Behavior and Philosophy, *26*, 109-119 (1998).

WHERE'S AWARENESS? LOOK IN THE 19TH CENTURY

Review of *Scientific Approaches to Consciousness*, edited by J. D. Cohen & J. W. Schooler (28 chapters based on the 25th Carnegie Mellon Symposium on Cognition)

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The title for this review was inspired by a paper by Bill Verplanck that was published almost three decades ago (Verplanck, 1962), when writers like Donelson Dulany were apparently arguing that "only subjects aware of the contingencies of reinforcement could learn" (Dulany, 1962). That assessment, by Thomas Hardy Leahey (1992a), is misleading, however, since Dulany, who contributed one of the more substantive of the 28 chapters in this collection, is a thoughty man and worries a lot about what "awareness" and "implicit," and "conscious" really mean. He dislikes the conscious/unconscious distinction and proposes that "different forms of nonconscious operations" work on "different forms of conscious contents that carry symbolic representation." The product can be "deliberative" or "evocative," rather than conscious or unconscious. Dulany is not as simple as Leahey and others paint him, and the question of the nature of consciousness is not a simple one either. But the subject matter—unconscious processes, subliminal perception, and the like—has been around for centuries, and the treatments described in this collection are fundamentally the same as those of the 19th century (see Glymour, Chapter 18, and Kihlstrom, Chapter 24, for corroborating opinions). There is no "hot news" here that is going to "get old"—it came old.

Bad Chapters

Before going farther, we must point out that only 13 chapters are worth any reviewer's comment and some of those are absolutely splendid. But the remaining 15 are not worth the mention; sometimes this is because they are just poorly

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written and in other cases it is because they are hack work. The chapters by Jacoby et al, Schiffrin, Schneider et al, Reder & Gordon, Rajaram & Roedinger, Baars et al, Rumelhart, Mandler, and McClelland range from bad to models of scholarly humbug. The pitiful attempts to apply connectionism to affect by Rumelhart (Chapter 25) are excruciatingly bad and contrived—what do we explain when we posit "affect circuits," a set point, and affect produced when discrepancies exist? Sounds like 1950s arousal theory, right? When McClelland comes along in Chapter 27 to defend it, sensitive readers may be tempted to rip out the pages and crush them, as if they were McClelland himself! Aside from these bad chapters, there are some bad chapters that are just simple, naive, and even ingratiating. In Chapter 5, Greenwald and Draine apply an agonizing method of data analysis, a regression method to sort out the "holy grail" of "indirect effects," which must tax even the most dedicated reader. Lewicki's Chapter 9 is "ho hum," and Schooler is too simple, writing as though fourth graders would be reading this book. Cohen seems uninspired (Chapter 20) and Galin is so ingratiating and deferential that his Chapter 23 feels sticky to the touch. Mandler's "this is the story of my life—again" is almost overwhelmingly irritating (Chapter 26). Thank goodness for Herb Simon—Nobel Prize notwithstanding, he speaks his mind. Many readers will appreciate his derisive assessment of so-called "information-processing models" that are no more than little boxes on paper with nonsense names assigned to them. Simon wants models that run as programs, not some multiple-entry memory (MEM) model with 63 faculties listed in little boxes.

One way to show one's ignorance is to refer to the "restrictive effect" of the behaviorists, who "refused to let us study the mind" for all those years. To make a long story short, the people who did that were mostly "cognitive" types, who are indistinguishable from mediational behaviorists, like Hull and Tolman. Good behaviorists, especially Skinner and his better followers, always advocated the inclusion of private experience, so long as it is not treated as the cause of anything. Those who have not read Leahey's (1992a) clear statements to this effect should either do so or write about something else. As it is, the first sentence of the first chapter of the book (past the introductory chapter) refers to "the banishment of the conscious and the unconscious by radical behaviorists." This notion expressed by Jacoby and his colleagues is exquisitely wrong and annoying. No one else makes real mention of such naive views until Galin (Chapter 23) ingratiates himself with Baars (Chapter 22) by saying that that was what Baars said. These guys need a good thrashing. And we need to consider the good chapters, of which there are plenty—enough to rinse the fetid taste of the bad ones from our mouths.

Good Chapters

The editors' introductory chapter is good, preparing the reader for the range of chapters to come. Merikle's Chapter 6 is also good, the first chapter since the introduction that is thoughtful and well written, leading the reader to believe that perhaps the book is worth something after all. Merikle advocates use of the fascinating Stroop incongruent differential masking procedure, as we call it. It's a method that Thomas Reid and Dugald Stewart could have used as Reid struggled to defend the idea that imagination and perception are always distinguished as "unreal" and "real," unless one is a very young child or insane. More on that method appears below.

Chapter 8 by Reber is absolutely a delight. He knows the literature of the 60s on "learning without awareness" and he advocates ignoring Dulany and others who deny learning without awareness. He describes Jacoby's work, which Jacoby failed to do in Chapter 2; he discusses brain damage and methods of studying implicit learning and ends with a long discussion of James' 1890 frog, a description of a standard laboratory demonstration of the effects of successive rostral-to-caudal sections of the frog's nervous system and the resulting gaining of aspects of "mind." This is a discussion that makes plain what Dulany has been saying unclearly for decades. It seems that his conception of levels of consciousness, shared by other theorists, has a long history, going back through Aquinas and Avicenna to Aristotle himself. Dulany's C2 (introspective awareness), C1 (implicit consciousness), and vegetative consciousness are still the categories of Aristotle. This chapter is a fine job by Arthur Reber and reason enough to buy the book.

Speaking of Dulany, his Chapter 10 is loaded with information about the methods of studying the "unconscious," but what is his point in discussing the topic? He wants to reassert, to the puzzlement of all, that we see, learn, and remember only what we are conscious of. What? Be aware that Dulany just has a funny definition of "conscious"—in fact, he is a lot like John Locke, who also treated all of mental life as "consciousness." Reber made this clear in Chapter 8.

History of the Unconscious

Anyone who values the history of psychology will appreciate the excellent chapters by Glymour and by Kihlstrom, as well as the priceless piece by Reber (Chapter 8). Wegner's "ironic monitor" machinations (Chapter 14) show him to be the living embodiment of Johann Herbart, whose 1816 proposal that the mind is a battleground for warring ideas, some conscious and some not, made him the

focus of attack during the rest of the 19th century. But Wegner did not cite Herbart in Chapter 14, and we have seen no such citation in other of his writings. But surely he knows . . . On the other hand, do Johnson and her colleagues realize the antiquity of the notion that they call "source monitoring?" Simply put, that is the distinguishing of "objective" and "subjective" experiences. Hume, Kant, Reid, and Mill paid more than a bit of attention to it. Other chapters do better or worse jobs covering more recent history, that is, the past half century, and they include Shiffrin (Chapter 3), Dulany (Chapter 10), Wilson (Chapter 15), Mandler (Chapter 26),[1] and Simon (Chapter 28).

And what is the history of the unconscious, before buzzwords like "implicit learning" and "objective threshold" were coined? The fact is that the unconscious was anathema—but not because it wasn't "scientific" to speak of it—the logical positivists did not rise up to fight such things until the 20th century. Countless writers had referred to unconscious "mind," but psychology really "went unconscious" when Herbart promoted an active unconscious in 1816.[2] His "ideas," or *Vorstellungen*, come into and go out from consciousness by gaining and losing strength and crossing a threshold.[3] Gustav Fechner thought that unconscious sensations were fine and Helmholtz thought it wholly proper to recast John Mill's theory of belief in terms of "unconscious inferences."[4] But every other writer on the subject of consciousness strongly opposed the notion of unconscious cerebration. William James despised it, though, like Kihlstrom and Kinsbourne (Chapter 16), he had no problem positing many selves, some of which are ignorant of others. Munsterberg arrived to direct the Harvard Laboratory with the opinion that the unconscious could be described in three words—"There is none." Wundt, along with most others, also argued strongly against the unconscious. When an idea is not present, it is nonexistent; ideas do not "go away" and "return." The leader of early Functionalism, James Rowland Angel, had the same opinion. The unconscious was not *casually* dismissed—it was opposed as an amateurish notion, as sophomoric as the idea of evolution. As Dulany wrote in this volume:

> And listen to Freud (1915/1957), who for one shining moment may have had it right: "The psychoanalytic assumption of unconscious mental activity appears to

[1] Mandler's chapter is autobiographical, needless to say.

[2] Leibniz proposed stages of consciousness in his monad theory of the 18th century, but it was never influential in psychology.

[3] Herbart's was the first use of that word in describing sensation—we think.

[4] "Unbewüßter Schluss" means unconscious conclusion.

> us, on the one hand, as a further expansion of the primitive animism which caused us to see copies of our own consciousness all around us" (p. 171). We would move beyond the explanatory primitivism that has dominated much of the discipline throughout the cognitive movement—the practice of attributing the poorly understood to a resident humanoid that secretly does what persons do. On the mentalistic view expressed, there's nobody home but us.

That is, there is no "unconscious," and it is no surprise to learn that Freud realized that he had posited a fiction when he "discovered the unconscious."[5] Hence, John Watson was redundant in 1913, despite textbook allegations that "the behaviorists forbade the study of the mind!" But Larry Jacoby and colleagues, in the first paragraph of Chapter 2, commit this common but thoughtless and egregious error, writing that "the unconscious was banished, along with consciousness, by the radical behaviorists." Galin refers to similar "dark ages" in Chapter 23, claiming that Baars and colleagues (Chapter 22) also made such a claim, though we could not find such reference in that chapter. We refer all believers in such false history to catch up on the scholarship of the past 20 years.[6]

What Made Us Go Unconscious Again?

All of the chapters except Dulany's were funded by NSF, NIH, The Research Council of Canada, or other agencies—hence, this is mainstream stuff. Why is it so popular? It certainly doesn't reflect a resurgence of popularity of Freudian theory and it most definitely does not derive from traditional cognitive "science." Perhaps the last few decades' findings in the study of expertise—do something for enough years and become "expert"—was the impetus. Or perhaps the demotion of consciousness by Nisbett, Wilson, Ellen Langer, and others in social cognition played a part. The irrationality displayed in the findings of Tversky and Kahneman may also have been a factor.

We prefer to believe that this reversion to the subjects of the 19th century reflects the general failure of cognitive science, a discipline that exists as the ever-changing response to the interests of popular culture. Clark Glymour titled his superb Chapter 18, in a paraphrase of the cognitive scientist Yogi Berra, "Déjà Vu All Over Again?" and described the "uncanny experiences" reading the literature of cognitive science and that of the closing years of the 19th century. Reviewing Chapter 17, by Martha Farah and her colleagues, Glymour wrote:

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[5] See Gay (1988).

[6] A good start in this direction is a reading of Leahey (1992b).

> For an extraordinary experience, take a weekend and on one day read Farah's (1990) *Visual Agnosia* and on the other read Freud's (1891) *On Aphasia*. I am confident Farah had never read a word Freud wrote before the turn of the century, and yet the parallelisms between the two books, written almost exactly a century apart, make one think Freud and Farah were collaborators, transcentury e-mail colleagues.

Further irony lies in the actual research described in many of the chapters. Excepting the painfully pitiful attempts by Schneider (Chapter 4), Rumelhart (Chapter 25), and McClelland (Chapter 27) to apply connectionist models, much of what we read was behavioral. The connectionist models were behavioral too, of course, in the sense that Clark Hull was a behaviorist.[7] For example, Rumelhart's model treats departures from a null point as the bases for emotion, harking to the now-defunct arousal models of the 1950s and 60s—not to mention adaptation-level theory. If Rumelhart's chapter *added* something to these models of yesterday, that would be another matter. As is, we have only the hollow feeling that "progress" and "cognitive science" are antonyms.

Methods of Studying Implicit Perception and Memory

During the 1950s controversy raged over "learning without awareness" and "subliminal perception," but the crude experiments presented by opposing sides settled nothing and lent an aura of chicanery and foolishness to the field. During the 1980s and 90s the methods had become refined and the controversy was less crude. By 1997, a major conference was even devoted to the topic of perceiving, learning, and remembering without conscious awareness. A topic that was of great interest to William James and to others of his time was once again interesting to researchers.[8] The methods used were new, but the interpretation of findings was as old and as controversial as ever. Since consciousness was never defined with any unanimity, matters must ever be murky and we mustn't be too quick to condemn. Consider now the methods "of the modern age" applied to the old question of conscious and unconscious mental activity.

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[7] See Malone, J. C. (1991).

[8] And to granting agencies, who funded most of the participants at the 25th Carnegie Mellon Symposium on Cognition. The Symposia had been held for 30 years, but this was the first time that consciousness was the topic. James had argued against unconscious mental activity in 1890, Chapter IV, "The Mind-Stuff Theory." As we have seen, Wundt, Munsterberg, Angell, and most others of the time took the same view.

The Exclusive Stem Completion Method

Probably the simplest method to show implicit memory is the method of stem-word completion and the use of inclusive or exclusive instructions.[9] A subject is shown a long list of words and later asked to complete word stems, such as TAB, which could be the stem for TABLE, or TABOO, or TABLEAU. In early experiments, subjects might be more apt to complete a stem with a word from the earlier set, and, if that word was not recognized as a set member, the use of it could be attributed to unconscious (implicit) processes. In a more sophisticated procedure, Jacoby and his colleagues (1991) instruct subjects to complete stems with words not on the original list. If such a word is nonetheless used, that might be evidence for implicit memory for a word that is "explicitly" not recalled as a set member. Use of a different word is taken to reflect voluntary/conscious/"explicit" mental activity.

Whether conscious or "unconscious" activity prevails can be assessed in a more sophisticated way, using a mask to limit the duration of a priming word to subthreshold values. That performance can then be compared with response when the masking effect is removed. Consider the procedure. Suppose that the prime word is presented just before the stem and masked by a bright or an obscuring field that occurs 50ms after the prime is presented. Assume also that it has been determined in advance that this subject does not report having seen anything that is present for so brief a time. The subject has been told not to use the prime word in completing the stem. But what if the subject claims not to have seen the prime, yet uses that word to complete the stem? Is that an unconscious priming effect, an instance of "subliminal semantic activation?" If the prime is presented longer, say 240ms, and then the mask appears, the subject will explicitly avoid using the prime to complete the stem. Those who use this method claim that it separates explicit ("conscious") and implicit ("unconscious") processes. Many disagree, of course.

A Novel Use For The Stroop

In 1935 J. R. Stroop showed that people were slow to name colors when a printed-word color, such as *RED*, appeared in blue or green letters—they were quicker when the word and color matched (Stroop, 1935). His interest was in the disruptive effect this had on learning, but later researchers used it for a different

[9] This is a "priming" method, familiar to William James, described as the "summation" method in his 1890 Chapter XI, "Attention."

purpose—as a way to separate explicit and implicit reactions, much as was done by Jacoby, described above. Consider one example from Merikle and Cheesman (1987), who presented subjects with color-word primes, *RED* or *GREEN*, followed by red or green target colors.

The ordinary Stroop effect occurs when subjects are quicker at naming congruent color words and colors (e. g., the word "*RED*" and the color red) than when the prime and color are incongruent. However, these authors also manipulated the percentage of trials when color word and color matched, so that this occurred only 25% of the time. That means that on 75% of the trials the color word *RED* would be followed by the color green. Subjects quickly learn this and so become quicker at identifying green when the priming color word is *RED*. This is assumed to be an explicit, consciously-adopted strategy, as opposed to the ordinary Stroop effect, which is an automatic, implicitly-controlled reaction—"unconscious," comparatively speaking.

Merikle and others10 also varied the duration of presentation of the priming word. In different blocks of trials, the color word primes were present for brief (median 57 ms) or long (214 ms) durations. The color word was presented for one of those durations, then masked by a row of asterisks that turned either red or green at the 300 ms mark. When the prime words were present for the brief durations, a standard Stroop effect occurred and the subjects reacted faster to *RED*-red color and to *GREEN*-green color. When the prime word was present for the longer duration, however, the subjects were faster responding to the incongruent color, which in fact appeared 3/4 of the time. Thus, *RED*-green color was responded to quickly, presumably since subjects were explicitly (consciously) adjusting their preparation.

Data averaged over their 16 subjects, each of whom received both brief and long prime word presentations, showed that at the brief duration, reaction to congruent color was faster than to incongruent (approximately 412 ms vs. 433 ms). When color-word presentation was longer, reaction to the incongruent color was faster (approximately 420 ms vs. 432 ms). The authors view this as evidence for assessing the relative magnitude of unconscious effects.[11]

[10] In addition to Merikle & Cheesman (1987), see Merikle & Joordens, (1997).

[11] Critics many point to the 11-12 ms differences as insufficiently convincing.

Repeating Sequences.

Others separate more and less conscious processes by showing that subjects are "implicitly" sensitive to sequences of events.[12] For example, subjects must respond as quickly as possible to an image that appears in one of the four quadrants of a visual display according to some rule (e. g., quadrant 1 every fourth trial, quadrant 4 every 13th trial, quadrant 3 on trials that are multiples of odd numbers . . .). With experience, subjects react more quickly to such sequences than when sequences are not governed by set rules. Yet, subjects are incapable of verbalizing the rule(s) and claim to have no idea what they are doing. Artificial grammars have been devised which produce the same results: Subjects can act according to rules which they cannot articulate.

Hidden Covariation and Subliminal Mere Exposure.

Yet another example of evidence for unconscious learning is the phenomenon of hidden covariation. In one example of this procedure, subjects saw six pictures of women with either long or short hair, along with paragraph descriptions that described them as kind or as capable. "Kind" or "capable" was associated with hair length, and, when eight new pictures were presented, subjects tended to match "personality" and hair length, though no subjects referred to hair length in doing so. Was the contingency between hair and personality description implicitly learned (Lewicki, 1986)?

The question arises again in subliminal exposure. Zajonc showed long ago (1968) that we prefer things that are familiar, even though we have no recollection of them. Visual patterns, nonsense words, and melodies may seem wholly new to us, but if we have experienced them we are apt to prefer them to novel stimuli. It appears that visual patterns that are briefly presented and/or masked are preferred over other figures, even though the subject is unable to specify which figures had been seen earlier. This too is taken as evidence for unconscious learning (Bornstein, 1992). But what of these subjects who cannot articulate what they seem to have observed?

How Many Ways Can You Ask a Question?

Specifically, how many ways can you ask subjects to report what they saw, learned, or remembered when they initially tell you that the answer is "nothing?" Merikle and colleagues argue that it is useful to think of thresholds as "subjective"

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[12] An example that we have not read is Lewicki, Hill, & Bizot (1988).

versus "objective." The first is the minimum value of stimulation that the subject reports can be sensed and the second is a lower threshold that includes stimulus values that are still effective, though unknown to the subject.

This sounds close to Skinner's position—we are many "selves," some of which are conscious, in the sense that they can use language and describe private experience. But others are not verbal and are shut off from the articulate, introspective self that we call "me." The infant's world is of this kind and it remains so until society constructs a consciousness as it transmits its language. How many gradations might there be from the highest level of self-consciousness down to the lowest level of "implicit" memory? Ask Marcel Kinsbourne who argued persuasively (Chapter 16) that the number of "minds" that may be demonstrated within a single nervous system depends largely on the number of cuts that the neurosurgeon dares to make.

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