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COMMENTARY

Searching for Affect: From William James to Neurophenomenology

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Miskovic and colleagues make a compelling case for reintegrating the study of affect into affective neuroscience. In support, we propose that the study of affect can benefit from combining an embodied perspective on "baseline affect" as a life-regulation process of the whole organism with neurophenomenological methods for investigating affect as episodic emotional experiences.

Keywords: affect, consciousness, neurophenomenology

Miskovic and colleagues make a compelling case for reintegrating the study of affect into affective neuroscience. In support of their position, we propose that the study of affect can benefit from combining an embodied perspective on affect as a life-regulation process of the whole organism (Thompson, 2007; Thompson & Cosmelli, 2011) with the approach to the study of consciousness known as neurophenomenology (Lutz & Thompson, 2003; Fazelpour & Thompson, 2015). We begin with a comment about the Jamesian background to this discussion.

James on Affect and Consciousness

In the second chapter of William James' *Principles of Psychology*, "The Functions of the Brain," James suggests that different centers in the brain and even the spine may have glimmerings of consciousness tied to preferential responses to feeling in the body (James, 1890/1950, pp. 65–66, 78). Considerations about differential responses in decerebrated frogs motivate this suggestion. Although these considerations are similar to those that Miskovic and colleagues review in their discussion of historical trends in the neuroscience of emotion, James's interpretation of their significance differed from that of later scientists. By the 1920s, as Miskovic and colleagues note, "it was believed that this preparation reproduced all of the visceral and somatic manifestations of an emotional reaction without the corresponding experience of affect," and this belief helped to inaugurate "a new period of studying 'affectless' emotional responses." James's view, however, was considerably more nuanced, for he devoted serious consideration to the possibility that what such experiments reveal is not "pseudoaffective reflexes" without any experience of feeling, but rather a more primitive form of consciousness that remains present even in the absence of central nervous system functioning. In retrospect, James's consideration of this possibility can be seen as anticipating contemporary discussions of the "corticocentric myopia" (Parvizi, 2009) in views of brain function as well as the possibility of "consciousness without a cerebral cortex" (Merker, 2007). Although James subsequently confines his discussion of consciousness to the "personal self of the individual" and to the cortex (James, 1890/1950, 66), he indicates that he does so for "practical purposes" (ibid.), because he thinks that more primitive forms of consciousness and their physiological substrates remain outside the scope of introspection.

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At the same time, James appreciates that the consciousness of the self is utterly inseparable from life-regulation processes of the body:

> Mental phenomena are not only conditioned *a parte ante* by bodily processes; but they lead to them *a parte post*. That they lead to *acts* is of course the most familiar of truths, but I do not merely mean acts in the sense of voluntary and deliberate muscular performances. Mental states occasion also changes in the calibre of blood-vessels, or alternation in the heart-beats, or processes more subtle still, in glands and viscera. If these are taken into account . . . it will be safe to lay down the general law that no mental modification ever occurs which is not accompanied or followed by a bodily change. (James, 1890/1950, 5)

These remarks anticipate the idea that there may be complex interrelations between mental processes and bodily hedonic responses of pleasure and displeasure, as Miskovic and colleagues discuss. To what extent these interrelations may themselves be felt or be introspectively accessible is an open question, one to which we will return in the final section of this commentary.

Embodied Affect

In contrast to theorists who think that there is little or no room for the felt experience of affect in scientific theories of emotion (e.g., LeDoux, 2012), Miskovic and colleagues argue that felt affect plays a role in the life-regulation functions of the organism. In their words: "The raw affective experiences, in their most elemental sense, those of pleasure and displeasure, communicate fundamental facts about the organism's consonance (or dissonance) with the ultimate demands of life and self-preservation." It follows that affective phenomenology, the careful description and analysis of felt affect, has an important role to play in scientific theories of emotion, as James originally envisioned.

Yet how should we relate phenomenology to biology? The tendency in affective neuroscience is to emphasize specific neural networks or pathways as the basis for specific types of affect as episodic emotional feelings. For example, Panksepp (1998) proposes that affect is constituted by primitive emotion types rooted in the brainstem. As Miskovic and colleagues point out, "A related viewpoint is adopted by investigators who study biological bases of the so-called primordial emotions . . . that is, organismic reactions to more direct homeostatic deviations (e.g., the hunger for oxygen, thirst in desiccated animals and so on)." From this perspective of "primordial emotion," however, we may also conjecture that felt affect reflects not just "affective programs" that hedonically encode information in the brain and that are subjectively felt by the organism, but also that it reflects the coherence of the whole organism through the ongoing external and internal perturbations to life-regulation (Craig, 2003, 2009; Damasio & Carvalho, 2013). In other words, we propose that such coherence be taken as the baseline level of functioning necessary to instantiate "baseline affect" as the "feeling of being alive" (Thompson, 2007); we also propose that such baseline affect grounds and serves as a background to the episodic and faster changing forms of affect occurring in transient emotional experiences and as reflected by large-scale brain dynamics.

This conception of baseline affect as the feeling of being alive casts light on the problem of finding the biological basis for affect. As Miskovic and colleagues note, "we simply do not have adequate information concerning the putative temporal granularity of affective experiences. Despite compelling evidence that canonical cognitive processes are discrete events . . . the majority of theories within affective neuroscience lack this level of detail." This formulation of the problem, however, treats affect only at the level of episodic emotional events on a relatively fast time scale (e.g., hundreds of milliseconds). We suggest that it may also be necessary to distinguish between such events and the baseline affect of the feeling of being alive, including its modulations on a slower time scale and across the sleep-wake cycle. If affect at this baseline level is tied to the coherence of the organism through perturbations to life-regulation, then its explanation is likely to require biological theories and models that take full account of the body beyond the brain and that therefore go beyond affective neuroscience as currently practiced using neuroimaging tools. For this reason, we suggest that it is important to enrich affective neuroscience with embodied perspectives from biology and cognitive science (Thompson, 2007; Di Paolo & Thompson, 2014).

Neurophenomenology

Neurophenomenology stresses the usefulness of obtaining detailed, first-person reports of moment-to-moment subjective experience to uncover information about neurobiological processes relevant to understanding cognitive processes and consciousness (Lutz & Thompson, 2003; Fazelpour & Thompson, 2015). The working assumption is that first-person reports—especially from individuals trained in the kind of metacognitive awareness cultivated in contemplative "mindfulness" practices (Lutz et al., 2008) or probed with refined methods for eliciting tacit experience (Petitmengin & Lachaux, 2013; Petitmengin et al., 2013) (or both)—can stand in a mutually constraining and illuminating relationship to evidence from affective-cognitive neuroscience about the physiological processes sustaining moment-to-moment experience. As Miskovic and colleagues note, however, to date no attempts have been made to apply neurophenomenological techniques in affective neuroscience. We believe that such attempts could be especially useful for addressing the question of the scope and limits of reportable awareness of bodily affect and the ways it may condition and be conditioned by cognitive processes.

Although neurophenomenology is still in its infancy, recent results suggest it would be useful for addressing this question. Neurophenomenology has been used (a) to differentiate novel gamma-band phase synchrony patterns predictive of novel and distinct attentional states modulating visual perception (Lutz et al., 2002); (b) to uncover distinct preictal experiences and predictive neurodynamical patterns in epileptic patients (Petitmengin et al., 2006, 2007); (c) to characterize the default-mode network and executive system contributions to mind-wandering (Christoff et al., 2009; Hasenkamp et al., 2012; Allen et al., 2013); and (d) to link objective measures of brain activity with distinct strategies of metacognitive awareness using real-time neurofeedback (McCaig et al., 2011), including relating such measures to reports of ongoing experience (Garrison, Santoyo et al., 2013; Garrison, Scheinost et al., 2013). In addition, neurophenomenology is currently being developed (e) to relate fine-grained information about the microdynamics of experiential cognitive processes to the trial-by-trial variability in neural processing as measured with intracerebral EEG (Petitmengin & Lachaux, 2013; Bagdasrayan & Le Van Quyen, 2013), and (f) to investigate the neural sources and temporal dynamics of spontaneous thought (Ellamil et al., 2015).

Given these initial results, we believe that the time is ripe for neurophenomenology to address questions in affective neuroscience, as Miskovic and colleagues suggest. One approach that might be able to make headway on the experience of baseline affect in relation to episodic emotional experiences and discrete cognitive processes would be to obtain detailed reports about moment-to-moment experience from individuals trained in mindfulness methods, for these mental training methods have been shown to be associated with both greater coherence between subjective and physiological aspects of emotion (Sze et al., 2010), and greater introspective sensitivity to bodily sensation (Fox et al., 2012; but see also Khalsa et al., 2008). Using participants with mindfulness training, therefore, may enable experimenters to uncover new information about the neurobiological processes underpinning affective experience.

Conclusion

Miskovic and colleagues are to be congratulated for their timely review on the question of how to integrate the study of felt affect into affective neuroscience. In support of their approach, we have proposed including an embodied perspective on baseline affect as a life-regulation process of the whole organism combined with a neurophenomenological approach to emotional experience, cognitive processes, and their associated large-scale, emergent brain dynamics.

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