

A Damasian Philosophy of Biology. Of reason, the Somatic Marker and Developmental Systems Theory

*Filosofía damasiana de la biología.
Sobre la razón, el marcador somático y
la teoría de los sistemas de desarrollo*

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ABSTRACT

The Damasian concept of emotion and the self fits within the emotivist tradition, viewing mind and reason as embodied realities linked to the body and its social and natural interactions. Emotion, for Damásio, creates the context for reason to operate effectively, aligning with anti-Cartesian ideas. Due to the role of emotions, this may be used to suggest that living beings are not just skin-bound entities but processes integrating body and environment. Therefore, we examine both his relevance to contemporary philosophy of mind and self, and his possible contribution to naturalized metaphysics, particularly within Developmental Systems Theory.

KEYWORDS:

PHILOSOPHY OF BIOLOGY - EVOLUTIONARY EPISTEMOLOGY -
DEVELOPMENTAL SYSTEMS THEORY - MIRROR NEURONS - EMOTIONAL
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RESUMEN

El concepto Damasiano de la emoción y el yo encaja en la tradición emotivista, que considera la mente y la razón como realidades encarnadas vinculadas al cuerpo y a sus interacciones sociales y naturales. Para Damásio, la emoción crea el contexto necesario para que la razón funcione eficazmente, en consonancia con las ideas anticartesianas. Debido al papel de las emociones, ello puede emplearse para sugerir que los seres vivos no son meras entidades ligadas a la piel, sino procesos que integran cuerpo y entorno. Por lo tanto, examinamos tanto su relevancia para la filosofía contemporánea de la mente y el yo, como su posible contribución a la metafísica naturalizada, en particular dentro de la teoría de sistemas de desarrollo.

PALABRAS CLAVE:

FILOSOFÍA DE LA BIOLOGÍA - EPISTEMOLOGÍA EVOLUCIONISTA - TEORÍA DE LOS SISTEMAS DE DESARROLLO - NEURONAS ESPEJO - EMPATÍA EMOCIONAL

I. THE ROLE OF EMOTIONS AS THE ONTOLOGICAL NECESSARY CONDITION FOR HUMAN COGNITION AND THE SOMATIC MARKER HYPOTHESIS

ANTONIO DAMÁSIO (1944-) MAY NOT have been the first to highlight the importance of emotions in the process of human cognition, but he can certainly be considered a pioneer. He has provided extensive scientific evidence to demonstrate its plausibility and has identified the link between emotion and cognition as the trigger through which the brain generated a myriad of realities that comprise the complex self of humanity.

It is relatively easy to observe how emotions act and interact among humans, even daily, without resorting to sophisticated scientific experimentation methods. This can be seen, for instance, through contagion and resonance. Consider those individuals who spontaneously and immediately yawn when another person yawns, or the number of sobs heard in the darkness of a cinema when a film transitions through its tear-jerking scenes. The existence of emotional resonance was already observed by David Hume (1711-1776), whose *Treatise of Human Nature* (1988) explicitly refers to the human mind's capacity to empathise with others' emotions using a mirror metaphor: «the minds of men are mirrors to one another, not only because each one reflects the emotions of others, but also because the irradiation of passions, sentiments, and opinions can often be reverberated» (p. 499). We must also remember that Sir Charles Darwin (1802-1882), in *The Expression of the Emotions* (2009, p. 244), conceptualised human emotions and those of other animal species comparatively as a set of physiological responses acquired during evolution due to their original adaptive utility.

If we accept the existence of emotional resonance, understood as the capacity for sharing psychological experiences between distant individuals by mere empathy, but refuse to consider it inexplicable or the result of a cryptic supernatural causality, then we must identify an underlying physiological mechanism in

our organism that is plausibly implicated in its development, and the brain seems to be the most likely candidate. Since the early 21st century, neuroscience has investigated and described this physiological mechanistic apparatus starting with the discovery of mirror neurons by Giacomo Rizzolatti and Corrado Sinigaglia (2006). Currently, almost all neuroscientists accept as an evidence-established scientific thesis that mirror neurons are responsible for emotional empathy. Therefore, it can be asserted that mirror neurons constitute the first concrete material evidence of the neural link between observing another's emotional state and its reverberation, simulation, or imitation in oneself.

Experiments conducted on primary emotions, such as disgust, demonstrate that experiencing disgust in both first and third person has a common neural substrate, with the insula playing a key role. Thus, perceiving another's emotion of disgust and effectively understanding the other's experience at that moment «does not presuppose nor is it based on inferential or associative cognitive processes» (Rizzolatti & Sinigaglia 2006, p. 175), a conclusion that supports the «simulation theory» over the «theory theory» in any debate about the theory of mind, i.e., the ability of a human or other species to attribute psychic content—thoughts, intentions, expectations, etc.—to another. The experiments conducted (Schienle et al. 2002; Calder et al. 2002; Adolphs et al. 2003; Krolak-Salmon et al. 2003; etc.) undoubtedly demonstrate that the recognition of disgust in both first and third person activates exactly the same region of the insula, providing scientific evidence for the involvement of a mirror mechanism in the experience and recognition of the emotion of disgust. The same appears to be true for other primary emotions, such as pain (Hutchison et al. 1999; Singer et al. 2004; etc.), where both the direct experience of suffering and its mere evocation from observing another's pain activate the anterior insula and the cingulate cortex through a mirror mechanism similar to that noted with the emotion of disgust.

Based on such experimental results, Rizzolatti and Sinigaglia interpret the understanding of emotional resonance in both first and third person analogously to Damásio's (2005) famous «as if» expression. Experiencing one's own emotion and recognizing it in another involve the activity of the same areas of the somatosensory cortex and the insula. Therefore, perceiving another person's expression of pain or disgust produces a resonant modification in the activation of the observer's own body maps, such that the observer perceives the other's emotion as if they themselves were feeling it. Ultimately, observing another's face expressing disgust or pain activates neurons in the premotor cortex, which send an efferent copy of their activation pattern to the insula and somatosensory areas. This pattern is very similar to the one generated when the observer experiences the same emotion. Thus, the insula would constitute the brain's seat of the mirror mechanism underlying the recognition of another's emotion. For Damásio, the activation of this copy in the afferent areas, as if it were the

same activated in the observer's brain when experiencing the same emotion, constitutes the process underlying the understanding of others' emotional reactions (Damásio, 2005).

Rizzolatti and Sinigaglia agree with Damásio on the resonance of the motor system when observing others' facial movements but consider the intervention of the sensory cortex redundant, attributing the recognition of others' emotions solely to the insula. They note that emotional resonance also occurs when gestures lack emotional expression (Singer et al., 2004). In essence, we can perceive the emotional content of others' behaviour without needing to fully understand or reproduce it beforehand. Perceiving others' actions and emotions simultaneously activates a neuro-mirror mechanism in our brain, allowing it to recognize instantaneously what we feel or imagine others are doing. Our brain reflects internal aspects of others' psychic activity through mirror neurons. Thus, it could be asserted that the available scientific evidence allows for hypothesizing «a plausible neurophysiological explanation of complex forms of social cognition and interaction» (Iacoboni 2009, p. 15) based on mirror neurons.

Once the discovery of the physiological mechanism is established, Damásio infers philosophical consequences that undoubtedly present a profound challenge to any model of anthropological dualism, such as the «ghost in the machine» concept. This includes both the Platonic version of body and soul and the Cartesian distinction of *res extensa* and *res cogitans*.¹ He does so through the so-called somatic marker hypothesis, according to which, cognitive activity does not proceed solely from the mind, understood as the result of a conglomeration of abstract psychic events and processes, both conscious and unconscious. Instead, it also inexorably depends on the body, with which it inherently constitutes a monadic unity forged in the crucible of emotions. More specifically, the body acts as the primary referent of the representations and dispositions with which the brain constitutes the mind.

Thus, the strict separation between rationality and emotion would be contrary to the available scientific evidence. Moreover, rational cognition does not exist without emotions, as they establish behaviour and decision-making guided by homeostatic changes in the organism that alter the very process by which the brain rationalises sensory information from the environment. To use an allegorical license, when generating the conceptual files we call «knowledge»,

1 Although it is true that Descartes, in *The Passions of the Souls*, tries to defend a kind of physiological interaction by which bodily perturbations might generate passions in the soul, this goes clearly against the dualism defended in the *Meditations*, where our ability to think is part of the *res cogitans* exclusively, under the understanding that *res cogitans* and *res extensa* are completely opposite substances. From a Damasian approach, body and mind cannot be separated and, of course, feelings and emotions are not the exclusive right of a disembodied mind that needs to interact with the body from its ontological outsides.

the hardware that constitutes our brain inevitably requires the diversity of software provided by emotions for the mind to function holistically as an effective operating system. Somatic markers demonstrate that the mind is not merely the brain; rather, it is hypostatized in the body through emotional experience, guiding decision-making and behaviour.

Despite the dualistic anthropological tradition inherited from Plato (*circa* 427 BC - 347 BC), René Descartes (1596-1650), and their followers, and recognising the merit of Friedrich Nietzsche (1844-1900) as a pioneer in highlighting the importance of corporeality, the visceral reactions or feelings conceptualised by Damásio encourage us to assert that the body and emotions play a crucial role in implementing knowledge and behaviour. They generate a physiological response that constitutes both the content and container of the higher psychic activities developed by our operative system.

Admitting all this, even *ex hypothesi*, how would the mechanics of this physiological process function? This might be the question posed by a curious or skeptical reader. Damásio's central premise is that the ventromedial area of the prefrontal cortex of the brain functions as a kind of mnemonic repository of somatic knowledge regarding the given connection between certain complex existential situations, the sensory representations that such situations lead us to experience, and the somatosensory and emotional reactions activated and reactivated by the organism in response to those situations (Damásio et al. 1996, p. 1415). These processes occur through cyclic mechanisms that involve both the body and the brain. Alternatively, as a new evolutionary acquisition based on the previous one, these cycles can happen while «diverting» from the body, nor leaving the brain while still activating properly somatosensory patterns in response to both conscious and unconscious physiological processes.

These mechanisms, when evoking certain sensory representations in the human mind, intrinsically affect decision-making processes in various situations. They allow us to judge these representations, corresponding to a current situation, based on the images they evoke in us and the sensorimotor responses they elicit. This results in a cognitive evaluation of the situation, for example, as good or bad, beneficial or harmful, safe or dangerous, and ultimately, adaptive or non-adaptive. If this process is consciously triggered, it functions as an alarm signal and produces, in Damasian terminology, feelings; if it is unconscious, it acts as a positive or negative bias towards the perceived sensory or emotional experience.

In summary, Damásio conceives somatic markers as alerts or, in the case of unconscious processes, describes them as an «attentional mechanism» (Damásio et al. 1996, p. 1417), which operates with the memory of the past connection between certain types of situations—dispositionally stored factual information—and the somatosensory states usually associated with them. These

states can be reactivated on different occasions. Damásio and his collaborators further hypothesise that somatic markers, from the perspective of their biological-evolutionary genesis, could have been originated by the co-opting of a mechanism originally dedicated to successfully confronting mere survival situations. This mechanism would be now incorporated into reflective or rational decision-making processes, absent in purely instinctive or automated mechanisms, which «likely increase the accuracy and efficiency of the decision-making process» (Damásio 2006, p. 243). Consequently, natural selection would favour the reproductive success of deliberative organisms endowed with self-awareness, due to their greater capacity to achieve evolutionary adaptation that allows them to survive in all types of hostile environments.

When making the described connection, the organism organises the perceived events so that the obtained information becomes more manageable for performing logical and cost-benefit analyses. This allows us to face the uncertainty arising from having more than one option available. Somatic markers are not sufficient for cognition, understood as the processes involved in reasoning, perception, memory, etc., but without them we would face a myriad of equally viable alternatives daily, relying solely on logical processes, which would render decision-making impossible or slow it to the point of being non-adaptive due to its blindness to learning from past experience or information:² «This is the pattern of slow and error-prone decision behaviour we often see in ventromedial frontal lobe patients. Random and impulsive decision making is a related pattern» (Damásio et al. 1996, p. 1415). It should be remembered that such decisions are connected to personal and social experiences intensely linked with pleasure and suffering, reward and punishment, and the homeostatic regulation of the organism, which precisely includes feelings and emotions, all of which are bioregulatory phenomena represented by the somatosensory system.

Consequently, reason can operate at full capacity only when the ventromedial area is damaged in cases where few associations with prior somatic states are involved. However, when the ventromedial frontal lobe is damaged, as in the cases of Phineas Gage and Elliot, patients are not only unable to recall dispositionally stored factual knowledge but also fail to consciously or unconsciously reactivate the relevantly associated somatic states. This impairs the thought process and decision-making, as the brain injury has annihilated the cognitive function performed by the somatic marker.

² Due to the fact that the organism-environment engagement is always open to change, this somatic-emotional fuel of reasoning might very well hinder the cognitive organisation and use of information at some moments, when the information possessed is outdated, for example, enforcing emotional dispositions no longer useful: being open to change is being open to be found mistaken.

The conception of the mind advocated by Damásio (2001, p. 161 ff.) becomes gradually visible. The neural self would substantially consist of a state of neural circuits that take the body as a basic reference. Firstly, references to bodily states associated with external perceptions captured by the senses, as well as internal states derived from proprioception, emerge both from an evolutionary and ontogenetic perspective. Through this association, only then can we begin to discuss representations of objects external to the organism itself, which also become associated with these body states for clearly adaptive reasons, leading the author to refer to «the thematic primacy of the body» (Damásio, 1999, p. 255). In this imaginative approach, the subjectivity of consciousness would emerge from a third type of representation, namely, that of the organism in the very act of perceiving and reacting to an object. However, this self is not so much a kind of homuncular entity occupying a seat somewhere in the brain or denoting its phenomenological manifestation during a moment in the psychic activity of the mind, but rather a state of self-awareness. Additionally, this self still has room for refinement, as this self-image can itself be perceived due to disturbances generated in these somatosensory and emotional states, thus being changed in a more or less constant feedback loop, hence Damásio's suggestion of a meta-self. Therefore, the self is not a singular entity—a simple neural self—with royal governance over the body, but a relatively stable psychic process that is reworked, refashioned, and reconstructed with reference to the body, providing subjective unity to the brain-body conglomerate and anchoring it in autobiographical knowledge stored through dispositional representations, thus connecting the past of organism-environment relationships with its present dynamics of constant change and projection into the future. Hence, conscious and unconscious emotions would form the solid ground enabling the unity of the self. Therefore, it is fully understandable that reason needs them, since, although evolutionarily configured by natural selection to adaptively manage the various possibilities offered by the environment, reason can only access these through disturbances of the body that activate said emotions. Suppress them, and you will suppress the dispositional information that reason was born to manage, greatly diminishing its use, which will be reduced to extremely simple and abstract activities where such information is not required or not required to such an extent. Consequently, the evolutionary origin of the mind would lie in the activation of microcircuits organized into extensive neural networks located in even different brain regions, forming momentary patterns that become recurrent and eventually give rise to a stable mind with feelings.

In conclusion, Damásio's conception of the mind explains consciousness as a stratified process—therefore, a stratified neural self—through the accumulation of successive layers of dispositional representations. The protoself allows the generation of feelings and emotions, and its metabolic nature is intimately linked to the body, forming a continuous feedback process between body and mind. The

coreself arises when the protoself, in its interaction with the world, modifies the myriad images constituting the human mind, thereby altering the emotions these images generate in the individual: it constitutes an intermediate phase between the organism—understood as an agent primarily responsive to environmental needs though conscious of itself (protoself)—and a deliberating entity already imbued with self-awareness or subjectivity and immersed in a social system, that is, a person. Finally, the autobiographical self would be the constituted person, a competent adult due to their ability to anticipate future events and systematically articulate knowledge and events from the past. In this way, it constitutes the «spiritual self» and the «social self» of a person, shaped by and shaper of social structures—social homeostasis—and the culture in which they operate.

II. THE EXPERIENCE OF MORALITY AND THE IDEA OF NORMATIVITY FROM AN EVOLUTIONARY EPISTEMOLOGY

If the description of the functioning of brain mirror-neuron circuits outlined in the previous section is essentially correct, it could be asserted that the dialectical conceptualization of the notions «self» and «other» intertwines inexorably in mirror neurons to the extent of diffusing the boundaries of alterity – although by no means eliminating it –, as in the infantile brain they «are formed by interactions between self and other» (Iacoboni, 2009, p. 134). Notably, Martin Buber (1977) asserts that the I-Thou relationship is not simply a relation among others, but the cognitive and empathetic relationship par excellence, the key to all anthropology. The function activated by mirror neurons in intertwining and strengthening intersubjectivity, acting in a direct, immediate, and pre-reflective manner, generates a self-other interdependence prior to any form of conscious complementarity based on the use of rationality: these neurons are premotor and therefore do not intervene in reflective processes. If mirror behaviours appear to be immediate, automatic, and pre-reflective, then the empathetic harmony between self and other underlying moral judgments precedes the abstract categorisation required for language articulation and any intellectual management of practical rationality.

This mutual intersubjective dependency between self and other facilitated by mirror neurons gradually develops into more complex associative bonds among individuals, such as self-us or us-you relationships, ultimately shaping social relations. Functionally specialised to provide harmony, valence, and emotional meaning to interactions among its members, mirror neurons establish the psychosocial foundations of commitment and its necessity for gregarious coexistence. They constitute physiological evidence of how evolution shaped humans to be internally and reciprocally interconnected, challenging philosophies that view society merely as an aggregation of isolated and merely selfish individuals who only surpass their innate solipsism conditioned by

the expectation of greater personal gain. On the contrary, by allowing us to understand each other through internal simulation or emotional resonance and deeply connect through empathy, mirror neurons demonstrate that evolution has equipped our neurobiology for the self-other engagement that constitutes society as much as selfish behaviours, making it impossible to reduce human beings to entirely calculating entities whose true-conscious or not-intentions and always nourished by selfish interests. «We have evolved to connect deeply with other human beings» (Iacoboni, 2009, p. 260).

This suggests the need to reconsider any naive kind of biologically determined selfishness in individual behaviour, as it shows how humans possess a natural ability to transcend the innate instinct for individual survival and bond with others through a fabric of empathetic, cooperative, reciprocal, and even altruistic interactions. The robust neurobiological mechanisms of mirror reflection enable the generation and assimilation of self-other bonds through positive or negative emotional valences and subsequently, through intergenerational transmission and cultural categorisation, ultimately attribute normative moral significance—approval or disapproval of social interactions. Hence, it does not seem far-fetched to affirm that the social and legal codes condensing normative morality essential for implementing harmonious and peaceful organization in human society are largely inspired—although their content is highly variable—by our biology.

As is well-known, sociability is not an exclusively human behavioural characteristic, nor is it a trait considered irrelevant by preceding philosophy. In *Politics* (1253a, 9-10), Aristotle (384-322 BCE) introduced the well-known concept of ζῷον πολιτικόν—zoon politikon—marking the first theoretical precedent to consider political activity as a substantial element of human nature. In Aristotle's conception, the notion of the political or civic animal attributes a dual social and political dimension to humans, while the idiosyncratic nature characteristic of non-human animals includes only sociability. Both human and non-human animals are social by nature, but only human social grouping is political. Thus, the human social dimension constitutes and must constitute the basis of education (paideia), while the political dimension contributes to and should contribute to its reinforcement in society.

To such an extent is the civil and political dimension of the human being intrinsic to their nature, that for Aristotle, the voluntary apolitical nature of those who do not need to live in the polis would be characteristic of deities, and the involuntary apolitical nature of those who cannot live in it would be characteristic of beasts. Modern science has increasingly confirmed the high relevance of sociability in explaining human behaviour, as numerous gregarious and social species have been extensively documented in *Ethology* and *Behavioural Ecology*. Observing and studying morality in the relationships

among members of species other than *Homo sapiens* sheds light on the genesis of social normativity, and ultimately of Law, as Edward Wilson (1929-2021) proposed in *Sociobiology* (1980), arguing for the suitability of a biologically based approach and methodology in studying social behaviours across all species, including humans, even if his particular perspective is now considered disproved.

Certainly, sociability among members of a group belonging to a particular species is far from implying morality in their intragroup relationships alone. In other words, the social nature of *Homo sapiens* by itself does not seem sufficient to understand, from the perspective of evolutionary epistemology, how the idea of normativity and, ultimately, of Law, arises. A prerequisite and essential component of normativity is moral experience. Even if there is a polis, without ethos there is no nomos, just as without nomos there is no ius.

If in the previous section we hypothesised about the emergence of emotional empathy from mirror neurons, here we would like to speculate on the origin of the moral experience required for the development of the idea of normativity. Methodologically, we will follow an inclusive perspective that integrates both evolution and culture-pioneering, albeit unknowingly, the theory of dual inheritance or biocultural evolution—as proposed by Edward Westermarck (1862-1939) in *The Origin and Development of Moral Ideas* (1912). Westermarck conducted a comparative analysis of morality starting from both human and non-human animals, aiming not so much to inductively record the behaviour of our ancestral relatives, but to demonstrate the underlying capacity to act.

For instance, the question would not lie in demonstrating the repetition of altruistic interactions among members of non-human animal species, proving food sharing and asserting that such behaviour is a key component of morality. Rather, the focus would be on documenting, in the same example, sensitivity to the needs of others, high tolerance, reciprocal exchange, etc., all capacities underlying the behaviour of food sharing and required by the act of sharing itself. Many species of insects share food just like humans and chimpanzees, yet the impulses driving these behaviours appear to be markedly different.

Therefore, the key lies not in the altruistic or non-selfish behaviour observed in species other than our own, nor in arguing whether such behaviour anthropomorphically fits *homo sapiens*' moral standards, but in elucidating whether certain non-human animals possess the capacity for «reciprocity and revenge, the application of social norms, conflict resolution, compassion, and empathy» (De Waal, 2007, p. 41).

From this methodological perspective, it can be said that the first and most basic behavioural outcomes derived from interactions within a group characterized by sociability are cooperation and reciprocity, both inherently involving exchange. Cooperation or mutualism involves an immediate exchange based on

simultaneous benefits generated for all individuals involved in the interaction: a pride of lions hunts down a wildebeest. Reciprocity entails a more complex form of sociability, as it involves deferred exchanges—not immediate but completed after a certain period—where the benefit to the recipient imposes a cost on the agent: a chimpanzee today gives one of its two oranges to a fellow chimpanzee. However, the cost to the agent disappears when an equivalent value is returned (Trivers, 1971): the chimpanzee who received yesterday donates a kiwi tomorrow to the chimpanzee who gave yesterday. This is the genesis of deferred equitable exchange, the lifeblood of a society.

The evolutionary origin of tendencies towards cooperation and reciprocity has been demonstrated in numerous species, from large felines and elephants to humans and other primates. Social species engaging frequently in cooperative and reciprocal exchanges show a clear tendency to assist their fellow members, with a particular focus on relatives and non-relatives inclined to reciprocate favors, along with a high degree of group belongingness and loyalty (De Waal, 2007, p. 40). This impulse to help increased the survival chances of agents and fostered group survival by adding a new level of organisation between organisms. However, as Evolutionary Biology commonly demonstrates in nature, once the immediate need in the social environment diminishes due to greater resource abundance, the instinct dissociates from its original evolutionary cause and adopts an evolutionary-cultural characterization. That is, it transforms into a cultural entity, into knowledge and social practice transmitted across successive generations.

Thus, it becomes plausible to explain how altruism could ultimately spread in society even when it was unlikely or impossible to recover or compensate for the initial investment of oranges with an equivalent kiwi, the cost incurred in social interaction without an express or necessary commitment to reciprocation.

Therefore, in this context, morality can be understood as an emotionally developed kind of social reciprocity that has been culturally dissociated from instinct, whose evolutionary origin initially favored natural selection to meet survival needs. Emotions constitute the sine qua non of moral reasoning and a prior and crucial element for almost all types of reasoning (Damásio 2005), to the extent that without any emotion involved in the various available options, reflection and reasoning themselves never lead to a decision, as evidenced by cases such as Phineas Gage and Elliot (Damásio 2006). In the case of Gage, the brain injury did not affect the locomotor and linguistic centers but damaged a specific area in the prefrontal cortex, explaining the sharp change in his behaviour: observing social conventions, behaving ethically, and making decisions beneficial for survival and prosperity require knowledge of norms and strategies, as well as maintaining certain specific prefrontal cortex systems fully operational, which were impaired by the patient's injury. Hanna Damásio (1942-) applied

modern neuroanatomy technology and the latest advances in neuroimaging to Gage's skull (Damásio et al. 1994), concluding that the selective lesion in the prefrontal cortex compromised his ability to plan for the future, conduct himself according to previously learned social rules, and decide on satisfactory courses of action to ensure his survival. While Gage retained intact prior knowledge and cognitive instruments—attention, perception, memory, etc.—his behaviour was significantly impaired, rendering him unable to perform basic and essential social and occupational skills. This impairment included: loss of concern for the future, inability to anticipate and plan within a complex social environment, inept reasoning in personal and social domains, lack of sense of responsibility towards oneself and others, inability to autonomously manage survival and make decisions in one's own interest, incapacity to make favourable decisions for one's own future within a decision-making process no longer influenced by pre-injury knowledge, coprolalia, etc. (Damásio 2006, pp. 21-54). In Elliot's case, despite previously enjoying a normal personality that led him to hold a stable job and be a good husband, father, and role model to his siblings and friends, the injury left the brain system responsible for decision-making so impaired that he lost all previous social adeptness, often acting as if he were stupid or ignorant. This included: the need for external stimulation to activate himself every morning and go to work, inability to manage time properly or follow a work schedule, constant interruption or discontinuation of activities started to attend to another task that seemed more appealing at a given moment, inability to perform an appropriate action when expected, despite retaining pre-injury knowledge, incapacity to make decisions and devise effective plans for his future, inability to learn from mistakes despite facing disastrous results from his decisions, etc. (Damásio 2006, pp. 55-73). Two pieces of evidence highlighted by Elliot during his treatment and study are noteworthy. First, he clearly stated that his feelings had changed and were no longer the same as before his illness, as issues or experiences that had previously elicited strong emotions now left him unmoved, with neither positive nor negative reactions; he knew but did not feel. Second, after a testing session where he generated and analysed a considerable number of viable and executable action options, he stated, «And after all this, I would still not know what to do!» (Damásio 2006, p. 71).

Ultimately, irreparable lesions in the brain areas responsible for emotions forever impair social skills and decision-making abilities. In other words, even while retaining intact capacity for abstract reasoning, coherent analysis, and calculation, without emotions there is no moral judgment. Consequently, there is no Ethics. Nor Law. Between pure abstract reasoning and passions as the cornerstone of human ethics, between Immanuel Kant (1724-1804) and David Hume, contemporary Neuroscience seems to tilt the balance of truth in favor of

the Scotsman. Moral preferences require empathy for others and a strong dose of instinctive visceral beliefs about right and wrong, making their genesis unlikely to be found in pure abstract reasoning. Additionally, brain scanning techniques and positron emission tomography have thoroughly demonstrated that moral dilemma resolution activates brain emotional centers whose evolutionary origin is extremely ancient. Therefore, moral decision-making can hardly depend on the extended neocortex, our latest acquisition in brain structures responsible for abstract reasoning, but rather «rests on millions of years of social evolution» (De Waal 2010, p. 43).

Conceiving morality in these terms, moral analysis can comprehensively understand the ethos of both human and non-human animals, as proposed by Westermarck with his notion of «retributive emotion» (1912, p. 38 ff.), observed and documented across various species. Retributive emotions constitute the primordial substrate of normative social morality that ultimately gave rise to Law. The Finnish sociologist and anthropologist distinguished two different types of retributive emotions broadly classified as positive and negative. Negative emotions stem from anger and resentment, with behavioural responses seeking revenge and punishment: these exceed direct or immediate settling of scores and include both delayed revenge, known in camels, elephants, and primates, and a genuine and deliberate «revenge system» where negative or harmful actions against the group are punished with equivalently negative and costly actions, extensively documented in chimpanzees (De Waal & Luttrell 1988). Positive retributive emotions derive from satisfaction and alleviation of anxiety, distress, or stress caused by receiving a benefit, with behavioural responses primarily aiming for reward. They include gratitude, returning favors, protecting others from aggression, and notably promoting reconciliation. Their importance lies in their prosocial nature, as they foster group harmony and thus propel morality towards normativity. Hence, Evolutionary Psychology teaches that moral experience enhances human survival, as «the ability to recognise certain norms of conduct in society and apply them to oneself and others helps to survive and thrive» (Gazzaniga 2006, p. 171).

Therefore, natural selection wisely favored those groups capable of developing an articulated morality aimed at establishing normative patterns of social conduct reinforced by more or less coercive incentive mechanisms. Conflict resolution and reconciliation are socially useful for maintaining intragroup peace (Aureli et al. 2002), just as protection against aggression serves to strengthen family clans and articulate alliances and coalitions, behaviours meticulously described through which primates have developed such complex and cognitively sophisticated sociability (De Waal 2007, pp. 44-45). These positive and inclusive retributive emotions of moral sanction bear a clear parallel with reciprocal altruism studied in Primatology and constitute the precedent for debates

on the notion of indirect reciprocity in current evolutionary ethics, focused on the construction of social reputation (Alexander 1987).

However, despite all the above, it could be argued that moral emotion is not yet full morality, in the sense of the ability to formulate moral judgments. Positive and negative retributive emotions like gratitude or revenge respectively operate within an egocentric orbit whose diameter is self-interest, depending on how someone wishes to be treated or how they do not wish to be treated. In morality compatible with moral judgment, the foundational emotion must transcend pure visceral instinct and detach from cost-benefit considerations for one's own situation, that is, from self-interest. Consequently, the turning point between retributive emotions and strictly moral emotions lies in selflessness, the only way to enable the impartiality and generality required for the abstract treatment of good and evil underlying moral judgments. Without selflessness, impartiality cannot exist, just as without it, the idea of justice cannot exist. Moral approval and disapproval only arise from general judgments made about actions by an abstract impartial judge—the impartial spectator of Adam Smith (1723-1790)—a capacity for which there seems to be a significant difference between *Homo sapiens* and other primates, likely due to the greater development of the prefrontal cortex in their brains.

However, while it is true that empathy and reciprocity observed in other species are not sufficient by themselves to generate moral experience as understood among human beings, it is equally true that they are indispensable for morality. Without emotional interest between individuals and reciprocal exchange, there would be no moral human society. Thus, the importance of ethological research that has shown moral capacity in other animal species, particularly in elephants, dolphins, and non-human primates, lies in establishing the evolutionary continuity between this extrahuman or prehuman moral activity and a properly human morality. Conversely, given that empathy is such an ubiquitous experience in human society, developing so early—the newborn can accurately mimic facial expressions between 42 minutes and 72 hours of age (Gazzaniga 2012, p. 173)—showing marked neuronal and physiological correlates (Decety & Chaminade 2003) and having such well-established genetic underpinnings (Plomin et al. 1993), it would contradict the available knowledge in Evolutionary Biology if this capacity lacked any evolutionary continuity with other primates.

III. THE ONTOLOGICAL FERTILITY OF THE DAMASIAN APPROACH

Now, deepening this blurring of the frontiers between the self and the others, let us consider two important elements in Damásio's narrative: he speaks of the self—or the different selves—as a state of the brain-body complex, that is, as a state of the organism that contributes processes of self-regulation. At the same

time, he always considers the vital role that homeostasis plays for the organism, that is, the ability of organisms to maintain stable internal conditions in response to disturbances from the external environment, thus internally compensating for changes occurring in its surroundings through regulated exchange of matter and energy with the external environment, and in the case of emotions, we could also say with psychological information from others. Emotions and their derivatives would have evolved to serve the mind by increasing the probability of making the most adaptive decisions at each moment, thereby promoting its homeostasis, especially when it comes to survival, by considering the information coming from the external environment together with past information, and its effects in our internal experience.

Thus, the neural self is a state which ultimately serves a homeostatic purpose, and the brain-body complex and its ability for self-identity achieve that identity as something presumed stable. It can no longer, as metaphysicians of yore defended, aspire to be a static self behind processes; on the contrary, it is a state that is reconstructed time and again, an intermittent reality, a problem that Descartes did not want to address when he proclaimed, in an Aristotelian manner, the spiritual substrate of a thinking thing behind all moments of consciousness. Here, the self is a kind of instrument or function of the organism that is invoked and reconstructed, to varying degrees, when needed and for what is needed; only the basic reference to the body and the dispositional biographical information provides the necessary unity for there to be a sense of continuity between different selves. Therefore, we can say that the organism is the same, but each self is a unique state that supersedes the previous state. If we wish, organismic identity precedes and supports neuropsychological identity.

Now, what kind of unity is the organism? We may see it as something static, but the reality is that, only by looking at homeostasis, we see that it is a porous entity facing the external environment. Moreover, if we perceive the myriad of cyclical processes—metabolic in nature, yes, but not only—that compose it, and indeed, the concept of homeorhesis (Waddington 1957), which identifies a set of processes that tend towards the ideal of a homeostatic state without fully achieving it, organisms are not a state of equilibrium between their parts and the environment but a process of seeking equilibrium through cyclical dynamics that seek to ensure the continuity of developmental processes and adaptation to the environment. Consequently, the idea of a static organism is further shattered, and with it, the idea of a static self.

Damásio's notion of the neural self as a state contributing to homeostasis can easily be redirected to contemplate it as a step in the myriad of events that constitute the constant homeorhetic processes of organisms understood as processes. Thus, we realize that Damásio's understanding of the self and consciousness navigates between two perspectives: sympathising with the idea

of a static entity, the organism, which uses the self as a homeostatic tool, or alternatively, with the concept of the living being as a multiprocess of which the self is just a step, an event among events.

One of the ontological proposals stemming from this process-based metaphysics can be found in developmental systems theories, particularly advocated by authors like Susan Oyama, who proposes an interactionist constructivism (Oyama, 2000, p. 333). Paraphrasing the terminology of West and King (1987), developed further by Griffiths (2017), different genetic, epigenetic–molecular elements regulating DNA expression–and environmental/exogenetic elements are not classified according to a nature-culture dichotomy model. Instead, they are viewed as resources of the developmental process that constitutes the living being, understood not as a static organism but as a life cycle—a set of organism-environment processes and events from conception to death, with the capacity to generate new descendant cycles (Griffiths and Gray, 1994, p. 291). These cycles have evolved—through natural or sexual selection, genetic drift, or ecological inheritance—to incorporate these resources, identifiable as historically-adaptive explanations. Their intergenerational recurrence is explicable in terms of an evolutionarily significant relationship between these resources and the organism (Griffiths & Gray, 1994, p. 287). The collective set of exogenetic elements is known as the developmental niche—«the set of parameters that must be within certain bounds for an evolved life cycle to occur» (Griffiths & Stotz, 2013, pp. 286-287)—allowing us to understand that these processes arise from the succession of different organism-development niche systems.

If we fit Damásio's understanding of the self into this framework, emotions and the self itself would be nothing more than resources for the development of adaptive-historically explicable life cycles, softening the idea of the self as a mere puppet state of the organism, albeit in full agreement with its intermittence, emergent character, and reflection on the importance of the body in its temporal and biographical stability and coherence.

Following this line of thought, emotions and particularly Damásio's somatic marker hypothesis would constitute a conduit through which we could incorporate external elements as exogenetic components into our own life cycle, especially in social situations where our aim is not to expel others from our environment but to understand them and adapt to our needs while considering theirs—this is, moral situations. From this ontological perspective, Damásio's somatic marker allows us to understand emotions not only as essential for reasoning but also as a mechanism for integrating others into our own self/life cycle, and reason as a tool for organising the information that enables such integration.

For instance, if dispositional knowledge from previous experiences with individual X suggests that X becomes upset when discussing their vegetarian diet but feels pleased when conversing about their proficiency in German, I will accommodate by engaging in topics that please X, thus establishing a temporal dyadic relationship that fosters mutual pleasure and information exchange. From the standpoint of process ontology and the somatic marker hypothesis, during this period, aren't we becoming part of each other, introducing pleasant sensations into our respective developmental systems that bring us closer and encourage further conversation? In environments where developmental resources are not scarce, persuasion is unnecessary; however, in contexts where resources may be scarce, appropriating them requires a subtlety that reason alone, without the self and its emotions, can hardly achieve. In fact, some of Damásio's patients struggled with their social relationships.

Therefore, not only are emotions crucial for reason and the self, and inseparable, in an anti-Cartesian sense, but they are also a key part of and for the constitution of the self—a constant process where logical and rational thought, once considered by Descartes as the identifying attribute of the *res cogitans*, is merely a part, a piece, an event, a step. Of course, any substance, even a mere emergent state or the substrate of a constant organism, becomes dissolved, radicalising Damásio's thinking by bringing it closer to a metaphysics that, based on processes, is also anti-essentialist.

Thus, we can say that Damásio can, if he wishes, contribute to both essentialist and anti-essentialist perspectives. However, this approach aims to explore its potential anti-essentialist fertility from the perspective of a process ontology that allows for a slightly different reconstruction of his thinking and his somatic marker hypothesis, moving away from the static–homeostatic–organism towards a life cycle characterized by homeorhesis and evolutionary constitution.

IV. CONCLUSIONS

Considering Damásio's development within the emotivist tradition, it becomes apparent that the mind is intricately connected with the body. Given the permeable nature of the body in relation to its social and natural environments, reason not only relies on but is fundamentally shaped by organism-environment interactions, which include moral engagements with others. These dynamic blurs conventional distinctions between the self and others. While the extent to which Damásio's philosophy should adopt a process metaphysics of the self remains debatable, it is evident that essentialism becomes untenable. This departure from substantialism aligns Damásio's thinking more closely with Humean ideas, diverging from the influences of Platonic and Aristotelian traditions that permeate Cartesian thought, perhaps in spite of Descartes himself.

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