

Gestures and Metaphorical Comprehension: Electrophysiological Evidence of the Influence of Gestures on Metaphorical Processing

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Introduction

One of the most interesting questions in cognitive sciences is the role of the body in the constitution and functioning of cognition. In language comprehension, this question can be translated into *Do non-linguistic information influence the comprehension of linguistic expressions?* The question becomes more complex when the linguistic content is an abstract one. Since an abstract linguistic expression has a distant relation to its referent in the world, the hypothetical embodied background knowledge seems to be simply inexistent.

A notorious example of this kind of complex and abstract linguistic expressions is the metaphor. Usually, metaphor is defined as a linguistic construction that implies a “representational mapping” between predefined linguistic categories (Gibbs, 1994, Ortony, 1993). Thus, in order to understand a metaphor, subjects should make complex high-level cognitive operations. As such, the original question should be reformulated: *Do non-linguistic information (i.e., bodily gestures) has any role in the construction of a metaphorical meaning?*

However, experimental approach to metaphorical comprehension has traditionally used written texts, which regard the semantic or grammatical aspects of the phenomenon. Focusing on written stimuli has nonetheless the disadvantage to isolate non-linguistic cues, which do come along metaphorical uses in the real world. Recent investigations have intended to overcome this methodological and theoretical bias including non-verbal stimuli (Coulson, 2004).

In the present study, we investigate the influence of bodily gestures upon the comprehension of metaphorical expressions. Our hypothesis is that gestures influence metaphorical comprehension, in spite of the abstractness of metaphors.

Methods

We present results of two experiments. In experiment 1, we measured RTs to answer the general question, which is whether the presence of gestures influences the comprehension of metaphors. In experiment 2, we compared the electrophysiological activity pattern of metaphors with

congruent and incongruent gestures. Before the experimental sessions, we measured the use frequency of each metaphorical expression from a set of metaphors. To both experiments, we selected metaphorical expressions with a mean use frequency. In experiment 1, we studied if the introduction of a bodily gesture, co-occurring with a metaphorical expression, facilitates its understanding. We presented 64 short videos to 120 participants, in which an actor said a metaphorical expression, and displayed a gesture coinciding with the last metaphorical word. Half of the expressions were accompanied of a gesture that was congruent with its meaning, while the other half were expressions displayed with an incongruous gesture. Immediately after each stimulus, participants were asked to answer a comprehension task. We report RTs and accuracy.

In Experiment 2, we investigated whether the introduction of gestures, which were incongruent with the metaphor’s meaning, produced an electro-physiological activity pattern different from that one observed for a metaphor with congruent gesture. Specifically we expected a modulation of the N400 effect reported for metaphors (Pynte, *et al.* 1996) by the gesture. We registered EEG electrophysiological records of 18 participants, measuring the modulation of Event Related Potentials (ERPs) given both types of gestures. Participants were asked to observe the videos displayed on a monitor. We presented the same material as in Experiment 1.

References

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