

Dichotomies of the Mind-Brain Debate

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Abstract

The mind-brain debate is a discussion on the degree of independence of mental processes from the physiological environment in which they are experienced. It has been argued along several axes, each analyzing different properties of the mind in relation to the brain: reductionist vs. holistic, materialist vs. idealist, monistic vs. dualistic, and many more. I argue that these opposing views try to answer particular, independent questions on the debate. The relationship between these questions has changed throughout history based on the contemporary understanding. Considering modern research on the brain, a holistic, emergentist, and constructivist approach is suitable to investigate human behavior.

Dichotomies of the Mind-Brain Debate

The many dichotomies used to take stances in the mind-brain debate try to answer particular, independent questions. Their relevance for the understanding of human behavior can only purposefully be examined by discussing these questions separately.

Axes of the Mind-Brain Debate

The following paragraphs outline important axes of the debate. For each axis, an introductory question characterizes the problem, followed by a short introduction of the two complementary positions and a discussion on how they relate to the study and understanding of behavior in the following chapter.

Mechanism vs. Vitalism

Are we driven by mechanical nuts and bolts or does a life force animate us?

Mechanism suggests that the driving force of life is based on matter similar to machines.

Vitalism sees a separate, spiritual energy present in living beings that otherwise could not qualify as life. In animism, vitalism is extended to include non-living entities. The underlying models of the mind are usually coarse, as in humorism's taxonomy of black and yellow bile, blood, and phlegm. (Galen, n.d., p. 14-18)

Reductionism/Localism/Individualism vs. Holism/Emergentism

Is the whole more than the sum of the parts? Reductionists reduce the whole to the sum of its parts that fully explain its behavior. Dependent on the context reductionism occurs as individualism (components) or localism (maps). Holism treats organisms as a whole, going beyond the sum of components that cannot entirely predict an organism's behavior. Holism shares with emergentism a degree of independence between emergent effects and their causes. Reductionism has also been opposed to *phenomenology*. (Dolan, 2007, p. 1; Varela, 1996, p. 332)

Materialism vs. Idealism

Is everything composed of a substance, or is everything just a shared hallucination?

Materialism assumes the physical brain produces the effects that are experienced as mental, and physical processes govern mental processes. Idealism accepts the mind as a dominating entity that archetypically governs and structures all phenomena that occur. Both are fundamentally monist. Materialism does not imply functionalism or mechanism; properties of material or ideas can still appear evolutionary or autopoietic. (Dolan, 2007, p. 4; "Idealism," n.d.)

Functionalism vs. Mysterianism

Is there no hard problem or is the hard problem solvable at all? If the mind-brain problem has been solved, there remains the question of how phenomena attain subjective qualities, e.g. colors, which specifies the *hard problem*. Functionalists reduce mental states to their functional units with relationships to their internal and external environment. Mysterianists argue that the hard problem has no solution at all; there is always something that remains a mystery. (Varela, 1996, 332-33)

Determinism vs. Constructivism

Is the rise of mental states defined a priori, or are knowledge and meaning constructed ex-post? Determinists claim that every phenomenon is caused predictably by a set of conditions. If one knows its preconditions, one can predict behavior. Constructivists see mental properties as constructions that emerge from preconditions (experience, thoughts, and environment) with which they remain structurally coupled. Any construction only remains valid within its particular context. The brain may constrain emergent phenomena, for example, sensory organs limit sensory experience, but not predict *how* they are experienced. The mind's properties are actively being constructed on top of each other during the being's lifetime. (Maturana, & Varela, 2009, p. 177-78; Vygotsky, 1978, 19-35)

Monism vs. Dualism

Are mind and brain separate entities or is everything one? Monists claim that everything is made up of one substance. So if matter exists, the mind is a property of that matter or vice versa. Dualists see the mind as an expression of a separate soul, it exists independent of matter. (Sperry, 1980, p. 195)

Behaviorism vs. Mentalism

Should study focus on cognition or behavior? Behaviorists claim the human psyche should be studied in terms of behavior, e.g. the causal relationship between stimuli and response. Mentalists assume that emergent mental properties can "exert downward causal control over electro-physiological events in brain activity". Thus, cognition should be the primary concern of study. (Sperry, 1980, p. 196)

Subjectivism vs. Objectivism

Can truth be assigned to any phenomenon except direct experience? Subjectivists argue that experience, available in first person, is the only fact that can be stated. Even third person perspectives are ultimately experienced in first person. Objectivists claim that truth can be assigned to phenomena if they still hold once observer bias has been eliminated. (Nagel, 1993, p. 11)

Innatism vs. Perceptionism

Is there innate knowledge or do we start from a blank slate? Perceptionism argues that the contents of the mind are created from experience. John Locke distinguishes between external sensation and internal reflection. (1690, Book II, I-4) Innatism claims that a higher force placed a priori ideas into human beings that subsequently unfold.

Changes in History

The relationship between these positions has changed throughout history, based on the contemporary understanding of the brain. Accompanying early, animistic positions, the model of the brain was widely opaque. Subsequent mapping of the brain into its anatomical parts, starting in the 16th century, inspired mechanistic and functional thinking. These ontologies were necessarily accompanied by a multitude of metaphysical and soteriological views on soul and self that cannot be answered by mechanistic and functional vocabulary. Luigi Galvani, at the end of the 18th century, set the stage for a modern understanding of neuronal networks by using electricity in medicine. It was only during the 20th century that the understanding of the brain as a neuronal network matured. (Finger, 2004, pp. 56-107; pp. 198ff)

Vygotsky, in the early 20th century, distinguishes between “natural scientific, materialistic and objective” and “metaphysical, idealistic and subjective” psychology. Sperry (1980) argues that mentalism and dualism as well as physicalism and monism, from a modern point of view, no longer necessarily imply each other. (p. 196; Vygotsky, 2012, p. 87)

Relevance of These Axes on Current Understanding of Behavior

Current research endorses the brain as a complex neural network. May they be material or just idea, when analyzing the brain we find a complex structure consisting of some 10^{11} neurons with 10^{15} connections. The brain is the most complex known network in our universe. We know that these connections maintain a high degree of plasticity throughout our lifetime. (Koch, & Laurent, 1999, p. 96)

This understanding of the brain suggests the arising of complex phenomena that cannot be described in mechanistic terms, i.e. modeled by a Turing machine. Thus, mechanistic thinking is actively challenged with regard to human behavior. As spiritual

energies cannot be scientifically researched (if they can, they are no longer spiritual), a relapse into vitalism is not a solution. The dichotomy has to be transcended. There remains an anthropic school of mechanism, which is engaged in a *mind-consciousness* debate over *free will*. Models on the nature of consciousness, such as Susan Greenfield's levels of consciousness, are subject to this debate. The brain's emergent effects (and thus behavior) possess some degree of independence. The body and its manipulation can only set constraints to mental processes that subsequently develop dynamics of their own. Thus, holistic approaches are necessary to describe behavior comprehensively. Reductionist approaches appear to be confined to structures that are tightly coupled with human biology. (Greenfield, 2002, "How the brain becomes a mind")

Functions are thought to be carried out independent of the underlying machinery, i.e. they could form on different, underlying mechanisms. Thus for functionalists there is no hard problem, just a lack of detail to scientific explanation. The importance of developmental trajectories refutes functional approaches to the understanding of behavior. If one follows constructivism, a therapist has to become part of the relationship with a client in order to promote a durable change of mind. In a functional approach, a bag of remedies could heal predetermined dysfunctional configurations. In a constructivist setting of psychology, medications serve as initial stimuli or temporary shift in constraints that enable change in behavior that still has to be constructed. So medication in psychology would temporarily be useful for patients who use the space that it provides to adopt new patterns.

It is of psychological interest whether the brain can constrain the mind or not. Even if one follows a dualistic model, the soul's perceptions will obviously be constrained by properties of the body that it currently inhabits. As John Locke (1690) states, "[man] cannot THINK at any time, waking or sleeping, without being sensible of it." (Book II, I-10, his capitalization) Dualism is a subject of soteriological debate. Similarly, whether to follow

idealism is more a question of philosophy rather than psychology, transcending empirical science. Materialists face the problem that matter can only be perceived as ideas of sensory perceptions. Idealists need to reduce mental phenomena to items in order to do science, thus creating realities whose components can in turn be viewed as material. (Nagel, 1993, p. 11)

Behaviorism considers the object it investigates as a black box. Therefore, it can only produce results for responses that are deterministic on particular inputs, losing developmental trajectories. Mentalism selects a white box approach, where the subjective experiences of the mind are related to objective expressions in behavior. This approach has implications on whether the individual that is being studied can be examined as a passive entity or it needs to play an active role in the investigation. This engagement turns the investigation into a recursive feedback process between examiner and examined individual.

Subjective experience is argued to be unavailable for scientific evaluation. Perceptionism does not yield answers but offer alternative ways of thinking. Subjectivists could itemize and relate to experienced phenomena, e.g. other subjects. Discourses among multiple subjects on observations can be tested for observer bias. This consensus creates a notion of observer-independent objectivity to construct realities. The argument on the hardness of facts is still alive, compare Barrett (2009, pp. 327-28). Whether the ability to build these basic constructs is innate is a contemporary question of Nativism, compare Chomsky vs. Foucault or subsequently Fodor vs. Pinker.

Summary

Functional descriptions of the contents of neural networks that aim to be concise are presumably too comprehensive for human understanding. Even if they can be made, they will be too detailed for practical use (compare Bonini's Paradox.) With the rise of second cybernetics there are models that describe the characteristics of complex systems and show the limits of functional, predictable sequences of cause and effect. Some relationships

between primary circuits within the brain's network and affective attributes of emotion have already been researched, for example, a model of *emotional styles*. (Begley, & Davidson, 2012; Peitgen, & Richter, 1986, p. 1-19)

Contemporary perspectives no longer need to leave subjectivity to metaphysics, but can explain subjective phenomena as emergent effects in complex, physical organisms. Constructivists thus need not take a position on the materialist-idealist axis when discussing the phenomena of the mind but rather need to explain the quality of the link between mental phenomena and their degree of independence. So the current state of research on the brain promotes a shift along some of the axes described above to adapt to scientific findings.

If one accepts the brain as a complex, neuronal network, a *constructivist* stance that *holistically* examines human behavior based on *emergent properties* and links subjective experience to objective observation today seems well-suited to explore cognitive phenomena. Functional models can still be used when neural structures are investigated that are tightly tied to the body's physiology. Monist-dualist, materialist-idealist, or mechanist-vitalist questions offer additional philosophical and soteriological perspectives, but do not make substantial contributions to psychological research.

Conclusion

As understanding progresses, new sets of items leave the mythic realm and become knowledge of scientific research, for example, structures, neurons, nodes, or circuits in the brain. As a result, new models appear to gain insight into the dynamics of the brain as a system, as well as an understanding of their consequences on mental processes and the methods that may successfully be applied to change behavior. Psychology studies the phenomena of the mind. At any point, psychology needs to deal with both physiological models that arise from scientific research on the brain and emergent phenomena that are out of the scope of our predictive capabilities. In the first case, physical phenomena as lesions in

the brain or medications can directly explain or influence behavior. In the latter case, methods need to be applied that accommodate emergent effects as proposed by Vygotsky's developmental method (1978, pp. 6-7). As much as the mind-brain debate calls for an answer, psychology lives on it. The current understanding of the brain sets the stage for relating objective, physiological knowledge to subjective, mental experience. Our progress in comprehending this relationship advances our understanding of human behavior.

References

- Barrett, L. F. (2010). The future of psychology: Connecting mind to brain. *Perspectives in Psychological Science*, 4(4), 326-339. Retrieved from https://elearning.uol.ohecampus.com/bbcswebdav/institution/UKL1/201520_DECEM_BER/MS_LPSY/LPSY_302/readings/UKL1_LPSY_302_Week01_Barrett.pdf
- Dolan B. (2007). Soul searching: A brief history of the mind/body debate in the neurosciences. *Neurosurgical Focus*, 23(1), 1-7. Retrieved from https://elearning.uol.ohecampus.com/bbcswebdav/institution/UKL1/201520_DECEM_BER/MS_LPSY/LPSY_302/readings/UKL1_LPSY_302_Week01_Dolan.pdf
- Davidson, R. J., & Begley, S. (2012). *The emotional life of your brain: How its unique patterns affect the way you think, feel, and live--and how you can change them*. New York: Hudson Street Press. Retrieved from <http://amazon.de>.
- Finger, S. (2004). *Minds behind the brain: A history of the pioneers and their discoveries*. New York, NY: Oxford University Press.
- Galen, C. (n.d.). On the humours. In: Grant, M. (Trans.), *Galen on Food & Diet*. London, UK: Routledge.
- Greenfield, S. (2002). *The private life of the brain*. London, UK: Penguin Books. Retrieved from <http://amazon.de>.
- Idealism. (n.d.). In *Wikipedia*. Retrieved December 14, 2014, from <http://en.wikipedia.org/wiki/Idealism>
- Koch, C., & Laurent, G. (1999). Complexity and the nervous system. *Science*, (5411). 96.
- Locke, J. (1690). *An essay concerning humane understanding* [Public Domain, Kindle-Version]. London, UK: Holt. Retrieved from: amazon.de.
- Maturana, H. R., & Varela, F. J. (2009). *Der Baum der Erkenntnis* [The tree of knowledge]. Frankfurt am Main, DE: Fischer.

Nagel, T. (1993). What is the mind-body problem? *Ciba Foundation Symposium*, 174, 7-13

Peitgen, H.-O., & Richter, P.H. (1986). *The beauty of fractals*. New York, NY: Springer.

Sperry, R.W. (1980). Mind-brain interaction: mentalism yes; dualism, no. *Neuroscience*, 5, 195-206. [http://dx.doi.org/10.1016/0306-4522\(80\)90098-6](http://dx.doi.org/10.1016/0306-4522(80)90098-6)

Varela, F. (1996). Neurophenomenology: A methodological remedy for the hard problem. *Journal of Consciousness Studies*, 3(4), 330-49.

Vygotsky, L.S. (1978). *Mind in society. The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Vygotsky, L.S. (2012). The science of psychology. *Journal of Russian and East European Psychology*, 50(4), 85-106.