

## Revising Scientific Models of Unconscious Mental Activity

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The question posed for this presentation is: **What revisions are necessary in scientific models of unconscious mental activity?**

The discovery of the unconscious is commonly attributed to Sigmund Freud, but the idea of unconscious mental activity can be traced back at least to Leibniz's notion of unconscious *petites perceptions*, and Helmholtz's argument that conscious perception is mediated by unconscious inferences. At the end of the 18<sup>th</sup> century, Kant discussed "the ideas which we have without being conscious of them", and in 1890, fully two years before Freud's *Studies on Hysteria*, William James elaborated a concept of "subconscious" or "co-conscious" mental states, based largely on the work of Freud's French rival, Pierre Janet.

Still, Freud's psychoanalytic theory and technique popularized the notion of unconscious mental life. The behaviorist revolution in psychology proscribed discussions of both consciousness and unconscious mental life, but the cognitive revolution of the 1950s and 1960s revived interest in consciousness. The "rediscovery" of the unconscious followed soon thereafter, prompted by research on the Stroop effect, skilled reading, and visual search; experimental studies of hypnotic analgesia and posthypnotic amnesia; solid evidence of "subliminal" perception, and neuropsychological studies of the amnesic syndrome and "blindsight" (Kihlstrom, 1994).

**So the first revision in scientific models of unconscious mental activity is to embrace a concept of the psychological unconscious as dynamically active, rather than as a mere wastebasket for unattended percepts and unavailable memories.**

Beginning in the 1970s, for example, cognitive psychologists began to identify a class of "automatic" processes that are inevitably engaged by the appearance of specific environmental stimuli, and once invoked proceed incorrigibly to their conclusion. Their execution consumes few or no attentional resources, and for this reason (and perhaps also because they are executed very rapidly) they leave no traces of themselves available to conscious recollection. Automatic processes are unconscious in two senses of the term: they are not available for conscious introspection, and they are not amenable

to conscious control. The distinction between automatic, unconscious and controlled, conscious processes is now widely accepted in both cognitive and social psychology (Kihlstrom, 2006).

While automatic mental processes are strictly unconscious, the mental states that they generate have generally been considered to be conscious. However, it soon became apparent that percepts, memories, and the like can be also be unconscious, in the sense that they are inaccessible to conscious awareness (Kihlstrom, 1987). For example, amnesic patients can show “priming” effects attributable to events that they cannot consciously remember. On the basis of such evidence, Schacter distinguished between two expressions of episodic memory: explicit memory entails conscious recollection of an event, as exemplified by recall or recognition; implicit memory refers to priming effects and other influences of past events on experience, thought, or action, in the absence of (or independent of) conscious recollection. Dissociations between explicit and implicit memory are well documented in a variety of conditions, including the amnesic syndrome, the anterograde and retrograde amnesias produced by electroconvulsive therapy, conscious sedation by benzodiazepines and similar drugs, dementias such as Alzheimer’s disease, the forgetfulness associated with normal aging, posthypnotic amnesia, and the “functional” or “psychogenic” amnesias associated with the dissociative disorders (such as “hysterical” fugue and multiple personality disorder (Kihlstrom, Dorfman, & Park, 2007).

Subsequent research and theory has extended the explicit-implicit distinction into other domains of cognition. While implicit memory refers to the unconscious influence of past events, implicit perception refers to the influence on experience, thought, and action of events in the *current* stimulus environment, in the absence of conscious perception (Kihlstrom, 1996; Kihlstrom, Barnhardt, & Tataryn, 1992). Dissociations between explicit and implicit perception are observed in “subliminal” perception, dichotic listening and parafoveal vision, inattentional blindness, various forms of “attentional” blindness (i.e., repetition blindness and the attentional blink), hypnotic anesthetics and negative hallucinations, conversion disorders such as “hysterical” blindness, and neuropsychological syndromes such as “blindsight” and unilateral neglect. While priming effects associated with general anesthesia are sometimes construed as evidence of implicit memory, they are better classified as implicit perception (Kihlstrom & Cork, 2007). In implicit memory, the person is consciously aware of the event at the time it

occurred, but cannot consciously remember it later; in implicit perception, there is a lack of conscious perception.

It is also possible for people to acquire knowledge through experience, and display it in task performance, in the absence of conscious awareness of what they have learned (Kihlstrom, 1996; Kihlstrom et al., 2007). The term “implicit learning” was originally coined in the context of Reber’s experiments on artificial grammar learning, in which subjects were able to identify “grammatical” letter strings even though they were unable to articulate the rules comprising the grammar. Implicit learning has also been documented in experiments involving concept learning, covariation detection, sequence learning, and the operation of dynamic systems. Like implicit perception, implicit learning has sometimes been included under the rubric of implicit memory. However, implicit memory is properly restricted to episodic memory, while implicit learning covers semantic and procedural knowledge. Source amnesia, in which subjects are aware of knowledge acquired through experience but cannot consciously remember the learning experience, is a subclass of implicit memory.

Although thinking is generally held to be conscious almost by definition, there is some evidence that problem-solving can proceed unconsciously as well (Dorfman, Shames, & Kihlstrom, 1996; Kihlstrom, Shames, & Dorfman, 1996). For example, subjects can discriminate between soluble and insoluble versions of a word problem, without being aware of the solution itself; moreover the unrecognized solution can generate priming effects. *Implicit thought* is similar to the feeling of knowing someone or something that we cannot identify further, and to the “tip of the tongue” experience. Implicit thought may be involved in the intuition stage of problem-solving: following a period of incubation, the formerly unconscious solution may appear in consciousness as an insight.

**Thus, the second necessary revision is that the conscious-unconscious dichotomy can apply to mental contents, such as percepts and memories, not just mental processes.**

Implicit perception, memory, learning, and thought comprise the cognitive unconscious (Kihlstrom, 1987), but cognition is not all that there is to the mind: Kant’s trilogy of mind includes feeling and desire as well as knowledge, emotion and motivation as well as cognition. Of course, conscious emotional and motivational states can be generated by unconscious processes that operate automatically. And when the eliciting events are not accessible to consciousness, conscious feelings and

desires may be expressions of implicit perception or memory. Although some authorities hold that unconscious emotion is an oxymoron, theoretically implicit emotion may reflect a desynchrony between one's subjective feeling state on the one hand, and behavioral and physiological expressions of emotion on the other (Kihlstrom, Mulvaney, Tobias, & Tobis, 2000). Procedures such as the Implicit Attitudes Test ostensibly reveal unconscious attitudes and prejudices which may be discrepant from one's conscious views – although it is not clear that the IAT actually does this. Implicit motives, as revealed by “projective” instruments such as the Thematic Apperception Test, may be uncorrelated with explicit motives assessed through self-report questionnaires – though again, the evidence for this is somewhat ambiguous (Kihlstrom, 2007).

William James warned that the unconscious was “the sovereign means for believing what one likes in psychology, and of turning what might become a science into a tumbling-ground for whimsies”. However, modern experimental psychology has provided clear standards for distinguishing between automatic and controlled processes, and between explicit and implicit perception and memory. By these standards, implicit learning, thought, emotion, and motivation are less well established, though the concepts cannot be rejected out of hand: emerging research may well put them on firm empirical ground.

**So, the third revision is to take seriously the notions of unconscious emotion and motivation, as a stimulus to further research in these areas.**

The unconscious mind is a historical puzzle for psychology, and a topic of interest in its own right, but it may also provide a new vehicle for studying the neural basis of consciousness. Every such study needs a control condition that contrasts with consciousness. The stages of sleep, and general anesthesia, provide contrasts with normal waking alertness. But consciousness is not just a general condition of wakeful alertness: consciousness is always *of* something – of an object in the present environment, an event in the past, or an expectation of the future. In this sense, the contrast between explicit and implicit memory gives us the opportunity to identify the neural correlates of conscious remembering; and the contrast between explicit and implicit perception gives us the opportunity to identify the neural correlates of conscious perception. Research on patients with the amnesic syndrome suggest that the hippocampus and other structures in the medial portion of the temporal lobe are involved in conscious recollection, while research on blindsight suggest that the striate cortex is necessary for conscious vision.

**The fourth revision, then, is to understand that the neural correlate of consciousness is not likely to be found in a single brain system, but rather will depend on precisely *what* is conscious.**

But consciousness is not just a matter of structures like the hippocampus and striate cortex, because dissociations between explicit and implicit memory, and between explicit and implicit perception, can be obtained in subjects who are neurologically intact, and whose hippocampus and striate cortex are functioning perfectly normally. At a psychological level of analysis, consciousness appears to entail a link between a belief (percept, memory, thought), feeling, or desire, and a mental representation of the self as the agent or patient, or stimulus or experiencer, of that event (Kihlstrom, 1997). All conscious mental states take the form of “I perceive (remember, believe, think) X”, “I feel Y”, or “I desire Z”. By contrast, priming and other expressions of implicit cognition, emotion, and motivation lack this sort of self-reference.

**So, the fifth revision is to understand that the mechanisms of consciousness are not just a matter for neuroscience, but that there is an intimate connection between consciousness and one’s sense of self.**

Although the idea of the unconscious was popularized by Freud, modern research on implicit perception and memory provides no support for the dynamic unconscious envisioned by psychoanalytic theory. The cognitive unconscious is “kinder and gentler” than Freud’s primitive, infantile, irrational, sexual and aggressive motives. Moreover, unconscious percepts and memories appear to reflect the basic architecture of cognition, rather than being motivated by conflict, anxiety, and repression (Kihlstrom, 2006).

**Alas, the sixth revision is to set aside the Freudian, psychoanalytic notion of the unconscious mind – at least until better evidence to support it is forthcoming.**

It is something of a paradox that mounting evidence for unconscious mental life has led some cognitive scientists to embrace doctrines of conscious inessentialism or even epiphenomenalism (Kihlstrom, 2006). In some respects, contemporary assertions of the “power” of unconscious processing are a return to Romantic notions of the unconscious, such as von Hartmann’s, which laid the foundation for Freudian psychoanalysis. However, in many instances unconscious processing appears to be analytically limited. To borrow James’ phrase, it is an “unwarrantable impertinence” to assert that we are automatons, and that consciousness is largely irrelevant to behavior, and even maladaptive. Without

consciousness, we would have nothing to talk about, and no reason to have universities and other social institutions for the conservation and transmission of knowledge.

**The final revision, then, is to recognize that, for all the evidence of unconscious mental life, consciousness plays an essential role in our everyday social interactions, and in cultural evolution.**

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