AG Publishing House

Recent Trends in Humanities, Literature, Sociology and Psychology (Volume 3)

Volume 3
Year: 2025

AG PH Books

Neuroscience and Psychology: Bridging the Gap between Mind and Brain

Ms. Pulkita Gupta[1*]

[1]*Student, BA Honor Psychology.*

Abstract

One issue with the mind-brain divide is the intricate interplay between the fields of neuroscience, clinical psychology and psychiatry, and philosophy of science. Positioning with reference to certain conceptual/philosophical factors is necessary for research in clinical psychiatry and neuroscience. The purpose of this article is to review the diverse literature on the topic of bridging the gap between the mind and the brain. This review highlights the growing precision of theories in behavioural neuroscience, driven by advanced methods of measuring brain activity. Computational models linking neural networks to cognition provide promising insights into brain-mind dynamics and enable prediction of behavioural outcomes. A major challenge remains in constructing comprehensive brain-behaviour models across domains like memory, attention, and mental health. Evidence suggests that the brain functions as a self-regulating system, with self-control networks playing a key role in integrative health. Targeting brain-body imbalances rather than isolated symptoms offers a holistic approach. Though complete solutions remain elusive, emerging findings indicate significant progress in bridging neuroscience and psychology.

Keywords: Neuroscience, Psychology, Bridging Gap, Mind and Brain, Neuropsychiatry, Brain-Mind, Psychiatric, Neurology, Mental Disorders.

1 Introduction

The multidisciplinary discipline of neuropsychiatry is dedicated to the investigation of the connection between mental illnesses and brain function. The objective is to investigate the physiological and biological foundations of mental disorder in order to close the gap between psychiatry and neuroscience

* ISBN No. - 978-93-49028-92-0

[1]. Neurology and psychiatry were formerly distinct academic disciplines, with neurology concentrating on the research of nervous system problems and psychiatry on the study of mental disorders. As a result of the emergence of neuropsychiatry, the investigation and management of mental illness have become more comprehensive. The anatomy and function of the brain in live people may now be studied because to developments in brain imaging technology. The result has been a more comprehensive comprehension of the biological underpinnings of mental illness, which has also facilitated the exploration of novel treatment options [2].

All things considered, the area of neuropsychiatry is expanding quickly and has the potential to completely change how we perceive and handle mental disease. Neuropsychiatry can help us create more effective therapies and enhance the lives of people with mental illness by bridging the gap between the brain and the mind [3]. Neuropsychiatry is distinguished by its interdisciplinary approach, wherein experts from many disciplines collaborate to enhance our knowledge of the brain and how it relates to mental illnesses. Neuropsychologists, psychologists, psychiatrists, neurologists, and other experts may be among these professions [4]. The capacity to pinpoint certain brain areas that can be connected to particular mental illnesses is one of the main advantages of neuropsychiatry. For instance, research indicates that depression is linked to abnormalities in the hippocampus, amygdala, and prefrontal cortex. Neuropsychiatrists can create interventions that are more precisely targeted and that target the specific regions of the brain that are affected by comprehending the neural basis of these disorders [5]. Understanding the genetics of mental illnesses has also been aided by neuropsychiatry. A higher risk of schizophrenia, for instance, has been linked to certain genetic abnormalities, according to research. Personalised treatment plans that consider the unique genetic profile of each patient can be developed by neuropsychiatrists through the identification of these genetic markers [6], [7].

A. Neuroscience

The scientific study of nervous system problems and functioning, including the spinal cord, brain, and peripheral nervous system, is known as neuroscience. It is a multidisciplinary field of study that integrates "physiology, anatomy, molecular biology, developmental biology, cytology, psychology, physics, computer science, chemistry, medicine, statistics, and mathematical modelling" to analyse the fundamental and emergent properties of neurones, glia, and neural circuits [8]. Eric Kandel has referred to the comprehension of the biological foundations of learning, memory, behaviour, perception, and consciousness as the "epic challenge" of the biological sciencess. As time has progressed, the field of neuroscience has expanded to include many methodologies for investigating the nervous system at various sizes. From studying individual neurones at the molecular and cellular level to visualising the brain's sensory, motor, and cognitive functions, neuroscientists' methods have greatly advanced [9], [10].

B. Importance of Neuroscience

Besides the production of thoughts, emotions, and behaviour, the nervous system also regulates critical bodily functions, such as respiration. The brain is hardwired with neural connections, just as computers are hardwired with electrical connections. These connections facilitate the exchange of information

between the brain's message centres and its numerous lobes, as well as motor output and sensory input. Actually, figuring out how this circuitry works and what occurs when it is broken is one of the main goals of neuroscience training [11].

Furthermore, although neuroscience influences many human activities, it also advances our knowledge of a broad variety of common illnesses, including immune system disorders, Parkinson's disease, Down syndrome, addiction, schizophrenia, autism spectrum disorders, ADHD, and brain tumours. Over the last 50 years, a deeper comprehension of the cellular and molecular mechanisms underlying thinking, desire, and behaviour has been made possible by the development of tools like membrane clamp electrophysiology, PCR, and genome sequencing. In the next fifty years, scientists anticipate increased conceptual agreement and higher technology advancements [12].

C. Psychology

The study of the mind, behaviour, and human experience is known as psychology. Including our decisions, personality, and social relationships, this encompasses the mental processes we undergo, from our transient thoughts and visions to our sense of consciousness. It examines the biological elements that impact our thoughts, behaviours, and emotions, including genetic predispositions and brain chemistry, as well as the environmental and social impacts [13]. It encompasses a wide variety of topics, including the development and learning of children, the treatment of mental illness, the manner in which we make decisions, the behaviour of individuals in groups, and much more. Psychologists research the difficulties and distinctions that make each individual unique in addition to the common patterns of behaviour. Learning more about psychology may help us better understand others and get insight into our own behaviour [9].

D. Importance of psychology

In its capacity to elucidate and comprehend human behaviour, psychology is of great value. This academic discipline aims to comprehend human cognition, emotion, and conduct as well as the ways in which biology, culture, and environment impact people. Consequently, psychology is of great importance because it facilitates our comprehension of both ourselves and others [14].

Furthermore, psychology may be applied to a variety of real-world problems and situations. For example, psychology may help us understand why certain people are more likely to experience worry or depression, or why other people are more inclined to engage in risky or hazardous behaviours.

Because psychology makes it easier for us to comprehend and address mental health issues, it is important. Mental health conditions including substance abuse, depression, and anxiety may have a major impact on a person's overall wellbeing and quality of life. Studying psychology may help us understand the origins of mental health problems as well as practical management and treatment techniques. One popular psychologically based treatment strategy that has shown promise in treating a range of mental health conditions is cognitive-behavioral therapy [15].

Psychology is important because it may help us better understand and manage social connections. Researching human contact, communication, and relationship creation may help us better understand the elements of effective relationships and how to improve them.

E. Bridging Brain and Mind

The goal of behavioural neuroscience theories is to clarify how the brain supports conduct and thought. Our ideas about the brain and mind are becoming more accurate as new techniques for monitoring brain activity are developed. These theories explain how networks of billions of nerve cells or neurones produce complex mental processes. There are instances when models are "computational," meaning that brain processes are mathematically described to provide novel behavioural predictions [16].

This method offers a lot of promise to further our knowledge of the relationship between the mind and the brain. Rehabilitation and therapy may be greatly impacted by a thorough grasp of how brain-based illnesses affect cognition. The creation of comprehensive brain-behavior models in the areas of neurodevelopment, hearing, memory, attention, executive control, and mental health is a common Grand Challenge across many Unit programs [17].

2 Literature Review

(Tang & Tang, 2024) [18] This opinion article addresses a number of important research concerns in the emerging multidisciplinary subject of health neuroscience, which examines how the body and brain interact to influence our health behaviour, including health outcomes, decision-making, behaviours, and attitudes throughout life. We suggest that instead of treating each symptom or disorder separately through different treatment approaches, the prevention and treatment of diseases should focus on the underlying causes—the dysfunction and imbalance of brain-body biomarkers—through evidence-based body-mind interventions like Tai Chi and mindfulness meditation. This will help to achieve physical, mental, and cognitive health as well as encourage changes in health-related behaviours.

(Thomas & O'Riordan, 2024) [19] Through brain-based research, the human condition has been exaggerated in recent decades, as the focus has been on the brain. Investigating consciousness entails examining our identities, subjective experiences, and relationships with the outside world and other people. Assuming that the brains are the producers of consciousness, materialist approaches predominate in normal and child development research. While challenging conventional constructionist, realist, and materialist philosophies, qualitative research may include children in consciousness studies. The use of innovative research techniques to investigate elements of phenomenal consciousness, including self and mind, with primary school students in the United Kingdom is covered in this article. We discuss our discoveries regarding the manner in which children comprehend consciousness, the impact of consciousness on their selves, and the manner in which children perceive and experience the mind/body.

(Masi, 2023) [20] There has long been discussion in the fields of psychology, neuroscience, and philosophy of mind over the causal link between phenomenal awareness, mentation, and brain states. Material monism asserts that the mind and consciousness are purely brain-based phenomena. The

ineffable, undefinable, and seemingly unphysical nature of our subjective qualitative experiences and their associated mental dimension, on the other hand, is the focus of dualism or idealism (in one form or another), which views consciousness and mind as something other than the exclusive result of cerebral activity. This article reviews a number of neuroscientific studies that cast doubt on the notion that phenomenal experience is an emergent characteristic of brain activity and contend that the foundation of material monism is an error in logical correlation and causation. Although these findings, which have been largely disregarded, could theoretically be reinterpreted as a physicalist paradigm when viewed in isolation, they equally substantiate an ontology that regards consciousness and mind as primordial phenomena when viewed in conjunction.

(Blanken et al., 2021) [21] Understanding the connection between the brain and behaviour is one of the most important topics of our day, and merging various network applications holds the potential of providing a unified framework to address it. By integrating rules in both domains, emphasising commonalities, and developing a shared vocabulary that facilitates the use of synergies, we close this gap in the present overview. We include examples of research on autism because it is a good representation of avenues of inquiry in both psychological and network neuroscience. In order to integrate brain and behaviour both conceptually and practically, we provide three methodological approaches that enable the fusion of behavioural and brain data networks. Therefore, the present article provides a first step towards the integration of brain and behaviour and the subsequent development of multi-modal networks.

(Cieri & Esposito, 2019) [16] The Project for a Scientific Psychology, which Freud initiated in 1895, sought to establish a neuroscientific psychology by integrating psychology and neurology. The psychodynamic neuroscience's examination of the mind-brain system is now being viewed in a new light as a result of the free energy principle and the discovery of neural networks, which resulted from years of research and clinical work from the last century. The key advancements in psychodynamic neuroscience are outlined in this narrative review, with special attention to the free energy principle, resting state networks, and the Default Mode Network in relation to the Self. Lastly, we propose a discussion by attempting to speculate about the relationship between neuroscience and the concept of Alpha Function, which was put forth by psychoanalyst Wilfred Ruprecht Bion.

(Telles-Correia, 2018) [17] The intricate interplay between the fields of neuroscience, clinical psychiatry and psychology, and philosophy of science is one issue that underlies the mind-brain divide. Positioning with reference to certain conceptual/philosophical factors is necessary for research in clinical psychiatry and neuroscience. Psychiatric explanatory techniques, models of the brain-mind interaction, and conceptual challenges like dimensionality vs categories, symptoms versus disorders, and neurobiological correlates versus clinical diagnosis of mental disease are all connected to these. We endeavour to resolve several of these concerns in this article, which, if addressed, could potentially diminish the disparity between neuroscientists and psychiatrists and increase the profitability of research in this field.

(Leeuwen, 2015) [22] Look at the argument and come to the conclusion that the neurosciences don't have strong empirical, methodological, ontological, or theoretical arguments against the idea of free will.

The conflict between pre-science ideas about mind and scientific ideas about the brain is the root of the issue. As a result, I suggest using psychophysics to examine mind-brain interactions from a more reliable and uncontroversial scientific standpoint. I go over two examples where the dynamics and substance of a psychophysical experience match those of the brain. The relationship is a one-to-one type-identity in one instance, and a radical multiple instantiation in another, where the identical perceptual dynamics are produced by a number of drastically different forms of brain activity. Consequently, it is more probable that mind-brain relationships will be resolved individually rather than in a cohesive manner.

3 Research Gap

Despite significant advancements in neuroscience and psychology, a critical research gap remains in fully understanding the complex interaction between neural mechanisms and cognitive processes. Existing literature often treats brain and mind as separate domains, lacking cohesive frameworks that integrate biological, psychological, and computational models. Many studies focus on isolated brain functions without exploring how these functions collectively give rise to mental states or behavior. Moreover, there is limited research on how interdisciplinary methods, such as computational modeling and systems neuroscience, can be harmonized with psychological theories. Bridging this gap requires deeper exploration of brain-behavior relationships and more unified, cross-disciplinary approaches.

4 Research Objective

- This article study the concept of Neuroscience, Psychology and its importance.
- Study the gap between mind and brain.
- Study the various literature work on Neuroscience and Psychology and Bridging the Gap between Mind and Brain.

5 Research Methodology

This review paper employs a qualitative research methodology, utilizing secondary data and an extensive literature review to investigate the intersection of neuroscience and psychology, with a focus on bridging the gap between mind and brain. The study critically examines academic journals, scholarly articles, official reports, and case studies published between 2013 and 2025 to provide a comprehensive and up-to-date understanding of this evolving field. By synthesizing insights from behavioral neuroscience, cognitive psychology, and computational modeling, the paper explores how neural mechanisms underpin cognitive functions and mental health, highlighting emerging approaches that aim to integrate biological and psychological perspectives.

6 Conclusion

The review paper highlights the evolving theoretical landscape in behavioural neuroscience aimed at explaining how neural mechanisms give rise to cognition and behavior. With advances in neuroimaging and brain activity measurement, theories linking brain function to mental processes have grown

increasingly precise, facilitating the development of computational models capable of predicting behaviour. These models provide critical insight into how networks of billions of neurons underpin complex cognitive functions. A major interdisciplinary challenge is the formulation of detailed brain-behavior models across areas such as neurodevelopment, attention, memory, hearing, executive control, and mental health. Understanding how brain-based disorders impact cognition is vital for developing effective rehabilitation and treatment strategies. The paper also introduces a systems-based perspective, proposing that humans function as self-regulating and self-organizing entities. Rather than treating symptoms in isolation, targeting the underlying imbalance in brain-body biomarkers may yield more sustainable health outcomes. Evidence-based mind-body interventions—such as those enhancing the self-control network—support this integrative health approach. Ultimately, while fully resolving the mind-brain problem remains elusive, existing piecewise solutions offer promising progress. By moving beyond conventional information processing models, a convergence of neuroscience and psychology may soon offer a unified understanding of mental and neural phenomena.

References

[1] G. Northoff and B. Ventura, "Bridging the gap of brain and experience – Converging Neurophenomenology with Spatiotemporal Neuroscience," *Neurosci. Biobehav. Rev.*, vol. 173, no. January, p. 106139, 2025, doi: 10.1016/j.neubiorev.2025.106139.

[2] M. Di Luca, F. Destrebecq, and S. Kramer, "Future of the aging brain: Bridging the gap between research and policy," *Aging Brain*, vol. 1, p. 100002, 2021, doi: 10.1016/j.nbas.2020.100002.

[3] Y. Zhou, "Dissecting Neuromyths – Bridging the Gap between Education and Neuroscience in EFL Pedagogy," *English Lang. Teach.*, vol. 17, no. 9, p. 1, 2024, doi: 10.5539/elt.v17n9p1.

[4] V. Sharma, T. K. Vashishth, B. Kumar, K. K. Sharma, R. Panwar, and S. Chaudhary, "Brain-Computer Interface: Bridging the Gap Between Human Brain and Computing Systems," *Int. Conf. Res. Methodol. Knowl. Manag. Artif. Intell. Telecommun. Eng.*, 2023, doi: 10.1109/RMKMATE59243.2023.10369702.

[5] J. Meng, "Bridging the gap between consciousness and matter: recurrent out-of-body projection of visual awareness revealed by the law of non-identity," *Integr. Psychol. Behav. Sci.*, vol. 58, no. 1, pp. 178–203, 2024, doi: 10.1007/s12124-023-09775-y.

[6] D. J. Correa, J. T. Jordan, and R. R. Said, "Bridging the Gap Between Brain Health Guidelines and Real-world Implementation," *Am. Acad. Neurol.*, 2025.

[7] D. B. B. Kotikalapudi and D. S. Sheibani, "Analysis of Depression in Married Women: A Quantitative Exploration of PHQ-9 Responses on Neuropathogenesis," *Int. J. Innov. Sci. Eng. Manag.*, vol. 4, no. 1, 2025, doi: 10.69968/ijisem.2025v4i1234-240.

[8] M. Abrams and J. D. Van Horn, "Bridging the Gap: How Neuroinformatics is Preparing the Next Generation of Neuroscience Researchers," *Neuroinformatics*, pp. 619–622, 2024, doi: 10.1007/s12021-024-09693-3.

[9] J. Stien, "Exploring the Intersection of Neuroscience and Psychology: Neuropsychiatry as a Pathway to Understanding the Brain-Mind Connection," *J. Depress. Anxiety*, 2023, doi: 10.35248/2167-1044.23.12.502.Citation.

[10] D. Basso and M. Cottini, "Cognitive Neuroscience and Education: Not a Gap to Be Bridged but a Common Field to Be Cultivated," *Sustain.*, vol. 15, no. 2, pp. 1–13, 2023, doi: 10.3390/su15021628.

[11] M. G. Di Bono, K. Priftis, and C. Umiltà, "Bridging the Gap between Brain Activity and Cognition: Beyond the Different Tales of fMRI Data Analysis," *Front. Neurosci.*, vol. 11, no. JAN, pp. 11–14, 2017, doi: 10.3389/fnins.2017.00031.

[12] M. E. Lavoie, J. Leclerc, and K. P. O'Connor, "Bridging neuroscience and clinical psychology: cognitive behavioral and psychophysiological models in the evaluation and treatment of Gilles de la Tourette syndrome," *Neuropsychiatry (London).*, vol. 3, no. 1, pp. 75–87, 2013, doi: 10.2217/npy.12.70.

[13] A. Othman, "Bridging Minds and Machines : The Rise of Brain Wave Technology," *Researchgate*, no. November, 2020, doi: 10.13140/RG.2.2.18885.56807.

[14] E. Manjarrez, G. Curia, K. Stecina, and A. Lopez Valdes, "Editorial: Bridging the gap between integrative neuroscience and translational neuroscience," *Front. Integr. Neurosci.*, vol. 17, 2023, doi: 10.3389/fnint.2023.1296701.

[15] Navitha.S.Nair, "Bridging The Gap Between Education And Cognitive Neuropsychology," *Int. J. Creat. Res. Thoughts*, vol. 10, no. 1, 2022, doi: 10.61504/COJE8576.

[16] F. Cieri and R. Esposito, "Psychoanalysis and neuroscience: The bridge between mind and brain," *Front. Psychol.*, vol. 10, no. JULY, 2019, doi: 10.3389/fpsyg.2019.01983.

[17] D. Telles-Correia, "The mind-brain gap and the neuroscience-psychiatry gap," *J. Eval. Clin. Pract.*, vol. 24, no. 4, pp. 797–802, 2018, doi: 10.1111/jep.12891.

[18] Y. Y. Tang and R. Tang, "Health Neuroscience—How the Brain/Mind and Body Affect our Health Behavior and Outcomes," *J. Integr. Neurosci.*, vol. 23, no. 4, 2024, doi: 10.31083/j.jin2304069.

[19] D. M. Thomas and Z. O'Riordan, "'My mind is not in my brain': exploring consciousness with children using creative research methods," *Qual. Res. Psychol.*, vol. 22, no. 2, pp. 346–377, 2024, doi: 10.1080/14780887.2024.2354338.

[20] M. Masi, "An evidence-based critical review of the mind-brain identity theory," *Front. Psychol.*, vol. 14, no. October, pp. 1–15, 2023, doi: 10.3389/fpsyg.2023.1150605.

[21] T. F. Blanken, J. Bathelt, M. K. Deserno, L. Voge, D. Borsboom, and L. Douw, "Connecting brain and behavior in clinical neuroscience: A network approach," *Neurosci. Biobehav. Rev.*, vol. 130, no. April, pp. 81–90, 2021, doi: 10.1016/j.neubiorev.2021.07.027.

[22] C. van Leeuwen, "Brain and mind," *Bonn Handb. Glob.*, 2015, doi: 10.1007/978-3-319-90377-4_8.