



# Unconscious emotion: A cognitive neuroscientific perspective



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## ABSTRACT

While psychiatry and clinical psychology have long discussed the topic of unconscious emotion, and its potentially explanatory role in psychopathology, this topic has only recently begun to receive attention within cognitive neuroscience. In contrast, neuroscientific research on conscious vs. unconscious processes within perception, memory, decision-making, and cognitive control has seen considerable advances in the last two decades. In this article, we extrapolate from this work, as well as from recent neural models of emotion processing, to outline multiple plausible neuro-cognitive mechanisms that may be able to explain why various aspects of one's own emotional reactions can remain unconscious in specific circumstances. While some of these mechanisms involve top-down or motivated factors, others instead arise due to bottom-up processing deficits. Finally, we discuss potential implications that these different mechanisms may have for therapeutic intervention, as well as how they might be tested in future research.

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## 1. The need for reconsideration of unconscious emotion

The concept of unconscious emotion may at first blush appear to be an oxymoron. What are emotions if not intense, conscious, subjective experiences that constitute our greatest joys and greatest sorrows? Emotion arguably makes living worthwhile: consider the value of life if emotions could not be experienced. Yet, with the advent of cognitive neuroscience and the foundational distinction between implicit and explicit processes that apply to all major areas of cognition, including perception, attention, memory and decision-making, coupled with the realization that the generation, expression, experience, and regulation of emotion all involve perceptual/cognitive mechanisms, it has been argued that the same implicit-explicit distinction that applies to cognition generally also applies to emotion (Kihlstrom et al., 2000; Lane et al., 2000; Smith and Lane, 2015). Indeed, evidence that unconscious emotion exists, at least in some forms, is now fairly strong. For example, emotionally relevant stimuli presented so briefly that perceptual awareness is not possible nevertheless reliably influence preferences (Zajonc, 1980), consummatory behavior (Winkielman and Berridge, 2004), and can also trigger other emotion-related physiological/behavioral reactions (Tamietto and de Gelder, 2010). A growing literature has also established that unconscious or implicit attitudes and beliefs have a profound effect on social behavior (McConnell and Leibold, 2001).

After reviewing a considerable body of such evidence from several research domains – including studies of implicit memory, the subliminal mere exposure effect, and deficit profiles in neurological and psychiatric patients, as well as studies of observed dissociations between the various components of an emotional response – it was suggested by Kihlstrom et al. (2000) that the unconscious emotional effects observed in these studies can be sub-divided into two broad categories of phenomena. The first category – which we will call “unconsciously generated emotion” – involves cases where emotional responses are themselves consciously experienced/recognized, but where those emotions are generated in response to unconscious processes (e.g., unconscious percepts, thoughts, or memories). In such cases, an individual will report feeling an emotion, but they will not be consciously aware of the internal/external event that caused the feeling. A slight variant that also falls within this broad category is a set of cases where one is conscious of both the emotional response and the eliciting cause, but where one remains unaware of the causal relation between them. For example, one might consciously perceive a desk and consciously experience becoming sad, and yet not be aware that the desk-percept caused the sadness response. In contrast to such cases, the second category suggested by Kihlstrom et al. (2000) – which he calls “implicit emotion” – is instead when an emotional response is generated but not consciously experienced/recognized. In this type of case, for example, a person might display an automatic fearful facial expression, exhibit an increased heart rate, and behave avoidantly in response to a stimulus, and afferent feedback would trigger unconscious representations of these changes in the brain – yet the person would not report consciously feeling fear. While Kihlstrom et al. (2000) identify many behavioral findings that are consistent with both categories, they identify very few instances in which the neural basis of such effects is examined, and this characterization remains largely true to date. Thus, although the behavioral reality of unconscious emotion has been fairly well established, a more detailed consideration of the origins, mechanisms, and maintenance of unconscious emotion from a cognitive neuroscientific perspective has not been undertaken, and it is the aim of this paper to attempt to fill this gap.

There are several reasons why a review of this topic is needed. First, advances in basic emotion theory point to the importance of unconscious emotion. In “Rethinking the Emotional Brain” (LeDoux,

2012), LeDoux addressed the challenges of linking animal and human research on emotion given that humans can report on their conscious experiences whereas other animals cannot. He proposed that emotions occur when survival circuits<sup>1</sup> are activated (in humans or other animals), leading to changes in various aspects of behavior, cognition, and physiology. Crucially, he argued that the activation of such circuits is not sufficient to generate a conscious feeling on its own. Instead, these activations must interact with other neural systems involved in conscious processing and awareness (i.e., if the organism in question possesses them), indirectly contributing to the generation of a subjective feeling. In the case of humans, we are learning a great deal about the neural basis of consciousness in relation to multiple domains of cognition, particularly visual and auditory perception (Dehaene, 2014). This work has revealed a great deal about the mechanisms of unconscious and conscious cognition, but, with few exceptions, these insights have not been applied to emotion. Addressing this topic will advance our understanding of how humans are and are not like our phylogenetic neighbors. With regard to humans, we have recently published a review of the hierarchical neural networks responsible for the generation, perception and regulation of conscious and unconscious emotion (Smith and Lane, 2015), which assumed that the full range of processing from unconscious to conscious would occur in each domain. In this paper we consider for the first time from the perspective of that model how emotion that is and remains unconscious (i.e., the “implicit emotion” category) may come about.

A second important reason for addressing this topic involves the clinical domain of psychotherapy. Traditional psychoanalytic concepts of affect held that unconscious emotions residing in the id pressed for discharge but were held in the unconscious by the forces of repression (Brenner, 1973). The advances in cognitive neuroscience alluded to above have led to some recognition within psychoanalysis that concepts about the unconscious should be updated. For example, Modell has called for a shift from traditional concepts of the unconscious as a cauldron of forbidden impulses to a cognitive and affective unconscious that is fundamentally adaptive (Modell, 2010, 2008), and Ginot has elaborated on the empirical foundation/justification and clinical implications of such a shift (Ginot, 2015).

Within psychoanalysis, alternative models of psychopathology focusing on dissociation (rather than conflict and repression) and the importance of the interpersonal relationship between therapist and client have been proposed – supported in part by findings in modern cognitive and affective neuroscience (Bucci, 2016). This perspective highlights the need to convert subsymbolic emotional responses to symbolic, conceptual representations of emotional experience. More generally, a fundamental principle of many psychotherapy modalities is that “emotion processing” is a necessary ingredient for therapeutic success. A quintessential example of this is Emotion Focused Therapy, which has a substantial record of empirical research supporting it, both in terms of outcome and process research (Greenberg, 2010). This form of therapy involves helping clients to experience their emotions, to become aware of them, to label them, understand them, and transform them. *However, the nature of the emotion prior to it being further processed in this manner is currently considerably less clear.* Recent work investigating the cognitive and neural processes underlying conscious

<sup>1</sup> While LeDoux believes that these survival circuits are responsible for generating the autonomic, cognitive, and behavioral reactions associated with the term “emotion,” he does not believe that there is a different circuit for each of the “basic emotion” concepts often used in psychological research (e.g., sadness, happiness, fear). Instead such basic emotion terms are likely applied to the outputs of different circuits in different contexts, and their use is also likely dependent on previous learning.

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