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Inventing the Self

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Neuroscience and Philosophy: A Collaborative Self

Before modern science and the Scientific Revolution, the term science was used synonymously as knowledge or study and was mostly the concern of philosophers. Since, science and philosophy have often taken many different directions of study and discourse, resulting in a schism in methodological approaches. As modern technology has increased, the appeal to empirical evidence and scientific experimentation has risen, often overshadowing the more philosophical approach of pure reason and logic. While the divide between science and philosophy appears vast and extensive, the two disciplines have more of a symbiotic relationship than is perceived. This is never more apparent than in the areas of the cognitive sciences. The cognitive sciences incorporate work in physical and social sciences and are attempting to solve problems that almost exclusively have their roots in the philosophical tradition. Problems such as consciousness, will and volition, mind and body can all be traced back to early philosophical theories.

The divide began with advances in technology and the scientific method, as well as, the appeal to empirical evidence and experimentation as opposed to simply reason and logic. As science became more advanced, the language of the discipline became more technical, building its own vocabulary of scientific and medical terms. Philosophy, on the other hand, remained mostly in the conceptual range causing the disciplines to continue growing in different directions. However, despite the division in dialect, the core problems and research motivations remain similar enough that the two disciplines' motivating questions overlap in important and interesting ways.

One of the ways in which research and analysis in science and philosophy has overlapped is in the

cognitive sciences, specifically in the topics of consciousness and the formulation of the self. The self, is a conceptual term, like love and justice, and cannot be defined through a singular process of science or philosophy. What is needed is a collaborative definition that incorporates the richness of the concept of the self with the biological correlates that actualize this richness. What this paper aims to achieve, is to provide leading, contemporary conceptions of the self as it is presented in the disciplines of neuroscience and philosophy and show that despite conception, there is a rich dialogue apparent between the two disciplines. In doing this, it will become evident that the self is a broad, conceptual term that cannot be strictly defined using one method of approach and thus, requires a collaboration between disciplines that on the surface appear to be vastly different.

In order to achieve this, I will first introduce two of the leading neuroscientists, Joseph Ledoux and Antonio Damasio's formulation of the self, while showing how they use philosophy to inform the motivating questions of their research. I will then discuss two philosophers, Alva Noë and Peter Hacker, who critique this neuroscientific evidence and theories as fundamentally flawed based on the difference in language and methodological approach. Next, I will discuss Daniel Dennett, a philosopher who specifically critiques Hacker's theory and in his own theory, appears to align himself with neuroscience to inform his philosophy. Finally, I will conclude with how Ledoux, Damasio, and Dennett are significant in the collaborative progress towards an interdisciplinary conception of self.

What the Neuroscientists are saying

Currently, the research being done in neuroscience is discovering amazing things about the brain, its different parts and functions, and what that means for human life. However, this does not mean that science has taken over as the leading authority on matters concerning human life. One of the critiques of modern science is its perceived arrogance in methodological absoluteness. In establishing itself with empirical and quantitative analysis, modern science set up a structure that criticism is only warranted from within its own methodology, as criticisms outside such quantitative measures do not pertain to its methods

of analysis. The problem with this structure is that it appears to ignore the qualitative aspects of life and living. This is often seen in scientific formulations of the self. One of the major differences in methodological approaches between science and philosophy concerning the self is the appearance of a stark difference between the biological understanding of life and the phenomenological feeling of living. However, as we will see, the two are not that separate. Two of the leading neuroscientists on the self, Joseph Ledoux and Antonio Damasio, do not ignore the phenomenological feeling of living, rather, attempt to extrapolate the biological understanding of life to explain the phenomenological feeling of living.

In Joseph Ledoux's seminal work, *The Synaptic Self*, he proposes that neuroscientists should be asking the philosophically laden question, "What makes us who we are?" (Ledoux 1). After all, once Descartes frees himself from total skepticism by recognizing that, at least at some level, he exists, this becomes the central question in his second meditation as he ponders, "But what, then, am I?" (Descartes 26). This is a difficult question to answer, however, as Ledoux and Descartes both realize, it is at the heart of what the question of the self is. Instead, Ledoux argues, that for good reasons, neuroscience has studied the brain and body's specific processes in detail, without attempting to connect the pieces to finish the puzzle. However good the reasons, Ledoux is inspired, promoting that:

"Maybe we know more than we think. Maybe some or even many pieces of the puzzle have already been discovered, and just have to be assembled into a coherent whole. Actually, I believe this might be the case. A lot of information is available about how the brain works, and while it may not yet be sufficient to fully explain persons, it should certainly encourage us to begin thinking about the problem" (Ledoux 2).

This admission, while not citing philosophy specifically, shows that Ledoux is quite aware that the philosophical questions "Who we are?" or "What makes us who we are?" are important and require attention. However, while the appeal to philosophy seems at the heart of the motivation for the project, he

recognizes the methodological divide, specifically when he notes the distinction that, “philosophers, by definition, seek philosophical solutions to problems (including the mind-body problem)...neuroscientists, by contrast, typically start with the assumption that the materialist view of the mind-body problem is correct (that the mind is a product of the brain) and then try to understand how the brain makes the mind possible” (Ledoux 18). This distinction is at the heart of the divide between the two disciplines.

However, as we see, the problems and questions that each discipline is concerned with overlap and share many similarities. In fact, as Ledoux points out, Descartes sought a philosophical solution to the problem of the self, but in contrast, attempted to reconcile the problem through anatomy and a more modern science approach by searching for the body and mind’s interaction in the brain. Although Descartes’s mind and body dualism is often discounted in contemporary practice, his approach to the problem should be recognized as an early indication of the different approaches of philosophy and modern science, and heralded for his attempt to reconcile them. Ledoux’s approach is not that dissimilar, as he recognizes the philosophical foundation to the problem and attempts to reconcile the evidence in neuroscience by showing how the brain actualizes these subjective conceptions of the self.

Ledoux’s answer to the question of what makes us who we are is somewhat simplified in nature, as it is reduced to synaptic transmission at its crux, but complex in practice and explanation. He views the self as tied to brain functions, claiming it is the “totality of what an organism is physically, biologically, psychologically, socially, and culturally...understood in terms of brain systems involved in learning and storing information, in explicit and implicit systems...[which occur] in a physical and social context (a situation) and is performed by networks that function the way they do because of both genetic inheritance and past experience” (Ledoux 31-32). He believes that “*brains make us who we are* (my emphasis), [through] synaptic processes that allow cooperative interactions to take place between the various brain systems that are involved in particular states and experiences, and for these interactions to be linked over time” (Ledoux 32). The complexity arises when you conjure feelings of the intricacy of human life and

attempt to reduce it to synaptic transmission in individual brains. However, as Ledoux states, he is not attempting to remove the social, cultural, moral, aesthetic, or spiritual aspects of life or offer his theory as alternative, he is simply attempting to show how these aspects of life are realized through biological processes and brain functions (Ledoux 3). Once again, we see Ledoux recognizing the crux of the problem of the self as informed by philosophical issues, and rather than dismissing them, he attempts to explain how they are realized in the biology of the brain and body.

Ultimately, Ledoux denies philosophy's conclusion, recognizing that "in spite of having gotten this far with some key concepts from philosophy, the fact is that philosophy will probably not give us the kind of foundation we need to pursue the relation between the self and the brain" (Ledoux 21). He also criticizes philosophy for concerning itself too much with consciousness in the formulation of the self, as that ignores a large portion of the brain (the unconscious functions) and how the process as a whole contributes to the self. That is an acceptable conclusion, however, as Ledoux is a neuroscientist and not a philosopher. The critical importance of Ledoux's, *The Synaptic Self*, is that it recognizes the importance of philosophy's contribution to the problem, and it allows that importance to inform the scientific research and analysis of the self. Otherwise, as Ledoux pointed out previously, neuroscientists would continue to only study parts of the puzzle without anyone trying to put the pieces together.

Antonio Damasio, a leading neuroscientist on the study of consciousness and the human mind, presents his current, revised theory of consciousness and the self in his book, *The Self Comes to Mind*. In contrast to Ledoux's elegant simplicity, Damasio's theory is complexly structured through history, evolution and converging hierarchal functions. Although Damasio's approach is wholly scientific, he nevertheless appeals to philosophical language, acknowledging the legacy of "a long tradition of formulating conceptions of mind and consciousness...[with] a rich history, as long a varied as the history of philosophy" (Damasio 16). Ironically enough, both Ledoux and Damasio call upon the same passage from William James to introduce their theory. In the first paragraph of the second chapter of Ledoux's,

The Synaptic Self, and from the first part of the first section of Damasio's, *Self Comes to Mind*, they quote William James's assertion that "*a man's Self is the sum total of all that he CAN call his, not only his body and his psychic powers, but his clothes and his wife and children, his ancestors and friends, his reputation and works, his lands and horses, and yacht and bank-account*" (Ledoux 13; Damasio 17). Here we see two of the leading neuroscientists on the brain and the self both making reference to the importance of the foundation of philosophy on the problem of the self in using the same quote to set up their contributions to the problem. Damasio agrees with James on this account and goes on to set up the first conception of self, the self-as-object as:

What allows the mind to know that such dominions exist and belong to their mental owners—body, mind, past and present, and all the rest—is that the perception of any of these items generates emotions and feelings, and, in turn, the feelings accomplish the separation between the contents that belong to the self and those that do not. From my perspective, such feelings operate as markers.

They are the emotion-based signals I designate as somatic markers. When contents that pertain to the self occur in the mind stream, they provoke the appearance of a marker, which joins the mind stream as an image, juxtaposed to the image that prompted it. These feelings accomplish a distinction between self and nonself. They are, in a nutshell, feelings of knowing. We shall see that the construction of a conscious mind depends, at several stages, on the generation of such feelings (Damasio 17).

This is huge because not only is Damasio essentially piggybacking off of a philosopher in James, but in his first conception of self, he is acknowledging the phenomenology of living and feelings of knowing which is often criticized as the exact aspect the neuroscientists appear to ignore. The second conception of self is layered on top of the self-as-object and is referred to as the self-as-subject. The self-as-subject is much more difficult to obtain, but was a turning point in evolution as it gave subjectivity to a mind and that, according to Damasio, is what bore consciousness. To Damasio, a *self* is what gave an unconscious

mind subjectivity, ultimately, making it conscious. Once again, Damasio is appealing to the subjectivity inherent in philosophical definitions of the self, and using that, he attempts to show how the brain and its relation with the body and environment actualize that self.

The process of the self-as-knower occurs in steps, which are distinct and hierarchal and build upon each other to achieve consciousness. The three steps in Damasio's theory are the protoself, the core self, and the autobiographical self. The protoself is about the relationship of the brain and body and develops primordial feelings. The brain and body are constantly engaged in activity in what Damasio calls a resonant loop of information between them which determine the state of the body and brain (the protoself) and this state develops certain primordial feelings of existence associated with this protoself. From here, the core self developed and is action based, structured on relation of the organism and object. The core self is concerned with this relation and how it receives and modifies an object and, vice versa, how an object is represented and manipulates the organism. These selves represent the self-as-object. Finally, at the top of the hierarchy, developed the autobiographical self. The autobiographical self is connected to knowledge of the past and anticipated future. Damasio defines autobiographical self as: "The autobiographical self occurs when objects in one's biography generate pulses of core self that are, subsequently, momentarily linked in a large-scale coherent pattern" (Damasio 139). When an autobiographical self is added, the core self and autobiographical self become the self-as-knower as they add the subjectivity essential for consciousness.

Damasio's three distinct selves are strikingly similar to one of the earliest formulations of the self. Aristotle proposed, in the *Nicomachean Ethics*, a tripartite soul that was conceived less spiritually and metaphysically than earlier Ancient Greek philosophers. Aristotle's definition included a vegetative, appetitive, and rational part of the soul (Aristotle 22), which can be seen as a direct influence to Damasio's three distinct selves. The vegetative is similar to the protoself as it is concerned with simple nourishment and the distinction between self and non-self; the appetitive is similar to the core self as it is

concerned with appetitive urges that can be seen as understanding how one receives objects and reacts to or manipulates these objects; the rational is similar to the autobiographical self as the rational soul is linked to the other two and is unique. Aristotle recognizes that humans share the vegetative and appetitive with other organisms and these two elements are linked and can be combined to be seen as a “self-as-object,” while the rational oversees these on a subjective level and can be seen as a “self-as-knower.” On this reading, it is clear there are several differences in the two theories (they’re separated by over two thousand years), and it is a stretch to claim them as the same, however it is an important similarity to distinguish, as it shows a direct influence from even Ancient Philosophy to modern neuroscience.

Damasio’s account of the self is extremely layered and complex, even more so than the brief summary above. However, it is an extremely complete theory that essentially attempts to build a theory of consciousness from the beginning. What is interesting about his conception of self, is the three step process of self that precedes and essentially creates consciousness, as oppose, to the generally held idea in philosophy that the self is born from consciousness. This is similar to Ledoux’s theory, as it incorporates the unconscious aspects of the brain and mind in arriving at self. Like Ledoux, Damasio ultimately strays from the philosophical conceptions of self, which again is understandable given his discipline. However, he, too, concedes the groundwork of his theory to the work done in philosophy of mind (and psychology and other physical sciences), which helps arrive at a better definition of self. Another important part of Damasio’s account of the self, is that it shakes a lot of previously held beliefs in philosophy on what constitutes a self. If what he calls protoself were the first formulation of self, then many organisms outside of humans would be considered to have a self. Even at the autobiographical self level, Damasio himself states that this does not rule out “a number of mammals” (Damasio 30) as having these selves. Removing the self from being uniquely human is not necessarily new, however, many still believe that the self is a special quality reserved for rational, conscious humans.

Therefore, as we see, Joseph Ledoux and Antonio Damasio define the self in novel ways using

biology and neuroscience, however, each acknowledges the foundation of philosophy's contributions and allows it to inform the research and motivating questions of "Who we are?" and "What makes us who we are?" In the next section, I will introduce two philosophers who speak directly to the work being done in neuroscience on the self and consciousness, but with a critical tone, rejecting much of what has been theorized on conceptual grounds.

Philosophy's Critics

Despite the two authors we just explored, a lot of the proposed neuroscience is, as Ledoux even stated himself, committed to studying particulars about the brain, its functions, and its interactions with the body. Because of this, many believe that science will never solve the problem of the self as it lacks the conceptual clarity and phenomenological aspect of selfhood. These critics often dismiss the neuroscience as too brazen and challenge its authority on the matter. As Alva Noë puts it, "Neuroscience is in the grips of technology; it has a grandiose sense of its own abilities"(Noë 7), which is an ironic claim for Noë to make, as his dismissal of evidence and assertion of his own "astonishing" theory can be seen as nothing short of grandiose. Noë, a contemporary philosopher, argues in his book, *Out of Our Heads*, that neuroscience has broken with philosophy, or that the discipline thinks it has moved past philosophy's influence. However, Noë claims that is not the case and that "neuroscientists have simply taken a specific family of philosophical assumptions for granted, so much so that their own reliance on them has become all but invisible to themselves" (Noë 6). I'd venture to say this is not the case, as Ledoux and Damasio distinctly state that the groundwork of their own theories and research are built upon work done in philosophy, among other things. For Noë, consciousness, which I'd argue is almost synonymous with the self in his view, is not something located in the brain or body proper, but something you do, inherently tied to the action of living and experiencing, which includes the brain, but only as one element of a larger structure. "Who you are?" and "What makes you who you are?" are not answered by any one brain, but by the brain and its embodied interaction with its environment and particular situation.

This thesis, as proposed by Noë, that the brain is not the only element of consciousness, but tied inherently to the environment and embodied situation present, is not new, nor is it “a truly astonishing hypothesis” (Noë 7) as Noë exclaims. The neuroscience that Noë critiques in order to assert his thesis, often argues a similar position. It is irresponsible to assert with such boldness and overgeneralized assumption that neuroscience is somehow ignoring the environmental influence and the embodied aspect of consciousness. Noë dismisses neuroscientific research on consciousness on a perceived conceptual falsehood, claiming that the research is resting on the fundamentally false presumption that consciousness arises in the brain. However, Noë’s postulation removes consciousness from the brain and places it back in the broad conceptual range of philosophy, while he masks his evidence in an odd mix of skeptical dismissal of neuroscience and assertion of convenient neuroscience based on his analysis, as it suits him. From *Out of Our Heads*, consciousness is “roughly experience” (Noë 8) and experience is to “be capable of thought, feeling, planning, etc” (when defining essential terms, “etc” is not a very useful tool) (Noë 10). Further, “to have a mind is, roughly, in my sense, to be conscious” (Noë 10) and “mind is life” (Noë 42), therefore, “the problem of consciousness, then, is none other than the problem of life” (Noë 41). This conceptual journey brings consciousness into as broad a focus and it can and essentially tells us nothing important about the problem at hand. He critiques neuroscience for replacing one mystery (Cartesian dualism) with another mystery (biological correlate of consciousness) and then defines the problem of consciousness as the problem of life. What is more complicated and mysterious than life?

As Noë builds his theory on the critique of neuroscience, it appears to be an attempt at a dialogue between the two disciplines. However, his critique is overgeneralizing, as it doesn't deal with particular neuroscientists or theories. This is unfortunate as his central claim of embodied consciousness is important (though not as new, groundbreaking, and astonishing as he brazenly exclaims), but his dismissal of neuroscience’s efforts on conceptual ground limits collaborative progress.

Another conceptual critic of work being done in neuroscience on consciousness and the self is

philosopher Peter Hacker. Along with neuroscientist Maxwell Bennett, Hacker discusses neuroscientific research and analysis and asserts that the community as a whole is committing a grave fallacy, one that pulls the rug from underneath the momentum of the discipline. Building their critique on what they call the “mereological fallacy,” they criticize the principle in neuroscience that “psychological predicates which apply only to human beings (or other animals) as wholes cannot intelligibly be applied to their parts, such as the brain” (Hacker 22). For example, the brain does not think, humans think. Brain activity allows us, as a whole, to engage in thinking, but it is the self as a whole that thinks, not the constituent brain or parts of the brain. This is analogous to Noë’s argument that the brain is not the end all in the equation. Hacker and Bennett challenge the connotation that their work is “unremittingly negative” and concerned only with “criticism”, expressing that philosophy can only help the empirical subjects through “identifying conceptual errors” (Hacker 13). I believe that this endeavor is a courageous one and is extremely important, as conceptual clarity is of critical importance with anything, but especially scientific research and analysis on something so fundamental as consciousness and self. However, I feel Hacker and Bennett are too overreaching in their dismissal. At one point, they make a claim that seems directly at the heart of the methodological divide, and it appears that this could be the role that the two disciplines would embody in creating the interdisciplinary definition required:

Empirical questions about the nervous system are the province of neuroscience. It is its business to establish matters of fact concerning neural structures and operations. It is the task of *cognitive* neuroscience to explain the neural conditions that make perceptual, cognitive, cogitative, affective and volitional functions possible. Such explanatory theories are confirmed or infirmed by experimental investigations. By contrast, conceptual questions (concerning, for example, the concepts of mind or memory, thought or imagination), the description of the logical relations between concepts (such as between the concepts of perception and sensation, or the concepts of consciousness and self-consciousness), and the examination of the structural relationships between

distinct conceptual fields (such as between the psychological and the neural, or the mental and the behavioral) are the proper province of philosophy (Hacker 4).

Unfortunately, as they proceed, it becomes clear that this claim is one of authoritative distinction, as oppose, to a call for collaboration. They are not saying that neuroscience should acquire empirical evidence through experimental investigation *and* philosophy should take that evidence and refine its concepts and theories; they are saying that neuroscience should stick to its own field and methodology and leave the conceptual questions to the philosophers. This is a disappointing declaration because it assumes that the two have to be mutually exclusive. When Ledoux and Damasio interpret their research, are they then, necessarily, doing philosophy? It seems counterintuitive to make such an authoritative distinction and counterproductive to interdisciplinary research. I would do more to unravel their argument and critique their overreaching theory, but the philosopher I intend to discuss next does so quite eloquently, and therefore, will serve me well to include his critique at the top of the next section.

Daniel Dennett to the Rescue

Before we look at Daniel Dennett's formulation of the self, it is important to pick up where we left off with Hacker and Bennett, and show how their entire critique comes crumbling down, as you pull the pin from their main tenet, the mereological fallacy. As Dennett points out,

The authoritative text on which Hacker hangs his conviction about the mereological fallacy is a single sentence from St. Ludwig [Wittgenstein]:

It comes to this: Only of a human being and what resembles (behaves like) a living human being can one say: it has sensations; it sees, is blind; hears, is deaf; is conscious or

unconscious. (Dennett 78)

(Philosophical Investigations, para 281)

Hacker and Bennett take this quote and develop the mereological fallacy, applying it to several neuroscientists' theories (including Damasio and Ledoux) on the basis that the brain and parts of the brain are not a human being nor do they resemble one, and thus, cannot be ascribed psychological predicates.

However, Dennett explains that “brains and their parts *do* ‘resemble a living human being (by behaving like a human being)’ -- and this resemblance is sufficient to warrant an adjusted use of psychological vocabulary to characterize that behavior” (Dennett 78). A different reading of the initial authoritative text can then be used as evidence against the very theory Hacker develops from this text. The simplicity in this critique illuminates the faulty ground that Hacker and Bennett’s theory rests, as their entire proposition is situated on one particular reading of a text. Dennett goes on to obliterate Hacker’s perceived authority on the linguistic rules of conceptual terms. He submits that Hacker took to cognitive science to “examine the use of words” but in doing so, “failed to notice that he himself was bringing *his* ordinary language into alien territory, and that *his* intuitions didn’t necessarily apply” (Dennett 86). Despite being a philosopher himself, Dennett understands that “no philosopher has *ever* articulated ‘the rules’ for the use of any ordinary expression” (Dennett 83) and that “philosopher’s intuitions, no matter how sharply honed, are not a superior source of evidence in this manifestly empirical inquiry” (Dennett 84). Because of their inability to articulate any cohesive set of rules, their flimsy foundational fallacy, and their perceived insultingly dismissive tone, Dennett lambasts Hacker and Bennett, offering almost ashamedly that they are part of the reason why some neuroscientists are so unimpressed with philosophy’s contribution.

In contrast to Noë and Hacker/Bennett, Daniel Dennett attempts to align himself with the neuroscience, informing his philosophy in an attempt to further the discussion between the disciplines. In his book, *Consciousness Explained*, Dennett proposes a multiple drafts theory of consciousness which states that different parts of the brain perform different functions and the information processing involved does not all come together in a particular place; rather, is more like parallel processing that constantly revises itself as more information is received and analyzed. This is a direct rebuttal to what Dennett describes as the Cartesian Theater, or the remaining remnants of Descartes dualism that are still apparent in language. According to Dennett, there is no place “where it all comes together;” information is

constantly being processed through different structures and networks in the brain, and it is constantly analyzing and revising the information in parallel processes. But, if there is no distinct moment of consciousness of place where it all comes together, what does that mean for the concept of a self? Here, Dennett is strikingly similar to Damasio (although almost two decades earlier and employing less neuroscientific evidence). Dennett appeals to the distinction of boundaries creating an early self in distinguishing “between ‘me’ and ‘the rest of the world,’ a distinction that even the lowliest amoeba must make, in its blind, unknowing way” (this actually sounds like Noë; truly astonishing) (Dennett 414) which is the *biological self*. This is similar to Damasio’s *core self* that recognizes the distinction between object and organism. In addition to this boundary, Dennett claims that humans construct a self out of a “web of words and deeds” which is a biological product, not necessarily premeditated or known, that “protects it, just like the snail’s shell, and provides a livelihood, just like the spider’s web, and advances its prospects for sex, just like the bowerbird’s bower” (Dennett 416). This web of words represents our selves in narrative, but unlike many narrative theories on self, is not a necessarily conscious aspect. “Our tails are spun, but for the most part we don’t spin them; they spin us. Our consciousness, and our narrative selfhood, is their product, not their source” (Dennett 418). Keeping with the disposal of the Cartesian Theater, Dennett does not believe that this narrative self is located in one specific place where it all comes together. Rather, it is invisible like the center of gravity in physics, which causes him to call it the *narrative center of gravity*. This narrative center of gravity is not located in your brain, nor is it a physical thing, but is the subjective aspect of a conscious mind. Once again, this is strikingly similar in conception to Damasio’s autobiographical self and the self-as-knower. This is significant because it shows a philosopher not only framing his conception of consciousness and the self on the groundwork laid by his own training, but also using neuroscience to inform his philosophy. It is also significant, as there seems to be a clear link between Dennett’s theory and Damasio’s later theory showing the prospect of philosophy informing neuroscientific research and analysis, and in turn, neuroscience informing

philosophy in a collaborative, interdisciplinary way.

Conclusion

Despite the conceptual nature of the self, its storied history, and its many formulations and revisions, we currently do not have an authoritative, definite understanding of what the self is. Having gathered its beginnings in philosophy and religious tradition, the study of the self stayed in the broad conceptual range until the advent of modern science. Since then, advances in science and technology have made it possible to study the biological and neural correlates of the self in order to better understand it. However, the empirical nature of this new scientific inquiry into the self is often criticized for missing the conceptual mark in its quantitative structure, as there appears to be a stark difference in the biological life and the phenomenological feeling of living. Despite this distinct difference in methodological approach, contemporary neuroscience and philosophy (particularly philosophy of mind) are more similar than it seems. The crux of the problem of the self is both a scientific and philosophical endeavor that overlaps in interesting and significant ways. Two particular neuroscientists, Joseph LeDoux and Antonio Damasio develop their theories with neuroscience, but acknowledge the foundation philosophy has achieved and use it to inform their research, creating an important collaborative aspect to the problem. However, two leading, contemporary philosophers of mind, Alva Noë and Peter Hacker, dismiss the neuroscience on conceptual error. While Noë admits that science plays a part along with philosophy, his almost arrogant dismissal of the current research and espousal of his own “astonishing” theory limits the dialogue and collaborative progress. Hacker dismisses neuroscience’s contributions on a proposed logical fallacy of attributing psychological predicates to the brain and its parts. While the call for conceptual clarity is an important aspect of any research, this flimsy foundation for the critique of an entire body of research and analysis is unproductive as Daniel Dennett shows in his rebuttal to Hacker’s theory. In addition to the rebuttal, Daniel Dennett shows the ability of a philosopher to incorporate neuroscience into their research and philosophy and, in turn, use it to inform their analysis of consciousness and the self.

This is important because there are links found between Dennett and Damasio's theories, which show that philosophy can inform neuroscientific research, while the empirical research in neuroscience can, in turn, inform philosophical analysis, creating a collaborative, interdisciplinary definition of what we call self.

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