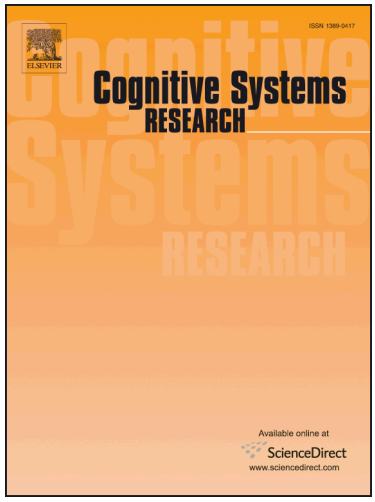

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Natural & Normative Dynamical Coupling*

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Abstract: Cognitive science has been dealt with the unique task of straddling and bridging the gaps between the mind and the body. One such gap that has not received as much attention within the literature is the gap between the natural and the normative. We propose that the theory of autopoiesis can be used for bridging this gap, and, so, we incorporate autopoiesis into the framework of dynamical systems theory in order to ground a physicalist theory of normativity. Within this framework, the dynamical coupling between an autopoietic system and its environment can be either natural or normative. We then construct a full-fledged theory of how cognition achieves normativity and find that we are confronted by the frame problem. We review Vervaeke, Lillicrap and Richards' (2012) theory of the mechanisms by which cognitive agents realize relevance and find that it promises to circumvent the frame problem. After augmenting their theory with our own theory of learning, we find that the frame problem has been circumvented in a way that meets the necessary conditions for normativity. We finally represent our theoretical findings in a dynamical systems framework and discuss some broad applications for social and psychological science.

Keywords*: Normativity, Autopoiesis, Enactivism, Relevance Realization, Self-Correction*

1. Introduction

Cognitive science is a unique field of science. Most other fields of science are able to maintain some *appearance* of philosophical neutrality. For example, Isaac Newton (1726 [1999], p. 943) infamously said of his work in physics, "I feign no hypotheses." When philosophers of science looked behind these appearances, though, they found that science made many of its own philosophical commitments (Duhem, 1914 [1954]). However, these commitments remain subtle, for the most part. Cognitive science is unique insofar as every cognitive scientific theory has to make glaringly obvious commitments with respect to what is probably the most famous and controversial problem in philosophy—the mind-body problem.

In order to do good cognitive science, therefore, we must state our philosophical commitments up front even before we state the problem that we wish to tackle and the method for solving it that we have chosen. Although cognitive science comes in many versions, most can agree, at least, that one of its primary goals is to find a naturalistic solution to the mind-body problem. The fundamental philosophical commitment made by cognitive science, therefore, is that the mind can be scientifically explained. Accordingly, a common strategy that cognitive scientists employ aims to "reverse-engineer" the causal structure of the mind based on its observed functionality (Chalmers, 2010; Dennett, 1991). While the phenomenal aspect of consciousness (i.e., qualia) tends to resist this functional analysis, the second philosophical commitment made by cognitive science holds that all other aspects of the mind (e.g.,

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