

Unconscious Mind ¹

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In some sense not yet defined we are both conscious and unconscious at the same time

— George A. Miller

Miller's eloquent assertion is illustrated perhaps most dramatically by an experiment conducted by Logothetis and Schall (1989), in which subjects were trained to 'self-report' the contents of their conscious experience under conditions of binocular rivalry, a striking perceptual phenomenon in which visual inputs cannot be resolved into a single percept. In this kind of experiment, subjects are first trained to respond in certain ways when presented with certain visual stimuli (e.g., to button-press when presented with the image of a house). After training, a different visual stimulus is presented to each eye (e.g., an image of a house to one eye and of a tree to the other). Surprisingly, the subject does not consciously perceive both objects (e.g., a tree overlapping a house), but responds as if perceiving only one object at a time (e.g., a house followed by a tree). Each percept occupies consciousness for only a few seconds, even though both images are continuously present and each exerts a non-trivial influence over nervous processing (e.g., activation of the visual system and other brain regions). At any given moment, the subject is unaware of the computational processes leading to this bizarre 'one at a time' outcome and of the systematic influence that the un-experienced percept has upon neural, cognitive, and even emotional processes (Williams et al., 2004).

(For a treatment of the factors that influence the outcome of the visual competition, including how 'voluntary' action toward the stimuli modulates rivalry, see Muraya, Yang, & Blake, 2007.) Paralleling what has been found in countless studies with undergraduate participants, the subjects of Logothetis and Schall—in this case, rhesus monkeys—exhibited binocular rivalry and were, in a sense, conscious and unconscious at the same time.

The workings of the unconscious mind are thus omnipresent, interacting with its conscious counterpart in ways that challenge our intuitions. But one does not have to look to phenomena as esoteric as binocular rivalry to appreciate the merit of Miller's conclusion. In ordinary perception, one is unconscious of the processes constituting low-level perceptual analyses (e.g., motion detection, color and auditory analyses) and of the sophisticated programs responsible for motor control. For example, in addition to action slips and spoonerisms, highly-flexible and 'online' adjustments are made unconsciously during an act such as grasping a cup. Because the spatial relationship between the objects of the world and one's body is seldom fixed (e.g., a cup is sometimes at left or right), each time an action is performed, new motor programs are generated unconsciously, to deal with peculiarities of each setting (Rosenbaum, 2002). One is unconscious of these complicated programs, which calculate which muscles should be activated at a given time, but is often aware of their proprioceptive and perceptual consequences (e.g., perceiving flexing a finger). (William James proposed that, for 'voluntary' action, the conscious mind later uses these perceptual-like representations to influence the generation of motor efference, which itself is an unconscious process.) More generally, as noted by Karl Lashley, one is aware only of the consequences of cognitive processes, not of the processes themselves, which is evident when considering spontaneous cognitions. These thoughts spring to mind without one's consent, as when one resolves a tip-of-the-tongue state,

¹ In W. E. Craighead & C. B. Nemeroff (Eds.), *The Corsini Encyclopedia of Psychology and Behavioral Science*. New York: John Wiley & Sons.

only after having given up, or when, out of the blue, one ‘gets’ the solution to creative problem (Dijksterhuis & Nordgren, 2006). Regarding ‘unconscious incubation,’ Helmholtz (1856) concludes, “inductive reasoning is the result of an unconscious and involuntary activity; and for this very reason it strikes our consciousness as a foreign and overpowering force of nature” (p. 117).

Such capabilities challenge the assumption that ‘minding’ occurs only in the ‘real,’ conscious mind. In addition, one must consider those cases in which, from input to output, organismic actions that can surely be described as ‘intelligent’ reside entirely beneath the horizon of consciousness, as in ‘consciously-impenetrable’ processes (e.g., pupillary reflex, peristalsis, and other ‘visceral’ reactions) and actions that transpire during unconscious states such as coma, seizures, and persistent vegetative states, in which patients can behave as if awake but possess no consciousness (Laurey, 2005). In conditions in which a general awareness is spared, complex actions can still be decoupled from consciousness. For example, in *blindsight* patients report to be blind but still exhibit visually guided behaviors, and in *blind-smell* people can learn to associate odorants with certain environments (e.g., a particular room), even though the concentration of odorants presented during learning was consciously imperceptible. Goodale and Milner (2004) report neurological cases in which there is a dissociation between action and conscious perception. For example, suffering from visual form agnosia, patient D.F. was incapable of reporting the orientation of a tilted slot (e.g., tilted 70 degrees), but could nonetheless negotiate the slot accurately when inserting an object into it. This led to the view that there are distinct visual pathways for perception and action.

In both normal and abnormal conditions, sensory processing can influence the fluidity of a motor act unconsciously. Similarly, ambient stimuli in our immediate environment can exert forms of unconscious ‘stimulus control.’ Most dramatically,

through experimental techniques such as backward masking, it has been shown that imperceptible (‘subliminal’) stimuli can influence various mental processes, at least to a certain extent. These stimuli (e.g., words flashed for 17 msec) can influence behavioral inclinations such as motivation and emotional states (e.g., as indexed by the skin conductance response). More commonly (and naturally), perceptible stimuli can influence cognition, motivation, emotion, and behavior in ways of which one is unaware, as exemplified in Freud’s conceptualization of the unconscious mind (where ‘supraliminal’ stimuli activate unconscious associations and motivations), and in experiments displaying the effects of covert ‘priming.’ The latter demonstrate that glancing upon a library card or football helmet may make one behave more quietly or competitively, even though while doing so one remains blind of the link between such incidental objects and their psychological effects.

For historical purposes, it should be noted that it was such unconscious effects of supraliminal (not subliminal) stimuli that led to the discovery of the unconscious. The discovery of the unconscious was in its unintentional nature. For example, ‘Freudian slips,’ in which one does unintended things (and is aware of doing so), were the basis of Freud’s own arguments for the existence of unconscious. Freud himself did not restrict the operation of unconscious processes to those rare if ever occasions in real life where a person was exposed to subliminal stimuli. Rather, he argued that the unconscious first processed all incoming stimuli, the huge majority of which were supraliminal. Thus, historically, the key feature of unconscious phenomena was in the doing of things one did not intend.

In conclusion, *the unconscious mind comprises information-processing events in the nervous system that, though capable of systematically influencing behavior, cognition, motivation, and emotion, do not influence the organism’s subjective experience in such a way that the organism*

can directly detect, understand, or report the occurrence or nature of these events. The unconscious mind is thus a capacious mind, comprising a variety of processes occurring at all stages of processing. As in the above examples, evidence suggests that it is not identifiably less flexible, complex, controlling, deliberative, or action-like than its counterpart. Unconscious reflexes and motor programs are controlled, sometimes in sophisticated and flexible ways (e.g., by feedback loops), and actions such as licking, swallowing, and other behaviors can occur unconsciously, given the appropriate stimulation. Hence, drawing a principled distinction between conscious and unconscious processes is less than straightforward.

There is a consensus that the unconscious, though capable of integrating various different kinds of information and processes (e.g., as in ventriloquism and McGurk effects, and a host of other cases of unconscious intersensory interaction), cannot generate actions that require the integration of certain kinds of information (see review in Morsella, 2005). Because of this deficit, workings and actions of the unconscious can seem ‘irrational’ and ‘non-reflective.’ For example, unconscious actions such as reflexes (e.g., automatic inhaling or pain withdrawal) may be irrational (e.g., inhaling while underwater or releasing a hot object that is lifesaving) in that they fail to take into account certain kinds of information. In disorders in which action is decoupled from consciousness, behavior is often perceived as impulsive and situationally inappropriate, as exemplified in *alien hand* and *utilization behavior syndromes*, in which hands and arms function autonomously, carrying out relatively complex behaviors that are in some cases at odds with a patient’s intentions. Research has begun to identify the specific kinds of information that the unconscious mind cannot integrate without the aid of its conscious counterpart: information from high-level processes that are intimately related to the skeletal muscle effector system and to what has historically

been referred to as ‘voluntary’ action (Morsella, 2005), a non-scientific concept that has begun to be deconstructed into its mechanistic components. In this way, science is beginning to illuminate the nature of the “some sense not yet defined” noted by Miller.

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Suggested Readings

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