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TEMPERATURE

ANTONIO DAMASIO:
The biology of consciousness

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Caption

Consciousness and the body landscape

Antonio Damasio gathers recent research in neuroscience into a scheme that shows how consciousness arises from, and is conditioned by, the ‘landscape of the body’. By this he means the viscera, heart, lungs, gut, muscles, skin, brain, and skeleton.

The unfolding states of this body landscape are in the first instance *emotions*, as the body manages itself in relation to changing circumstances. In the second place, Damasio sees the inner awareness of these emotional states as *feelings*. He makes a useful biological distinction between what the body does autonomically—fight/flight or rest/digest—and the brain circuit representations of these states as feelings.

Feelings tell us whether what is happening matches our needs and expectations. Feelings, along with the emotions out of which they arise, are not luxuries: they should be regarded, Damasio says, as internal guides that help us communicate to others how we are. ‘Feelings are neither intangible nor elusive they are just as important to us as other perceptions. Feelings let us catch a glimpse of the organism in full biological swing, a reflection of the mechanisms of life itself as they go about their business’, without feelings ‘there would be no suffering or bliss, no longing or mercy, no tragedy or glory in the human condition’.

Damasio sees mind as a flow of mental patterns which he defines as *images* (not exclusively visual), and this is a process rather than a thing. He offers the metaphor of an orchestra playing a complicated piece of music [see illustration](#). At any moment only parts of the complete orchestral ‘bodymind’ are in play: some instruments may be strident, others silent, awaiting their cue and still others may be resting.

Bioregulation

Damasio argues that consciousness and emotion are not separable and that the mind has to be understood in terms of an organism and its surroundings. ‘Emotions are part of the bioregulatory devices with which we come equipped to survive.’ All organisms monitor their surroundings for changes that affect the organism’s *stability*. Within this continuous flow of monitoring, Damasio sees some parts of the mind as constantly mapping changes in the body landscape, i.e. feeling and emotion, and others, i.e. thinking, language, or perception, as free to roam the outer world. The shifting states of the body, whether controlled and/or influenced by the brain, are constantly signalled to the brain, where, Damasio proposes, these messages are mapped in three distinct ways: 1. internal milieu and viscera, including the thick skin; 2. vestibular and musculoskeletal; and 3. fine-touch.

These internal, postural, and touch messages register in the brain as non-verbal images and are relentlessly and continually translated into language, words, sentences, numbers, and concepts—enabling us to think with precision, and classify and name, and argue out options, and communicate complicated notions with a single word or phrase.

Embodied mind

However, as Damasio points out, ‘The range of possible states of the internal milieu and of the viscera is tightly limited. This limitation is built into the organismic specifications since the range of states that is compatible with life is small.’ Bodies have a tendency, built into the genes, to maintain sameness, whether we want it or not. Why is this important? Because the

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over arching imperative for survival, for maintaining stability, can be a source of great emotional urgency and/or inhibition. Hunger, thirst, cold, or life-threatening events can push the body's coping capacity to, or past, its viable limits, at which point the scale of body mobilization may become overwhelming, and can indeed push out all other considerations.

Body and brain have two routes of interconnection: the sensory and motor peripheral nerves that carry signals from every part of the body to the brain, and second, formed at an earlier stage of evolution, is the bloodstream, carrying chemical signals, hormones, neurotransmitters, and modulators. However, Damasio invites us to make an essential conceptual leap here, of getting away from even these notions of A affects B affects A, and moving towards a sense of the fundamental indissociability of the body/brain that is intrinsically embedded as an ensemble in our environment and in which are generated the images, that we experience as 'mind'. 'Most of the words we use in our inner speech, before speaking or writing a sentence, exist as auditory or visual images in our consciousness. If they did not become images, however fleetingly, they would not be anything we could know.'

Rationality

Damasio argues that rationality is not some specialized subsystem of the mind but arises out the whole mix of body/mind interactions. In the first place, even though emotional states—being conscious of what is happening in the body—offer '*flexibility of response based on the particular history of your interactions with the environment*' (italics in the original), we need the innate devices of autonomic, and other regulation to start the ball of knowledge rolling.'

In situations posing a difficult choice, what counts as 'rational behaviour'? Deploy formal logic, cost/benefit analysis? Disassemble and study different scenarios for action? Leave feeling and emotion at the door? This is the 'high reason', common-sense view, as Damasio calls it: 'to obtain the best results, emotions must be kept out. Rational processing must be unencumbered by passion.' However, in the light of body-mind integration he questions the notion that reason requires the suppression of feeling and emotion. 'Knowing about the relevance of feelings in the processes of reason does not suggest that reason is less important than feelings... on the contrary taking stock of the pervasive role of feelings may give us a chance of enhancing their positive effects and reducing their potential harm.'

The ingredients of consciousness

Out of this set of propositions about how an embodied mind works, Damasio suggests that consciousness arises as a clutch of selves, each of which emerge from a particular biological setting or process. There is an *autobiographical self*, a *core self*, and a *proto-self*.

The *proto-self* is Damasio's name for the sets of neural patterns that, moment by moment, out of consciousness, register the state of the body. *Proto-self* is a collector of messages that are held as patterns, collections that permit the construction of what Damasio calls *core self* and *core consciousness*. Core self and core consciousness 'know that something is going on'. *Autobiographical self*, drawing on memory, registers that this is something familiar, or perhaps unknown. Essential to these internal, neurochemical events is reciprocal exchange between the brain and the body, when the brain

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triggers the release of a hormonal cocktail in the bloodstream, it too is bathed in this cocktail. *Core consciousness* is the process of registering a neural pattern that brings together in the brain these inner states of the body, the perception of what is going on outside the body, and a pattern for the relationship between the two.

Through *core consciousness* we pick up a feeling in ourselves, plus perhaps a perception of something in the room or the street, and gradually accumulate a sharper grasp of this, plus its relevance to us and our well-being. Damasio is outlining an unconscious, subterranean, bodily domain of innumerable transient neural patterns, that may from time to time be quite turbulent, and a small window into consciousness that is unable to register them all.

Encompassing and including *core consciousness* Damasio also proposes what he calls *extended consciousness*. *Extended consciousness* is the process of taking the flurry of messages and feelings and integrating them with *autobiographical self* (memory) material, i.e. previous experience, through reasoning and decision making.

Extended consciousness points to our ability to manipulate knowledge successfully so that we can come up with novel solutions to unprecedented life problems. While an organism is necessarily orientated toward personal survival, *extended consciousness* can show us that cooperation with others may make survival much more likely, and point to ways of doing it.

Consciousness links the biological regulation of an individual life with the biology of thought so that we continually balance/reconcile our inner bodily universes of automatic regulation with the inner universe of images.

Damasio further speculates that *conscience*, a key ingredient of mind, is generated through *extended consciousness*.

Descartes' Error

Damasio's biology of consciousness brings feeling and emotion in from the wasteland created by 'Descartes' Error', as he calls it. He defines Descartes' error as 'the abyssal separation between body and mind, between the sizable, dimensioned, mechanically operated, infinitely divisible body stuff, on the one hand, and the unsizable, undimensioned, unpushpullable, nondivisible mind stuff; the suggestion that reasoning, and moral judgement, and the suffering that comes from physical pain or emotional upheaval, might exist separately from the body'.

Damasio's contradiction of this split and the evidence that he offers in support look set to further undermine the mechanistic approach of cognitive science to the mind—clockwork mechanics as a model for life processes, the mind as a software program—which, due to its high academic and scientific status, distorts psychology and psychiatry and contributes to alienated practice across both medicine and science. As an example, he cites the deep ignorance of science and medicine of the basis for the placebo effect, in particular the degree of error it has created for 'so-called double-blind studies', and the way that sub-specializations of medicine—knowing more more and more about less and less—have contributed to increasing the inadequacy of medicine.

As Damasio argues, scientific resistance to accepting the intrinsic subjectivity of mind is a failure to acknowledge that mind and consciousness are private: 'the conscious mind and its constituent parts are real entities, not illusions, and they must be investigated as the personal, private, subjective experiences that they are'.

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The new directions in research that Damasio represents point to an embodied soul and spirit that are ‘complex and unique states of an organism’, and that in consequence, ‘perhaps the most indispensable thing we can do as human beings, every day of our lives, is to remind ourselves and others of our complexity, fragility, finiteness, and uniqueness’, ‘to move the spirit from its nowhere pedestal to a somewhere place, while preserving its dignity and importance’.

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Damasio: the mind and consciousness

Reason—subtle, complex, personalized responses to the stream of body messages registering as conscious images, that can be weighed and evaluated, and which may be acted on as behaviour.

Feelings—the private mental experience of an emotion— sensory patterns signalling pain, pleasure or other emotion coalescing into images that may be translated into words and sentences

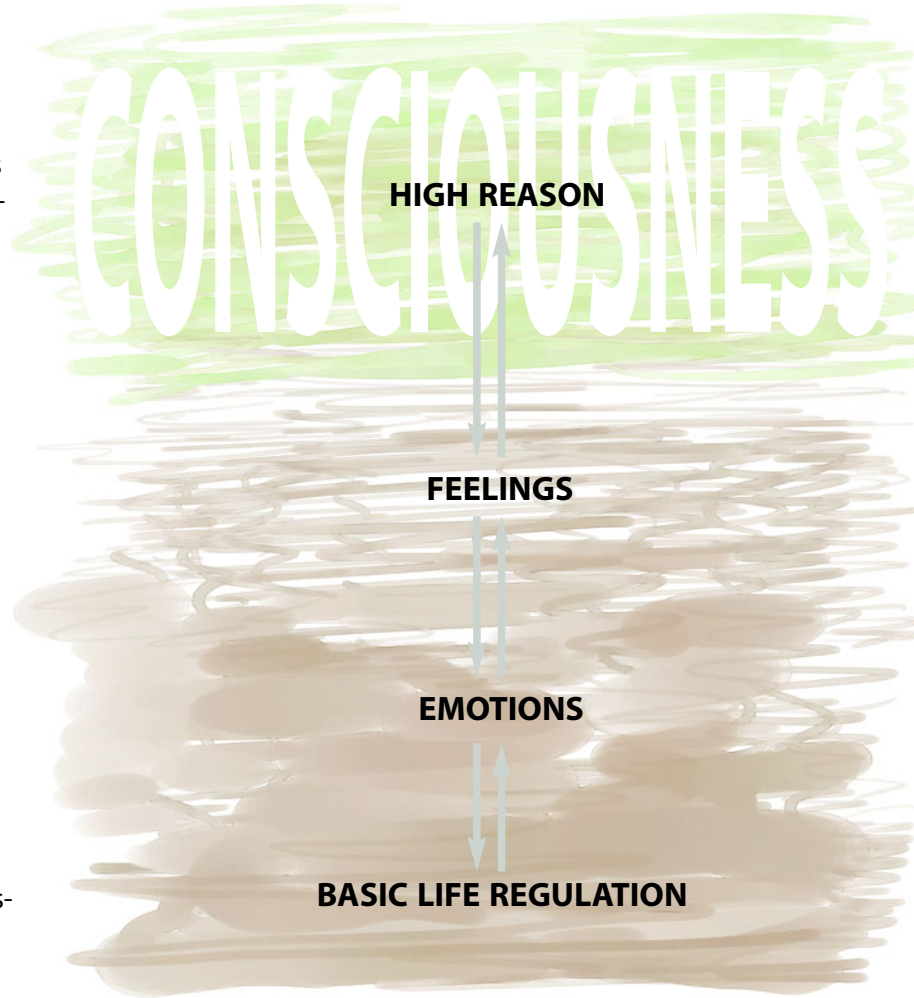
Emotions—Primary: (universal) happiness, fear, surprise, sadness, disgust, anger

Secondary: (social) embarrassment, jealousy, guilt, pride

Background: well-being, malaise, calm, tension

Regulation—Our preset internal survival kit, a system of checks and balances that regulate oxygen intake, heart rate, temperature, digestion, sleep, acidity, liquid balance, hunger etc. when these are out of their prescribed range.

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Feedback—continuing streams of chemical and neural communication, from the brain to the rest of the body and from the body to the brain, enable the sensitive adjustment of behaviour to match bodily needs.

There is no single brain centre for processing emotions but separate systems for individual emotional patterns.

Emotions are induced from a very small number of mostly subcortical brain sites: these include: the brain stem region, the hypothalamus, basal fore-brain and the amygdala—in the cerebral cortex: the anterior cingulate region and ventromedial pre-frontal region.

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