enactivists can pursue by thinking about enactivism reflexively, looking at it from the inside.

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Divide & Rule: The Future of Enactivism

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> Abstract • Meyer & Brancazio's article provides a strict categorization of enactivist research that can lead to productive foundational discussions but risks leaving out enactive perspectives that do not fit into the two categories. I discuss what will fall through the grid of the utopian and scientific split and how the exchange of philosophical and empirical methods is an essential part of all scientific models.

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« 1 » Enactivism faces two problems simultaneously: its explanatory targets encompass a diverse set of biological and cognitive systems, and at the same time, its conclusions are insufficiently discussed by specific research in cognitive psychology, neuroscience, or biology. In their target article, Russell Meyer and Nick Brancazio thoroughly review the state of the art of the field. While I agree that a categorization of all the different strands is much needed, the proposed separation of utopian (philosophically oriented) and scientific (empirically oriented) enactivism appears to go against one of its central messages. According to Francisco Varela (1996), the explanatory gap between phenomenological and scientific descriptions of cognition can only be bridged by a methodology that takes empirical and philosophical content seriously. Here, I am extending Varela's notion of mutual constraints to the whole enactivist modelling process. In the neurophenomenological program, first-person data about subjective experience should constrain our acquisition of third-person data that comes from conventional scientific tools. In the same way, these scientific results should guide our way of studying subjective experience in a mutually constraining framework. The enactivist program starts with a novel epistemic perspective, where theoretical and experimental ideas constrain each other in a way that makes them inseparable in practice. Separating scientific from "utopian" endeavors might render the empirical data meaningless and the philosophical concepts mere speculation. This perspective of mutual constraints suggests that most of enactivist theory-building happens on the spectrum of scientific and utopian ideas mentioned in §51, and through the reflexive interaction of theory and practice. While the hard separation may be productive for reevaluating the explanatory goals of enactivism, in practice, it can lead to an artificial opposition of utopian and scientific approaches, while they are complementary. This opposition is visible in §29, which frames foundational texts of enactivism as utopian, even though these texts provided the basis for building novel research methodologies, such as the aforementioned neurophenomenology program.

« 2 » From a more general perspective, a significant amount of the philosophy of science literature deals with the problem of separating ontological from epistemological questions in areas as diverse as physics, psychology, and economics. Focusing on the enactivism debate only, Meyer and Brancazio do not provide an argument for why the explanatory goals of enactivism should be any different from those of modelling approaches in other areas, such as physics. A comparison of the interaction of ontological and epistemological questions in other scientific disciplines may be revealing for theory building in enactivist research. Mary Hesse's (1953) hypothetic-deductive method explains how models in physics appear to be deduced from empirical data, while theoretical considerations already provide the basic structure into which the results are fitted. According to Hesse, this applies to formalized models in general and to their empirical tests. While scientific enactivism may appear to be independent of ontological commitments, its underlying concepts

will inevitably influence data collection and model building. In a more interdisciplinary context, Paul Humphreys (2018) argues that even if formal methods are transferred from one discipline to another, theoretical considerations need to justify how these tools are applied. Since enactivism has an interdisciplinary scope, it must provide conceptual justification for why its ideas can be fruitfully applied in biology, psychology, and neuroscience. Without "utopian" ideas to justify its application, it will be difficult to argue how enactivism can enrich such a wide range of disciplines.

« 3 » In Footnote 3, the authors state that they exclude ecological enactivism from their considerations because it is outside the scope of the article. However, it is specifically ecological enactivism that indicates some weak points of their utopian–scientific categorization. Building on empirical evidence from ecological psychology and philosophical intuitions about the connections between ecological and enactivist thinking, it remains unclear how the proposed separation would be able to capture future developments of related research such as ecological and enactivist readings of free energy minimization (Ramstead et al. 2019). Recent articles show a growing influence of ecological enactivism on philosophical debates in the cognitive sciences, as well. For example, Manuel Heras-Escribano (2021) highlights the philosophical overlap of ecological enactivism with pragmatist philosophy. He argues that contemporary cognitive science benefits from a pragmatic viewpoint built on post-cognitivist ideas that move beyond mental representation and highlight the interaction of organism and environment to explain cognitive dynamics. This approach includes ideas from both utopian and scientific enactivism and provides a productive example of how empirical and theoretical debates might enrich each other. Another position that seems to defy the proposed categorization is exemplified by non-representational work on philosophy of modelling. Guilherme Sanches de Oliveira and colleagues (2019; Sanches de Oliveira, Raja & Chemero 2022) explore the notion of scientific models as artifacts that use enactivist and pragmatist ideas to explain how scientific modelling leads to explanation, while avoiding the question of how models represent natural phenomena.

« 4 » While I completely agree with Meyer and Brancazio's (§5) claim that a debate about the future of the enactivist program is, at the moment, both necessary and productive, I submit that not all provided examples fit the clear separation proposed in the article. My argument builds on work in the philosophy of modelling and ecological enactivism showing how scientific and philosophical debates influence each other, and that it is this clear separation that appears to be utopian rather than certain branches of enactivism. This raises the question of what a productive alternative categorization would look like, but I would much rather see how the debate initiated by the target article plays out. Discussing the foundations and future direction of enactivism as opposing poles may reveal the underlying goals of the different strands, but I advocate not leaving out the fertile middle ground between strict philosophical or scientific research. Tracking how philosophical and scientific views co-evolve is as important as categorizing a diverse field of research. Because of the way utopian worldviews manifest themselves in scientific methodology and the way science shapes our worldview, I am convinced that a pragmatic view of the spectrum of positions can be equally valuable in identifying the future goals of the enactivist paradigm, without losing research that does not fit into these clear-cut categories.

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