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Eliminativism is at the Heart of E-Cognition

Abstract

Eliminativism was a controversial practice by scientifically-oriented twentieth century analytic philosophers. The basic idea is that concepts that play roles in explaining the natural world ought to refer to real things, and if they do not, then the concept should no longer be employed. The current work claims that proponents of "e-cognition" (e.g., embodied cognition) regularly make eliminativist moves in their work, even if they have not referred to them as such. This is particularly the case with regard to core concepts held by more mainstream approaches like cognitivism, such as the concept of representation. This chapter begins by providing an overview of eliminativism and e-cognition. Next, examples of explicit and implicit eliminativist moves made in the e-cognition literature are presented. Last, it is argued that proponents of e-cognition ought to be eliminativists and should continue to be so explicitly, especially regarding contemporary work in artificial intelligence and neuroscience.

1. Introduction

What exactly defined twentieth century analytic philosophy is controversial (Glock, 2008; Preston, 2007). Still, there were trends, such as emphasizing formal logic (e.g., logical atomism) and the nature of language (e.g., linguistic turn). One prominent facet of analytic philosophy in the twentieth century was the attempt to treat philosophy as continuous with science (e.g., Quine, 1960/2013). This movement was due in no small part to the influence of the logical positivists (or logical empiricists; Stadler, 2008). While there was no single adhered to doctrine observed by all members (e.g., Rudolph Carnap and Moritz Schlick), one core aim of early logical positivism was to offer a way to determine if claims are meaningful (Creath, 2023). To that end, be it a "philosophical" or "scientific" claim, in order to determine if it is meaningful the claim must either be true by way of analyticity (or, true by definition; e.g., a "bachelorette" is defined as "an unmarried woman") or empirically verifiable in practice or in principle (e.g., "there are mountains on the farther side of the moon," could be verified by a rocket being sent either actually or in principle; Ayer, 1952). It was hoped that by taking on this "scientific conception of the world" (Neurath, 1973), that a method was offered to turn away from or outright reject metaphysical theorizing. According to the logical positivists, metaphysical claims—such as those purporting to concern ethics and theology—were not susceptible to the methods of analyticity or empirical verification, and, thus, were *meaningless*. Consequently, such claims should be *eliminated* from discourses that attempt to make progress on our understanding of what the world is really like.

The idea of eliminating meaningless concepts in these ways was especially impactful on the history and philosophy of science and philosophy of mind. Regarding the former, elimination was understood as playing crucial roles in scientific progress, for example, during intertheoretic reduction (e.g., phlogiston; Churchland & Churchland, 1998). It is arguable that the attempt to eliminate concepts played its largest role in the philosophy of mind, where it was commonplace to utilize concepts with shaky definitions and to study phenomena that resisted empirical verification, both in practice and potentially in principle (e.g., qualia; Dennett, 1993). It is fair to say that the majority of philosophers who employed eliminative strategies with regard to mind and related phenomena were also proponents of brain-centric explanations of said phenomena (e.g., Bickle, 1998; Churchland, 1994; Rorty, 1965; Stich, 1983). Specifically, philosophers of mind who were interested in what the sciences have to contribute typically defended forms of identity theory—e.g., mental state 1 *just is* brain state X—or reductive theories—e.g., mental state 1 is *explained by* brain state X—that treated minds as in some essential way brain-centric phenomena.[1]

It is uncontroversial to state that strategies that can reasonably be called "eliminative" were common among twentieth century analytic philosophers that defended various ways of understanding minds as brain-centric phenomena. However, what is controversial is the main claim defended in the current work: *Eliminativism is at the heart of e-cognition*. In short, "e-cognition" refers to a range of approaches to studying cognition that, at a minimum, place more emphasis on the role of the body than typical brain-centric approaches do (e.g., Jovanov, Clifton,

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[1] On the other hand, there were analytic philosophers who championed non-brain-centric approaches to mind. These ranged from proponents of multiple realization—e.g., functionalism (Putnam, 1975)—to nonreductive views—e.g., emergence (Kim, 1993)—that did not treat minds as necessarily being located in or produced by brains. Such approaches are not central to the current work as they tend not to employ eliminative strategies (e.g., Chalmers, 1996).

Mazalek, Nitsche, & Welsh, 2015) and, at a maximum, understand cognitive phenomena as necessarily spanning brain-body-world systems (e.g., Chemero, 2009).[2] The primary reason that this claim is controversial is due to the fact that proponents of eliminative approaches—such as those mentioned above (e.g., Bickle, Churchland, Dennett, etc.)—are typically viewed as endorsing views about cognition (e.g., computationalism and representationalism) that are radically contrary to those endorsed by some proponents of e-cognition (e.g., direct perception and dynamicism). As a result, it seems quite strange—at least at first blush—to associate a strategy so commonly attributed to one group (i.e., eliminativism by brain-centric analytic philosophers) as central to another group that tends to hold diametrically opposed views. In order to motivate the thesis that eliminativism is at the heart of e-cognition, the next two sections provide brief overviews of eliminativism and e-cognition. After, examples of explicit and implicit eliminativist moves made in the e-cognition literature are presented. Last, it is argued that proponents of e-cognition ought to be eliminativists and should continue to be so explicitly, especially regarding contemporary work in artificial intelligence and neuroscience.

2. Eliminativism

This section expands on the brief discussion of eliminativism above, with an emphasis on its application to mind (for a more thorough overview of eliminativism, see Ramsey, 2024). As mentioned in the previous section, with regard to twentieth century analytic philosophy, eliminativism can be viewed as originating with the logical positivists and their strong opposition to metaphysics (Carnap, 1932/1959). Claims can be understood as meaningful if they meet one

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[2] Here, "cognition" is intended to be a catchall term that includes related or synonymous phenomena such as goal-directed behavior, mental states, mind, and the like.

of two criteria: either they are analytic (i.e., true by definition) or they are empirical (i.e., they can be verified by empirical data either in practice or in principle). Metaphysical claims—inclusive of aesthetic, ethical, and theological statements—are considered *meaningless* because they resist both criteria. If a claim is meaningless, then it should be eliminated from use in work aimed at understanding how the world really is.

There is no doubt that logical positivism had an immeasurable impact on twentieth century analytic philosophy. Still, the movement was quickly met with considerable challenges, not least of which included the following: First, one of their foundational works was seriously undermined by its author. Specifically, while the logical positivists were greatly influenced by the *Tractatus Logico-Philosophicus* (Wittgenstein, 1921/2001), the author, Ludwig Wittgenstein, would critique many, if not all, of the main claims in his later work (e.g., Wittgenstein, 1958). Second, numerous challenges were made to verificationism, such as the idea that it is self-undercutting. Specifically, the claim that "meaningful statements are either analytic or empirically verifiable" is not itself a claim that is analytic or empirically verifiable (Creath, 2023).

With all that said, the general idea of eliminativism persisted in two main forms. One, is via work in the history and philosophy of science. Here, progress in the history of science is understood as sometimes occurring by way of elimination. For example, Patricia Churchland and Paul Churchland (1998) describe a number of forms of scientific progress: some occur when one theory is displaced by way of being reduced to a more encompassing theory—such as Newton's laws of motion being intertheoretically reduced to Einstein's special theory of relativity—while others occur when a theory is displaced by way of being eliminated—such as phlogiston being

totally replaced by Lavoisier's oxygen theory of combustion.[3] The other form in which

eliminativism persisted is via the philosophy of mind. Here, progress on theorizing about minds

is understood as sometimes occurring by way of elimination. For example, Paul Churchland

(2005) describes what Elizabeth Irvine and Mark Sprevak (2020) call "discourse eliminativism"

by way of explaining subjective color qualia in terms of neuronal coding vectors. In this case,

there is no attempt to eliminate the experience of subjective color qualia, but its explanation is

offered in terms of neuronal activity. Daniel Dennett's (1983) critique of the concept of "qualia"

offers a rich example of what Irvine and Sprevak call "entity eliminativism" (2020). In this case,

there is an attempt to eliminate the notion of qualia from philosophical theorizing. The idea, in

short, is that because each of the criteria for qualia are fundamentally flawed, then what those

criteria are purported to refer to does not exist.[4]

It is safe to say that eliminativism peaked by the late-twentieth century. Even so,

eliminativism continues to be present in contemporary philosophy of mind, such as the recently

offered illusionism, which claims that phenomenal consciousness is an introspective illusion

(Frankish, 2016). Illusionism is eliminative in both the entity sense (e.g., denies that

"phenomenal properties" exist) and the discourse sense (e.g., there are forms of consciousness

that are not properly characterized as having phenomenal properties; Frankish, 2016). So, while

eliminativism may not have the controversial pop it once had (e.g., Churchland, 1981;

Hardcastle, 1999), it remains, minimally, a position worth acknowledging in histories of analytic

philosophy or, maximally, an approach that has taken on new forms (e.g., illusionism). Perhaps

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[3] It is worth acknowledging that the Churchlands' story about phlogiston is not accepted by all
(e.g., Ludwig, 2014).
[4] It is important to make clear that Dennett's (1983) eliminativism about qualia does not mean
that he is an (entity) eliminativist about minds and what can be called "mental experiences."

surprisingly, an underappreciated area of research where eliminativism is thriving—or so the current work claims—is in the e-cognition literature. The next section offers an overview of e-cognition, and is followed by examples of eliminativism in such work.

3. E-Cognition

There is an increasingly-long list of what counts as an "e" in "e-cognition." For that reason, this section does not aim to provide anything close to a comprehensive overview.[5] Instead, it has the more modest aim of providing a flavor of "e-cognition" for uninitiated readers. To start, e-cognition can be understood as first appearing in the form of "4E cognition," where "E" refers to embodied, embedded, enacted, and extended cognition (Rowlands, 2010). *Embodied cognition* refers to a range of views. At one end, cognition remains a brain-centric phenomena, but recruits brain regions commonly understood as being involved in motor control and perception during "higher-order" cognitive tasks, such as abstract reasoning. At the other end, cognition is not brain-centric, but instead spans nonneural physiology, such as representing numbers with one's fingers during counting. *Embedded cognition*, sometimes synonymous with situated cognition, refers to the idea that cognition is caused and/or constituted by a body and environments, which is inclusive of everything from ambient light to social interactions. *Enacted cognition*, at its most basic, typically claims that cognition emerges from sensorimotor activity. The longer story is that "enacted cognition" is commonly synonymous with enactivism (e.g., Varela, Thompson, & Rosch, 1991), which also observes the crucial role of sensorimotor activity

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[5] Helpful resources for understanding what "e-cognition" refers to include Anderson (2003); Calvo & Gomila (2008); Chemero (2009); Coelllo & Fischer (2016); Favela (2024); Menary (2010); Newen, de Bruin, & Gallagher (2018); Rowlands (2010); and Varela, Thompson, & Rosch (1991).

in cognition, but incorporates other commitments, such as the idea that life and mind are continuous (Thompson, 2007). *Extended cognition* is the idea that cognition is caused and/or constituted by features external to the commonly-accepted boundaries of organisms (e.g., feathers, scales, skin, etc.). As such, nonbiological tools can be part of cognitive systems, including artifacts like canes and smart phones.

These four "e's"—five, if you include "enactivism" as distinct from "enacted," not to mention the additional "s" provided by "situated"—can be challenging for the newly initiated to get their head around. Unfortunately (or fortunately), there are more "e's" and other letters as well. Other letters include "d" for *distributed cognition*, which—much like embedded cognition—understands cognition as being spread across brains, bodies, and environments, such as the crew (e.g., navigators) and equipment (e.g., engine controls) on the bridge of a ship while it traverses bodies of water. Other "e's" include *ecological*, which is primarily associated with ecological psychology (Gibson, 1986/2015), and refers to an approach to perception that treats it as continuous with action and involves the organism-environment system (Segundo-Ortin & Raja, 2024). *Emotional cognition*, *affective cognition*, and others have also been thrown into the mix, not to mention *dynamical* approaches (Favela, 2020).

For the remainder of the current work, when "e-cognition" is referred to, it is not to invoke any particular combination of the above-mentioned forms of cognition (e.g., embodied, emotional, distributed, etc.). Instead, it refers to two of the more noteworthy lessons to be extracted from the relevant literature. First, whatever goes before "-cognition" plays a rhetorical role in drawing attention to often underappreciated or ignored phenomena that are causally and/or constitutively relevant to cognition. To invoke embodied cognition, for example, is to draw attention to the fact that even if one is a neuroreductionist about cognition, brains are

always in bodies and those bodies are important (e.g., they enable brain activity). Invoking

emotional cognition is, among other reasons, to push back on the hard line drawn between reason

and emotion. Thinking about cognition as extended motivates expanding the purview of what is

relevant to investigating and understanding particular cognitive phenomena. Taken together, e-

cognition motivates going outside of brains to take a more encompassing view on what is

causally and constitutively relevant to cognitive phenomena.

Second, and although not applicable to all forms of e-cognition (e.g., brain-centric

versions of embodied cognition), is the lesson that *cognitivism*, the mainstream way to

understand cognition, is not the only game in town. That is to say, cognition does not have to be

understood as consisting of computations and/or representations, nor as being exclusively located

in brains. Undoubtedly, cognitivism is the mainstream understanding of cognition observed

across the cognitive, neural, and psychological sciences, as well as the philosophy of mind. It is

essentially a kind of information processing, where cognition—broadly construed to include

everything from the control of bodily movement to solving complicated mathematical problems

and imagining a story—involves computations and representations (e.g., Koch, 1999; Neisser,

1967/2014; Thagard, 2023; Von Eckardt, 1995). Computations are the processes of cognition and

representations are the objects that are computed. E-cognition calls all of these assumptions into

question: "Must cognition happen in brains;" "is cognition a computational process;" and "does

cognition necessarily involve representations?" The answer to all three is minimally "not

necessarily" and maximally "no." Embodied cognition (of the radical flavor) and ecological

psychology offer powerful arguments for undermining the need to appeal to representations for

all cognitive phenomena—that is, they are antirepresentational. Distributed and embedded

cognition offer compelling reasons to dethrone brains as the locus of cognition—that is, they are

non-brain-centric. Enacted/enactivist and dynamical approaches offer plausible alternatives to understanding cognition as a form of computation—that is, they are noncomputational.

This section had two aims. The first was to offer a brief overview of what is meant by "e-cognition," such as embodied cognition, ecological psychology, and dynamicism. The second aim was to offer a sample of the more noteworthy lessons to be taken from the e-cognition literature, particularly that cognition can be fruitfully understood by way of non-brain-centric, antirepresentational, and noncomputational commitments. With the groundwork laid by the previous two sections, the following section motivates a defense of the main thesis of this work, that eliminativism is at the heart of e-cognition.

4. The Eliminativist Heart of E-Cognition

In a previous section (§ 2), it was stated that a surprising and underappreciated area of research where eliminativism is thriving is in the e-cognition literature. It is surprising because history demonstrates that eliminativist strategies have been predominantly applied in the service of brain-centric understandings of cognition, particularly in philosophy of mind in twentieth century analytic philosophy. It is underappreciated because, as will now be shown, proponents of e-cognition regularly make eliminativist moves in their work, even if they have not referred to them as such. To that end, three examples of eliminativist moves in the e-cognition literature are offered.

4.1. Ecological psychology and perception-action

Gibsonian ecological psychology can be boiled down to four primary principles (Favela, 2024): First, *perception is direct*, is the idea that an organism's perceptual capacities can make

noninferential contact with its environment in order to detect ecological information, which are patterns of energy that uniquely specify properties of the world and are temporal in nature. Second, *perception and action are continuous*, is the idea that an organism's perceptual abilities were evolutionarily selected to guide action; conversely, action abilities were selected to enable perception. Third, as a consequence of the previous two, detected ecological information can specify meaningful opportunities for action, or *affordances*. Fourth, the *organism-environment system* is the proper spatiotemporal scale for investigating and understanding the previous three.

If any part of ecological psychology is to be viewed as eliminativist, it would likely be the first principle that perception is direct because of its antirepresentational flavor. While that is reasonable, an underappreciated application of eliminativism is to be found in the second and fourth principles. Across his two most popular books, Gibson (1966; 1986/2015) dedicated significant amounts of space to attempting to dissolve commonly-accepted dichotomies, or "dualisms," as he put it (1986/2015, p. 108). Examples include mental sensations and physical movements, observer and environment, and subjective and objective, to name a few. In this fashion, Gibson applies both discourse and entity eliminative strategies, with the latter following from the first. As Irvine and Sprevak put it, the "discourse eliminativist seeks to rid science of certain ways of talking, thinking, and acting" (2020, p. 349). Put that way, Gibson clearly aims to rid science—at least perceptual psychology—of ways of talking and thinking that assume dualisms like minds as distinct from bodies. Entity eliminativism is a consequence of Gibson's discourse eliminativism in that rejecting those dualisms eliminates kinds of ontologies (i.e., perception *and* action, organism *and* environment) in favor of terminology that highlights continuities (i.e., perception-action, organism-environment). Taken together, three of the four primary principles are readily viewed as eliminativist strategies.

4.2. Radical embodiment and representations

> Radical embodiment is summarized by Andy Clark as centering on the following thesis: Structured, Symbolic, Representational and Computational views of cognition are mistaken. Embodied cognition is best studied using non-computational and non-representational ideas and explanatory schemes involving e.g. the tools of Dynamical Systems Theory. (Clark, 1997, p. 461).

Anthony Chemero (2009) further developed the thesis into a research program, radical embodied cognitive science, which integrates much of the theory of Gibsonian ecological psychology with the methods of nonlinear dynamical systems theory. Collectively, principles of ecological psychology (e.g., affordances) and dynamical methods offer a rich framework for investigating and understanding perception(-action) without need to appeal to representations. Not appealing to representations to account for perception(-action) has led some to claim that "Chemero explicitly endorses eliminativism by rejecting the traditional assumption that agents solve problems and navigate through the world by consulting mental representations" (Ramsey, 2024, § 3.2.3.). It is not clear that Chemero is an eliminativist in any form.[6] However, it is clear that practicing radical embodied cognitive science minimally permits discourse eliminativism. In particular, radical embodied cognitive science offers a theoretically valid and empirically supported framework to investigate and understand perception(-action) without needing to appeal to talk of mental representations.

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[6] In recent work, Chemero (2025) neither explicitly nor implicitly endorses any form of eliminativism, especially about minds. He describes his view as being in line with Dennett's, in particular, a view that follows from observing the intentional stance, "that having a mind is a matter of being the sort of thing whose behavior can be explained by the attribution of mental states."

With that said, while Chemero and other proponents of radical embodied cognitive science could be comfortable with understanding their approach as being motivated to some degree by discourse eliminativism, there is room to see entity eliminativism in the framework as well. It is not just that representations can be eliminated from *talk* of perception(-action), the fact is that the relevant experimental work makes no use of representations. For example, there is a rich empirical literature on affordances that makes no appeal to representations in neither the process of experimental design nor discussions and interpretations of their findings (for review see Blau & Wagman, 2023; Lobo, Heras-Escribano, & Travieso, 2018; Segundo-Ortin & Raja, 2024). That most certainly seems to be an approach that at least implicitly eliminates representational entities.

4.3. Dynamicism and computationalism

Many e-cognitive approaches have embraced dynamical systems theory (DST) to some degree, such as enactivism (Varela et al., 1991) and ecological psychology (Turvey, Shaw, Reed, & Mace, 1981) and, of course, radical embodied cognitive science (Chemero, 2009). All three of these examples have utilized DST as a methodology in support of another theory, such as integrating DST in affordance experiments. Nevertheless, DST has been appealed to by other proponents of e-cognition as offering theoretical commitments as well. The dynamical hypothesis offers both a methodology (i.e., DST) and a theoretical understanding of cognition. It claims that cognitive organisms are and can be understood as dynamical systems (Favela, 2020; van Gelder, 1995). At the core of that claim is the view that natural cognitive systems are temporal and continuous in nature.

Such an approach is straightforwardly contrary to cognitivism, namely, the position that cognition is an information processing phenomena based on computations operating over representations. Consequently, the dynamical hypothesis is as close to being explicitly eliminativist about computational approaches to cognition as one can be without saying as much. DST offers a methodology to facilitate discourse eliminativism. Experiments and results can be designed and interpreted without necessitating computational vocabulary. Instead, such vocabulary is eschewed in favor of a dynamical one. Moreover, and in line with the dynamical hypothesis, DST offers a theory to facilitate entity eliminativism, where cognitive phenomena are viewed not as constituted by computational processes but by dynamic ones.[7]

5. Conclusion

The previous section offered three examples of eliminativist moves in the e-cognition areas of ecological psychology, radical embodiment, and dynamicism. All three exhibited discourse eliminativism by way of critiquing one way of talking about topics of research interest that are more fruitfully approached by different vocabulary, such as ecological psychology eschewing dichotomous talk in favor of terminology that stresses continuity. All three also exhibited entity eliminativism by way of doing away with terminology that does not refer to the nature of the actual phenomena, such as dynamicism rejecting computationalism about natural cognitive systems in favor of DST. In none of this literature is the work referred to as "eliminativist." As claimed above (§ 4) this is likely due to the history of usage of eliminativist strategies in the service of brain-centric understandings of cognition. Consequently, and as

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[7] The dynamical hypothesis has faced challenges. For example, it has been argued that DST is not a replacement for computationalism, but merely supports it (e.g., Eliasmith & Anderson, 2003). Others have argued that DST is a form of computationalism itself (e.g., Sussillo, 2014).

argued in this work, it is surprising that non-brain-centric frameworks have provided the rich soil for eliminativism to continue to flourish.

Up until this point, the current work has been largely descriptive, appealing to e-cognition research that can readily be described as employing eliminativist strategies. In closing, a prescriptive claim is offered: Proponents of e-cognition ought to be eliminativists and should continue to be so explicitly. The *ought* of explicit eliminativism stems from the *is* of the place of e-cognition in the cognitive, neural, and psychological sciences, as well as the philosophy of mind. The fact is that non-e-cognition research programs dominate scientific and philosophical understandings of cognition. We are well into the twenty-first century and the science literature is largely dominated by both metaphorical and analogical understandings of brains as computers (e.g., Marcus, 2015; Sprevak & Colombo, 2019). The recent attention garnered by "artificial intelligence" (AI) is proliferating this view.[8] The media abounds with claims of generative AI exhibiting behaviors formerly attributed only to natural cognitive systems, such as creativity and hallucinations (e.g., O'Brien, 2023). Commitments to brain-centrism and cognitivism will continue to strengthen alongside increased research in "NeuroAI" (Laird, Lebiere, & Rosenbloom, 2017; Zador et al., 2023). As a result, e-cognition remains the minority approach to cognition. One strategy is to build bridges by showing how e-cognition and brain-centric/cognitivist approaches can be integrated. Another strategy is to show how e-cognition and brain-centric/cognitivist approaches are radically different, and that the former is better suited to the investigation and understanding of cognition. Given its minority status, proponents of e-

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[8] "Artificial intelligence" is put in quotes here because it is unclear that generative AI, such as large language models (e.g., ChatGPT) are "intelligent" in any way resembling the foundational goals of computer science in the mid-1900s. Such forms of "AI" seem more like fancy ways to do regression to the mean than intelligence. But that is an argument for another day.

cognition ought to take the stronger position: Highlight the radical differences and eliminate

misdirected talk (i.e., discourse eliminativism) and adherence to nonexistent entities (i.e., entity

eliminativism. To proponents of e-cognition: Eliminativism has always been at the heart of what

you do. Embrace it.

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