

Concept of Consciousness in Philosophy and Neuroscience

*Mukundan, C.R., *Kacker,P.

*Abstract:*The article is a metaanalysis of understanding and comparisons of the concept of consciousness in philosophy and neurosciences. It attempts to bring out the semantic and processing differences in the usage of the concept in the two domains of application. Consciousness in philosophy and religion is often referred as an all-pervasive entity of the universe,often imbining a spiritual dimension. In neuroscience, consciousness is a psychobiological state of a living organism, which is needed for its sensory – motor interactions with the external world.An important component of consciousness in this domain is the ability to become aware of the semantic and other cognitive and emotional processes that take place within the brain.

Key words: Consciousness, Philosophy, Neuroscience, Awareness

* Institute of Behavioral Sciences, Gujarat Forensic Sciences University, Gandhinagar, Gujarat.

Religious and philosophical thinking domains were the two original contexts in which the concept of consciousness was first created and used. Consciousness was thought of as an entity that contributed to life, in a larger sense, and to mind in a more specific sense. Philosophically consciousness has been postulated as an independent entity, which exists within and outside the brain. The need to create a concept of consciousness could have originated from top down thinking strategies used, when one wanted to find a cause and purpose for life and the universe. A spiritual origin of the universe or the existence of a spiritual entity became the core idea for a dualistic thinking in most of the ancient eastern philosophical thinking efforts, though dualism was considered in the Western schools of thinking mainly as the distinction between mind and the body. In Indian Vedic philosophy, consciousness is considered as the ultimate reality, which is present in every living being and forms the basis of life in the body. Consciousness is considered to energize the body and provide life to it. The philosophical ideas are created mainly for explaining the experiences that indicated an infinite and pervasive existence of the universe. A close scrutiny of the ancient philosophical thoughts of consciousness would show that the explanation of what they considered and defined as

consciousness were genuine symbolic efforts to capture otherwise unexplainable attributes of life and the universe. A direct comparison of these concepts with scientific explanations of consciousness is illogical and does not serve any meaningful purpose.

In Vedic philosophy, consciousness is described as an entity encompassing the infinite universe, all its qualities, strengths and weaknesses, and presents itself in every living being. It is an amazing concept as it reflects the simultaneous presence of all qualities. One wonders if this was the earliest attempt by human mind to symbolically capture the relative nature of existence, time, and space of the universe, which was captured by Einstein in the Relative Theory thousands of years later. On the one hand, consciousness was considered to encapsulate not only the physical attributes of the universe, but what human mind considered nonphysical viz. awareness, personality, thoughts, etc. On the other hand, it was considered to include what was proposed to exist outside energy and matter. Consciousness is considered to represent an ultimate attribute responsible for experiences and the self, an entity different from the body and its functions. Consciousness has its own independent existence and death only refers to the cessation and separation of the body from consciousness. In this dualistic theory, consciousness is both inside and outside the body. It was believed that the self has an independent existence over and above the matter and the body. In the total absence of scientific methods and experimentations, there was a need to conceptualize a method of internal organization and wisdom responsible for life and the universe, and one of the concepts created was that of consciousness. Consciousness thus reflected wisdom, knowledge, awareness, and power, present eternally. Consciousness was considered an imperative need for awareness or knowing what one perceives and performs. Its presence in the body gave rise to the self, though one could attain the realization that the self within is merely the part of universal force or consciousness. The proposal that self could merge across persons and other living entities in the universe reflected the realization of the universality of life as a force of nature. The same model of integration and merger was applied with regard to matter and their various physical attributes, which helped to conceptualize a merger of all entities into a universal force or energy. Consciousness was also considered a functional state of mind, superior to cognitive processes associated with recognition, learning, memory, etc. Consciousness came to be considered part of a spiritual dimension, superior to matter, energy, and mind and all the qualities that could be attributed to the body and the mind. Some considered consciousness an internal energy developing and merging with energy at the universal level. Origin of matter has been always an issue

of immense interest, and there was need to develop theoretical models as well as prove their accuracy. Some considered consciousness an internal energy developing and merging with energy at the universal level. When the concept of Quantum potential model was developed, it was considered to highlight the transformation of matter from energy and it explained the presence of physical properties at molecular, atomic, and subatomic levels were intriguing and the theory gave impetus to the notions of consciousness as energy at a universal level.

A spiritual dimension came to be selectively developed when man chose to attribute the origin or creation of the universe and life to a superior power. This choice provided mankind opportunity to develop faith in a superior force, and the faith provided them with reason for the needs of social harmony, and strength to live purposively, caring for one another. This style of living lifted the human life over and above the fight-flight animal life models, creating a new dimension or phenomenon of nature. The effects of the strength of love and compassion helped in the creation of thoughts with meaningful relationships helping to develop purpose and goals for living and goal directed strategic navigational efforts for achieving the goals. Human brain learnt, refined and developed these strategic abilities over ages. Expressions of love and compassion by man in the place of normal Flight-Fight models of nature's response patterns created a new exclusive response dimension in the nature, which could be learnt, expressed, and practiced only by human beings. This gave human beings a chance to choose an alternate method of responding with love instead of reacting with the natural methods of aggressive responses.

Scientifically explaining, mere presence of life or biological functions of the body or body organs are not considered indicative of a conscious state of the living being. A human being can remain unconscious and alive for long periods. The biological functioning of the body is indeed a prerequisite for being conscious. Consciousness only refers to a processing state of the brain in which the whole nervous system may differentially take part. Medically consciousness is a state when the brain can recognize/perceive the sensory inputs and respond to them, whereas neuroscientifically one can additionally retrieve and process stored information in this state. The conscious state is differentiated between wakefulness and sleep. Brain processes stored information during wakeful states as well as in sleep, but does not process online sensory inputs or respond to them during sleep. The fact that sleeping is a time limited alternating state with wakefulness, and the brain maintains the continuity in processing and responding, when wakefulness returns every time after a period of sleep, help to conceptualize and verify continuity of consciousness.

Knowing the external world is therefore an essential component of being conscious. Consciousness can be affected by conditions like diseases and lesions that impair normal functioning of the brain. Anesthesia is introduced as a routine medical requirement for various forms of surgery, when the patient is either unconscious or does not have sensations of pain in the organs surgically manipulated. Conceptually this is a huge departure from that of consciousness as a form of energy thought over in philosophy. A comparison of the two concepts is not feasible and is illogical as the changeover is from a processing state to an entity.

A scientific model of consciousness has always been the most intriguing and challenging as it needs to be physically verified, and some of the aspects of awareness cannot be experimentally controlled or monitored. There are specific and clear parameters of physical responses and mental changes, which indicate the degree of restoration of consciousness when it is impaired because of lesions or diseases of the brain. On the one hand, wakeful and conscious state indicates the capacity of the brain to monitor its own sensory and motor processes and use the information for controlling the online sensory and motor effects, which take the brain in contact with the physical realities of the world. On the other hand, consciousness is a state providing ability to monitor the cognitive and emotive processes taking place within, allowing the use of the information to semantically create or recreate new relationships and to create those relationships in reality.

We presume consciousness occurs at different levels in each individual and any current level determines the qualitative attributes and the effectiveness with which the external world and internal processes are monitored, organized, and processed. There are independent scientific methods to measure the monitoring and processing abilities. The effectiveness in using the monitored information for altering and adjusting the ongoing processes can be evaluated, and hence consciousness is used as a concept to refer to these complex and dynamic processes in the brain. Wakefulness and sleep are the most strikingly different phases of consciousness. We know that sleep is an essential state that should follow hours of wakefulness. Processing takes place in the brain during both the states, though the nature of processing and their consequential effects differ in the two states. Recognition of external stimuli and their internal processing and consequent proprioceptive physical changes do not occur during sleep. Therefore, the individual is considered to be in a temporary non-conscious state in sleep.

During wakeful conditions, the cerebral cortex passes through two phases, which may overlap or remain independent. One phase is that of sensory – motor

interactions with the external world, whereas in the other phase, the brain may remain partly or fully (?) independent of these interactions, but may engage in internal processing of retrieved information and creating new information. Internal processing may range from very active and focused states of problem solving or states with minimal to nil processing. One learns to engage in processing of both external and internal signals and the processing efficiency may be determined by the relative importance allotted to the two domains, which in turn affects the emotional arousal and attentiveness of the individual. An important component of consciousness in neuroscience is the presence of awareness or knowledge of the ongoing processes. Verbal awareness is different from awareness in other sensory modalities as they are generally considered equivalent to modality specific sensory perception. On the other hand, in verbal awareness the listening brain has the opportunity to monitor the processing of the talking brain contributing to verbal awareness of the thoughts created and recreated. That we transcode most of nonverbal experiences into verbal mode helps to have a verbal equivalent and documentation of all experiences, which may be further critically appraised and modified by the brain. Verbal awareness therefore becomes a comprehensive mode of accessing own experiences and thoughts for critical analyses and problem solving.

Verbal awareness is of the semantic interpretations or meanings of sensory-motor experiences and explanations of those experiences. Creation of a universe of meaningful relationships and entities reflecting those meanings constitute the mind of the individual, which is driven by the emotional arousal present in the system. Such processing is possible only in a conscious state and hence become the hallmark of consciousness in the individual. These processing occur even if sensory-motor experiences are partially impaired, and awareness therefore represents the minimum requirement of consciousness. Semantic interpretations and their understandings are essentially the functions of the frontal and temporal lobes and other associated systems of the brain, which contribute to the core function of creation of meanings. The universe of meanings created and associated processes used for the creations form the matrix of human mind. In reverse, it can be said that the mind can create infinite meanings and relationships, and it creates a world larger than the real world. The presence of the mind, whether it represents a real or imaginary world is an active state indicating consciousness in the individual.

Emotional and behavioral responses can be directly elicited by certain types of external stimuli from the brain of a living system, without their perception and awareness and hence. It may be said to take place in a non-conscious state of the

system, as the brain has not either recognized or become aware of the presence of the stimulus. These preattentive emotions are considered to support an unconscious processing faculty of the brain. Hence, perception and awareness cannot be either considered exclusive feature of consciousness or consciousness can be considered to represent an exclusive requirement of a living system's interaction with the external world. Such responses represent essential memory dependent survival needs of the living system, whereas recognition may lead to mere knowledge of the external world and internal conditions, which may or not result in responses and actions. The ability to monitor oneself and gather relevant information from the processing systems within the self, which we consider the core feature of conscious mind, within a scientific frame, result in the development of immense and powerful capability of the brain-mind to predict as well as change and create reality. Mind becomes an essential property of the brain, which cannot be separated from it, contributing to a unique "brainmind" system. The fact that we are stepwise succeeding in creating an imitation of the "brainmind" processing capabilities externally, shows that it is not a mere conceptual model but a reality of the nature.

Awareness is the most important component of consciousness discussed in philosophy and science. Awareness has been discussed from a "top down" point of view for several centuries, as part of philosophical explanations of body-mind relationship. This platform is used for explaining the presence of a spiritual realm of existence, from where the creation of the universe could be viewed and its components understood. As study of awareness in this respect is primarily experiential and needs intense and focused observation of what happens within the body and the mind, as understood from time to time. On the other hand, a "bottom up" view may hardly take us to some of the complex realms of their seeming presence. Scientifically speaking many hesitate to go beyond recognition or perception with the familiar brain structures. Acceptance of a phenomenon was essentially experiential for decades; the explanations are based on highly focused self-observations, rather than experimental work. The need for experiential explanations in this domain cannot be avoided; as varying effects of mind on the brain are now clearly demonstrated, as seen in several studies of hypnosis and practice of yoga. Further, propositions related to awareness are about the presence of functional capabilities of the same brain structures, which are employed in complex sensory-motor and critical thinking and decision making activities. The vast

range of experiences and the meanings created represent the phenomenon, which may always remain unique to the human brain. The two-way traffic between the brain and the mind is bound to create unknown and complex interactions, which require explanations beyond the reductionist approach, commonly used in science. Indian and Western Philosophical thinking have supported awareness at two complimentary levels. At the first level, one becomes aware of perceptions, recognitions, and behavior. Once this happens, an awareness of becoming aware of may also take place, if the individual makes special efforts. In normal conscious state, one is not especially aware of being conscious, as consciousness is reflected in the sensory-motor interactions with the world. Recognition of the entities of the external world is a typical example of being aware of them. Additionally, verbal awareness takes place, when one (the listening brain) monitors creation or recreation of thoughts (inner or explicit speech of the talking brain). Encoding and transcoding takes place intentionally or habitually, and the semantic interpretations used in turn help produce verbal awareness of the sensory-motor effects taking place in the individual, as the same is monitored and interpreted by the language expression and reception areas in the brain. Verbal expressions, visual and spatial expressions can be created and the awareness following the creation help to make critical or aesthetical judgments and make alterations until the creating individual is satisfied. The semantic interpretation of the relationships of the external world thereby created help explaining the nature and the contents of external realities or own behavior and expressions. Recognition and listening to inner and external speech are means to become aware of the processes taking place within the brain and their interpretations. The two phases of the related process are recognition at the primary level and becoming aware that one is recognizing. Recognition itself is therefore the first phase of awareness, which may or not be followed by the second phase. The first phase of awareness is therefore directly related to recognition and experience, and the other related to knowing that one is engaged in recognition and experiencing. The former phase of awareness is indeed experiential and the experience may be composed of not only sensory-motor effects but also the associated emotions and related interpretations. The second phase merely provides information about the occurrence of the cognitive and/or motor engagement, and hence forms as a state devoid of components of recognition and the original experiences.

The most important aspect of becoming aware of is the use of verbalization

(encoding and transcoding) of recognition, perceptions, and experiences. Perception is differentiated from recognition in this respect, as it does not produce meaningful information to the perceiver. Understanding a meaning is considered recognition. Verbalization of all nonverbal engagements is an example of use of the language for such monitoring. Using names during recognition is the simplest example of transcoding. Relationships detected at sensory-motor levels need to be transcoded for explaining the relationships and the associated verbal awareness helps in their critical evaluation and consequent reorganization until the meaning or the relationship is accepted by the processor. The awareness of the encoded and transcoded details help in making critical judgments of the accuracy and appropriateness of the expressed relationships and opportunity to alter them until one is satisfied about the meanings or the effects created. Adequacy of transcoding and associated encoding are therefore important needs to explain the complex relationships that exist in the universe. The phase of awareness of the semantic interpretations and engaging in sensory-motor experiences may occur only intentionally, as the earlier processes can occur habitually and automatically without awareness. Thus one can speak or respond without knowing or being aware of the meanings and effects of the words used and responses made. One needs to practice and develop the phase of awareness of mental processes taking place by focusing on the cognitive, motor, and emotional engagements. Recognition, encoding, and transcoding are drawn from the knowledge base available to the individual. Knowledge base is a continuously changing domain. Knowledge base may be stagnated if one stalls creation of new information, by believing that the knowledge one has is absolute and there is no more to know. One may make an intentional effort to become aware of what one recognizes, and encodes and transcodes as it helps in their interpretations and multiple planned interactions between the body and the external world. As these phases of awareness are about the processes that take place within the brain (body and the mind), they are referred as self-awareness, whether it contains either the two phases or only the initial phase. The intentional aspects of explanations (encoding and transcoding) have been often sighted as important features of self-awareness. Awareness at this level may have the color and intensity of the original sensory-motor experiences, as it is composed of self-monitored the components and associated emotions.

One can learn through practice to become aware of becoming aware of the

experiences. However, awareness at the second level may have no experiential value except the notion of occurrence of self-awareness or conscious experience. Self-awareness in this respect may be considered only a reference to the experience occurring within the body-mind and hence referred as occurring with the self. This is evident from the remembrance of awareness of the effort made for remembering an experience, especially when one fails to remember an autobiographical episode (Mukundan 2007). One becomes aware of not only the making effort to remember an episode, but also may remember being aware of making effort to remember in an earlier occasion. Awareness at this level may be considered reflexive and self-illuminating as proposed in Buddhists and Hindu philosophy (Mackenzie 2013). Jean-Paul Sartre commented that, for one to be whatever he is and to be aware of what he is, are one and the same (Heidegger 1962, 2000). This is indeed like equating recognition with awareness. This proposition of awareness is indeed a core feature of Buddhists philosophy of mind. However, in most of philosophical writings, awareness is proposed as part of consciousness and consciousness is dealt as an entity or form of universal energy. This is the point at which awareness does not mean the same in philosophy and science. However, isolating the self in this manner may result in developing ability to look upon oneself objectively, and also develop a concept of independent self, which can be isolated from pain, suffering, and pleasures. This appears to help one to develop mastery over the body and the mind and even learn to control and regulate them.

Learning to self-observe, in turn helps in monitoring own sensory – motor functions, creation of thoughts related to them, and presence of related emotional states. Monitoring of the bodily and mental – cognitive processes is done by the same system used to monitor and recognize the external world. Self-observation provides awareness of its own sensory-motor events and helps produce a mirror reflection of all that can be observed and known, which in turn merge with the reflection of the self. The ability to stand apart and look at or observe oneself results in the belief that the one who is observing is different from the observed. The fact that one can create an image of an independent self within the brain may be considered not as an artifact but an ability that facilitates the control of the body through the brain. One learns to monitor the body-mind processes and create images of the sensory-motor effects, which in turn works as a reflection of the same, and which one identifies as the self – the body and the mind. The reflexive image may

often be verbal in nature, but it may have other sensory-motor equivalents, which one may symbolically express. Creative expressions may contain such components or concepts. One may be able to know what he has in the image only when it is verbally or nonverbally expressed. One may spend hours or long periods of life to find an expression for those images. Artistic and scientific creations may take this route and one may spend creatively anguishing time till the images are expressed and the creator has opportunity to become aware of the results of own creation. Monitoring the process and the content of sensory-motor monitoring and thinking provides one with awareness of the sources as well as reflection of the monitored and monitoring process. Thus, one gets to know one perceiving, recognizing, moving and acting, responding, thinking, retrieving, and emoting. It is common knowledge that one qualifies these states of awareness as self-awareness or as "I am aware of..." The second phase of awareness is mere monitoring, which one can develop while becoming aware of any of the above. It is proposed that the detachment of the self from the body-mind activities achieves high personal focused status in the individual. The self is often defined as a spiritual entity, as he presumes that a spiritual entity cannot have material existence and any of its qualities or properties. The lives of several eminent persons, who could suffer pain and trauma happily for the sake of their community and humanity may be considered the strength of detachments one can attain from own body and mind. However, the self in this respect is a reflection of the experiences of the body and the mind; one has succeeded in creating from their own body and the mind. This self may be considered different from the self, which ordinary people refer to as the self in them, as it is merely a conceptual representation and reference to every property and functions of the body and the brain-mind, which one is.

Continued practice in the self-observation renders the process to become gradually objective for the practicing person, and strengthens the identity and strength of the observer. It also strengthens the concept of the observer, who transforms from a concept to an identity. The observer may consider and propose that the self is different not only from the observed entities but also from the observing system – the body and the mind. One may consider that one can observe oneself experiencing pain, pleasure, other sensory – motor effects affecting the body, and cognitive processes like thinking and retrieving, and that one can observe the reflection of the various processes in the body and the mind in an objective manner, if

one stands detached from the experiences. Creating an independent self-identity may therefore strengthen the ability to control the body and its varied processes. This model employed in a positive sense, places man over and above the fight-flight model used by the nature for the control biological survival. If the self-development is unregulated, it can also create negative and fearsome identities.

Bibliography

Alter, T., Walter, S. (Eds). (2007). *Phenomenal Concepts and Phenomenal Knowledge: New Essays on Consciousness and Physicalism*. New York: Oxford University Press.

Baars, B., Banks, W., Newman, J. (Eds.) *Essential Sources in the Scientific Study of Consciousness*. Cambridge, MA: MIT Press, 2003.

Block, N. (1995). On a Confusion about the Function of Consciousness. *Behavioral and Brain Sciences*, 18: 227-47.

Bishop, S.J., Duncan, J., Lawrence, A.D. (2004). State anxiety modulation of the amygdala response to unattended threat-related stimuli. *J. Neurosci.*, 24, 10364-68.

Botterell, A. (2001). Conceiving what is not there. *Journal of Consciousness Studies*, 8 (8): 21-42.

Carruthers, P. (2000). *Phenomenal Consciousness*. Cambridge, MA: Cambridge University Press.

Caston, V. (2002). Aristotle on Consciousness. *Mind*, 111: 751-815.

Chalmers, D.J. "What is a Neural Correlate of Consciousness?" In Metzinger 2000.

Chandrankunnel, M. (2000). *Philosophy of Physics*, Anmol Publications, New Delhi.

Chandrankunnel, M. (2008). *From Quantum Holism to Cosmic Holism: Philosophy of Quantum Mechanics*, Global Vision Publications, New Delhi.

Dainton, B. *The Phenomenal Self*. Oxford: Oxford University Press, 2008.

deGelder, B., Rouw, R. (2000). Paradoxical configuration effects for faces and objects in prosopagnosia. *Neuropsychologia*, 38, 1271-79.

deGelder, B., Vroomen, J., Pourtois, G., Weiskrantz, L. (1999). Non-conscious recognition of affect in the absence of striate cortex. *Neuroreport*, 10, 3759-63.

- Edelman, G., Tononi, G. (2000). Reentry and the Dynamic Core: Neural Correlates of Conscious Experience." In T. Metzinger (Ed.) *Neural correlates of Consciousness – Empirical and Conceptual Questions*. Cambridge MA: MIT Press.
- Flohr, H. (1995). An Information Processing Theory of Anesthesia. *Neuropsychologia*, 33: 9, 1169-80.
- Gennaro, R.J. (1996). *Mind and Brain: A Dialogue on the Mind-Body Problem*. Indianapolis: Hackett Publishing Company.
- Gennaro, R.J. (2005). The HOT theory of consciousness: between a rock and a hard place? *Journal of Consciousness Studies*, 12 (2): 3-21
- Gennaro, R.J. (Ed.) (2004). *Higher-Order Theories of Consciousness: An Anthology*. Amsterdam and Philadelphia: John Benjamins.
- Gennaro, R.J. (2012). *The Consciousness Paradox: Consciousness, Concepts, and Higher-Order Thoughts*. Cambridge, MA: MIT Press.
- Gennaro, R. J. (2006). Between pure self-referentialism and (extrinsic) HOT theory. In U. Kriegel, K. Williford (Eds.), *Consciousness and self-reference*. Cambridge, MA: MIT Press. Kriegel, U.
- Hirstein, W. (2005). *Brain Fiction*. Cambridge, MA: MIT Press.
- Horgan, T., Tienson, J. (2002). The Intentionality of Phenomenology and the Phenomenology of Intentionality. In D. Chalmers (Ed.), *Philosophy of Mind: Classical and Contemporary Readings*. Oxford University Press.
- Koch, C. (2004). *The Quest for Consciousness: A Neurobiological Approach*. Englewood, CO: Roberts and Company.
- Kriegel, U. (2004). Consciousness and Self-Consciousness. *The Monist* 87: 182-205.
- LeDoux, J. (1996). Emotional networks and motor control: A fearful view. *Prog. Brain Res.*, 107, 437-46.
- LeDoux, J. (1998). Fear and the brain: Where have we been, and where are we going? *Biol. Psychiatry*, 44: 1229-38.
- LeDoux, J. (2003). The emotional brain, fear, and the amygdala. *Cell. Mol. Neurobiol.*, 23, 727- 38.
- Morris, J.S., Ohman, A., Dolan, R.J. (1998). Conscious and unconscious emotional learning in the human amygdala. *Nature*, 393, 467-70.

Mukundan, C.R. (1998). From perception to thinking – Verbal adaptation in human brain. In: Isaac, J.R. and Purendu, H. (Eds) Proceedings of International Conference on Cognitive Systems, New Delhi, Allied Publishers, XXXIX -XIII.

Mukundan, C.R. (1999) Power of Words: Neuro-cognitive Approach for Understanding Brain Mechanisms of Awareness. In: Sangeetha Menon, M.G.Narasimhan, A.Sinha, &B.V.Sreekantan (Eds.), Scientific and Philosophical Studies on Consciousness. National institute of Advanced Studies, Bangalore, India. 127-136.

Mukundan, C.R. (2007). Brain Experience: Neuroexperiential Perspectives of Brain-Mind. Atlantic Publishers, New Delhi.

Mukundan, C.R., Ajayan, P. (2011). Awareness and Self-Image. Indian Journal of Clinical Psychology, 38:1, 37- 48.

Mukundan, C.R., Kamarajan, C., Ajayan, P., Roopesh, B.N., Sharma, M. (2013). Frontal Cortex and Recognition: Neurocognitive Findings of Hypnosis. *Indian Journal of Health & Welfare*,4 (4): 703 – 710.

Penrose, R. (1989). *The Emperor's New Mind: Computers, Minds and the Laws of Physics*. Oxford: Oxford University Press.

Penrose, R. (1994). *Shadows of the Mind*. Oxford: Oxford University Press.

Perrett, R. (2003). "Intentionality and Self—Awareness." *Ratio* 16 (3): 222-235.

Place, U. T. (1956). Is Consciousness a Brain Process? *British Journal of Psychology*, 47: 44-50.

Polger, T. (2004). *Natural Minds*. Cambridge, MA: MIT Press.

Preston, J., Bishop, M. (Eds.) (2002). *Views into the Chinese Room: New Essays on Searle and Artificial Intelligence*. New York: Oxford University Press.

Radden, J. Ed. (2004). *The Philosophy of Psychiatry*. New York: Oxford University Press.

Ramachandran, V.S. (2004). *A Brief Tour of Human Consciousness*. New York: PI Press.

Ramachandran, V.S., Blakeslee, S. (1998). *Phantoms in the Brain*. New York: Harper Collins.

Revonsuo, A. (2010). *Consciousness: The Science of Subjectivity*. New York: Psychology Press.

Robinson, W.S. (2004). *Understanding Phenomenal Consciousness*. New York: Cambridge University Press.

- Rosenthal, D. M. (1991). The Independence of Consciousness and Sensory Quality. In E. Villanueva (Ed.) *Consciousness*. Atascadero, CA: Ridgeview Publishing.
- Rosenthal, D. M. (1993). Thinking that one thinks. In M. Davies, G. Humphreys (Eds.) *Consciousness: Psychological and Philosophical Essays*. Oxford: Blackwell.
- Rosenthal, D. M. (1997). A Theory of Consciousness. In N. Block, O. Flanagan, G. Guzeldere (Eds.) *The Nature of Consciousness*. Cambridge, MA: MIT Press.
- Rosenthal, D. M. (2000). Introspection and Self-Interpretation. *Philosophical Topics* 28: 201-33.
- Rosenthal, D.M. (2005). *Consciousness and Mind*. New York: Oxford University Press.
- Seager, W. (1999). *Theories of Consciousness*. London: Routledge.
- Shallice, T. (1988). *From Neuropsychology to Mental Structure*. Cambridge: Cambridge University Press.
- Shear, J. (1997). *Explaining Consciousness: The Hard Problem*. Cambridge, MA: MIT Press.
- Silberstein, M. (2001). Converging on Emergence: Consciousness, Causation and Explanation. *Journal of Consciousness Studies*, 8: 61-98.
- Skinner, B. F. (1953). *Science and Human Behavior*. New York: MacMillan.
- Thau, M. (2002). *Consciousness and Cognition*. Oxford: Oxford University Press.
- Van Gulick, R. (1993). Understanding the Phenomenal Mind: Are we all just armadillos?" In M. Davies, G. Humphreys (Eds.), *Consciousness: Psychological and Philosophical Essays*. Oxford: Blackwell.
- Van Gulick, R. (1995). What would count as Explaining Consciousness? In T. Metzinger (Ed.) *Conscious Experience*. Paderborn: Ferdinand Schoningh.
- Van Gulick, R. (2000). Inward and Upward: Reflection, Introspection and Self-Awareness. *Philosophical Topics*, 28: 275-305.
- Van Gulick, R. (2004). Higher-Order Global States HOGS: An Alternative Higher-Order Model of Consciousness." In Gennaro 2004a.
- Van Gulick, R. (2006). Mirror Mirror – is that all? In U. Kriegel, K. Williford (Eds), *Self-Representational Approaches to Consciousness*, (pp. 11–39,). Cambridge, MA: MIT Press

Weisberg, J. (2008). Same old, same old: The same-order representation theory of consciousness and the division of phenomenal labor. *Synthese*, 160: 161-181.

Weisberg, J. (2011). Misrepresenting consciousness. *Philosophical Studies* 154: 409-433.

Whalen, P.J., Rauch, S.L., Etcoff, N.L., McInerney, S.C., Lee, M.B., Jenike, M.A. (1998). Masked presentations of emotional facial expressions modulate amygdala activity without explicit knowledge. *Journal of Neuroscience*, 18(1), 411-18.

Williford, K. (2006). The Self-Representational Structure of Consciousness. In U. Kriegel, K. Williford (Eds), *Self-Representational Approaches to Consciousness*(,). Cambridge, MA: MIT Press

Yablo, S. (1999). Concepts and Consciousness. In *Philosophy and Phenomenological Research* 59: 455-63.

Zelazo, P., Moscovitch, M., Thompson, E. (Eds). (2007). *The Cambridge Handbook of Consciousness*. Cambridge: Cambridge University Press.