\, \exists a\, (\alpha \in \sigma \rightarrow K(s, \alpha, a, \neg(\neg a))))$$

The argument α may stand for the feature 'is an empty set', but the very α is not an empty set; it must convey some relevant information.

Does this mean that there is no room for a description of linguistic expressions of the form $\left\langle C^{\sigma}, M^{\sigma} \right\rangle$? No, it does not. Actually, a number of grammars exclusively deal with that kind of expressions. However, two comments are in order at this point. First, such units are obtained via generalization over full-fledged triples. Otherwise, none of these expressions could be even judged quotable or not. It would simply remain undefined whether such units are utterable in a particular form or not. Second, that kind of generalization changes the status of the linguistic expression in question. The difference I have in mind corresponds to that of Wittgenstein's (1921) distinction between facts and complexes. In short, the complex is the set of all possible configurations; the fact, on the other hand, is the only configuration of this set that actually exists. Thus a complex is neither an actual nor a potential case. It is a set of possible cases, one of which becomes a fact. And since complexes lack their truth-value, they cannot be, as pointed out by Potter (2009: 104), a propositional thought.

A corresponding distinction can be drawn for grammatical triples. As I have been at pains to show, generalizing over material features may result in expressions that are undefined with respect to their linguistic features. Such units cannot, of course, be actually used in an utterance, not only because they are not quotable, but also because they remain undefined with respect to their relevant features. And linguistic units that cannot be used in an utterance (even as a thought) cease to be actual or potential linguistic units at all. It is in this regard that I take the expressions of the form $\left\langle C^{\sigma}, M^{\sigma} \right\rangle$ to correspond to Wittgenstein's complexes. In terms of the notions introduced at the beginning of this paper we can say that expressions of the form $\sigma = \left\langle C^{\sigma}, M^{\sigma} \right\rangle$ correspond to a set of values obtained from a given token via the interpretation function *I*. Tellingly, they do not correspond to any actual act of linguistic interpretation.

7. Summary

The main aim of this paper was to argue for a stronger triple-account of grammar, as well as against the standard partial algebra account. Setting off from particular examples of the expressions of natural language I showed that generalizing over material features changes the logical status of the object to be analysed. This is the gist of the foregoing discussion. The standard partial algebra account as defended, e.g., in Pagin and Westerståhl (2010b) does not, for logical reasons, deal with the actual linguistic expressions, but merely with complexes. Moreover, the standard triple-account turns out not to be explicit enough. In this regard I defined and formalised additional rules that allow to determine the actual status of all the three elements of grammatical triples with respect to any linguistic analysis. The elements have been described from the epistemic point of view, in which it is the epistemic functor *know that*, understood along the lines of Bogusławski (2007), that binds all the elements of grammatical triples. This, in turn, was introduced by means of semantic relation that holds between the elements. This move imposed all-important constraints on the elements of the triple that are not given in other triple accounts. The constraints opened up a new path for describing the expressions generated within the standard partial algebra model. The expressions turned out to be incomplete and thus undefined. What is more, it is the triple account, and not the standard partial algebra account, that allows to express that kind of undefinedness. Within the scope of the latter, subsequent semantic and formal ambiguities presented in section (2) remain unsolved. Therefore the stronger triple account, as given here, allows not only to determine well-formed linguistic expressions, but also to express their conditions and the source of potential incompleteness.

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