



What, if anything, is consciousness made of?

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Abstract. This paper explores the multifaceted nature of consciousness from philosophical, neuroscientific, and social perspectives. It discusses Cartesian dualism, which views consciousness as a non-material entity, contrasts this with neuroscientific evidence linking consciousness to brain activity and considers non-reductive physicalism and social constructionism's insights into the subjective experience of consciousness. The study integrates these views, suggesting that consciousness arises from both biological processes and social interactions, highlighting the complex interplay between an individual's internal and external worlds.

Keywords: Consciousness, Dualism, Neuroscience.

1 Introduction

From ancient philosophy to modern neuroscience, people have been trying to explain the concept and composition of consciousness since this unique human attribute plays a key role in our lives in multiple dimensions. In the past, due to limitations in understanding the whole world and the influence of religion, earlier scholars focused on the relationship between body and human's soul. During the Renaissance, the understanding and exposition of consciousness became a diverse and complex topic. Some scholars shifted their attention to studying the human brain, suggesting that consciousness is determined by the structure and function of the brain. With the help of advanced technology, scientists today may also conduct more in-depth research on the inner brain. Social science, based on their perspective about the function of society, also attempts to explain the component of the external environment that affects consciousness. In this paper, according to Tononi and Koch (2008), consciousness is defined as the ability to reflect on our own perceptions.[8] It is highlighted that among the arguments of different schools of thought, including dualism, neuroscience, non-reductive physicalism, and social-constructionism, consciousness is made of the dynamic relationship between organisms and the environment, as well as individuals' perception and thinking of the outside world.

Consciousness is deeply intertwined with our cognitive processes, acting as a bridge between sensory input and our responses. It allows us to interpret and give meaning to

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the things we see, hear, and feel. This interpretative process is crucial for making informed decisions, as it enables us to weigh the consequences of our actions based on past experiences, current circumstances, and future projections. Moreover, consciousness is not static; it evolves with our experiences. As we encounter new situations, our consciousness adapts, shaping our thought patterns and influencing our behavior. This dynamic nature of consciousness is essential for learning and development, allowing us to integrate new information and adjust our behaviors accordingly. The social aspect of consciousness also plays a critical role. Our interactions with others and the cultural contexts in which we live shape our consciousness. This social dimension influences how we perceive norms, values, and expectations, and it guides our behavior in social settings. It is through this lens that we can understand the impact of society on individual consciousness and how it molds our identities and worldviews.

Consciousness is a multifaceted phenomenon that encompasses our thoughts, emotions, and perceptions. It is shaped by biological processes, personal experiences, and social interactions. Understanding consciousness is not just an academic exercise; it has practical implications for improving mental health, enhancing learning and memory, and developing artificial intelligence systems that mimic human cognitive functions. As we continue to explore the depths of consciousness, we must consider its biological, psychological, and social dimensions to fully appreciate its role in shaping human experience.

2 Dualism: Mind and Body

To start with, during the seventeenth century, philosopher Descartes proposed a far-reaching perspective about consciousness, mentioning that consciousness is an inner perception and self-reflection ability of the spiritual entity, which is an independent non-material existence from the material world, such as the body. Specifically, Descartes presented that even if we doubt everything in the external materials, we cannot doubt ourselves as thinking beings. Therefore, Descartes (2013) proposed that “I think; therefore, I am”, emphasizing that the mind is a non-material, thinkable object that differs from the body, which is a material and observable entity.[4] When offered from all the physical senses, including closing their eyes, blocking the ears, and being unsensible to any odors, people still can think, doubt, or understand something created by our mind without the perception of external senses. This means that such mental object is independently different from the sensory experience. Moreover, by observing the size of the sun from different perspectives, Descartes explained that although human sensory organs, because of the far distance between the earth and the sun, make the sun look as small as a ball, the astronomical fact tells people that the sun is several times larger than the earth. This observation suggested that senses and consciousness view the same thing in two different ways, so they are independent of each other. Accordingly, consciousness was considered as a non-material and mutually exclusive mind with the body, which is a material object.

Descartes' assertion that the mind, as a non-material entity, could exist independently of the body has profound philosophical implications. It raises questions about the locus

of consciousness and whether mental processes such as thought, emotion, and self-awareness can truly be separated from the physical processes of the brain. In contemporary discussions, this leads to inquiries into the nature of personal identity and the existence of an immaterial soul, aspects that continue to be central in philosophy of mind, theology, and ethics. Moreover, Cartesian dualism challenges modern neuroscience, which tends to view consciousness as emerging from complex brain processes. This scientific approach argues against the dualistic separation by demonstrating how changes in the brain's physical structure and function can directly affect consciousness and cognitive functions. Studies showing that brain damage or changes in brain chemistry can alter personality, memory, and cognitive abilities offer compelling evidence that the mind is closely tied to the physical brain.

However, despite these challenges, dualism still influences contemporary discussions, particularly in understanding the subjective quality of consciousness—what philosophers call 'qualia'. For instance, understanding how physical processes in the brain give rise to the subjective experience of color or pain remains elusive. Dualism provides a framework for considering these phenomena as possibly distinct from purely physical processes, suggesting that subjective experiences might not be fully explainable by neuroscience alone. Furthermore, dualism has practical implications in medicine and ethics, particularly in end-of-life issues where decisions about brain death and consciousness are critical. The dualist perspective forces us to consider whether physical signs of brain activity are truly indicative of consciousness, or if consciousness could persist even when physical brain function becomes undetectable. In integrating dualism with modern science, we may consider a more nuanced approach that acknowledges the interplay between the mind and body while recognizing the distinctiveness of mental phenomena. Such an integrative perspective could foster a more holistic understanding of human consciousness, accommodating both the physical processes identified by neuroscience and the subjective experiences emphasized by dualism.

While Cartesian dualism presents challenges to our scientific understanding of the brain and consciousness, it also enriches the dialogue by forcing us to confront the profound mysteries of mind, body, and their interaction. Continuing to explore this dialogue not only deepens our philosophical understanding but also enhances our approach to practical issues in medicine, psychology, and artificial intelligence, where the nature of consciousness directly impacts ethical decisions and technological advancements.

3 Neuroscience: Consciousness and Brain

However, increasing neuroscientific evidence has highlighted consciousness as a biological process that is regulated by the nervous system. Specifically, neuroscience research has shown that the occurrence of consciousness is related to specific neuronal activities and interactions between brain regions. In one study, ten healthy participants were recruited to report their emotional experiences and used functional Magnetic Resonance Imaging (fMRI) to detect the activity of the amygdala when they were presented with neutral and negative scenes. The result shows that amygdala activation could reflect instantaneous subjective emotional experience, especially fear, and enhance

memory according to the different emotional intensities (Canli et al., 2000).[1] Thereby, the amygdala, as a part of the limbic system in the brain, gives scientists a clue that emotion can be generated from brain activities. Although most scientists believed that consciousness might just be a kind of perception reflecting our own thinking, James-Lange theory of emotion (James, 1884), published by Harvard Medical School, mentioned that emotion, especially fear, can also contain in “a perception of changes in the body”, which reflects the definition of consciousness.[5] Besides, Schrouff et al. (2011) revealed that conscious processing will be affected by the connectivity in the frontal cortex and parietal lobe by using fMRI to measure the conscious state of the patients with unresponsive wakefulness syndrome, showing that their network properties were altered in the regions related to conscious processing.[7] Accordingly, the study gives us direct evidence that damage to the brain highly correlates to negative influences on consciousness perception, illustrating that individuals’ neuron responses are included in the concept of consciousness. Therefore, consciousness may not be, as Descartes believed, composed of immaterial matter, but instead, it is likely to have a neurological basis.

The evidence provided by neuroscience has increasingly suggested that consciousness is not a singular entity but a spectrum of states determined by various neural processes. For example, the roles of the amygdala, frontal cortex, and parietal lobe in emotional regulation and conscious awareness demonstrate how specific brain areas contribute to distinct aspects of conscious experience. This specificity supports the theory that consciousness emerges from complex networks of neurons that interact dynamically. Moreover, advances in neuroimaging and other technologies have allowed scientists to observe the brain in action and to see how different patterns of brain activity correlate with different conscious states. Techniques such as fMRI and EEG provide insights into the temporal and spatial dynamics of brain activity that accompany cognitive tasks and sensory processing. These methods have revealed that consciousness involves widespread, coordinated patterns across various brain regions, rather than being localized to any single area. This understanding leads to a discussion of the "global workspace theory," which posits that consciousness results from the integration of information by various cognitive processes across the brain. According to this model, different neural circuits compete for access to a global workspace, which is responsible for higher cognitive functions such as attention, reasoning, and decision-making. This theory provides a plausible explanation for how disparate neural activities are unified into a coherent conscious experience.

However, despite the progress in identifying the neural correlates of consciousness, significant challenges remain. One major issue is determining causality; that is, whether these neural activities are the generators of consciousness or merely associated with it. This dilemma reflects the classic question of correlation versus causation in scientific research and highlights the difficulty in identifying the precise mechanisms that produce consciousness. Furthermore, the complexity of neural interactions and the plasticity of the brain complicate the mapping of consciousness to specific neural circuits. The brain's ability to reorganize itself in response to new information or injury (neuroplasticity) suggests that consciousness is not fixed but can adapt, highlighting the dynamic nature of the neural basis of consciousness.

In addressing these challenges, neuroscience not only expands our understanding of the physical basis of consciousness but also intersects with other disciplines, such as psychology, philosophy, and computer science, to develop a more comprehensive theory of mind. This interdisciplinary approach is crucial for developing models that accommodate the physical, experiential, and functional aspects of consciousness. In conclusion, while neuroscience has provided significant insights into the brain mechanisms underlying consciousness, it also opens up new questions and challenges. These include understanding the exact neural pathways that contribute to conscious awareness, determining how consciousness can alter brain function, and exploring how these insights can be applied to artificial intelligence and mental health treatments. As we continue to unravel these mysteries, the neuroscientific approach will remain pivotal in shaping our understanding of the fundamental nature of consciousness.

4 Nonreductive Physicalism: the Problem of Conscious Experience

Nonetheless, the limitation of the neuroscience perspective is that when people try to only use the sensory system, according to neuropsychology, to explain the process of responses, it is difficult to figure out why and how the sensation and experience arise. Although neuroscience explains the easy problems related to cognitive ability and function that can be answered by the standard methods of neuroscience, the hard problems of consciousness related to individuals' subjective experience remain unanswered (Chalmers, 2017).[2] Despite biology explaining the sensory functions in humans, we may still face the hard problem, as we "experience" the felt quality of redness, and a stream of conscious thought or certain emotions and form mental images like "the sound of a clarinet". In other words, for the easy problems, scientists just need to study how the cognitive mechanism performs the function since the central process of the system that aggregates the sensory stimuli, integrates information content, and utilizes them to promote various behaviors, can be solved elementally by the scientific methods, but such explanation fails when facing the conscious experience. To visualize the idea, Chalmer (2017) portrayed that it is easy to tell how DNA can transmit hereditary materials to the next generation, but it has not explained the origin of the information, such as "how DNA is experienced".[2] Therefore, the importance of personal experience in the formation of consciousness showed that there is an "explanatory gap" (termed by Chalmers) between subjective experience and sensory functions, which is unable to be explained by the evidence from pure neuroscience.

The "explanatory gap" highlighted in the thesis points to the persistent challenge within the philosophy of mind: bridging the divide between objective neurobiological processes and subjective experiences. The qualitative character of mental states—what it feels like to experience sadness, the redness of red, or the pain of a headache—remains elusive under the standard neuroscientific approach. Nonreductive physicalism suggests that these experiences, or qualia, while rooted in the brain's physical structure, follow principles that are not yet fully understood by neuroscience or physics alone. Moreover, nonreductive physicalism encourages a multidimensional exploration of

consciousness. It acknowledges that mental states are influenced by and interact with physical states but are not wholly defined by them. This perspective aligns with emerging research in cognitive science that views the mind as a dynamic system, characterized by complex interactions that include but transcend its physical foundation.

In practice, this philosophical approach supports the integration of various research methods and theories from neuroscience, psychology, computer science, and philosophy to create a more comprehensive understanding of the mind. For instance, computational models of the brain that incorporate elements of human experience and emotion could lead to more accurate simulations of human-like consciousness in artificial intelligence. Ultimately, embracing nonreductive physicalism could propel forward our understanding of the human condition, enhancing our approaches to mental health treatment, educational strategies, and the development of AI technologies that more accurately reflect human cognitive and emotional processes. This broadened perspective invites ongoing dialogue among scientists and philosophers to explore and elucidate the rich tapestry of consciousness, continually challenging and refining our theories about the mind in light of new evidence and technological advancements.

5 Social-constructionism: the Function of Social Activities

Social constructionism might have added some clarification on the hard problem of consciousness, particularly, the formation of experience. In psychologist Vygotsky's view (1987), consciousness is a motivating sphere that includes "our inclinations and needs, our interests and impulses, and our affect and emotions".[9] He proposed that "internalization", involving the interactions between people and things related to society, facilitates the human developmental process from lower mental functions, which is an innate ability like sucking, to higher mental functions, including conscious thoughts such as rational thinking, pointing, etc. In other words, social activities promote conscious thinking. Specifically, Vygotsky emphasized that when people learn scientific concepts that were described as those that "form a coherent, logical hierarchical system" in society or schools, we transform the external knowledge into the inner experience and our consciousness (Daniels, 2008).[3] Beyond speech and scientific concept acquisition, Lave (1990) also mentioned the importance of observation within the community in the formation of consciousness.[6] In one field research, she studied a group of apprentices who were required to construct the outline of a piece of clothing by continuously observing the process of making clothes by masters, until they understood all the sewing details and made fine clothes that all the parts correctly connected to enter the practice phase. Through in-depth observation of other tailors, the apprentices learned the whole-activity practice and remembered all the details of the garments. Despite being rarely evaluated by others, they had a reflective consciousness about when they make mistakes, the accurate decision about the clothes' quality, and what price to set. In short, the tailors' form of education inspires people inherently to spontaneously apply what they are learning from society in daily life and consciously know their productions and purposes, indicating that individuals' interactions with their social environments play a role in the formation of consciousness.

The thesis discusses Vygotsky's notion of "internalization," where the interactions between individuals and their social environments lead to the development of higher mental functions, such as conscious thought, through the process of learning and social engagement. This theory suggests that consciousness is not just an internal construct but is also developed through our engagement with the cultural and educational systems that surround us. As individuals participate in social practices, they internalize the values, norms, and knowledge of their society, which in turn shapes their cognitive frameworks and consciousness. For instance, the way individuals perceive and interpret their roles within different societal contexts can significantly affect their self-awareness and decision-making processes. Social norms and cultural values are internalized and influence how we think about ourselves and interact with others, which can lead to a diverse range of consciousness experiences based on one's cultural background and social interactions.

Further extending this idea, future research could explore how changes in social structures, such as shifts in educational methods or transformations in cultural values, could lead to changes in the collective consciousness of a society. Additionally, understanding the role of technology in shaping social interactions is crucial, as digital media profoundly affects how we construct our social realities and, consequently, our consciousness.

Social constructionism provides a vital framework for understanding the complex interplay between society and the individual in the formation of consciousness. It challenges us to consider how our social environments not only shape our external behaviors but also our internal experiences and awareness. As we continue to explore this interplay, it becomes increasingly important to consider the broader social dynamics at play, which continuously shape and reshape the landscapes of our minds.

6 Conclusion

From the perspective of Descartes' dualism, consciousness is a distinct non-material entity, while neuroscientists have provided evidence that conscious thoughts are related to the human brain. Nonreductive physicalism, however, stresses the limitation of neuroscience: it is difficult to interpret the subjective experience in human consciousness. Finally, constructionism, focusing on social interactions within society, tried to explain the origin of internal experience. Taken together, it is concluded that consciousness consists of the complex connections between biology and environment, especially social activities. Indeed, studies on the composition of consciousness are of paramount importance. Not only may research on consciousness facilitate the development of new treatment methods for psychological disorders, but it may also provide a supplement standard for the Turing test used in artificial intelligence, and help us understand and reflect on our selfhoods and potentials. Nonetheless, consciousness remains a topic that to be further studied. There are still many problems waiting to be solved, including the individual differences in the composition of consciousness, the specific interaction mechanism between social environment and neuroscience, etc. Hence, it is vital to continue interdisciplinary research on the composition of consciousness in the future.

Future research should continue to bridge the gaps between these disciplines, as each provides unique insights that are crucial for a comprehensive understanding. For instance, advances in neuroimaging and genetics offer promising pathways to explore the biological underpinnings of consciousness, potentially leading to breakthroughs in understanding neurological disorders and cognitive functions. At the same time, psychological and social sciences contribute significantly to our understanding of how consciousness manifests in behavior and social interactions, which is essential for developing effective mental health therapies and educational strategies. Moreover, the ethical implications of consciousness research are profound. As we delve deeper into understanding this complex phenomenon, questions about the nature of personhood, the treatment of disorders of consciousness, and the potential for artificial consciousness in machines become increasingly urgent. These ethical considerations must be integrated into research frameworks to ensure that the advancement of knowledge is aligned with respect for human dignity and rights.

Another critical area is the application of consciousness studies in technology, particularly in artificial intelligence (AI). The integration of cognitive models inspired by human consciousness into AI systems could lead to more sophisticated, adaptive, and intuitive technologies. However, this also raises ethical issues about the autonomy of AI systems and their role in society, which must be carefully managed. In addition to the applications and ethical dimensions, theoretical advancements are also necessary. The "hard problem" of consciousness, which concerns the subjective experience of the mind, remains unresolved. Addressing this problem requires not only scientific inquiry but also philosophical deliberation to explore concepts that are not readily accessible through empirical research alone. Therefore, as the study of consciousness progresses, it is crucial to foster an environment of collaboration among neuroscientists, psychologists, philosophers, and other scholars. Such interdisciplinary efforts should aim to create a unified framework that respects the contributions of each discipline while striving for a deeper understanding that could transcend the limitations of individual fields.

In conclusion, the study of consciousness is not merely an academic endeavor but a pursuit that touches the core of human existence. The insights gained from this research have the potential to transform our approach to education, mental health, technology, and ethics. Therefore, continuing to explore the complex nature of consciousness with an integrated approach is not only beneficial but imperative for the advancement of society.

Reference

1. Canli, T. Zhao, Z., Brewer, J., Gabrieli, J. D., & Cahill, L. et al. (2000a) 'Event-related activation in the human amygdala associates with later memory for individual emotional experience', *The Journal of Neuroscience*, 20(19). doi:10.1523/jneurosci.20-19-j0004.2000.
2. Chalmers, D. (2017) 'The hard problem of consciousness', *The Blackwell Companion to Consciousness*, pp. 32–42. doi: 10.1002/9781119132363.ch3.
3. Daniels, H. (2008) "An introduction to Vygotskian theory," in Vygotsky and Research. [Online]. United Kingdom: Routledge. pp. 9–36.
4. Descartes, R. (2013) *Meditations on first philosophy* (1642). Broadview Press Ltd.

5. James, W. (1884a) 'II. —what is an emotion?', *Mind*, os-IX(34), pp. 188–205. doi: 10.1093/mind/os-ix.34.188.
6. Lave, J. (1990) 'The culture of acquisition and the practice of understanding', *Cultural Psychology*, pp. 309–327. doi:10.1017/cbo9781139173728.010.
7. Schrouff, J. *et al.* (2011) 'Brain functional integration decreases during propofol-induced loss of consciousness', *NeuroImage*, 57(1), pp. 198–205. doi: 10.1016/j.neuroimage.2011.04.020.
8. Tononi, G. and Koch, C. (2008) '*the neural correlates of consciousness*', *Annals of the New York Academy of Sciences*, 1124(1), pp. 239–261. doi:10.1196/annals.1440.004.
9. Vygotsky, L. S. (1987) *The collected works of L.S. Vygotsky / edited by Robert W. Rieber and Aaron Carton*. New York; Plenum Press.

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