

REVIEW ARTICLE

Neurophilosophy: A Philosophical Analysis for Interpretation of fMRI to Replace the Commonsense Psychology

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SUMMARY

For thinking, brain activity occurs, yet not every area of our brain is active when we think about various things. There are significant ramifications for cognitive psychology and neuroscience from functional brain areas. It should enable us to apply neurophilosophical theories to the brain. This review aims to draw attention to neurophilosophy and its focus on fundamental problems in neuroscientific theories to address age-old metaphysical issues, i.e., the nature of consciousness, thinking, intention, and action. There are different theories and points of view in the field of neurophilosophy, but eliminative materialists and reductive materialists (a.k.a. mind-brain identity theory) are both strong candidates. Those are very well-established in the philosophy of mind, and they run counter to the development of conceptual succession in neuroscience. Both theorists rely on neuroscience to back up their conclusions about the mind. Eliminative materialism has received a lot of attention from several philosophical points of view. It begins with a critique of commonsense psychology and offers neurophilosophy as an alternative. So, for reductive materialists, *mind is brain*, whereas for eliminativists *mind as brain*. Both theorists have different views about mental states to cohere with neurophysiology. The philosophical problem of dualism, as the body/brain (physical), and mind/cognition (mental) is discussed in psychiatry, neuropsychology, and neuroscience. Neurophilosophy deals with functional magnetic resonance imaging (fMRI) data to shed light on psychosocial problems like moral psychology, free will, social interaction, and mood disorders. An fMRI is a neuroimaging technique and an essential tool for bridging cognitive psychology and neurophilosophic theories. It is used to investigate mental resilience, impairments, changes in neural dynamics, and neuroplasticity mainly for brain trauma. I will tie this discussion by discussing fMRI and commonsense psychology as exploratory rather than confirmatory evidence in my conclusion.

Keywords: *Brain, Emotions, fMRI, Memory, Neurobiology, Philosophy.*

How to cite this: Sohail A. *Neurophilosophy: A Philosophical Analysis for Interpretation of fMRI to Replace the Commonsense Psychology.* *Life and Science.* 2023; 4(4): 494-500. doi: <http://doi.org/10.37185/LnS.1.1.392>

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Introduction

Philosophy is defined as the love of wisdom. It is an old discipline that has impressed many intellectuals, academicians, and thinkers, throughout the history

of humans. Philosophy also serves as a pursuit of truth, knowledge, and understanding of the most fundamental characteristics of human life, and its interaction with the natural world. Throughout history, it has often been concerned with the investigation of thought and consciousness. Philosophers in ancient Greece, specifically, Plato and Aristotle talked about the nature of the mind and the relationship between thought and reality. They believed that the mind (a nonphysical entity) is distinct from the brain and intellect is not justified in physical terms.¹

In medieval times thought and consciousness were incorporated with religious and theological

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Funding Source: NIL; Conflict of Interest: NIL

Received: April 26, 2023; Revised: Jul 10, 2023

Accepted: Jul 19, 2023

perspectives, on the nature of the soul, and the relationship between faith and facts. Later, modern philosophers, specifically, Descartes and John Locke gave the idealist and empiricist view of thought and consciousness. Rene Descartes (1596–1650) in his work meditations², utilized a method of doubt, that questioned everything and brought the certainty of the thinking self – I think therefore I am. Immanuel Kant's "Critique of Pure Reason" explored the nature of human cognition while Hegel saw it through the lens of history. In the 19th and 20th centuries, existentialist philosophers like Jean-Paul Sartre, and Heidegger examined human thought and consciousness with the nature of existence and freedom. At the same time, analytical philosophers focused on the analysis of language and explored the question of meaning and mental representation. Contemporary philosophy and neurosciences investigate the relationship between mind and brain. Neurophilosophy³ is a multidisciplinary field that dips into the thoughtful interplay between philosophy and neuroscience.

Churchlands (Paul and Patricia) are the proponents of neurophilosophy. Philosophers initially questioned the need for this field. They even referred to themselves as "philoneuroscientists".⁴ Hence, the emergence of this theory helped in the rise of science.⁵ Psychology, neurology, and behavioral sciences give proper space for neurophilosophy. Neurology as an academic discipline, is the antithesis of metaphysical beliefs or concepts, serving as a strong supporter of empirical investigation and scientific knowledge. For instance, a unicorn, a mythical creature, is a fictional notion that holds very significance in everyday conversation as a firm belief as it is a tangible reality. But in the real world, there are no unicorns, including mermaids, pegasus, and dragons, are mere illusions of human imaginations, and psychological experiences. To understand human behavior as an internally disturbed physiological system rather than caused by external sources like demons or witches – neurology evolved as a field to analyze such mental occurrences in the twentieth century. The philosophical theories and methods are very important for addressing such issues, specifically consciousness (brain or mind), cognition, and nervous system functions. For

instance, many changes in consciousness were evaluated in epilepsy patients and individuals with brain injuries from concussions.⁶ In this scenario, understanding consciousness has always remained philosophy's main objective.^{7,8}

Discussion

Neurophilosophy explains the intricate cognitive processes by which people harness their commonsense psychology to make decisions based on factors that transcend mere physical mechanisms. The commonsense psychology encompasses common people's perceptions, analysis, and interpretation of the behavior of common people regarding their actions, with the subsequent outcomes and consequences of that behavior. Different concepts are conveyed in the descriptions and terminology that we use to categorize the proverbs and tales that we regularly share. In short words, it underlies and is conveyed by our everyday language. Two problematic aspects that require careful consideration in the realm of philosophy are the problem of causation and the problem of consciousness. These two interrelated dilemmas are significant challenges to question the nature of human reality and its existence. The problem of causation, in particular, digs into the underlying principle of causality, exploring the relationship between an event and its antecedent cause. This demands a deep inquiry into concepts such as free will, determinism, and the nature of agency. Similarly, the problem of consciousness deals with the paradox of subjective experience and self-awareness. This elusive phenomenon is a formidable challenge for philosophers and scholars, which represents the very essence of human existence.

The problem of causation tells us that all causally effective mental phenomena must also be physical due to the causal connection between mental and physical phenomena. And, consciousness (intentionality, and free will), either does not exist (eliminativism) or is reducible to third-person behavior (reductionism). Reductionists acknowledge the presence of mental states rather than eliminating them. However, the proposed reduction eliminates the subjective first-person in favor of objective third-person ontology.⁹ All efforts

towards elimination or reduction deny the data of subjective experience. Here, in this article I will just discuss two rivals in a little brief: one is mind-brain identity theory (reductionist), and the other is eliminative materialism (eliminativists). Mind-brain identity theory played a significant role in the twentieth-century philosophy of mind. It is also known by other names, including type identity, reductive materialism, type physicalism, type materialism¹⁰, and type-type theory. According to this theory, the mental and physical states of the brain are strictly identical. The mind-brain relationship is purportedly one of correspondence rather than interaction. It shows somehow Berkeley's idealism, where 'mind' is the essential corrigendum to every physical explanation, and the identity theory's rigorous materialist position have a lot in common in terms of simplicity.¹¹

The Australasian materialists have made advancements for this theory in the mind-body dualism, as for J. J. C. Smart, 'man is a physical process,¹² and for Armstrong, 'mind is simply the brain.¹³ Armstrong provides a clear explanation of the interconnectedness of the mind and brain. He believes that because the brain is internal to the body, it serves as a pilot in the vessel. The usage of the word 'in' in this context exclusively refers to the extension or space; this represents a complete rejection of the dualist theory. For him, man is merely a material object with physical properties. The human central nervous system correctly perceives mental activities as neural events and neural events are electrochemical events. Physical events are not distinguished from neural events. The physical, in its most fundamental form, is an extension of space and time. Mental and neurological events have bodily consequences. Mental events which have certain causes and effects do have their causes and effects.¹⁴ What occurs as a 'mental event,' such as a thought, a concept, or an image, does not appear to be merely a brain-event, because these all involve multi-dimensional meanings that refer to a person's overall psychological outlook on life, whereas a brain event is merely a repetitive physical change caused by other physical processes in the brain (or body). Mental events (in general said to) have causal

qualities that are either essential (inner) or distinct (outer).¹⁵

The distinction between eliminative materialism and reductive materialism is very thin. This distinction is based on the to-be or not-to-be state of commonsense psychology. Even though mental conceptions are rooted in neurophysiological brain processes rather than autonomous entities, identity theorists claim that the language of thought is meaningful. Eliminativists do not hold this view, they prefer brain states over mental states. For them, consciousness, self-consciousness, reason, introspection, intuition, mind, thought, and concepts, are all considered old-fashioned terms of commonsense psychology. They claim that neurology provides strong foundations for these descriptions of brain functions, whilst identity theory is impeding the advancement of neuroscience.¹⁶ Specifically, eliminativist Paul Churchland consigns the concept of commonsense psychology to the trash of history's discredited and abandoned notions.¹⁷ For him, eliminativism 'is the thesis that our commonsense conception of psychological phenomena constitutes a false theory, a theory so fundamentally defective that both the principles and the ontology of that theory will be displaced, rather than smoothly reduced, by completed neuroscience.¹⁸ He emphasizes that commonsense psychology can be replaced by neuroscience. The commonsense 'psychological theory needs replacement with neuro-physiological theory, to predict brain activity more accurately and precisely, and near to the physical reality.¹⁹ Therefore, with the development of neuroscience, commonsense psychology will be eliminated rather than reducing it.

Neurophilosophy and fMRI

To study the brain (pathologies, mental disorders), one needs to use instrumental philosophy in today's times. To treat and understand brain pathologies, fMRI scans demonstrate the philosophical role in physiological studies. Anokhin²⁰ was one of the pioneers in neuroscience to apply systematic theory. The learning method comprehension has an objective impact on how that process in question develops. For instance, when an animal or person is trained using a combination of a conditioned stimulus and a reinforced stimulus. We are unable to

determine the reinforcement's effectiveness until memory recall is evaluated. We deem reinforcement ineffective if the memory is not created. In other words, the learning process is in some ways formed by the future results. Brain functioning continuously monitors changes in metabolic reactions, while subjects carry out such cognitive tasks.²¹ An fMRI is now ubiquitous in neuroscience for detecting variations in brain activity associated with specific cognitive processes. Neuroscience has undergone a revolution because of these traits. Neuroscientist narrative is an important aspect of how our minds work. And how do we translate the neurological basis of sensations of subjective experiences? For instance, using fMRI to describe the characteristics of coffee taste or see yellow color.²² It provides a convincing explanation for how these experiences occur. Seeing the yellow color is a learned categorization of seeing the red color in the past if he is sure about his past and present experiences.²³ There is no objective way of knowing what someone is genuinely feeling. At this stage, any conclusion regarding the subjectivity barrier²⁴ is an assumption. Considering the activity of the brain, single-neuron monitoring would detect any prospective action. A specific neurotransmitter is released, and a specific receptor is triggered to know how mental things arise. By studying neuroimaging, we can understand the human motor system rationally by analyzing fMRI data. It refers to a discipline that lets researchers observe the brain in action through imaging technology. Neuroimaging has drawn the interest of many philosophers as well because it also addresses such concrete concepts: free will, rational choice, moral deliberation, ethical and social interaction, weakness of will, belief, humor, political orientation, deception, happiness, fear, a feeling of bliss (drug-induced), cultural differences, and even stock market forecasts, or responses to reality TV shows. For commonsense psychology, such concrete concepts are only mental images of essences, causal nexus, functions, relationships, and/or contextual facts.²⁵ What constitutes commonsense psychology knowledge for such notions is not currently specified in the literature. Specifically, those notions contain other types of facts, like prototypes, which, depending on the situation, may be used alone or in

conjunction with mental states (conscious/subconscious). An experimenter utilizes brain activity as proof of his true beliefs, to complete a logical chain.²⁶ Clinical and philosophical studies reveal that clearing an idea isn't as simple as once understood. For instance, one could puzzle over whether an individual in an irreversible coma is dead or not dead. The reason is that his lungs and heart are showing life with the support of mechanical ventilation.

Here, some of the concepts and their relations with the fMRI are illustrated

Emotion:²⁷ It is studied through a variety of methods, including emotive phrases, fear, romantic movies, and mood disturba, to name a few. It is the area of neuroscience, where fMRI also helps to measure the intensity. The brain region appears to be active when emotions are expressed. Neuroimaging is a provision of information about personal emotional stimuli and experiences. The subjectivity of emotional experiences is so individual, that current empirical and statistical approaches reveal underlying complexities. A significant component of emotion is subjective experience, which varies amongst individuals based on our interpretation of it. Still, neuroscience is trying to explain how our brains become our minds, and how phenomena of subjectivism emerge. As iPhone's likeness of the individual is based on the activation of a small brain area (the insula of the telencephalon).²⁸

Pain: Studies of pain offer another illustration of how neurobiology, neurology, and neurophilosophy interact. Despite being aware of some of the pain molecular underpinnings, we still need to gain the knowledge to develop efficient methods for treating it. Pain is defined as a failure of the nervous system's dynamic and nonlinear adaptivity through philosophical methods. Research on pain combines neuroscience with philosophy, allowing for the dialectical method for comprehending and treating chronic pain.²⁹

Hallucinations: Neurobiologists, philosophers, and specifically psychiatrists, all research the nature of hallucinations, albeit none of them have been able to develop a comprehensive theory. According to Perogamvros, the neurophilosophical model of psychosis would connect neurobiological

information.³⁰ Illusions are seen as an individual's attempt to make sense of these intrusions. This model is an illustration of how a philosophical theory can enhance and strengthen a scientific conclusion and has significant clinical research, and therapeutic implications (the reverse is also true).

Free will and determinism; Ivanitskii³¹ discusses the paradox between free will and determinism as a physiologist, which is an intriguing illustration of how neurophysiologists are involved in philosophical debate. He holds the belief that "I" as a subject – is capable of decision-making, and managing its activities, and perceives the outside world as something apart from it. Humans perceive freedom of choice as being fundamental to their worldview. Therefore, it has been demonstrated that risk preferences (uncertainty with known probability) coincide with posterior parietal brain activation.

Memory: A warehouse that is filled with subjective experiences, interpretations, and autobiographical memories.³² For semantic, working, and episodic memory, fMRI studies have been conducted to see the networking of brain areas, with a focus on changes related to aging and memory disorders such as dementia, Alzheimer's disease, and cognitive impairment.³³ Whereas neuropsychological approaches can identify the brain regions required for intact memory function. Neuroimaging techniques can study which brain regions are activated during healthy memory generation, storage, and retrieval. For instance, fMRI studies have revealed that the lateral prefrontal cortex (PFC) supports several aspects of working memory performance. It makes perfect sense that instrumental neurophilosophy would later be required to comprehend and treat various brain illnesses, notably mental disorders. FMRI research further helps us grasp psychological and philosophical notions like pleasure and sadness.³⁴

The Problem of Reverse Inference: In reverse inference, an independent variable is labeled from an activity pattern, whereas forward inference is labeled from an independent variable.³⁵ According to Poldrack,³⁶ cognition has a significant impact that a reverse inference is right. It relies on brain activity to prove cognition, which presents another challenge to fMRI interpretation. Reverse inference is the use

of reasoning, from brain activation to cognitive functions. This is an induction method that has not been directly tested but may be related to the task performed. It has been used to distinguish between social decision-making and nonsocial decision-making, specifically, in neuroeconomics,³⁷ as in games theory (e.g., prisoner's dilemma, ultimatum game, etc.). Where the hidden mental processes might be less known. However, reference inference is logically invalid, and philosophically this is the problem. Reverse inference can be an exceptionally valuable system, particularly if it depends on genuine information instead of a casual perusing of the literature. Reverse inference in this sense is an illustration of abductive inference or 'thinking to the best clarification',³⁸ which is generally valued as a helpful method for logical thinking.

Cognition: Cognitive characteristics are intuitively distinct.³⁹ Assume, an image of a dead body is shown to the audience, after seeing they get panicked. Though, we are unable to witness or measure these distinct internal states. But a sociopath will take it humorously, or someone will take it as a reminder of a previous episode in which he was attacked. For all this, there are physiological markers that can be examined: respiration rates, heartbeat, skin conductance, and facial muscle activity. This study reveals that fMRI can address several neurophilosophical issues. According to Anderson's insightful observation, fMRI studies make the implicit assumption of cognitive attributes to brain regions.⁴⁰ The research on brain mapping tells that researchers frequently fail to interpret correctly.⁴¹ Studies on the motor cortex provide a vivid illustration of functional localization. It tells that several muscle groups are controlled by clusters of nerve cells in the motor regions. The motor cortex sends a signal through the spinal cord and an action triggers calcium release, which causes sarcomeres in muscle fibers to shift, resulting in muscular contraction. The outcomes are observable, therefore there is no subjective barrier.

Conclusion

The rising consensus among scientists and philosophers is in support of a better understanding of neurological procedures. Philosophical approaches regarding fMRI, are helping to integrate

neuroimaging findings or descriptions.⁴² Philosophers have long debated the potential connections between cognitive processes and actions. These actions could be abstract like reading a novel or subtracting (a mathematical task). Verifiability is the sole difference between commonsense psychology and neuroscience, as we discovered in this article. It is undeniably true that neuroscience is real and approachable, because commonsense psychology, 'has chief failings as a theory: it is severely limited in its explanatory scope, stagnant and infertile; and it is not integrated with the other sciences of man and beast.'⁴³ The radical objective of eliminative materialism is to eradicate commonsense psychology.⁴⁴ For the brain, neuroscience is the domain of empirical investigation (i.e., fMRI) into the central nervous system to establish matters of brain structure and its operational function.

Authors Contribution

AS: Idea conception, study designing, data collection, data analysis, results and interpretation manuscript writing and proof reading

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