Cognitive Modeling in Linguistics

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Edited by

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INTRODUCTION

VLADIMIR POLYAKOV[1]

The long period of the existence of CML (Cognitive Modeling in Linguistics) conferences allows us to speak about the relevance of this direction in the complex interlacing of numerous roads of the modern science.

Initially, CML was created intercultural and interdisciplinary. In many respects it was a success, though, as everybody knows, the most difficult barriers are the idea ones.

We yield to the temptation of taking some time to look back. To understand what plans have been realized, and what plans are still waiting for their turn. To outline new goals. To reconsider the answers to the following question–What is cognitive modeling in linguistics? What is being modeled and how? What phenomena are being studied? What models are being created?

Another incidental question is the ratio of fact and model. What facts are taken into consideration? What facts should be considered? The next question is fullness of revealing. What cognitive phenomena are not presented in the topics of CML, what types of models are poorly used? And finally–What is it all for? The main strength of the science is in its explanatory and predictive strength.–Where is it applied?

I understand that every participant of CML has his personal answer to these "childish" questions, and the proceedings of the conference "Cognitive Modeling in Linguistics" are in some respect a collection of a great number of ideas both of leading linguists and young and perspective scientists from all over the world. In the present book we gathered the most outstanding and interesting (chosen by the organizing and programme committees out of several dozens of reports) articles of the participants of CML that belong mainly to the humanitarian part of the XIII-th International Conference "Cognitive Modeling in Linguistics"

During 14 years of its existence, the conference itself became a remarkable event in the cognitive science. It visited such countries as

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Russia, Bulgaria, Montenegro, Romania, Croatia, Greece; and scientists from almost all Europe, many Asian countries, the USA, Australia, took part in the conference.

It is highly flattering to realize that the conference has worked out its scientific character and that it has a constant core of participants. The term “cognitive modeling” became a popular topic of profile conferences in linguistics and artificial intelligence, which also witnesses for the right direction of movement.

I wish successful work to all participants of CML. Everything is only beginning.

NOMINAL TAUTOLOGIES AS AVAILABILITY HEURISTICS

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The goal of this paper is to describe the cognitive processes underlying the use of nominal tautologies of the form *A rose is a rose, War is war, A woman is a woman, Politics is politics, or even A tautology is a tautology,*[1] which are often preferred to descriptive, analytical, non-tautological counterpart structures with a similar meaning. The thesis of the paper is that their use constitutes a case of availability heuristic, due to the ease with which they come to mind, their fixed structure and the fact that they are readily computable.[2]

Keywords: availability heuristics, tautologies, cognitive, bias.

1. Introduction

The association of traditional grammar and logic has been affirmed by the common terms used, such as "subject", "predicate", "mood", etc. The question that arises is if the use of similar terms describes identical content between the two disciplines. This study focuses on nominal tautologies of the form *War is war, A woman is a woman, A kid is a kid, Business is business, Boys are boys, A man is a man, A friend is a friend, Magic is magic, Chomsky is Chomsky,* and its ultimate goal is the description of the cognitive processes underlying the choice to use nominal tautologies, rather than other more analytical non-tautological counterpart structures with similar meaning. After this introductory section, the rest of the paper is organized as follows: Section 2 presents a review of basic descriptions

[1] Cf. the article entitled "A tautology is a tautology" (Hoidas 1988-1989) and the Squib "A tautology is a tautology (or is it?)" (Bulhof and Gimbel 2004).
[2] For this term cf. Clark (1992).

of nominal tautologies; in Section 3 repetition is discussed, as a basic function of language and as a basic function of nominal tautologies, in particular; in Section 4 nominal tautologies are claimed to be a case of availability heuristic and Section 5 concludes the paper.

2. Nominal tautologies

According to Kalish and Montague (1964), a tautology is a symbolic sentence whose truth value is T, with respect to every possible assignment. They are patent tautologies, and so necessarily true. Their meaning, which is identified with their logical form, can be informally stated as follows: "For every entity that it is true to say that it is an x, it is true to say that it is an x". However, as has already been indicated, utterances of this type convey more. In what follows, we will give an account of basic theories that have been proposed for the structure of nominal tautologies.

Levinson (1983, 111) observes that such “tautologies” are necessarily true and that the differences that lie between them, as well as their communicative import, must be due to their pragmatic interpretations. He claims that an account of how they come to have communicative significance can be given in terms of the flouting of the maxim of quantity, assuming, of course, that the speaker is cooperative. In the case, for example, of *War is war*, it must be "terrible things always happen in war, that's its nature and it's no good lamenting that particular disaster." Levinson adds that sentences of this type share a dismissive or topic-closing quality, but the details of what is implicated will depend upon the particular context of the utterance. He concludes that exactly how the appropriate implicatures in these cases are to be predicted remains quite unclear, although the maxim of relevance would probably play a role.

Wierzbicka (1987, 101) claims that utterances like *War is war* are context-independent. She objects to the view that such constructions should be calculable from some language independent principles; although some English “tautological” constructions do have literal counterparts in other languages, they are used with a different communicative import. The constructions in question have a language-specific meaning, and the meaning should be spelled out in appropriate semantic representation. Thus, to explain the partly conventional and language-specific character of tautologies, she submits a semantic metalanguage derived from natural language. She describes it (ibid., 103) as follows:

> "...the proposed method of analysis consists in paraphrasing the word expression, or construction under consideration, in a metalanguage based on intuitively intelligible natural language and couched in simple terms;

this makes possible a precise comparison of both the similarities and the differences between different concepts."

According to Wierzbicka, it is an attitude which can hardly be called "true" or "false". Let us give a sample of Wierzbicka's analysis (ibid., 105):

A "sober" attitude toward complex human activities:
N abstr. is N abstr.
Examples: *War is war*, *Politics is politics*, *Business is business*, **Wind is wind*, **Sneezing is sneezing*, **Wars are wars.*

She provides the following example of her analysis implementing the structure *War is war*:

a. Everyone knows that, when people do things of this kind (x), they have to cause some bad things to happen to other people.
b. I assume that I don't have to say what things.
c. When one perceives that such bad things happen, one should not cause oneself to feel something bad because of that.
d. One should understand that it cannot be different [cannot be changed].

Wierzbicka provides the following formulae for some of the most basic examples of nominal tautologies:

$\text{Noun}_{\text{abstr}}$ *is* $\text{Noun}_{\text{abstr}}$ *War is war; *Wars are wars, Wars will be wars.*
Noun_{pl} *are* Noun_{pl} *Kids are kids; *The kids are the kids.*
Noun_{pl} *will be* Noun_{pl} *Boys will be boys; *A boy will be a boy.*
A N *is a* N *A party is a party; *The party is the party.*
The N *is the* N *The law is the law; The war is the war.*
N_1 *is* N_1 *(and* N_2 *is* N_2*); East is east and west is west.*

Frazer (1988), on the other hand, provides the following account for nominal tautologies:

An English nominal "tautology" signals that the speaker intends that the hearer recognizes that:
the speaker holds some view towards all objects referenced by the NP,

the speaker believes that the hearer can recognize this particular view,

this view is relevant to the conversation.

Metalinguistic in its nature, like Wierzbicka's, Frazer's account, is characterized by excessive generality.

In Hoidas (1988-1989) it was shown that the meaning of nominal tautologies does not correspond directly to the content of a tautological proposition as it is expressed in logic, despite the fact that we are dealing with a structure of a form NPj is NPj. The non-violation of the reasonableness conditions by a structure, which at first sight seems to state the obvious, suggests that a more "subjective", notional specification of meaning should be pursued. Thus, it is suggested that, by being *definitivized*, the repeated element of the structure profiles substructures, thus generating the relevant implicatures. The more definitive a sentence is, the more difficult it is for it to appear in a "tautological" construction. The following examples illustrate the point (ibid., 229):

a) Professors are professors.
b) ?Tenured professors are tenured professors.
c) *Tenured professors who have been at the university for more than fifteen years are tenured professors who have been at the university for more than fifteen years.

Miki (1996) describes nominal tautologies such as *Kids are kids* as forms of self-identification, in which objects referenced by a noun phrase are identified by means of *evocation*, with a set of qualities and attributes normally assumed about them. *Evocation* thus refers to shared beliefs, which are then reaffirmed in the current context of utterance.

Whether the interpretation of nominal tautologies is a matter of primitive semantics and therefore not calculable from some language independent principles (Wierzbicka 1987), or it is the case that radical semantics and radical pragmatics are both found to be inadequate for the interpretation of tautologies (Okamoto 1993), nominal tautologies exhibit similarities in languages like English, Greek and Japanese.

Bulhof and Gimbel (2001) use the term "deep tautologies", in the sense that they acquire meaning not by shedding their tautological status, but by drawing attention to it. The use of a tautology of this form in a conversational context will indicate the speaker's intention that the noun phrase be considered non-vague.

In what follows we provide a brief description of the basic functions of repetition in language in the relevant literature. These general views about the function of repetition will be later examined in the context of nominal tautologies.

3. Repetition: the backround

The significance of repetition for discourse has been emphasized by many authors, who argue that all discourse is partly structured by repetition. It has been claimed that every time a word or phrase is repeated its meaning is altered (Derrida 1976). On the other hand, the cognitive process of comprehension is facilitated by the emotional effect that is created (Tyler 1978, Bateson 1984, Friedrich 1986). Repeating a word, phrase, or longer utterance, creates a rhythmic pattern which produces a cognitive effect. It is this cognitive effect which allows the mind to absorb information. It has also been suggested (Merritt 1994, 28) that repetition facilitates rhythm and provides “catch-up” time, allowing longer periods of time for information to be processed. In a similar line of thought, Jucker (1994), working in the framework of relevance, claims that repetition is an effort saving device. In the context of foreign language learning, a study conducted by Webb (2007) examines word knowledge acquisition at different levels. The results showed that greater gains in knowledge were found, for at least one aspect of knowledge, each time repetitions increased. In sum, all these studies suggest that repetition serves cognitive and interactional functions in discourse.

In the account that follows the thesis of this paper is put forward, which is that nominal tautologies constitute cases of availability heuristics, their use being preferred in some cases over analytical descriptions, which are more complex to process. In other words, nominal tautologies will be presented as a sort of cognitive bias to which speakers fall prey.

4. Availability heuristics

The study of availability bias was developed by Tversky and Kahneman (1973, 1974), who founded the domain of "heuristics and biases" to explain bias in human decision-making. Tversky and Kahneman propose that, when confronted with a task or decision, people use a limited number of strategies, called heuristics, one of them being the availability heuristics. By implementing these strategies, which are based primarily on what is relevant, salient or recent, speakers simplify their judgments and processing. As Tversky and Kahneman (1974, 1127) remark,

> "There are situations in which people assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind. For example, one may assess the risk of a heart attack among middle-aged people by recalling such occurrences among one's acquaintances. Similarly, one may evaluate the probability that a given business venture will fail by imagining various difficulties it could encounter."

Tversky and Kahneman call this judgmental heuristic availability. It is the availability heuristic which allows instances of large and common classes to be remembered better and quicker than instances of less common classes, and likely occurrences to be easier to imagine than unlikely ones. The availability bias causes us to base decisions on information that is more readily available in our memories, rather than other data. Humans estimate the occurrence of an outcome by assessing the ease with which instances of categories come to mind, rather than examining complete data, alternatives or procedures. Judgments of frequencies, choices or probabilities are shaped based on assessed availability.

In the next chapter we will elaborate on the thesis of the paper, which is that nominal tautologies are cases of availability heuristics, due to the fact that factors such as familiarity and salience, which characterize nominal tautologies, affect their retrievability.

5. Nominal tautologies as availability heuristics

The thesis of this paper is that nominal tautologies are intimately connected with the availability bias. This is based on the fact that when confronted with the task of processing general classes and their properties, such as *men, war, women, kids, boys,* or even *tautologies,* rather than making complex analytical descriptions of those properties, speakers often resort to the cognitively and semantically dense statements of the form that nominal tautologies have, such as *Men are men, War is war, Women are women, Kids are kids, Tautologies are tautologies*, etc. Thus, speakers use a heuristic strategy by which they simplify their judgments and reduce their processing effort, based primarily on what is personally relevant and salient, as well as conventionalized. Speakers resort to nominal tautologies due to the fact that these expressions come to mind easily in actual speech situations. There is a stock of conventionalized nominal tautologies which are known by all speakers. Their generation, retrieval and association seem to be facilitated by the ease with which they are produced, due to the simplified processing they require, compared to the more analytical

counterpart language that could be used in their place. In fact, rather than going into the details of properties associated with the general classes of the noun phrase referred to, we claim that speakers often resort to the flexible, non-binding[3] character of nominal tautologies. Furthermore, repetition of a noun phrase in the context of nominal tautologies provides "catch-up" time allowing longer periods of time for information to be processed, thus acting as an effort and time saving device.[4]

The view that all discourse is structured by repetition finds application in nominal tautologies in particular, which are linguistic mechanisms par excellence structured by repetition. It appears then that in the context of nominal tautologies the meaning of the second occurrence of the noun phrase is denser than the meaning of its first occurrence. Thus, nominal tautologies appear to be an example of the view that each time a word or phrase is repeated its meaning is altered.[5] However, in the context of nominal tautologies repetition happens in a much more structured way, providing evidence about the relationship between language and cognition, as well as the tautological aspects of language.

We claim that resorting to the nominal tautologies heuristic is favored by the fact that the repetition of the noun phrase of nominal tautologies results in a rhythmic pattern which produces a cognitive effect, a fact already noted in the literature.[6] An attempt to describe this cognitive effect in the context of nominal tautologies has been made by Hoidas (1988-1989), who describes the function of nominal tautologies as a *definitivization* process, according to which the repeated element of the structure profiles substructures, thus generating relevant implicatures. In a similar manner, the cognitive effect produced by nominal tautologies could be accounted for by Miki's (1996) description of nominal tautologies as forms of self-identification, in which objects referenced by a noun phrase are identified by means of *evocation*, with a set of attributes assumed about them.

So, there are obvious reasons for which there is a bias to use nominal tautologies. The questions that arise then concerning the choice to use nominal tautologies are the following:

- Who would not be attracted by nominal tautologies, which allow the cognitive effect of comprehension to be facilitated by the emotional effect that is created?

[3] Interlocutors are free to assign their own meanings to the general classes described by the NPs involved in the structure.
[4] Cf. Section 2 above.
[5] Cf. Section 2 above.
[6] Cf. Section 2 above.

- Who would not be attracted by nominal tautologies, which facilitate rhythm and provide "catch-up" time, allowing longer periods of time for information to be processed?
- Who would not be attracted by nominal tautologies, which constitute time and effort saving devices?
- Who would not be attracted by the ease with which they come to mind?
- Who would not be attracted by their fixed structure?
- Who would not be attracted by the fact that they are readily computable and non-binding?

6. Conclusion

An availability bias has been described as happening when we make a judgment based on evidence that comes easily to mind, rather than assessing complete data. The existence of cognitive biases can be verified empirically in language, a case being nominal tautologies. Using nominal tautologies speakers can connote things which would normally take elaborate language to describe, leaving this way processing time and effort to other parts of the message. It is this fact which makes the communicative potential of such expressions humongous. However, along with these positive aspects of the choice to use nominal tautologies there is the opposite side of the coin. Nominal tautologies may sound like clichés which involve a kind of automatic processing. This means that they are easily generated, but they constitute a kind of mental bias which may block the speaker from being explicit and analytical in contexts in which it is necessary. Being powerful and productive, as nominal tautologies are, has a cost.

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HIGH-LEVEL METAPHOR AS A MOTIVATING FACTOR IN THE CAUSED-MOTION CONSTRUCTION

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The paper argues that a fuller understanding of the semantics associated with the caused-motion construction needs to take into account the high-level metaphorical operations underlying them. High-level metaphor lies at the basis of grammatical processes such as subcategorial conversion which accounts for the change of a verb with a prepositional complement (e.g. *laugh at*) into a purely transitive verb (e.g. *laugh someone*). The focus of the paper will be on sentences that illustrate metaphorical uses of the caused-motion construction in English. Examples instantiating such uses include *They laughed him out of the room, She drank herself into a depression* and *He stared me into silence.*

Keywords*:* caused-motion construction, construction grammar, constructional meaning, lexical constructional model, high-level metaphor, lexical-constructional subsumption.

1. Introduction

We have chosen to approach this topic for at least two main reasons: first, figurative uses of the caused-motion construction are not discussed extensively and systematically in literature; second, learners of typologically different languages (e.g. English and Romanian) often fail to make frequent and good use of the caused-motion construction (probably because constructions in L2 can be obscured by constructions existing in L1).

The aim of this paper is to examine sentences that illustrate metaphorical uses of the caused-motion construction in English and to use the analytical

and explanatory tools developed by The Lexical Constructional Model (Ruiz de Mendoza and Mairal, 2007; Mairal and Ruiz de Mendoza 2008, 2009) in the analysis of the integration of lexical items within the caused motion construction

2. Constructions: definition, characteristics, types

In traditional grammar the term "construction" is used in a somewhat loose manner and usually refers to a rather abstract, recurrent configuration of morphosyntactic categories which is typically smaller than a sentence and larger than a word, such as the infinitive construction, the participle construction, etc. In Construction Grammars the term "construction" constitutes a broadening of the traditional notion because it is seen as a symbolic configuration, a complex sign, a pairing of form and meaning. Construction grammarians consider constructions as the basic units of grammar.

A construction is defined by the criterion of unpredictability in the sense that at least one of the properties of the construction must not be predictable from its constituent parts and its formal make-up:

> "Any linguistic pattern is recognized as a construction as long as some aspect of its form or function is not strictly predictable from its component parts or from other constructions recognized to exist."
>
> (Goldberg, 2003: 219)

In Goldberg's view, constructions can vary cross-linguistically:

> "Crucially, all linguists recognize that a wide range of semi-idiosyncratic constructions exist in every language, constructions that cannot be accounted for by general universal or innate principles or constraints".
>
> (Goldberg, 2003: 222)

From the perspective of language acquisition, constructions are the basic language units that children acquire when learning how to speak a language.

In terms of schematicity/abstractness, constructions can classified as: (1) fully lexicaly filled (e.g. idioms), (2) partialy lexically filled (e.g. the *let alone* construction) and (3) fully schematic (e.g. the *caused-motion* construction).

In her 1999 article, Goldberg distinguishes five types of argument structure constructions:

1. Intransitive: *Pat sneezed.*
2. Cognate object: *Pat sneezed a terrible sneeze.*
3. Resultative: *She sneezed her nose red.*
4. Caused-motion: *She sneezed the foam off the capuccino.*
5. *Way* construction: *She sneezed her way to the emergency room.*

3. Caused-motion construction: form and semantics

The Caused-motion construction is a construction common to satellite-framed languages (e.g. German, Dutch and Swedish) but almost inexistent in verb-framed languages (e.g. Spanish, French and Italian), a phenomenon that may facilitate or hinder its learning. In English**,** the form of the caused-motion construction is as follows: [SUBJ [V OBJ OBL]] (Goldberg (1995)). The slot of V is occupied by a non-stative verb and OBL, which stands for 'oblique', is realized by a directional prepositional phrase.

(1) *They laughed the poor guy out of the room.*
(2*) Frank sneezed the tissue off the table.*
(3) *Mary urged Bill into the house.*
(4) *They sprayed the paint onto the wall.*
(5) *Lily coaxed George under the table.*

The semantics associated with the caused-motion construction in English is roughly the following**:** X CAUSES Y TO MOVE Z, that is, the causer argument causes the theme argument to move along a path indicated by the directional prepositional phrase. This interpretation, exemplified in (6), (7), (8) and (9) is considered to be the central sense of the caused-motion construction because the verb entails concrete, physical motion.

(6) *The cow shouldered Sam to the ground.*
(7) *She blew the dust off the picture.*
(8) *The wind blew Mary's hair into her eyes.*
(9) *George tickled Jane off the sofa (with a feather duster).*

However, there are cases in which the semantic interpretation cannot be attributed to the main verb or when the semantics of the construction is not inferred from the lexical elements which occur in it.

4. Extended senses from the basic sense

Besides the basic sense of the caused-motion construction, Goldberg (1995: 161-162) discusses four extended categories of related senses:

The first extended sense differs from the central sense in that motion is not strictly entailed; only if the conditions of satisfaction of the predicate are met, motion is involved. Examples include verbs that are force dynamic verbs that encode a communicative act and express directives such as persuasion (10), request (11) and invitation (12):

(10) *Sally implored Jane into the shop.*

In (10), Sally imploring Jane into the shop does not necessarily mean that Jane actually moves into the shop. Motion is implied if the conditions of satisfaction designated by the predicate are fulfilled. In example (10), Jane will enter the shop eventually, if the persuasion is satisfied. Likewise, if the request in (11) is satisfied, the person will enter the cottage:

(11) *Sally asked him into the cottage.*

Similarly, the invitation in (12) is satisfied if the person enters the car:

(12) *Sally invited him into the car.*

The second extended sense is 'X ENABLES Y TO MOVE Z'. This subset includes verbs that encode the removal of a barrier (e.g. *allow, let, free, release*). This subset is illustrated in (13) and (14), examples that contain verbs which express enablement or permission (*allow, let*):

(13) *The gaoler allowed Allen out of prison.*
(14) *They let Allen into their hotel room.*

The third subset of constructions which derives from the central sense has the following function: 'X PREVENTS Y from MOVING Comp(Z)'. The path argument 'CompZ' codes the complement of the potential motion. This subset, unlike the previous one, can be described in terms of the force-dynamic schema of imposition of a barrier, causing the patient to stay in a location. It includes verbs such as *lock*, *keep*, and *barricade*:

(15) *John locked George into a dark cellar.*
(16) *The work kept George at the office.*

(17) *Her ex-lover barricaded Jessie out of her own home*.

In (15), what is entailed is that John prevented George from moving *out of* the cellar. Likewise, in (16), the work prevented George from moving out of the office, while (15) implies that Jessie's ex-lover prevented her from entering her house.

The fourth subset includes constructions with the meaning 'X HELPS Y to MOVE Z'. This subset implies continuous assistance to move in a certain direction as illustrated in the following examples:

(18) *Allen helped Helen into the wheel chair.*
(19) *The nurse assisted Mr. Brown out of his bed.*
(20) *Helen guided Allen through the cold empty streets.*
(21) *Helen invited Allen into her quaint sitting room.*
(22) *Helen walked Allen to the bus stop.*

5. The issue of 'fusion'

In order to understand how an intransitive, non-motion verb can participate in the caused-motion construction such as the instantiation in (1) *They laughed the poor guy out of the room*, we have to understand the notion of "fusion". Jackendoff (1990) uses the term 'fusion', to designate the combining of semantic constraints on distinct but coindexed slots within a given lexical entry, while Goldberg (1995: 50) uses it to capture "the simultaneous semantic constraints on the participant roles associated with the verb and the argument roles of the construction". In other words, fusion refers to the conditions that the construction imposes on lexical meaning for a lexical predicate to be a candidate for incorporation into the caused-motion construction; it is the process whereby a verb's participant roles are integrated with a construction's argument roles.

Goldberg's Construction Grammar assumes that fusion or lexical constructional integration is facilitated by the Semantic Coherence Principle and the Correspondence Principle. The Semantic Coherence Principle states that participant roles are matched with argument roles with which they overlap, such that one can be construed as an instance of another. For example, general categorization principles enable us to determine that the THIEF participant role of the verb 'steal' overlaps sufficiently with the argument role AGENT, because both share semantic properties such as ANIMACY, INTENTION, CAUSATION and so on. The Correspondence Principle states that profiled argument roles are obligatory matched with profiled participant roles. If the verb has three profiled participant roles,

then one of them may be fused with a nonprofiled argument role of a construction.

In the Lexical Constructional Model (LCM), a cognitively-oriented constructionist approach founded by Ruiz de Mendoza and Mairal (2008), the term 'fusion' is replaced by the term 'lexical constructional subsumption', defined as "the principle-regulated fusion of a lexical template into a higher-level constructional pattern". A lexical template is a low-level semantic representation of the syntactically relevant content of a predicate which captures lexical structure. A constructional template is a high level or abstract semantic representation of syntactically relevant meaning elements abstracted away from multiple lower-level representations.

The LCM recognizes a number of constructional types such as the caused-motion construction, the resultative construction and the benefective construction. Ruiz de Mendoza and Mairal see lexical constructional integration as a cognitive process that is constrained by a number of internal and external principles. Internal constraints refer to the metalinguistic units encoded in a lexical representation, while external constraints invoke higher conceptual and cognitive mechanism like high level metaphoric and metonymic operations. It is towards this last group of constrains, i.e. external constrains that will be the focus of our attention in the remaining sections.

6. High-level metaphor in grammar

A high-level metaphor accounts for the adaptation of the lexical meaning of the verb to the constructional meaning. For example, a sentence like *Peter laughed John out of the office* can be understood by analogy with *Peter kicked John out of the office.* Therefore, a verb with a prepositional complement (e.g. *laughed at someone*) can be changed into a purely transitive verb (e.g. *laugh someone*) due to the analogy mentioned earlier, or, more technically, due to the mapping or high level metaphor 'EXPERIENTIAL ACTION IS EFFECTUAL ACTION' (i.e. an action that has a direct physical effect on the object).

In grammar, besides changes in the transitivity type (23), high level metaphor also accounts for nominalizations (24) and conversions of verbs into idiomatic types (25):

(23) *He talked me into business.*
(24) *We couldn't prevent the destruction of the town by the enemy*
(25) *They gave the thug a big beating.*

The high level metaphors at work in the above-mentioned examples are: COMMUNICATIVE ACTION IS EXPERIENTIAL ACTION (23), EVENTS ARE OBJECTS (24) and ACTIONS ARE TRANSFERS (25).

7. Metaphorical senses of the caused-motion construction

7.1 Real motion without motion verbs

The list of high-level metaphors mentioned in the previous section can be completed with other types that underlie instantiations of the caused-motion construction. One of them is the case where real motion is expressed but no motion verb is used, as in the following examples:

(27*) Sam frightened Bobby under the bed.*
(28) *The students shouted him out of the lecture hall.*
(29) *She winked him into her bedroom.*

Ruiz de Mendoza and Mairal (2008) identify other high level metaphors that constrain lexical-constructional subsumption. For example, in (30a) the metaphor COMMUNICATIVE ACTION IS EFFECTUAL ACTION licenses a subcategorial conversion process whereby the receiver of the message is seen as if directly affected by the action of talking rather than as the goal of the message:

(30) a. *Firefighters coaxed the man down from the roof.*
b. *She lured him into the room.*
c.**Sam convinced/persuaded him into the room.*
d. *Sam convinced/ persuaded me to go into the room.*

Semantically related verbs such as “convince” and “persuade” (30c) do not appear in the caused-motion construction. Goldberg (1995) finds examples such as “Sam convinced /persuaded //instructed/encouraged him into the room” unacceptable. However, verbs like “coax” and “lure” do appear (30 a, 30 b). The explanation lies in the existence of a cognitive decision made by the entity denoted by the direct object. This cognitive decision mediates between the causing event and the entailed motion. Example (30d) shows that it is possible to use the verbs ‘convince’ and ‘persuade’ in a caused-motion sense without making direct use of the caused-motion construction. This constraint does not apply in cases of figurative motion to which we turn in the next section.

7.2 Figurative motion indicating a change of state

A high-level metaphor which accounts for the adaptation of the lexical meaning of the verb to the constructional meaning is AN ACTIVITY IS AN EFFECTUAL ACCOMPLISHMENT. In (31) this metaphor allows us to interpret the originally intransitive predicate “drink” in terms of a transitive structure of the “actor–reflexive object” kind:

(31) *He drank himself into a stupor.*

The high level metaphor AN EMOTIONAL STATE IS AN EFFECTUAL ACTION underlies a sentence like (32), where the sensor is treated as an effector and the phenomenon as an effectee:

(32) *Peter loved Mary back into life*.

7.2.1 Figurative motion with motion verbs

Uses of the caused-motion construction which illustrate the case where there is a caused-motion verb but there is no real motion, i.e. caused-motion is figuratively used to express a change of state, include the following:

(33) *She drove me into a depression.*
(34) *His words shook her out of her bad mood.*
(35) *The work pushed him to the brink of insanity.*
(36) *The discovery threw her into a state of great excitement.*
(37) *A terrible noise pulled him out of his thoughts.*
(39) *The news quickly knocked her out of her complacency*.

8. Conclusion

Following the supporters of the LCM model, we have shown that external constraining factors on the lexical-constructional fusion process are cognitive operations (e.g. high level metaphorical mappings) that affect the subsumption process. From the grammatical point of view, we have seen that a goal-directed intransitive expression can be transitivized when a high-level metaphor is at work. Generally, changes in the tranzitivity of a verb in the caused-motion construction are possible because of high-level metaphors.

Approaching figurative uses of the caused-motion construction we have grouped them into three classes:

1. motion involved only when the conditions of satisfaction of the predicate are realized (section 2)

2. literal, actual motion without motion verbs (section 6.1)

3. figurative motion with motion verbs (section 6.2.1).

The high-level metaphors that act as external constraining factors in the caused-motion construction include EXPERIENTIAL MOTION IS EFFECTUAL MOTION, COMMUNICATIVE ACTION IS EFFECTUAL ACTION and AN EMOTIONAL STATE IS AN EFFECTUAL ACTION. These metaphors seem to operate when verbs that are not independently caused-motion (e.g. *laugh, coax, love*) are coerced into such a verb class.

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FUNCTIONALITY AND METONYMY

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The paper provides a formal account for metonymies on the basis of frames understood as recursive attribute-value structures. The central claim is that metonymies are constrained by two principles: concept preservation and target functionality. The first principle formalizes the widely accepted view that metonymies occur within one conceptual representation. The second principle states that a functional link between the source and the target concept is required–a constraint which is missing in previous approaches. We provide evidence for both principles by analyzing metonymical shifts in semantic change and word formation.

Keywords: metonymy, frames, semantic change, word formation.

1. Introduction

Since the 1980s, several approaches have analyzed metonymy as a mapping between two contiguously related concepts, i.e. a source and a target concept which belong to the same conceptual domain, idealized cognitive model or frame. However, these theories are not restrictive enough to exclude cases in which a metonymical shift from one concept to another is not possible, despite the fact that there is an incontestable relation of contiguity between them. In this paper, we postulate an additional necessary condition: functionality of the target concept in relation to the source concept. We propose a model of metonymy on the basis of an entirely formalized, concrete account that is based on the frame theory of Barsalou (1992).

Based on a critical discussion of current approaches to metonymy, we first formulate two principles which underlie metonymical shifts: concept preservation and target functionality. In order to be able to define concept

preservation in clear terms we subsequently formalize the structure of concepts as frames in the sense of Barsalou. According to Barsalou, frames are the general format of conceptual representation. However, his theory does not rely on a formalized basis. We build upon the formal modeling of frames as directed graphs, as introduced by Petersen (2007). Since this model is static, it cannot capture meaning shifts like metonymy. For this reason, we define morphisms the way they are used in graph theory. On this basis it is possible to capture operations on frames mapping one frame onto another. It will be argued that metonymy corresponds to a subtype of morphisms we will refer to as conceptual isomorphism which covers both principles. The relevance of these principles as well as the adequacy of our frame approach is illustrated by analyzing metonymical processes in semantic change in French and deverbal nominalization in English.

2. Metonymy

2.1 State of the Art

In antique rhetoric, *metonymy* (Gr. *met–ōnymía* 'renaming' from *metá/met-*'across/over to sth.' and *ónoma* 'name') is regarded as a figure of speech based on the meanings or referents of words. It consists in designating a thing not by its original designation–the *verbum proprium*–but by another word–the *verbum translatum*–whose meaning is logically, i.e. not by analogy or resemblance, related to what is really meant. Even if Aristotle himself does not mention metonymy, his four main types of metaphor (cf. Aristotle 1982 [335 BCE]) incorporate at least two types which would now be classified as metonymies since they rely on taxonomic relations: hyponym for hypernym and hypernym for hyponym.

Modern approaches to metonymy adopted the concept and recognized its crucial role for human thought and communication far beyond simple rhetoric stylistics. They maintain the idea that metonymy means using a word in a sense which does not correspond to its original meaning. But in contrast to the traditional view which states vaguely that there has to be some kind of contiguity between the involved meanings, the main emphasis is put on the assumption that metonymy relies entirely on the way concepts are related to one another in the brain. These cognitive approaches to metonymy try to explain what kind of conceptual processes the meaning shift of the used word consists in and which are the exact conditions on which metonymy becomes possible.