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# Embodied creativity: a critical analysis of an underdeveloped subject

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## Abstract

While the idea that cognition is embodied appeared in the literature more than four decades ago, studies concerned with how and to what degree might the body and the environment influence creative thinking represent a relatively recent scientific endeavor. In this paper we wish to provide a critical examination of the core ideas of this new field, suggesting new experimental paradigms for testing the more radical and often ignored assertions of the embodied cognition program. We conclude that given the extremely small number of papers that are produced on this subject, as well as its obscurity within the scientific community, future research will have to expand its theoretical considerations greatly if the field is to survive and flourish.

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## 1. Introduction: a brief history of embodied cognition

In the last four decades, the vast and complex program of embodied cognition has often been prophesized to mark a revolution within the field of cognitive science. Intellectually rooted in the works of continental philosophers such as Martin Heidegger or Merleau-Ponty, the program's popularity really took off when Chomsky's former student, George Lakoff, joined forces with Mark Johnson in 1979 and suggested that contrary to the dominant view held at the time, mental representations are intimately connected with "direct physical experiences" (Lakoff & Johnson, 1980, p.57), a fact which makes most, if not all concepts intertwined with bodily movements and human anatomy. Drawing from a wide range of papers published in the late 70s and early 80s (e.g. Kay & McDaniel, 1978; Talmy, 1983) as well as ingenious thought experiments, Lakoff later conceived of his work as a break with what he described as first-generation cognitive science (Lakoff & Johnson, 1999; Lakoff, 2003). At the core of his new program stood the idea of the embodied mind, namely that the categories in which we think are shaped, modified and severely restricted by the manner in which we spatially explore our environment.

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Needless to say, a retrospective analysis of the literature produced in the last three decades shows that the prophesized revolution never took place. Not only that, but careful and lucid deconstructions of the program, as those conducted by Adams (2010) and Shapiro (2011), reveal that Lakoff may have simultaneously overestimated just how radical his thesis really was and underestimated its compatibility with standard computational views of the mind (Shapiro, 2011, pp. 92-93, pp. 112-113). Nonetheless, where the new thesis really succeeded was in inspiring scientists across different disciplines to promote similar conceptions regarding the relations hypothesized to exist between the workings of the mind and those of the body (e.g. Moravec, 1988; Varela, Thompson & Rosch, 1991; Clark, 1997; Damasio, 1999), further fragmenting the entire field into various subprograms that exist to this day. As such, embodied cognition in the 21st century refers not to a unitary and cohesive paradigm, but to an entire family of theses glued together by the overreaching idea that various aspects of cognition are influenced and shaped by body states and processes (Wilson, 2002). The nature of this influence as well as its magnitude, however, varies significantly from one perspective to another.

In this paper, our main purpose will be to analyze and explore how the core ideas of embodied cognition have influenced the cognitive science of creativity. This field is not only relatively new, but still undeveloped. As such, most authors prefer to write theoretical papers instead of engaging in empirical research. Furthermore, as we will argue in the next sections, scientists working in the field have adopted only some of the premises found within the embodied cognition paradigm, leaving unexplored a huge range of ideas that can lead to potentially fruitful research. Before we engage in such an analysis, however, a short description of the various subprograms is entitled.

## **2. The various claims of embodied cognition**

To simplify greatly, following Wilson and Golonka (2013), at one end of the spectrum of the embodied cognition program stands the not so radical idea according to which cognition can be biased by bodily states (Eerland et al., 2011) and higher order, abstract mental representations are ultimately grounded in these states (e.g. Lakoff & Johnson, 1999; Jostmann et al., 2009; Miles et al., 2010). In their first works, Lakoff and Johnson (1980, 1999; see also Lakoff, 1987) dissected an enormous amount of metaphors in order to support this perspective. In fact, our everyday language is full of “dead metaphors” that fully illustrate the point. To give just some examples, we sometimes say that we are “above a situation” because we associate “up” with control and dominance and “down” with submission; we “look forward” to meeting someone as if time relations were spatial (see Boroditsky, 2001); ultimately, we might be scared of “dark times” perhaps because our species is not adapted to a nocturnal lifestyle.

From all the various subprograms of the embodied cognition paradigm, this thesis, sometimes called “the conceptualization hypothesis” (Shapiro, 2011), is undoubtedly the less controversial one. Actually, whether they realize it or not, scientists working within this program are doing standard cognitive science with another name (Wilson & Golonka, 2013). Why this is so will become clearer in the following section in which we will discuss the various shortcomings of the embodied creativity research. For the time being it is safe to say that there is no premise within this thesis that prevents cognition from happening in a central, disembodied processing unit, as the orthodox view suggests.

In sharp contrast, at the other end of the spectrum, we find the much more radical and unorthodox perspective according to which cognition goes beyond the boundaries of the brain and becomes distributed across mind, body and environment (e.g. Beer, 1995, pp. 182-183; Clark & Chalmers, 1998; Clark, 2008; Wilson, 1994). While more of a philosophical thesis than an actual research program, this view suggests that objects found outside of the brain do not simply cause mental states and processes, but actually constitute them. Avoiding philosophical jargon, this is equivalent to saying that when you solve a simple math problem using pen and paper, the pen and paper are not simple instruments that aid the internal processing but actual “ingredients” of a coupled cognitive system that performs the processing. What are the necessary characteristics of a cognitive coupled system and what are the marks of the cognitive? – These are not simple questions (Adams & Aizawa, 2001). In fact, the counterintuitive and convoluted ideas entertained by this radical thesis make it unpopular with the vast majority of psychologists working today. Given the scope of this paper as well as the complexity of the matter we will refrain here from pursuing the subject further. Our aim until now was simply to show that the program of embodied cognition goes beyond the popular brand found in Lakoff’s writings with which most psychologists are familiar with. Sadly, however, the vast

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