

Notwithstanding my comments on what are, at the end of the day, details in the bigger picture, Berlin's important and thought-provoking article is a remarkably comprehensive look at cognitive neuroscience of unconscious influences and a valuable resource for anyone wanting an insightful review of the relevant literature.

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## The Anna Karenina Theory of the Unconscious

Commentary by Ned Block (New York)

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The Anna Karenina theory says: all conscious states are alike; each unconscious state is unconscious in its own way. This paper argues that many components have to function properly to produce consciousness, but failure in any one of many different ones can yield an unconscious state in different ways. In that sense the Anna Karenina theory is true. But in another respect it is false: kinds of unconsciousness depend on kinds of consciousness.

**Keywords:** Anna Karenina; unconscious; phenomenal consciousness; access consciousness; dream; anosognosia

The Anna Karenina theory says: all conscious states are alike; each unconscious state is unconscious in its own way. What are those different ways in which states are unconscious? In her illuminating article, Heather

Berlin describes a vast variety of ways unconscious states can occur. Here are some examples illustrating the variety of such processes even within the domain of perception:

1. Subliminal perception, in which the stimulus strength is below threshold and so too weak to

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- produce conscious experience. Variants include degrading the stimulus or superimposing noise on it.
2. Masking, in which even a strong stimulus can excite early vision but interference at a later stage of processing prevents conscious experience.
  3. blindsight, in which subcortical pathways can lead to unconscious representation of a stimulus.
  4. Attentional blink, in which a strong and unmasked stimulus can be prevented from reaching conscious experience by attention being drained away by another task. Variants: the emotional blink, the surprise blink.
  5. Neglect, in which one side of space is not attended to, resulting in the perceptual representation of stimuli that the subject is unable to report.
  6. Binocular rivalry, in which a stimulus presented to one eye inhibits the processing of a stimulus presented to the other eye. Adaptation in the dominant eye eventually weakens its hold, reversing the rivalry (Alais, Cass, O’Shea, & Blake, 2010).
  7. Motion-induced blindness, another form of bistable perception
  8. Crowding, in which spatial integration fields in the periphery are too large to isolate a single object, and so representations of properties of different objects interfere with one another (Pelli & Tillman, 2008).

These and other ways in which perception and perceptual priming can occur outside of consciousness are accepted by nearly everyone in this field. Unconscious semantic and cognitive processing are somewhat more controversial. Nonetheless, some of these semantic and cognitive unconscious effects withstand even the harshest scrutiny (Kouider & Dehaene, 2007). As Berlin mentions, there is ample evidence for unconscious decision processes, even inhibitory decision. (An impressive series of studies at the University of Amsterdam that she does not mention demonstrates unconscious inhibitory control: van Gaal, Ridderinkhof, Scholte, & Lamme, 2010.) Furthermore, as Berlin notes, there are a variety of ways in which motivational and affective states and processes can occur unconsciously. She mentions, for example, that invisible emotion-provoking stimuli (e.g., fearful faces) can evoke emotions that the subject does not know he has; affective blindsight; induced affective blindsight; repression (in which a representation is pulled out of consciousness by unconscious mechanisms); suppression (in which a representation is pushed out of consciousness); depersonalization disorder and various forms of dissociative identity disorder (DID).

By contrast with unconsciousness, consciousness is usually viewed as a more uniform phenomenon. One reason is that perceptions, emotions, and cognitions can all be co-conscious—experienced phenomenally in a single unified consciousness, so there must be something in common to the way in which these very different kinds of mental states are conscious. Our most widely accepted theories of consciousness appeal to something uniform among all consciousnesses, be it global broadcasting, phase-locked oscillations, reentrant processing, higher order monitoring, or high “phi.”

It may seem obvious that the Anna Karenina theory is true. For any kind of complex machinery of success, everything has to work together properly to succeed, but any one of the many individual components of the process can fail, resulting in overall failure. An airplane can fall from the sky if the engines fail but also if there is a problem with the wings, the rudder, the ailerons, the control system, or the fuel lines. But there is only one kind of success, at least for a given type of airplane—if everything functions properly.

I mentioned many ways in which unconscious states and processes can be produced, but do these different ways produce genuinely different *kinds* of unconsciousness? In my view, genuinely different kinds of unconsciousness depend on genuinely different kinds of consciousness. I have distinguished between phenomenal consciousness—what it is like to have an experience—and what I call “access consciousness”—cognitive accessibility (Block, 2002). I also think there are various forms of monitoring consciousness and self-consciousness. (The co-consciousness I described that unites conscious perceptions, emotions, and cognitions is a matter of phenomenal consciousness.) So in my view, the Anna Karenina theory is true if understood to say that there are many ways of *producing* unconsciousness, but false if understood to claim that genuine kinds of unconsciousness float free of genuine kinds of consciousness.

Anyone who has had a vivid dream knows that dreams are phenomenally conscious. However, there is plenty of evidence that self-consciousness of the “autobiographical” sort that we typically have in waking life is severely reduced in dreaming. Activation in the dorsolateral prefrontal cortex is inhibited (Muzur, Pace-Schott, & Hobson, 2002), which is presumably responsible for the decreased volition, self-reflection, and insight people report in dreams. It is silly to say that dreams are unconscious, as Antonio Damasio (2010) does, and as Daniel Dennett (1976) and Norman Malcolm (1962) earlier suggested. But there is a grain of truth in this idea—namely that (except in lucid

dreaming) dreaming involves inhibition of a kind of self-consciousness.

I believe that some of the cases of “unconsciousness” described in Berlin’s article may be cases in which all of phenomenal and access and self-consciousness are missing, but others may be cases of mere failure of access consciousness—that is, cases of cognitive inaccessibility, possibly with preserved phenomenal consciousness. And this possibility is suggested by the way Berlin describes the cases.

As Berlin notes, in DID, patients in the “neutral identity state” claim amnesia for memories that they remember perfectly well when in the “traumatic identity state.” She says that “they appear to inhibit access and responses to traumatic memories.” Her description in terms of inhibition of *access* raises the possibility that those traumatic memories are represented in a form that is experienced phenomenally even though access to the neutral identity state is inhibited. The key to this speculation (and speculation is what this is) is the thought that the neutral and traumatic identities share some memory and imagery but differ in cognition.

Similar points apply to some cases of anosognosia—denial of deficit. Fotopoulou, Pernigo, Maeda, Rudd, and Kopelman (2010) describe what sounds like implicit knowledge of deficits in patients who explicitly deny them. For example, they describe one patient with anosognosia for paralysis on one side (hemiplegia) who “unceasingly complained about everyday difficulties with an emotional intensity that better fitted her devastating disability than these minor every-day disappointments.” Using a task involving descriptions that in some cases were related to the deficits, Fotopoulou et al. found that anosognosic patients were significantly slower on tasks involving deficit-related descriptions than were controls, revealing “implicit” knowledge of the very deficits that they explicitly denied having. The task requires adding a missing word to a sentence that is supposed to be “completely unrelated to the theme of the sentence.” For example, subjects might be asked to complete the following sentence with an unrelated word: “A hoist is often used to lift paralyzed patients off the \_\_\_\_.” Paralyzed patients who deny their paralysis were slow in completing such blanks compared to controls—paralyzed patients who did not deny their paralysis. On Fotopoulou’s analysis, there is response competition between emotionally self-threatening information and what is needed to do the task. If the Fotopoulou analysis is right, the question arises as to how the emotionally self-threatening information is represented in these patients. If this emotionally self-threatening information is represent-

ed in the form of phenomenally conscious images of being unable to move, then these subjects would have phenomenal states that are cognitively inaccessible without a shift out of the anosognosic state.

Berlin describes repression in terms that suggest a similar account. She speaks of “inhibition of conscious access to emotions,” noting that the emotions do not disappear in repression and that their inhibition puts the body under stress. One might wonder whether part of the explanation of this stress is that the emotions are actually experienced in phenomenal consciousness.

I started this paper with a discussion of the Anna Karenina theory, noting that fundamental kinds of unconsciousness must be based on fundamental kinds of consciousness. In particular, I argued, one kind of unconsciousness may involve impaired cognitive access (access consciousness) with preserved phenomenal consciousness. Whether the converse case of preserved access consciousness without phenomenal consciousness can occur is another matter (Block, 1996; Hartmann, Wolz, Roeltgen, & Loverso, 1991). But my main point has been that in Berlin’s essay as in much of the literature on unconscious states, some kinds of unconscious states are described in the language of access, as if the author is leaving room for the possibility that what is missing is *just* access, opening up the possibility that a deeper form of consciousness may be preserved.

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## Psychological Processes and Neural Correlates

Commentary by Morris N. Eagle (New York)

The wide range of studies and findings presented in Heather Berlin's paper supports Freud's claims regarding the descriptive unconscious, in particular the claim that unconscious mental processing is ubiquitous. However, what do the studies and findings show with regard to claims regarding repression and the dynamic unconscious? Dealing with that question is the focus of my commentary. I also discuss the question of unconscious affect, together with some general comments on the relationship between psychological processes and neural correlates.

**Keywords:** unconscious processes; neural processes; dynamic unconscious; repression; unconscious affect; neuroscience and psychoanalysis

Heather Berlin's article, "The Neural Basis of the Dynamic Unconscious," is a *tour de force* of information and the sheer number of studies and research areas covered. It provides a valuable and impressive overview of research findings on the neurophysiological underpinnings of unconscious processes. It would be a daunting task to discuss the wide range of studies and findings presented in her article, particularly given my lack of expertise in neurophysiology. Hence, my commentary will deal mainly with one central question: How are the studies covered relevant to psychoanalytic concepts, propositions, and formulations? In particular, I focus on repression, the "cornerstone" of psychoanalysis that is central to an understanding of the "dynamic unconscious."

I begin with a general comment, then focus on the implications of the findings reported in the article for the concept of repression, followed by a brief comment on the question of unconscious affect and ending with some general remarks on the relationship between neuroscience and psychoanalysis.

### The dynamic vs. the descriptive unconscious

As is implicit in Berlin's article, one must first demonstrate the tenability of unconscious processing in

general before one can even begin to refer to processes relevant to the dynamic unconscious. And indeed, despite the title of the paper—"The Neural Basis of the Dynamic Unconscious"—much of it is concerned with the former. However, although the existence of the former is a necessary condition for the latter, it is not a sufficient one. Indeed, there are many theorists (e.g., Kihlstrom, 1987) who accept the existence of ubiquitous unconscious processes, but reject the claims associated with the dynamic unconscious.

Still, recognition of the existence of unconscious processes and the identification of their neural correlates is of no small significance for psychoanalysis. It opens the door to the possibility of investigating dynamic unconscious processes. As the studies described by Berlin indicate, we have come a long way from the Cartesian equating of mind with conscious awareness. One needs to recall that the dominant philosophical position greeting Freud's concept of unconscious mental processes was the Cartesian equating of mental with conscious. From that perspective, the notion of unconscious *mental* processes was a contradiction in terms, a logical absurdity. Indeed, some philosophers reacted in precisely that way (e.g., Field, Averling, & Laird, 1922). And as late as 1968, in a primer entitled *Philosophy of Mind* (1968), written by the distinguished philosopher Jerome Shaffer, there is not a single reference to unconscious processes. Indeed, the author writes that "if we were asked to give a general characterization of the branch of philosophy of mind, we might say

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