

## EMBODIED CONSTRUCTION GRAMMAR APPROACH TO COMPOSITIONALITY AND CONCEPTUAL REPRESENTATION

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### ABSTRACT

The objective of this paper is to bring us a little bit closer to a general Neuro-Cognitive Theory of Cognition in Language and Thought that can account for the mechanics of language understanding, studied by the models of AI or connectionism, and the biology, explained by neurology and psychobiology. Embodied Construction Grammar (Bergen et al. 2001) provides a formalism to show conceptual representation. Traditionally compositionality is considered a key feature of structured representational systems, be the case of the so called linguistic system. A system of representations is considered compositional because the semantic values of complex representations are determined by the semantic values of their parts. It is the aim of this paper to further the exchange of views on compositionality across disciplines and to explore the implications and condition of compositionality as a property of representational systems in the study of language, mind and brain.

### INTRODUCTION

Compositionality is the idea that the meanings of complex expressions (or concepts) are constructed from the meanings of the less complex expressions (or concepts) that are their constituents. Compositionality has become the key for theories of lexical meaning but such is so hard to find that it filters out practically all of the theories of lexical meaning that are current in either philosophy or cognitive science. What matters about meanings is how they relate to the world, and the way to investigate this is by showing what else they entail.

Grammatical Constructions (Goldberg 1995) are conventional compositions of form and meaning. But meaning is not constructed in any single inferential space and by the same associations. It resides in the entire array and its connections (Fauconnier & Turner 1998:158). Today's orthodox framework, ruling in Cognitive Science, stresses the need of positing abstract entities (semantically interpretable) in order to explain cognitive activity. This view affects both to the classical cognitive sciences—e.g., AI—as well as to connectionist modelling—e.g., artificial neural networks—, and maintains that the only way to understand higher cognitive processes is by means of the combination and recombination of symbolic and/or subsymbolic units.

The Embodied Construction Grammar theory states that language comprehension and language generation are possible thanks to a set of constructions elaborated by means of the **interaction of semantic units and simulation-based inference based in bodily grounded structures**, such as image schemas and executing schemas (Bergen et al. 2001). As language typically underspecifies meaning, the pragmatic circumstances will often determine what a specific utterance is actually taken to mean, so we will initially turn then to the notion of frame (Fillmore 1992). Frames relate to typical situations with familiar processes and role configurations and are also associated with entrenched language routines. For that reason they provide a great scenario for creative processes involving such routines.

### NOMENCLATURE

Put nomenclature here.

The principle of compositionality says that the meaning of the whole is a simple function of the meanings of the parts and their mode of composition. So the meaning of John loves Mary is a function of the meanings of John, loves and Mary, together with the fact that John is the subject and Mary is the object. It's all very well (and important) to look at the logical structure of language. But we have to think about what words mean as well. How can we sensibly organize the process of semantic interpretation; that is, the derivation of the meaning of a sentence? The answers that people have found to this question are various, but one principle attributed to the philosopher Frege stands out in just about every approach that has been made and it can be informally stated as: The meaning of the whole is a function of the meanings of the parts. According to this principle, known as *principle of compositionality*, the meaning of a sentence can be expressed in terms of the meanings of the phrases within it. The meanings of these in turn depend on the meanings of the subphrases within them. And so on, until we are down to the meanings of individual words or even the meanings of the morphemes that make up the words.

The aim of Embodied Construction Grammar is to show how **different constructions elicit different mental arrays**. Mental access to such structures depends on the kind of connections we deal with and the way in which different connections pop the integration of form and meaning. So that, mental access to Metaphoric or Metonymic Constructions depends on the kind of connections we deal with and the way in which such connections pop the integration of form and meaning.

In this paper we will go through different examples (from English and Spanish) in order to analyze this phenomenon in depth. Some of these examples are:

(A). "Reference Point Construction" (Alec and Coulson, 2002: 364): This construction is exemplified with metonymic expressions such as:

- (1) I am parked out back (Alec and Coulson 2002:369)
- (2) This is parked out back (Alec and Coulson 2002:369)

(B). "Verb-into-something Construction": This construction is exemplified with metaphoric expressions such as:

- (3) Played the harpstrings of milk into a wooden pail (Heaney, 1984).
- (4) Feel into words (Vendler 1998:7)

(C). "Pleonastic-le" Construction: This construction results from a constructional blend.

- (5) Ana le pone azúcar al café (Bretones & Robles, in press).  
Rosana (IO pronoun) puts sugar to the coffee =  
*Rosana puts sugar in the coffee*
- (6) Ana le echa betún al zapato (Bretones & Robles, in press).  
Rosana (IO pronoun) puts polish to the shoe =

We know that traditional approaches focus on entrenched combinations of words and have no principled means of distinguishing creative collocations from unacceptable ones. But we intend to show that **creative strategies follow general principles of compositionality that must be accounted for in a framework of conceptual integration** (Fauconnier and Turner, 2002).

For example, let's analyse some Metaphoric Constructions:

- The *Metaphoric "in" Spatial-Relation Construction*:

Ex. In love

Construction Met Spatial-Phrase

Metaphoric Constructional  
Sr: Met Spatial-Relation  
Im: Met Ref-Expr (Abstract Noun)

Form: Schematic-Form  
Sr(f) before Im(f)

Meaning: Trajector-Landmark  
Sr(m).landmark <->Im(m)  
Self(m) <-> met sr(m).container

(Note: Formalism given by Embodied Construction Grammar and explained more extensively in long paper)

Metaphoric connections are induced by "in" being dependent on the rest of the expression.

Metaphor, emotional answer, or even, style are considered by many as *poetic* elements. But they can be described by means of a neurological base (Holland 2001). We recognise the style when we read a book, but we also recognise the person's style when we see him/her. That is, we can identify the recurrent pattern that characterizes it/him/her; "Style, in short, is the deepest thing in one's being" (Sacks 1974, p. 239n). The conclusions of this neuro-cognitive theory of language could give account of novel contributions to the study of language and literature.

In conclusion, this study tries to demonstrate that the cognitive processes arise from neural interactions that take place by means of synaptic connections (Feldman & Lakoff forthcoming) and that result from specific mental states. The final aim is to make it clear that at a complete theory of compositionality a mental representation should take into account the linguistic form of its given utterance and that the analysis should **go beyond traditional referential analysis**.

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