

# The Interplay of Propositional and Communicative Information in Sentence Synthesis

Jasmina Milićević  
Dalhousie University

## ABSTRACT

The paper explores the interplay of the propositional (situational, “objective”) and communicative (information packaging) aspects of sentence meaning by looking into ways in which the values of semantic-communicative oppositions such as Thematicity, Focalization, Assertivity, etc., influence the expression of propositional content.

**Keywords:** semantics; paraphrase; semantic structure ~ semantic-communicative structure pairings; limits of paraphrastic variation.

## 1. THE PROBLEM STATED

The meaning of a sentence can be thought of as comprising three aspects: 1) *propositional meaning* (situational, “objective” meaning, representable in terms of logical propositions); 2) *communicative orientation* (organization, or “packaging”, of the propositional content in terms of oppositions Rheme ~ Theme, Focalized ~ Non-Focalized, etc., in view or conveying a specific message); 3) *rhetorical intent* (stylistic orientation given to the propositional content, in terms of the oppositions “neutral ~ formal ~ colloquial ~ etc.” or “neutral ~ ironic ~ poetic ~ etc.”). The expression of the semantic content of a sentence is a result of the interplay between these three aspects of meaning.

Within the Meaning-Text linguistic theory (Mel’čuk 1974, Mel’čuk 2012-2015, Polguère & Mel’čuk, eds, 2009, Mel’čuk & Milićević, in press),<sup>1</sup> these three aspects of linguistic meaning are modeled as three structures making up the Semantic Representation [SemR] of a sentence: Semantic Structure [SemS], Semantic-Communicative Structure [Sem-CommS], and Rhetorical Structure [RhetS].<sup>2</sup> A sample SemR (incomplete—the inflectional meanings are not included) is shown in Fig. 1.

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<sup>1</sup> The main tenets of the MTT can be summarized as follows: the primacy of the Speaker (= synthesis orientation), a paramount role of synonymy (= paraphrase) for both the use and acquisition of language, formal modeling of linguistic phenomena (= construction of models of natural languages or fragments thereof) and dependency relations as the principal organizational factor in language.

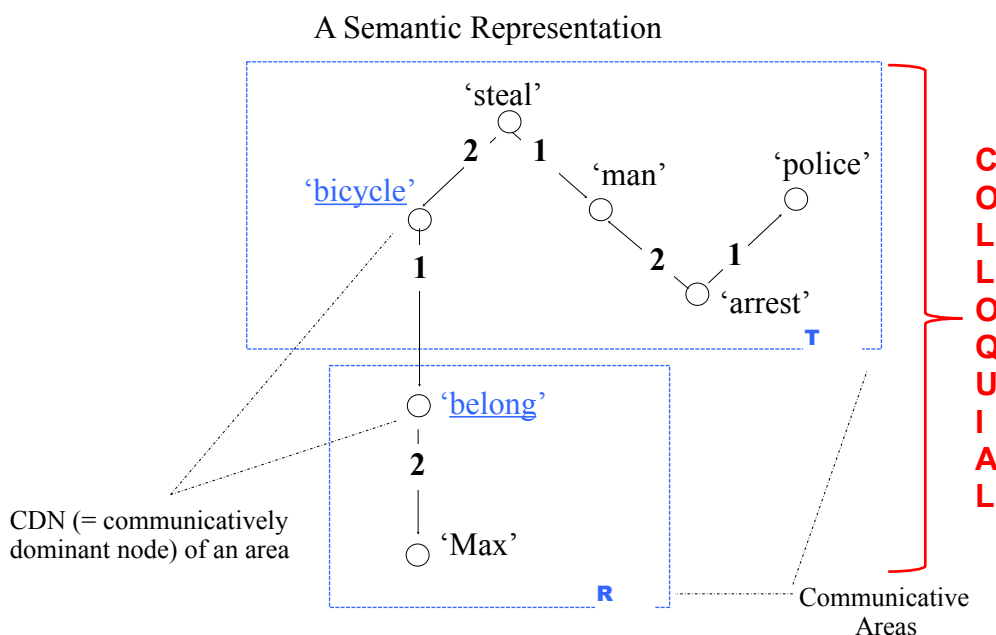
<sup>2</sup> The fourth structure, the Referential Structure, which provides interface with Conceptual Representation (Hampton & Moss, 2003), is “less linguistic” than the other three and will not be considered here.

Given the pervasiveness of synonymic means in language, the meaning specified by a SemR can in principle be expressed by several (near-)synonymous sentences, i.e., *paraphrases*. Thus, the SemR in Fig. 1 can be realized by the following paraphrases (among others).

REMARK. “Q” stands for ‘underlying question’, a piece of preceding context which allows for eliciting the semantic Theme of a sentence.

- (1) [Q: What about the bicycle stolen by the guy that the police arrested?]  
*The bike that the guy áfellow, Br. Eng. bloke, Br. Eng. chap, Am. Eng. dudeñ arrested ácaught, capturedñ by the cops áBr. Eng. coppersñ stole áBr. Eng. nicked, Br. Eng. pinchedñ belongs to Max áis Max’sñ.*

FIGURE 1



In order to better understand the interplay of the three aspects of linguistic meaning in sentence synthesis, we can consider *structure pairings*: 1) SemS ~ Sem-CommS pairings, and 2) SemS ~ Sem-Rhet pairings. In this paper, the pairings of the first type will be examined. More specifically, we will look into the content side of SemS ~ Sem-CommS pairings, having to do with ways in which the different values of Sem-Comm oppositions influence the expression of the propositional content. What is at stake here is mutual substitutability of sentences realizing well-formed pairings which feature the same SemS, leading to the question of limits of paraphrastic variation. (For the formal side of SemS ~ Sem-CommS pairings, involving, on the one hand, well-formedness constraints on the pairings and, on the other, constraints on realizations from well-formed pairings, see Milićević 2002 and 2013.)

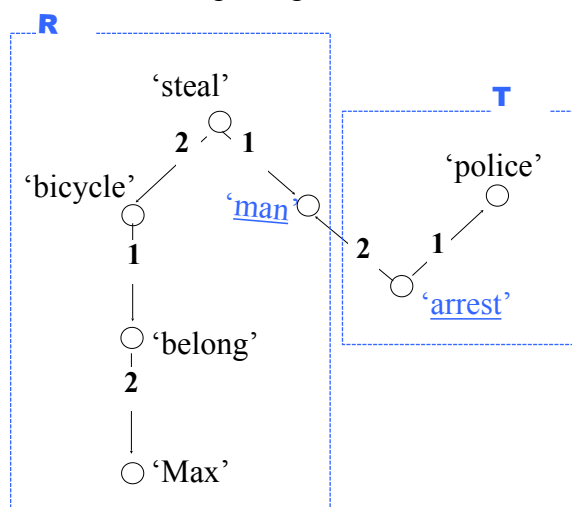
By way of illustration, let us compare, from the viewpoint of their respective realizations, the SemS ~ Sem-CommS pairing in SemR of Fig. 1 with the one in Fig. 2 (next page), both pairing featuring the same SemS. Some of the realizations of the pairing in Fig. 2 follow:

- (2) [Q: Whom did the police arrest?]  
*The police arrested* á*apprehended, took into custody*ñ *the person* á*individual*ñ *who stole Max's bicycle* á*the bicycle owned by/belonging to Max*ñ.

As we can see, the realization of the one and the same propositional content is heavily influenced by communicative parameters. Sentences in (1) and (2) express very different messages (cf. the respective underlying questions)—so different that their mutual substitutability, taken as an indication of their paraphrastic status, is severely limited. Such sentences (= realizations from pairings featuring the identical or equivalent SemSs and different Sem-CommS) are considered *paraphrases in a broad sense* (Milićević 2007: 61ff); they are opposed to *paraphrases in a narrow sense* (= realizations from pairings featuring the same SemS and the same Sem-CommS), which should be substitutable in most contexts.

FIGURE 2

A SemS ~ Sem-CommS pairing with the same SemS as that of Fig. 1



The study reported in the present paper considered the impact of each of the eight communicative oppositions (see below, Subsection 2.1) on the expression of a given propositional content. (Previously, this question has not been systematically investigated; only some of the communicative oppositions, in the first place Thematicity and Focalization, were taken into account.)

A given SemS was alternatively paired with Sem-CommS featuring different values of a single Sem-Comm opposition (e.g., the values EMPHASIZED VS. NEUTRAL of the Emphasis communicative opposition);<sup>3</sup> sentences realizing the resulting SemS ~ Sem-CommS pairings were then examined for mutual substitutability. Lexical means implementing the underlying SemS were kept as constant as possible in order to better appreciate the impact of the varying Sem-CommS on the implementation of the pairings.

The following two assumptions were tested:

<sup>3</sup> That is, in addition to the obligatory Thematicity marking.

- 1) In a given context, it should be possible for the unmarked member of a Sem-Comm opposition to be substituted for the marked one; therefore, at least in some cases, realizations from different SemS ~ Sem-CommS pairings will turn out substitutable.
- 2) In some cases, adjustments of the propositional content, i.e., interventions affecting the underlying SemS, may be necessary to allow for substitutability.

As for the linguistic data, it consists of simple, for the most part constructed, sentence sets placed in a minimal context (a preceding/following sentence, an underlying question).<sup>4</sup>

The study is intended to contribute to a better understanding of the notion of paraphrases in a broad sense, and, ultimately, allow for writing communicative (quasi-)equivalence rules to cover the cases where mutual substitutability of the realizations from different SemS ~ Sem-CommS pairings was found to be possible. (Some such rules were proposed, mainly for Thematicity and Focalization values, in Milićević 2007: 231ff.)

## 2. EVALUATING THE IMPACT OF COMMUNICATIVE INFORMATION ON THE EXPRESSION OF THE PROPOSITIONAL CONTENT

I first briefly present the elements of the semantic-communicative structure as envisaged by the MTT; then, the semantic-communicative oppositions are considered from the viewpoint of their impact on the expression of the propositional content.

### 2.1. The Eight Semantic-communicative Oppositions

The semantic-communicative oppositions distinguished within the MTT framework and their respective values follow.

Table 1. Semantic-communicative oppositions and their values

Communicative Opposition	Values (= Communicative Markers)
Thematicity	{THEME ~ RHEME ~ SPECIFIER}
Givenness	{GIVEN ~ NEW ~ NEUTRAL}
Focalization	{FOCALIZED ~ NEUTRAL}
Perspective	{FOREGROUNDED ~ BACKGROUNDED ~ NEUTRAL}
Emphasis	{EMPHASIZED ~ NEUTRAL}
Assertivity	{PRESUPPOSED ~ NEUTRAL}
Unitrariness	{UNITARY ~ ARTICULATED}
Locutionality	{SIGNALLED ~ PERFORMED ~ COMMUNICATED}

<sup>4</sup> These simple example sentences are not necessarily syntactically simple; in fact, in some cases complex clauses are involved.

The values of Sem-Comm oppositions characterize *semantic-communicative areas* defined over a given SemS or individual nodes thereof; each Sem-Comm area has a *communicatively dominant node* [CDN] (identified in our diagrams by underscoring), which “sums up” the semantic content of the area and serves as its “minimal paraphrase”.

Each Sem-Comm opposition can be characterized for: 1) obligatoriness; 2) multiplicity/recursiveness; and 3) combinability with other Sem-Comm oppositions. Thus, Thematicity is obligatory (at least a Rheme must be defined over a Ssem of a clause), unique (there can be no more than one Rheme and one Theme in a clause), but recursive (secondary and tertiary thematizations are possible), and freely combinable. Focalization is not obligatory, it is rather unique, non-recursive and freely combinable, with some restrictions: focalization markers can appear only within a SemS of a clause, and a backgrounded area cannot be focalized as a whole.

For each value of a Sem-Comm opposition, means of expression can be specified from among four possible such means in natural languages: lexical units, word order, prosody and inflection. These are, of course, language specific. For example, in English and French, the Theme of a neutral declarative sentence is aligned with the Syntactic Subject and sentence-initial, while the Rheme focus is sentence-final. In Salishan languages (Bella Coola, Lushootseed), however, it is the Rheme, implemented by the syntactic predicate (which is not necessarily a verb), that comes first. In Slavic languages, in principle any clause element can express the semantic Theme. While Japanese/Korean have a morphological marking of the Theme (suffixes), Tagalog marks it lexically (by a special particle). And so on.

For more on the Meaning-Text information structure theory, see Mel'čuk 2001; for other theoretical approaches see, for instance, Lambrecht (1994), Krifka (2008) and Krifka & Musan, eds (2012).

REMARK. In order to save space, the values of Sem-Comm oppositions will be indicated directly on sentences, rather than on the underlying SemSs.

## 2.2. Thematicity

Three possible ways of modifying the thematic organization of a sentence are indicated below (Milićević 2007: 233ff); CDNs are underscored.

- Introduction of a secondary thematization: in a rhematic sentence, any actant of the main predicate may become a secondary semantic Theme.
- (3) [Q: What will happen next?]
- a. [*There will be an increase in oil prices.*]<sub>RHEME-1</sub>
  - b. [*[Oil prices]<sub>THEME-2</sub> [*will increase.*]<sub>RHEME-2</sub>]<sub>RHEME-1</sub>*
- (4) [Q: What happened in the Parliament?]
- a. [*The opposition]<sub>THEME-2</sub> [*blasted the PM again.*]<sub>RHEME-2</sub> ]<sub>RHEME-1</sub>*
  - b. [*The PM]<sub>THEME-2</sub> [*was again blasted by the opposition.*]<sub>RHEME-2</sub> ]<sub>RHEME-1</sub>*

But (4b) does not fit into the context [Q: What did the opposition do?], in which (4a) “passes” quite naturally.

For the SemS ~ SemS-Comm pairings underlying sentences in (4), see Fig. 3 (next page).

- Different marking of the same Sem-Comm area

(5) [Q: What are financial experts predicting?]

a. [[*They are predicting*]<sub>THEME-2</sub> [*an increase in oil prices*]<sub>RHEME-2</sub>]<sub>RHEME-1</sub>

b. [*According to their predictions*]<sub>SPEC</sub> [*oil prices will increase*]<sub>RHEME-1</sub>

Paraphrases such as these are frequent with information predicates (SAY, INFORM, PREDICT, FORESEE, etc.) and probably also possible with opinion/attitude predicates (*I think this is OK. ~ In my opinion, this is OK*).

- Changing Sem-Comm areas boundaries & choosing different CDNs

(6) [Q: What about this information?]

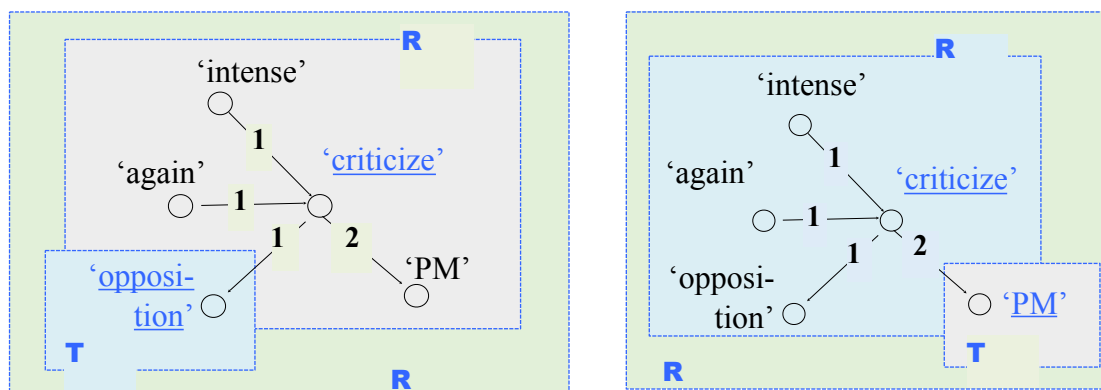
a. [*Its confidentiality*]<sub>THEME-1</sub> [*prevents us from making it public*]<sub>RHEME-1</sub>

b. [*Because of its confidential character*]<sub>SPEC</sub> [*it*]<sub>THEME-1</sub> [*cannot be made public.*]<sub>RHEME-1</sub>

Semantic decomposition is involved here (‘X prevents Y from Z’ = ‘X causes that Y cannot Z’), followed by a different lexicalization of the underlying SemS (‘Y cannot Z, which is caused by X’).

Not any CDN can be changed in this way; causation semantemes in this role can.

Figure 3. SemRs of (4a) and (4b)



In some cases, however, there is no substitutability.

- (7) a. *The guy wearing a bizarre hat entered the bar.*  
 b. *The guy who entered the bar wore a bizarre hat.*  
 c. *The hat worn by the guy who entered the bar was bizarre.*

Table 2: Mutual substitutability of sentences (7) (Mel'čuk &amp; Milićević, in press)

YES	?	NO	Context (following)
(5a)	(5b)	(5c)	<i>He [= the guy] ordered a beer.</i>
(5a)		(5b), (5c)	<i>It was a shabby bar with ...</i>
(5b), (5c)		(5a)	<i>It was a shabby hat that resembled ...</i>

Each sentence in (7) expresses the same three logical propositions: ‘The guy entered the bar.’; ‘The guy wore a hat.’; ‘The hat was bizarre’. However, in each of them a different logical proposition is expressed as the main predication, which substantially limits the range of contexts in which they are interchangeable. Cf. also the bicycle theft sentences in (1) and (2).

### 2.3. Givenness

- (8) [Q: What’s new this morning?]  
 a. [*There is [a gentleman]<sub>NEW</sub> waiting for you.*]<sub>RHEME-1</sub>  
 b. [[*A gentleman*]<sub>THEME-2, NEW</sub> [*is waiting for you.*]<sub>RHEME-2</sub>]<sub>RHEME-1</sub>  
 c. [[*This gentleman*]<sub>THEME-2, GIVEN</sub> [*is waiting for you.*]<sub>RHEME-2</sub>]<sub>RHEME-1</sub>

In (8c), GENTLEMAN seems to be **situationally** given (e.g. ostensibly pointed out to the person that asked the underlying question); in another situation, (8c) and (8a-b) may not be interchangeable. Note also the different, albeit equivalent, thematizations in (8a) vs. (8b-c).

- (9) [“Out of the blue” question; all-rhematic sentences]  
 a. *Could you get me [the book]<sub>GIVEN</sub> that is on the table?*  
 b. *Could you get me [the book]<sub>GIVEN</sub>?*  
 c. *On the table there’s [a book]<sub>NEW</sub>; could you get [it]<sub>GIVEN</sub> for me?*

In (9b), BOOK is, again, situationally given, which allows for removing the propositional material expressed in (9a) within the relative clause. In (9c), there is a substantial change of the syntactic structure that appears to be a necessary “cost” for the change of the Givenness status of BOOK.

These examples seem to indicate that substitutability for GIVEN vs. NEW material is difficult: only specific types of GIVEN are interchangeable with NEW and only within specific thematization (all-rhematic sentences, perhaps containing a secondary theme ~ rheme articulations.); in addition, a modification of the propositional material may be necessary in order to preserve substitutability.

## 2.4. Focalization

- (10) [We now turn to Focalization leaving Emphasis aside.]  
 a. [*This latter topic*]<sub>THEME</sub> [*was examined in Ch. 2.*]<sub>RHEME</sub>  
 b. [*This latter topic*]<sub>THEME, FOCALIZED</sub> [*we examined in Ch. 2.*]<sub>RHEME</sub>

Sentence (10a), featuring a semantic theme *tout court*, and sentence (10b) with a focalized semantic theme “pass” in the same context. The “cost” for this is, however, a change of the syntactic structure: while (10a) is a passive sentence in which the theme is implemented by the syntactic subject, (10b) is an active sentence with a fronted direct object as the theme.

This kind of interchangeability is possible in languages like English that implement a focalized theme by fronting and may not be available elsewhere. Also, other implementations of a focalized theme, making use of lexical means (*As for the focalization, it was examined in Ch. 2.*) are not necessarily appropriate for the same contexts.

When it comes to rheme focalization, there are contexts in which both a focalized rheme and a non-focalized one are possible, as illustrated in (11), but they are no doubt rather limited.

- (11) [Everybody knows about X, one the greatest discoveries of the 20<sup>th</sup> century.]  
 a. *But did you know that [it was by pure chance]<sub>RHEME, FOCALIZED</sub> that X was discovered?*  
 b. *But did you know that X was discovered [by pure chance]<sub>RHEME?</sub>*

The following is an example where the focalization is used in the target language for the same rhetorical effect a lexical mean has in the source language. So, far, no formal description has been proposed for such cases.

- (12) [Next morning, as soon as he entered the courtyard [of Reb Mendel’s house], Mikcha knew ...]  
 Serb. ~ French<sup>5</sup>  
 a. [*Reb Mendel*]<sub>THEME</sub> *se međutim nije pomaljao iz kuće.*  
 ‘RM, meanwhile, was not getting out of the house.’  
 b. [*Reb Mendel, lui*,<sub>APPOSITON, foc. marker</sub>]<sub>THEME, FOCALIZED</sub> *n’avait pas paru.*  
 ‘As for RM, he hadn’t shown up.’

## 2.5. Perspective

The values of the Perspective communicative opposition seem to be rather freely substitutable (BACKGROUNDED is expressed by special prosody/parenthetization, FOREGROUNDED by linear ordering):

- (13) [In a text about the evolution of global temperatures.]  
 a. *Temperatures have been on the rise since 1890 [(Fig. 3).]<sub>SPECIFIER, BACKGROUNDED</sub>*  
 b. [*As shown in Figure 3,*]<sub>SPECIFIER, NEUTRAL</sub> *temperatures have been on the rise since 1890.*
- (14) [Q: What are the plans for this afternoon?]  
 a. [*I am staying at home [(because of the rain)<sub>BACKGROUNDED.</sub>*]<sub>RHEME</sub>

<sup>5</sup> This example was taken from a Serbian novel (Kiš 1979) and its French translation.

- b. [*I am staying at home [because of the rain.]*NEUTRAL]RHEME  
 c. [*[Because of the rain,]FOREGROUNDED I am staying at home.*]RHEME

## 2.6. Emphasis

The marked value of this communicative opposition is always expressed by emphatic prosody (indicated in our examples by capitalization) which in some contexts can be equivalent to some special lexical means, such as *assertorial* in (15b) or intensifiers in (16b-c). The copula in (16a) is used in a tonic (= stressed) form (while in (16b-c) it appears as a clitic); this provides additional emphasis.

- (15) a. *I TOLD*EMPHASIZED *him*.  
 b. *I did tell him*.  
 (16) Serbian  
 a. *To JESTE*EMPHASIZED *tako*.  
 lit. ‘That IS so’.  
 b. *Zaista je tako*.  
 lit. ‘Really is so’. = ‘It is so, indeed.’  
 c. *Tako je, kad ti kažem*.  
 lit. ‘So is, when I tell you’. = ‘It is so, believe me.’

While sentences in (15) can be produced out of the same SemS, those in (16) obviously cannot. This is yet another case of equivalence communicative means ~ lexical means, seen in example (12) above.

## 2.7. Assertivity

The presupposed, i.e., implicit, content in the first sentence of each of the examples below is asserted, i.e., explicitly expressed, in the second one. Presupposition triggers (underlined> are a WH-question in (17a), a definite description in (18a), and a factive verb in (19a).

- (17) a. *How did you kill him?* [Presupposes: ‘You killed him.’]  
 b. *I know you killed him; now tell me how (you did it)*.  
 (18) a. *Our cat is called Tabi*. [Presupposes: ‘We have a cat.’] *He ...*  
 b. *We have a cat called Tabi. He ...*  
 (19) a. *Max knows / doesn't know Shannon's in town*. [Presupposes: ‘Shannon's in town.’]  
 b. *Shannon's in town and Max knows / doesn't know that*.

Sentences (17) have very different perlocutionary effects (a trick question vs. a bona fide one) but are nevertheless interchangeable in some contexts; for instance, that of a police interrogation.

Sentence (18b) explicitly expresses the presupposition of existence carried by the phrase *our cat* in (18a); this is accompanied by a change of the Givenness status of CAT to INDEFINITE.

Factive verbs such as *to know* presuppose the truth of the proposition expressed by the subordinate THAT-clause implementing their second semantic actant; cf. *Max doesn't know if Shannon is in town*, where *to know* has a complement of a different type (a hypothetical clause), which does not carry any presuppositions.<sup>6</sup>

In all the cases above, propositional changes are triggered by a change of Assertivity values which seriously affect arborization (i.e., the syntactic structure); in some cases, additional communicative marking is called for, as well.

## 2.8. Unitariness

The following examples should be considered having in mind that we start from a decomposed SemS—such that at least one of its semantemes is replaced by its decomposition (= the lexicographic definition of the corresponding lexical unit).

Whether a semanteme configuration will be realized as UNITARY or ARTICULATED does not depend entirely on the Speaker, but on the available lexical items and *conflation patterns* (Talmy 1985) preferred or imposed by their language. Some semanteme configurations must be expressed synthetically, i.e., as UNITARY; cf. (21b) and (22b), the latter sentence having been uttered by a native speaker in a context of a police investigation.

- (20) a. *Do you have [siblings]<sub>UNITARY</sub>?*  
 b. *Do you have [brothers or sisters]<sub>ARTICULATED</sub>?*
- (21) a. *He [woke up]<sub>UNITARY</sub> at 8 am.*  
 b. *\*He [ceased to sleep]<sub>ARTICULATED</sub> at 8 am.*
- (22) a. *Three Chinese women ran out of the house.*  
 b. *???Three adult females of Chinese origin exited the residence running.*

It is perhaps possible to consider that the inflectional vs. lexical expression of the irrealis mood is controlled by the values of Unitariness. If so, the same treatment could apply to other modal meanings: ‘may’, ‘might’, ‘should’, etc.

- (23) a. *Max [could have come]<sub>UNITARY</sub>.*  
 b. *Max [had the possibility to come but did not (do so)]<sub>ARTICULATED</sub>.*

<sup>6</sup> Non-factive verbs (*believe*, *suppose*, etc.) do not trigger presuppositions. In order to correctly paraphrase a sentence containing a non-factive verb, e.g., *Max believes that Shannon's in town*, purely linguistic knowledge is not enough, we need to check the real-world situation; cf. *Max believes that Shannon is in town, and she indeed is/but in fact she is not.*; *Max correctly/wrongly believes that Shannon is in town.*

## 2.9. Locutionality

The Locutionality value COMMUNICATED has a strictly technical sense—‘presented in the form that allows for negation and interrogation’ (not to be confounded with the everyday meaning of the word) and SIGNALLED means exactly the opposite—‘presented in the form that does not allow for negation and interrogation’. All non-declarative, i.e., imperative and interrogative, clauses are SIGNALLED.

- (24) [Adapted from Halliday (2004): 634]  
 a. [*Don't!*]<sub>SIGNALLED</sub>  
 b. [*I wouldn't if I were you.*]<sub>COMMUNICATED</sub>

- (25) [Are you sure you can come?]  
 a. [*I promise I'll be there.*]<sub>PERFORMATIVE</sub>  
 b. [*I'll be there.*]<sub>COMMUNICATED</sub>

While it is customary to oppose (25a) and (25b) as direct and indirect performative speech acts (Austin 1959), (25b) is, strictly speaking, COMMUNICATED.

Prosody plays an important role in the implementation of Locutionality values; thus, a different prosody can turn (24b) into a piece of advice, i.e., non-equivalent to (24a), or make (25b) into a threat or a simple statement, again, non-equivalent to (25a).

## 3. Conclusions and Future Work

The paper looked into the interplay of the propositional and communicative aspects of sentence meaning by examining some of the ways in which different communicative markers belonging to one of the eight semantic-communicative oppositions influence the expression of the propositional content. Realizations of SemS ~ Sem-Comm pairings obtained by alternatively superposing upon the same SemS different markers of a single Sem-Comm opposition were compared for mutual substitutability in the same context order to determine if they can indeed be considered paraphrases in a broad sense, as previously postulated. This assumption was borne out, given the following findings:

- Substitutability of sentences marked by different values of a Sem-Comm opposition was possible in many cases of single predication; however, in some instances it required adjustments of the propositional content (i.e., modifying the SemS) and/or additional communicative marking.
- In many cases it was possible to use the non-marked value of a given Sem-Comm opposition as default, i.e., to substitute it for the marked one(s).

Future work should focus on broadening the study to include more languages and authentic examples in order to corroborate the preliminary findings reported here.

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