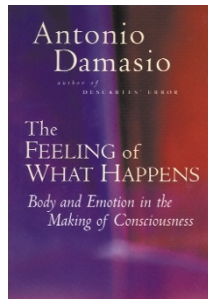


Thinking about feeling



The Feeling of What Happens: Body and Emotion in the Making of Consciousness

by Antonio R. Damasio
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Over a century ago, William James sought to understand the nature of subjective experience by combining introspective observations and biological facts. James' program did not succeed in his time; instead, subjectivity came to be considered unapproachable, and the behaviorists defined a new goal of reducing all facts about mind to third-person behavioral observations. Although modern neuroscience has distanced itself from many of the tenets of behaviorism, it still holds great skepticism about whether subjective experience is a proper tool for—or target of—scientific understanding.

One prominent exception is Antonio Damasio, a neurologist and cognitive neuroscientist whose new book, *The Feeling of What Happens*, represents a radical departure from conventional thinking. Damasio's goal is no less than an account of the neurobiological basis of the subjective nature of human consciousness. The theory he presents is acknowledged to be incomplete and preliminary, but is nevertheless broad, nuanced and clearly articulated. Building on and refining many of the themes of his previous book, *Descartes' Error*, Damasio presents a view that is informed not only by extensive consideration of neurological and neuroanatomical facts, but also by keen social and introspective observations.

Damasio starts by breaking down the idea of consciousness into two components. The more fundamental 'core consciousness' is envisioned to direct moment-by-moment attention in the acquisition of knowledge. Core consciousness is proposed to be a fundamental brain function, and therefore is likely to be shared by, and could be studied in, non-human and even non-primate species. Extended consciousness,

which may occur in animals, but which reaches its peak only in humans, starts with core consciousness and incorporates memory and other faculties to produce the autobiographical knowledge that makes up human personality and identity.

Damasio views subjectivity, the sense of there being an 'I' engaging the world, as key to the entire problem. The self, he posits, is central not just to self-consciousness, but to all consciousness, from the awareness of a visual scene to the feel of a pin-prick to the noticing of one's own thoughts. The organism must be able to represent itself within its brain, but the fear of homunculi has directed attention away from this critically important point.

What is the self? The initial representations of the organism are proposed to occur in a distributed set of interconnected brain stem nuclei and somatosensory cortices known to be closely involved in monitoring and controlling body state. Damasio refers to this representation as the 'proto-self'. The proto-self is not itself conscious, but lesions or temporary inactivation of key proto-self structures abolish consciousness, leading to conditions such as epileptic automatism or persistent vegetative state.

Consciousness, according to Damasio, is a feeling that accompanies the formation of representations of the organism interacting with the world. Because both organism and objects are initially represented elsewhere (in proto-self and sensory maps, respectively), the representations that constitute core consciousness are second-order representations. Thus, to be conscious of something is to re-represent the original (non-conscious) images alongside representations of the organism they are occurring in. The conscious self emerges when the brain tells this 'wordless story', explicitly answering the question 'to whom' this something is happening.

Consciousness allows the organism to focus attention toward pertinent objects—those causing a change in the organism itself—and enhance their sensory processing. Damasio describes consciousness as a kind of homeostatic mechanism that links life preservation with sensory image formation, speculating that it evolved to extend and modify the function of primitive, non-conscious emotions.

The proposed substrates of core consciousness include brain areas anatomically situated to integrate the requisite information, primarily cingulate cortex and thalamus. There is a strong neurological rationale for these choices. Extensive damage to the cingulate cortex or the thalamus abolishes awareness, whereas damage to other high-order cortical areas, such as prefrontal or temporal regions, do not extinguish basic awareness, even though they may impair memory or attention.

Other recent theories of consciousness have postulated explanations in terms of microscopic brain properties, such as synchronous patterns of neural activity, or activity in specific subclasses of neocortical neurons. Damasio has taken a different tack by constructing a theory entirely at the macroscopic level. Rather than seek the neural correlates of consciousness, he proposes a neural architecture of consciousness. His proposal assigns novel functions to a specific set of brain stem nuclei and cortical areas, with critical roles for many 'obscure' structures that tend to receive less than their share of attention in theory and experiment.

Some will observe that Damasio has neglected the task of relating his hypotheses to the physiological properties of circuits, cells and synapses. Although he proposes specific experiments to test his ideas, they relate only to lesions and large-scale brain imaging, and not to the level of single-cell recordings. Yet postponing these microscopic questions may be a wise strategy; relating cognitive function to cellular substrates has proven to be among the most difficult challenges in neurobiology, and there is no reason to think it will be any easier for consciousness.

The Feeling of What Happens clarifies the concept of consciousness and brings it home to biology, laying a vital foundation for future scientific exploration of the subjective nature of experience. Damasio's book ought to provide inspiration not only to cognitive neuroscience, but to any discipline concerned with the nature of mind.

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