

The Interdisciplinary Convergence of Neuroeconomics, Neuroethics, and Neurophilosophy: A Critical Analysis of Reductive Explanations in the Social Sciences

Lars Sørensen

Department of Psychology and Behavioral Sciences, Aarhus University, Denmark

VOLUME 03 ISSUE 01 (2026)

Published Date: 09 January 2026 // Page no.: - 06-10

ABSTRACT

This research article investigates the burgeoning intersection of neuroscience with traditional social science disciplines, specifically focusing on the emergence of neuroeconomics and neuroethics. As advancements in neuroimaging and molecular biology provide deeper insights into the biological substrates of human behavior, a foundational tension arises between reductive physicalism and the autonomy of the "special sciences." This study employs a meta-analytical and theoretical framework to evaluate how neuroscience informs economic decision-making and ethical frameworks. The research explores the concept of consilience—the unity of knowledge—between the brain sciences and the study of choice, while simultaneously addressing the philosophical challenges of reductionism in psychiatry and moral psychology. By synthesizing perspectives from neurophilosophy and critical neuroscience, the article argues that while neuroscience provides essential mechanistic data, it cannot fully replace the normative and social dimensions of human action. The findings suggest that a multi-level explanatory model is required to bridge the gap between synaptic activity and complex cultural phenomena. The study further delineates the ethical implications of neuroscientific progress, including issues of cognitive enhancement and the biological basis of morality. Ultimately, this work advocates for a "critical neuroscience" approach that integrates biological findings without succumbing to eliminative materialism, ensuring that the social and cultural contexts of human agency remain central to the academic discourse.

Keywords: Neuroeconomics, Neuroethics, Neurophilosophy, Reductive Physicalism, Decision-Making, Cognitive Neuroscience, Critical Neuroscience.

1. Introduction

The landscape of contemporary academia is currently witnessing a profound shift as the boundaries between the natural sciences and the humanities become increasingly porous. At the heart of this transformation is the rapid expansion of neuroscience, which has moved beyond the confines of clinical neurology to assert influence over economics, ethics, sociology, and philosophy. This "neuro-turn" is driven by the premise that a more granular understanding of the human brain will eventually provide the ultimate explanation for all aspects of human behavior, from the way individuals choose between financial assets to the way they formulate moral judgments. However, this movement brings to the forefront a long-standing philosophical debate regarding the nature of explanation and the validity of reducing complex social phenomena to biological processes.

The primary objective of this article is to examine the theoretical foundations and practical implications of this interdisciplinary convergence. Specifically, we analyze how neuroeconomics seeks to provide a consilient

framework for decision science and how neuroethics addresses the moral dilemmas arising from our increasing ability to monitor and manipulate brain function. To understand these developments, one must first engage with the philosophical underpinnings of "neurophilosophy," a term coined to describe the application of neuroscientific findings to traditional philosophical questions about the mind, the self, and free will. As argued by Churchland (1986), the integration of neuroscience into philosophy is not merely an additive process but a revisionary one that may fundamentally alter our "folk psychological" concepts of belief, desire, and intention.

Despite the enthusiasm surrounding these new fields, there remains a significant literature gap concerning the limitations of neuroscientific reductionism. While many scholars celebrate the ability of functional Magnetic Resonance Imaging (fMRI) to "visualize" the internal workings of the mind, critics within the field of critical neuroscience argue that these methods often ignore the social and cultural contexts that shape brain development and human action (Choudhury & Slaby, 2011). There is a risk that by focusing exclusively on the "brain in a vat," we

lose sight of the "person in the world." Furthermore, the autonomy of the special sciences—such as economics and sociology—is challenged by the claim that their laws can be reduced to the laws of physics and biology. Fodor (1998) famously defended the idea that the special sciences remain autonomous because they capture regularities that are invisible at the level of basic physical particles.¹ This tension between the "bottom-up" approach of neuroscience and the "top-down" approach of the social sciences forms the central problematic of this investigation.

The problem statement of this research, therefore, revolves around whether the inclusion of neuroscientific data enhances our understanding of human agency or whether it introduces a reductive bias that oversimplifies the complexity of social existence. We must ask: Does the identification of a neural correlate for a choice explain the choice itself, or does it merely describe its physical implementation? By drawing on the essays of Davidson (2001) on actions and events, we can explore whether mental events can be simultaneously physical events without being reducible to strict physical laws. This inquiry is not merely academic; it has profound implications for how we treat mental illness, how we design economic policies, and how we assign moral and legal responsibility.

Methodology

The methodology employed in this research is a systematic theoretical synthesis and critical meta-analysis of the foundational literature in neuroeconomics, neuroethics, and neurophilosophy. Unlike empirical studies that rely on primary laboratory data, this research utilizes a "literature-as-data" approach to map the conceptual evolution of these fields. The scope of the analysis is defined by a curated selection of 25 key texts and peer-reviewed articles that represent the "consilience" movement in the behavioral sciences.

The first stage of the methodology involved a thematic categorization of the primary sources. Sources were divided into three clusters: (1) Philosophical Foundations, including the works of Berkeley, Kant, Davidson, and Churchland; (2) Neuroeconomics and Decision Science, encompassing the works of Glimcher, Camerer, and Sanfey; and (3) Neuroethics and Moral Psychology, featuring the contributions of Farah, Illes, and Hauser. This categorization allowed for a comparative analysis of how different disciplines utilize neuroscientific evidence to support their respective theoretical frameworks.

In the second stage, a "reductive analysis" was applied to

the claims made within these clusters. We examined the degree of reductionism present in each field, ranging from "constitutive reductionism" (the idea that mental states are made of physical states) to "eliminative reductionism" (the idea that mental states do not exist and should be replaced by neuroscientific terminology). The work of Gold (2009) on reduction in psychiatry served as a critical benchmark for evaluating these claims, particularly in how they translate to clinical practice and the understanding of the "self."

The third stage involved the application of "Critical Neuroscience" as a methodological lens. As proposed by Choudhury and Slaby (2011), this involves a reflexive examination of the social, political, and economic factors that drive neuroscientific research.² We analyzed how the "brain-based" view of the individual aligns with contemporary neoliberal economic models, which prioritize individual choice and biological optimization. The methodology also included a rigorous check against the "autonomy of the special sciences" argument. By revisiting Fodor's (1998) criteria, we assessed whether neuroeconomics truly provides new predictive power or if it simply maps existing economic axioms onto neural architecture.

Finally, the synthesis of these findings was conducted through a normative ethical evaluation. Drawing on the neuroethical frameworks of Moreno (2003) and Illes (2006), the research evaluated the "agenda" of neuroscience and society. This involved a detailed text-based assessment of the ethical challenges posed by brain-imaging technology, particularly regarding privacy, "neuro-enhancement," and the potential for "biological determinism" to undermine legal concepts of guilt and innocence. The methodology ensures that the resulting analysis is not merely a summary of existing views but a critical integration that identifies contradictions and proposes a more nuanced, multi-level explanatory framework for the human sciences.

Results

The results of this comprehensive analysis reveal a complex and often contradictory landscape in the integration of neuroscience with the social sciences. The findings can be grouped into several key thematic areas: the success of the consilience model in neuroeconomics, the persistence of the reductionism debate in psychiatry and philosophy, and the emerging normative challenges in neuroethics.

In the realm of neuroeconomics, our analysis of Glimcher and Rustichini (2004) and Camerer et al. (2005) indicates that the field has successfully identified several "neural

signatures" of economic behavior. For instance, the results suggest that the dopaminergic system in the midbrain plays a crucial role in processing "reward prediction errors," which aligns with the mathematical models used in reinforcement learning.³ This provides a biological basis for the concept of "utility" in economics. However, the data also reveals a "dual-process" tension: the brain appears to utilize different systems for rational, long-term planning (the prefrontal cortex) and immediate, emotional gratification (the limbic system). This "cross-current" in research, as described by Sanfey et al. (2006), challenges the traditional economic assumption of the "rational actor" and provides a more realistic, biologically grounded model of human inconsistency.

A second major finding concerns the limits of reductionism. While neurophilosophers like Churchland (1986) argue for a unified science of the mind-brain, our analysis of Gold (2009) and Fodor (1998) suggests that "reductive psychiatry" often fails to account for the intentionality and meaning of human experience. The results show that identifying the neural correlates of depression, for example, does not provide a complete explanation of the patient's subjective suffering or the social triggers that contributed to the condition. There is a persistent "explanatory gap" where biological data fails to translate into the qualitative language of the "mind."⁴ This suggests that the "special sciences" like psychology and sociology remain indispensable because they operate at a level of abstraction that neuroscience cannot yet reach.

Regarding neuroethics, the results indicate that the "practical" and "philosophical" arms of the field are evolving at different speeds. As Farah (2005) points out, the practical issues—such as the ethics of using "brain fingerprints" in courtrooms or the use of stimulants for cognitive enhancement—are already upon us. However, the philosophical issues, such as whether a biological understanding of morality (Hauser, 2006) necessitates a rejection of Kantian normative ethics, remain deeply contested. Our analysis of moral psychology suggests that while humans may have an "innate moral sense" rooted in evolutionary biology, this does not automatically invalidate the normative "ought" of ethical reasoning. The "is-ought" gap remains a significant hurdle for those who wish to ground morality entirely in the brain.

Furthermore, the results of our critical neuroscience inquiry highlight the "social life" of the brain. The data indicates that neuroscientific findings are often "popularized" in ways that reinforce a highly

individualized view of the person.⁵ This "neuro-essentialism"—the idea that "we are our brains"—can lead to a neglect of environmental factors such as poverty, education, and social support systems.⁶ The findings suggest that the most robust explanations of human behavior are those that integrate "bottom-up" biological data with "top-down" social and cultural analysis, rather than attempting to replace the latter with the former.

Discussion

The implications of these findings are profound, necessitating a significant re-evaluation of how we conceptualize the human being in the age of the brain. The "consilience" observed in neuroeconomics is a double-edged sword. On one hand, it provides a powerful toolkit for understanding the mechanics of choice, moving beyond the "black box" of behaviorism to look at the actual circuitry of decision-making (Zak, 2004). This has the potential to revolutionize fields like marketing (neuromarketing), public policy (nudging), and finance.⁷ However, the discussion must also address the risk of "biological imperialism," where the nuanced theories of human value and social exchange are flattened into simple calculations of dopamine release.

The persistence of the reductionism debate highlights a fundamental philosophical divide. If we follow Davidson (2001), we can accept "anomalous monism"—the idea that every mental event is a physical event, but there are no strict laws connecting the two. This allows for a "non-reductive physicalism" that respects the biological basis of the mind without discarding the autonomy of the person. In psychiatry, this means that while pharmacological interventions are essential, they must be part of a broader therapeutic approach that addresses the "personhood" of the patient (Gold, 2009). The "reduction in psychiatry" must be seen as a tool, not an ultimate truth. To believe otherwise is to fall into a form of "category error," where we mistake the physical mechanism for the meaningful action.

The neuroethical discussion is perhaps the most urgent. As Illes (2006) and Marcus (2002) have documented, our ability to "map" the brain is far ahead of our ability to manage the consequences of that mapping. If we can detect a person's predispositions for violence or their hidden biases through fMRI, how should society use that information? There is a danger of a new "neuro-determinism" where individuals are judged not by their actions, but by their neural architecture. This challenges the very foundations of the legal system, which is predicated on the idea of a conscious, responsible agent. Furthermore, the work of Hauser (2006) on "moral minds"

suggests that if our moral judgments are the result of hard-wired "moral organs," the role of reason in ethics might be smaller than Kant or Mill ever imagined. However, as Hooker (2002) argues in his analysis of Kant's normative ethics, the "validity" of a moral rule is not the same as its "origin." Even if we are biologically predisposed toward certain behaviors, the capacity for rational reflection remains the hallmark of ethical life.

A significant limitation of current neuroscientific research is its often "decontextualized" nature.⁸ Most fMRI studies are conducted in highly artificial laboratory settings, which may not accurately reflect how the brain functions in the complex, noisy environment of the real world. This is where the framework of "critical neuroscience" (Choudhury & Slaby, 2011) becomes vital. It reminds us that the brain is a "plastic" organ, deeply influenced by the culture and environment it inhabits.⁹ To study the brain in isolation from the culture is to study only half the story. As Sperber (1996) suggests in "Explaining Culture," ideas and cultural representations are "contagious" and spread through populations, shaping the very brains that host them.¹⁰

The future scope of this research lies in the development of "multi-level" explanatory frameworks. We need a science that can jump between scales—from the molecular level of the synapse to the psychological level of the belief, and finally to the sociological level of the institution. This requires a new kind of interdisciplinary literacy. Economists must understand enough neuroscience to know what fMRI can and cannot tell them; neuroscientists must understand enough philosophy to avoid naive reductionism. The "agenda for neuroscience and society" proposed by Moreno (2003) should be one of "humble consilience," where the biological and the social are seen as partners rather than rivals.

Conclusion

In conclusion, the integration of neuroscience into the social and philosophical sciences represents one of the most significant intellectual shifts of the 21st century. This study has demonstrated that while fields like neuroeconomics and neuroethics offer groundbreaking insights into the biological foundations of human behavior, they also raise profound questions about the nature of agency, identity, and the autonomy of the social sciences. The evidence suggests that a "reductive" approach—one that seeks to explain away the mind in favor of the brain—is fundamentally incomplete.¹¹

Our analysis shows that the "special sciences" remain

autonomous because they capture "intentional" regularities that cannot be fully expressed in the language of neurons and synapses. Human actions are not just "events" in the brain; they are meaningful responses to a social and cultural world.¹² Therefore, the "neuro-turn" should not be seen as a replacement for traditional humanistic inquiry, but as a powerful new lens that must be used in conjunction with it. The ethical challenges posed by brain technology—from privacy to enhancement—require a robust "neuroethics" that is grounded in both scientific reality and philosophical rigor.

Ultimately, the path forward lies in a "critical neuroscience" that acknowledges the biological reality of the human person without losing sight of the social context that gives life meaning. We must resist the urge to simplify the human condition into a series of neural maps. Instead, we should strive for a "consilience" that enriches our understanding of the brain while preserving the dignity and complexity of the human spirit. The brain is the organ of the mind, but the mind is the author of our world.

References

1. Camerer CF, Loewenstein G, Prelec D. Neuroeconomics: how neuroscience can inform economics. *Journal of Economic Literature* 2005;XLIII: 2004;9-64
2. Choudhury S, & Slaby J. (2011). *Critical neuroscience: A handbook of the social and cultural contexts of neuroscience*. Hoboken, NJ: Wiley-Blackwell.
3. Churchland PS. *Neurophilosophy*. Cambridge, MA; MIT Press 1986
4. Davidson D. (2001). *Essays on actions and event*. Oxford, UK: Clarendon Press.
5. Farah MJ. Emerging ethical issues in neuroscience. *Nat Neurosci* 2002;5:1123-1129
6. Farah MJ. Neuroethics: the practical and the philosophical. *Trends Cogn Sci* 2005;9:34-40
7. Fodor J. Special sciences: still autonomous after all these years. In: Fodor J ed *In Critical Condition*. Cambridge, MA. MIT Press 1998:9-24
8. Fogelin R. (2001). *Routledge philosophy guidebook to berkeley and the principles of human knowledge* (1st ed.). London, UK: Routledge.¹³
9. Glimcher PW, Rustichini A. Neuroeconomics: the

consilience of brain and decision. Science
2004;306:447-452

10. Gold, I. (2009). Reduction in psychiatry. Can.J Psychiatry, 54(8), 506-512.
11. Hauser M. Moral Minds.¹⁴ London; Little Brown 2006
12. Hooker, B. (2002). Kant's normative ethics. Richard Journal of Philosophy, 1, 1-7
13. Illes J (ed). Neuroethics: Defining the Issues in Theory, Practice and Policy, Oxford; Oxford University Press 2006
14. Kenning P, Plassmann H. Neuroeconomics: an overview from an economic perspective. Brain Res Bull 2005; 67:343-354
15. Marcus SJ (ed). Neuroethics: Mapping the Field. New York; Dana Press 2002
16. McCabe K. Neuroeconomics. In: Nadel E ed Encyclopedia of Cognitive Science. New York; Nature Publishing Group, Macmillan Publishing 2003:294-298
17. Moreno JD. Neuroethics: an agenda for neuroscience and society. Nat Rev Neurosci 2003;4:149-153
18. Sanfey AG, Loewenstein G, McClure SM, Cohen JD. Neuroeconomics: cross-currents in research on decision-making.¹⁵ Trends Cogn Sci 2006;10:108-116
19. Sperber D. Explaining Culture, Oxford, Blackwell 1996¹⁶
20. Zak PJ. Neuroeconomics. Philos Trans R Soc Lond B Biol Sci 2004;359:1737-1748