Book Review


Reviewed by CORINNE ZIMMERMAN, University of Alberta

*Descartes’ Error* is the provocative title of Damasio’s (1994) book in which he proposes that emotion and reason are inextricably linked, an idea that runs counter to common folk wisdom but with potentially profound implications for neuroscience, cognitive science, and philosophy. Not since James Watson’s (1968) *The Double Helix*, has a book about a scientific endeavor been as captivating. Damasio describes the book as “a conversation,” but it is also an engaging presentation of empirical neuroscience research, history, and philosophical questions. As *Descartes’ Error* may also be of interest to academic psychologists and neuroscientists, this review will provide (a) a general description of Damasio’s book, (b) an outline of the development of the somatic-marker theory that he proposes to account for the evidence suggesting a relation between emotion and reason, and (c) a brief evaluation of this hypothesis.

**General Overview of Descartes’ Error**

*Gage and Elliot: A starting point.* Damasio has divided the book into three sections. In the first section, he tells the tale of Phineas Gage, the colorful character who sustained both brain damage and severe personality change following an explosion that blew a 3-foot tamping iron through his skull. Damasio uses Gage’s story as a starting point for an exploration of the connection between prefrontal brain damage and impaired rationality. Damasio then examines the behavioral consequences in other cases of prefrontal damage. What emerges is an apparent pattern of behavior involving flattened affect accompanied by impaired reasoning in real-world domains. Damasio refers to this pattern as “Gage Matrix.” These cases of prefrontal damage hinted at the possibility that certain brain regions may be responsible for the ability to plan future survival within a complex social environment, and that this ability relies upon intact systems underlying both cognition and emotion.

The next breakthrough in Damasio’s thinking about the coupling of localized brain damage with decision making deficits was the case of Elliot, a patient with a ventromedial prefrontal tumour in the same region of the brain that was damaged in Gage. Yet an extensive battery of laboratory tests failed to show that Elliot was impaired in any way. He clearly had intact cognitive abilities, knowledge of and access to social rules, and the ability to generate options and scenarios. In spite of this, he was an emotionally contained and ineffective social being unable to manage his affairs and to select the most advantageous course of action with respect to his personal life. Elliot’s case led Damasio to consider that a lack of emotion could be responsible for poor decision making and irrational behavior.

Damasio also considers evidence from cases of brain damage in regions beyond the prefrontal cortices that nevertheless also result in behavior consistent with “Gage Matrix.” He proposes a neural circuit that might be responsible for the connection between emotion and reason, and suggests that damage to this circuit may result in “Gage Matrix.” The collection of systems underlying this neurological condition includes the ventromedial prefrontal cortices, the right somatosensory cortices, and subcortical regions (e.g., the amygdala). This collection of systems is involved in goal-oriented reasoning and decision-making, emotion and feeling, and the processing of bodily signals.

*The Journey Towards an Explanation.* In the second section, Damasio starts to assemble an explanation to account for the phenomena presented in the first section, that is, the “mysterious alliance” of emotion and reason. Damasio defines key terms and lays out the assumptions required to take part in the “conversation.” Fundamental concepts such as brain, body, mind, behavior, the nature of decision making, feeling, and emotion are delineated. He also discusses the neural basis of knowledge and its dependence on images. Other topics include biological regulation and survival, the differences between emotion and feeling, and the mechanisms responsible for connecting emotion and decision making. This exploration is necessary to prepare the reader for Damasio’s presentation of the somatic-marker hypothesis, to be described shortly.

*The Somatic-Marker Hypothesis and the Mind-Body Problem.* In the third section of the book, Damasio presents some of the initial attempts to test experimentally the somatic-marker hypothesis. In the last two chapters, he turns his attention to the assertion that “the body, as represented in the brain, may constitute the indispensable frame of reference for the neural processes that we experience as the mind” (p. xvi). This part of the conversation is
when they consider the various alternatives to a course of action. Because somatic-markers function as a biasing device, or a type of alarm system that aids in deliberating about future decisions, the absence of these somatic-markers reduces the efficiency of the decision-making process. The result of this partnership between bodily sensations and decision making is an inseparable connection between body and mind. Because Descartes envisioned thinking to be separate from the body, we now see the "error" that Damasio has alluded to.

An Evaluation of the Somatic-Marker Hypothesis

Descartes' Error represents Damasio's attempt to outline the key features of the somatic-marker hypothesis, including its history, rationale, assumptions, and predictions. Is it worthy of our attention yet? Should we seriously consider the possibility that feeling and emotion are an integral component of rational decision making? The hypothesis is intriguing on several counts.

First, the reader definitely develops the sense that the somatic-marker hypothesis is a well-developed idea. Damasio traces the formation of the hypothesis from the rudimentary questions posed by the mysterious behavioral consequences following prefrontal damage, through a consideration of the neurobiology of emotion and feeling, to the proposal for a mechanism that might be responsible for the counterintuitive connection between reason and emotion. Damasio developed the hypothesis following a consideration of data from several sources, including historical data, case studies, and both human and animal data.

Second, the theory that Damasio proposes is very thorough in many respects. It takes into account that these systems are part of a functioning person living within a culture with general survival as a goal. Damasio does not ignore the fact that we are biological systems with "lower level" regulatory mechanisms, drives, and instincts at the expense of focusing solely on our capacity for "high reason." The theory takes into account development with respect to both the individual person and evolutionary theory. He tentatively proposes that the systems that developed probably did so because it was both adaptive and because of evolutionary conservation. With respect to individual development, he provides the necessary account of how somatic-markers are formed, which is consistent with current knowledge about learning, socialization, and biological regulation.

A third feature that makes the somatic-marker hypothesis worthy of attention is the fact that it is a relatively parsimonious theory that may account for a range of psychological phenomena. It may account for how it is that we make rational decisions about issues as complex as choosing a career or voting, and as instinctive as moving to avoid a falling object or eating dinner. We can also appeal to it to explain what we know of as "intuition." It may also account for why it is that we do not always choose courses of action that offer immediate or short-term reward. We can envision long-term positive outcomes, and the pleasant somatic states that mark those images, and use these to postpone more immediate
gratification (e.g., finishing medical school rather than quitting). Furthermore, the hypothesis may be used to explain decision making in both normal and brain-damaged populations.

Fourth, the somatic-marker hypothesis that Damasio outlines is clearly testable. It has heuristic value in that it is sufficiently well-developed to derive unique predictions and stimulate novel research. Damasio includes his initial attempts to test these predictions empirically in research using a skin conductance response paradigm. Unlike traditional cognitive theories, there are clear connections to the underlying brain systems and mechanisms. Even if the exact systems that Damasio proposes are not implicated, future research could be used to refine the model as empirical findings confirm or disconfirm its predictions.

Concluding Remarks

Descartes' Error is an entertaining, educational and thought-provoking journey. Damasio does a remarkable job of bringing together a diversity of topics that are often studied and discussed separately – cognition, emotion, learning, neuroanatomy, personality, evolution, and philosophy of mind. Should psychologists and neuroscientists take up the implicit challenge to consider the interface between cognition and emotion and the underlying neural mechanisms? If the challenge sounds intriguing, a good starting point would be to engage in Damasio's "conversation." His presentation of the somatic-marker hypothesis will pique interest and may serve to guide new research to test the tenability of this theory. He has highlighted the importance of that ill-defined aspect of human existence known as "emotion," and brought it to the forefront, a step that may make it not only respectable to consider in future research, but necessary.

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References


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