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# Toward a Neurobiology of Rationality

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**Abstract:** Understanding human rationality necessitates a deep exploration of its neurobiological underpinnings. This article proposes that rationality is inherently linked to bodily processes, supported by evidence from neuroscience and philosophical perspectives. The exploration centers on how emotions and bodily states influence cognitive processes and decision-making by integrating insights from thinkers like Nietzsche and contemporary neuroscientists such as Antonio Damasio. As outlined by Damasio, the concept of somatic markers reveals that feelings and homeostasis play a critical role in shaping rational thought. This dynamic relationship between body, emotion, and mind challenges traditional views of rationality as a purely logical function, suggesting instead that it emerges from a complex interplay of biological and psychological factors.

**Keywords:** neurobiology, rationality, emotions, somatic markers, cognitive processes, consciousness, decision-making.

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## 1. Introduction

In the quest to understand human rationality, the body emerges as a crucial hermeneutic phenomenon and a validator of reason. This presents initial challenges due to the logical elements inherent in reason. Traditionally, reason is perceived as making sense through language (Gadamer), linguistics (Apel and Habermas), or metaphorical resolution (Beuchot). These perspectives converge on a common reference point. Apel (1985), in his critical hermeneutics of experiential reason, incorporates an a priori bodily element (Leibapriori) for the linguistic understanding of meaning (Conill, 2021).

Neuroscientific evidence supports the notion that the body is an a priori element of reason, essential for a comprehensive understanding of human rationality. Nietzsche posits that life's evaluative actions are driven by vital needs, such as self-preservation, rather than logical mechanisms provided by language. Conill (2021) argues that the principle of non-contradiction, initially assumed by Aristotle to stem from ontological reality, is actually an imperative of life. This principle strengthens beliefs and enhances life decisions. Starting from the body, we uncover that the "fundamental organic function" is "the drive for assimilation," through which the will to power operates. This assimilation precedes logical processes, manifesting as an intellectual activity that does not reach consciousness. There exists an intelligent activity before logical and rational processes, an "internal happening" that is volitional, factual, impulsive, and organic.

Within this framework, it is essential to clarify whether and in what sense rationality, from a bodily perspective, can be conceived as an effect of the will. Neuroscience reveals an impulsive, organic force—a radical wanting and doing within reason's mechanism. However, this does not necessarily equate to an act of will in deciding and regulating one's behavior. A deeper neuroscientific understanding of the will is required, refining the classical definition with insights from Nietzsche's study of the selbst, or self (2011).

## 2. Mental Maps, the Self, and Human Rationality

The relationship between the self, the body, and reason appears convoluted. Nevertheless, Damasio's significant contributions to neuroscience (1994, 1996, 2003, 2010, 2019) might provide a compelling scientific explanation of Nietzsche's idea. Damasio discovers that constructing the self depends on what he calls somatic markers. These somatic markers are the traces left by the mind when an image is linked to the continuous stream of thought with an image juxtaposed to the already induced image. In other words, according to Damasio's hypothesis, the appearance of somatic markers helps us understand that the decisions made by the self, from a scientific perspective, are laden with an emotional element that enables mental configuration. For this reason, Damasio (2010) indicates that consciousness is not limited

to the images in the mind but also organizes mental contents around the organism that generates them. For the brain to acquire consciousness, it needs to develop a new characteristic: subjectivity. A defining feature of subjectivity is the feeling that permeates the images we experience subjectively.

In other words, Damasio's discoveries reveal a biological reality, and thus an objective one, that configures a dynamism and even organizes human cognition. This is the objective self, a result of a series of biological processes governed by the principle of homeostasis. Homeostasis is how an organism maintains the balance of its vital functions in response to environmental variations. According to Damasio (2010), homeostasis involves continuously regulating the organism's internal states, translating into sensations and emotions. These sensations and emotions are the foundation of the mind and self-awareness, enabling the organism to perceive itself and the world around it. Damasio (2010) argues that homeostasis is the organizing principle of biological and cultural evolution, and its preservation is the ultimate goal of human behavior. Therefore, in seeking homeostasis, the body constantly maps the reality it is immersed in to evaluate the level of satisfaction of this biological balance. Emotions, in turn, help configure the mental representations that are the raw material for the communication of the entire neuronal interconnection.

Therefore, the rational exercise of human beings is an expression of this subjectivity created by cognition and fueled by the emotional elements underpinning it. The result is a dynamic shaped by the world images consolidated throughout a human being's life. For Damasio (2010), these world images are mental representations that arise from what humans feel when interacting with the environment and themselves. In this sense, consciousness is not an exclusive property of humans but a process that occurs at different levels of complexity in all living beings. According to Damasio (2010), feeling is the basis of consciousness, and world images result from integrating sensations, emotions, and feelings into a coherent and meaningful narrative. Therefore, Damasio (2010) distinguishes between three types of world images: the proto-self, the core self, and the autobiographical self. The proto-self is the most basic level and consists of a neural map of the organism's state at each moment. The core self is the intermediate level and consists of the perception that the human being is an agent acting in the world with a unique perspective. The autobiographical self is the most advanced level and consists of the memory of personal history and social and cultural identity. Hence, world images directly relate to the fields or belief maps anchoring various experiences. For Damasio (2003), the term map applies to all these representation patterns. Maps or fields, from a neuroscientific perspective, help the human mind create a series of world images.

This insight allows us to glimpse a primary operational mechanism of rationality. This mechanism depends, as previously seen, on emotion and representation. The sum of these two creates the fields or mental maps that consolidate cognitive processes. However, it is necessary to clarify that fields or maps contain images, which refer to visual images and any sensory representation (Damasio, 2010).

The mind uses its maps to play with, organize, and combine images to create the sense needed for action. Emotion triggers the resolution of cognitive processing, as proposed by the somatic marker hypothesis. However, a broader understanding of where these markers are configured is necessary. According to Damasio (1994, 1996, 2003, 2010, 2019), the body supports all cognitive operations, as it is the foundation of the conscious mind. The brain structures of the proto-self are inextricably linked to the body, forming a continuous resonance loop disrupted only by brain disease or death. The body and brain are interconnected, making the proto-self the central axis around which the conscious mind revolves.

We must analyze how the objective self-configures perceptions and actions to understand the connection between body and mind. Initially, it seems human decisions rely on rational processes in the cerebral cortex. Unlike animals, human decisions can undergo higher-order processing, perfecting them. However, neuroscience shows that conscious states depend on primordial feelings present during wakefulness. Panksepp (2004) notes that these feelings, which may arise from external phenomena, enable humans to recognize their active participation in surrounding experiences.

For his part, Damasio (2010) points out that more than a reality caused by an external element, primordial feelings are produced independently of external causes. These feelings or primordial feelings are not configured precisely in the cerebral cortex. They are genuinely neuronal activities originating in the brainstem. Therefore, all feelings of an emotion are variations of primordial feelings.

First, these primordial feelings are possible because of a mental representation caused by the created mental maps. Second, each mental map has a sense condition based on the emotional response caused by each map's activation. It is not enough to state that feelings are perceived because they are represented in body maps. Damasio hypothesizes that besides having a unique relationship with the body, the brainstem machinery responsible for generating the images called sensations and feelings can extensively mix signals from the body. Thus, it creates complex states with original and special feeling properties, not just simple maps of the body without originality. According to Damasio, the reason non-sensory images are also felt is that they are usually accompanied by feelings. The brain does not begin to form a conscious mind in the cerebral cortex but rather in the brainstem (Damasio, 2010).

This could validate the thesis that mental processes consist of the effect of the brain's "cartographic" projection on the body. This would largely explain the bodily reason Nietzsche proposed. Conill (2021) synthesizes this by stating that the neural center of intelligence and interpretations is in the body for Nietzsche. According to Nietzsche, before thinking (gedacht), it is necessary to have invented, composed, and poetized (gedichtet). From these original processes arise logical and moral interpretations. If the world appears (erscheint) logically structured to us, we have previously endowed it with logic.

## 3. Biological Transemiotics of Human Reason

Neuroscientific explanations should provide evidence stipulating that reasoning before logic allows for solving life's problems. Damasio (2003) finds evidence that allows him to assert that all living organisms, from the humble amoeba to humans, are born with mechanisms designed to automatically solve the fundamental problems of life without the need for proper reasoning.

This is because emotions configure a series of natural means for the brain to almost automatically evaluate the internal and external environment and, thus, respond adaptively. This finding gives the word heuristic its whole meaning. Our rational processing system, as already mentioned, operates under a preconscious heuristic. Damasio (2002) clearly explains that this heuristic functions in service of life, survival, and the pursuit of fulfillment.

The arguments supporting this are amplified, for example, by the neuroscientific findings of Carruthers (2011), who clarifies that our apprehension of the mental states of others is often phenomenologically immediate. Even the simple perception of another person and the interpretation of their existence occur on a preconscious level. Thus, Fodor's (1983) protomodular theory makes sense when he noted that perception is a mechanism of fixation par excellence: the normal consequence of the transaction is the acquisition of a perceptual belief. It is a modulation that always resolves into a syntax operated by the belief system (Fodor, 1983).

The mind uses its maps to organize, combine, and superimpose images to create the necessary sense for action. Emotion validates and triggers cognitive processing, as described by the somatic marker hypothesis. However, understanding where the mind configures these markers is essential. According to Damasio (1994, 1996, 2003, 2010, 2019), the body is the foundation of the conscious mind. The brain structures of the proto-self are intrinsically linked to the body, forming a continuous resonance loop, disrupted only by disease or death. The body and brain are interconnected, with the proto-self serving as the central axis around which the conscious mind revolves.

To understand the connection between body and mind, we must analyze how the objective self- configures perceptions and actions. Initially, human decisions seem to rely on rational processes in the cerebral cortex, allowing for higher-order processing. However, neuroscience shows that conscious states depend on primordial feelings present during wakefulness. Panksepp (2004) notes that these feelings, potentially stemming from external phenomena, enable humans to recognize their active participation in experiences. This modulation configures belief mechanisms. Beliefs result from modules that make brain processing efficient and establish a pre-existing heuristic. Therefore, belief is fixed and biological, depending on the subject's interaction with the environment.

Beliefs and emotions influence each other dynamically, making life the defining factor for beliefs. Damasio (2019) explains that these belief configurations follow the biological and homeostatic responses of human feelings about correct choices in life, always related to the body. Thus, feelings naturally define life processes as favorable or not for the body's well-being and prosperity.

The human brain creates mental maps to integrate various mental images in the association cortices. It processes these images simultaneously with their affective load, validating them internally. This biological self-orders the neuronal circuit to accommodate stimuli that support life, not only for survival but also for psychological fulfillment. The brain maps external sensory sources and internal states, producing feelings (Damasio, 2019).

Damasio (2021) defines reasoning as the reconfiguration of mental content shaped by mental cartography. These contents, considered broad images (visual, auditory, tactile, visceral), are internal representations of reality. Mental images result from integrating sensory, emotional, and cognitive information across several brain areas (Damasio, 2010).

The biological purpose of reasoning is homeostasis, fulfilling survival principles. In humans, this realization includes meeting basic needs and maintaining life through subjective experience configurations. Damasio (2021) identifies three levels of this process: feeling or detecting something, sustaining attention, and validating the stimulus through somatic markers in the limbic system. Meaning, feeling, consciousness, and reasoning are interconnected. Feelings, as mental expressions of homeostasis, regulate the body and activate somatic markers for mental maps. Feelings guide decisions and permeate existence, regulating life at both biological and social levels (Damasio, 2019).

A preconscious heuristic activating reasoning was discovered through interoception, the brain's representation of internal sensations (Barrett, 2018). Neuroscience sees interoception as perceiving and regulating internal signals, while phenomenology views it as a form of bodily consciousness involving subjective experience. Interoception, from both perspectives, reveals essential aspects of existence, such as emotion, affectivity, intentionality, and temporality.

Returning to the neuroscientific realm, the brain, in its clusters of neurons called modules, executes a series of representations that help predict what will happen and prepare information and elements to make the best decision based on the homeostatic processes it is undergoing at the moment, without needing an external stimulus. When the brain's sensory cortices process a situation, the prefrontal circuits are immediately activated based on records related to the situation. When this happens, emotions and feelings play a crucial role as they will activate the ventromedial prefrontal cortices to resolve which response elements can address the situation considering past experiences. Emotions and feelings will define the response in the automatic heuristic being carried out (Damasio, A., 2003).

This heuristic is preconscious as it resolves automatically in people. This phenomenon is also known as prediction (Bar, 2009; Friston, 2010; Lochmann & Deneve, 2011; Clark, 2013; Hohwy, 2013). Prediction is a neuronal operation in which the brain, without an external stimulus, adjusts responses based on what is automatically predicted to happen. This operation not only assumes the received input but also configures a heuristic that explains it. This heuristic is automated and, therefore, raises the question of the existence of free will. Wolpe & Rowe (2014) clarify that this brain process occurs because neurons emit a series of responses before the intention can operate in the processing. This is because if the brain had only a reactive stimulus-response mechanism, it would be entirely inefficient for maintaining human survival. Therefore, evolutionarily, the human brain has configured these preconscious processes to operate with the least metabolic load and respond better to environmental stimuli. In this sense, it is not that free will does not exist simply because the brain operates automatically; quite the opposite. Automation occurred from the configuration of mental modules and the architecture generated in neuronal interconnections, which result from experience and genetics. Humans configure their brain's automaticity based on mental cartographies that are efficient for assuming life itself (Barrett, 2018).

This prediction process has a loop structure. Neuronal networks initiate the predictive process by simulating and validating the possible response according to established somatic markers, data captured in memory, and how the module was configured. It is crucial to highlight the module's form here, as it directly affects the operation performed. This form results from a series of previous experiences that have configured the module. Once the simulation and evaluation are carried out, also automatically, neurons provide feedback on the response to compare what was done with previous actions and, if necessary, correct and resolve operation errors to predict the possible response to the stimulus again. This complex loop system has caught the attention of several neuroscientists (Houweling, Bazhenov, Timofeev, Steriade& Sejnowski, 2005). This is because bodily homeostasis regulates cognitive life. Moreover, understanding the prediction process led to the conclusion that affect is prediction (Barrett & Simmons, 2015). Prediction explains the assertion that humans see or perceive what they believe, as the feeling arises precisely from the prediction. In summary: we feel what the brain believes (Barrett, 2018).

Human perception is resolved based on predictions made by the brain from prior knowledge and experiences. In this sense, interoception generates feelings that affect perception, not the other way around as one might believe. Feelings define the degree, form, and content perceived in received stimuli. Therefore, from a neuroscientific perspective, reason cannot be seen as a logical mental exercise evaluating the will, detached from feeling.

Thus, we might believe we are rational beings who weigh the pros and cons before deciding how to act, but our cortical structure makes this mere fiction. Our brain is designed to pay attention to our bodily budget. Affect is in charge of everything, and rationality is just a passenger. Affect is not only necessary for wisdom but is also irrevocably intertwined in the structure of every decision (Barrett, 2018).

According to these ideas, human rationality consists of a preconscious heuristic. When humans reason, it is to argue the decision already made and to validate the prediction resolved at a given moment. In other words, it serves to continue supporting the foundations of beliefs, which, as seen, are directly linked to feeling. Thus, the results of neuroscientific studies contribute to a conception of the human being as not a fully rational animal, or at least not as previously believed.

This is largely because the brain "operates as a closed system" (Llinás, 2020, p. 31). As previously inferred, prediction is "the brain's primary function" (Llinás, 2020, p. 39). To maintain their survival, animals require a closed mechanism that allows them to make apprehending reality efficient, effective, and impactful in the shortest time possible, with the least resources, and generating the greatest impact in terms of fulfilling homeostasis. For this, the brain always keeps its prediction mechanism active, emulating the reality perceived through the senses. It is worth noting that prediction does not occur in a specific location. It operates in brain modules and uses a series of permutations of neuronal circuits to perform its function. However, it does have a mechanism that centralizes its operation: the "self."
The "self" is the centralization of prediction and does not arise from the domain of self-consciousness, as

this only generates awareness of the self. According to this perspective, the self can exist without being aware of its existence. Even in us humans, as self-conscious individuals, self-consciousness is not always present (Llinás, R., 2020).

Llinás (2020) demonstrates that the self operates without self-consciousness, showcasing the prediction system's preconscious heuristic. This prediction relies on a premotor, preconscious response to emulated reality, systematically validated during the updating process. Damasio adds that this validation requires somatic markers providing feedback, referencing fluctuating feelings and latent emotions. The brain's prediction system needs constant validation and an evaluation mechanism to determine homeostasis, achieved through emotions and somatic markers. The thalamocortical system supports predictions by synchronizing external sensory properties with internal motivations and memories, requiring somatic markers for validation. Llinás likens this to a stomach, with somatic markers activating hunger or fullness, just as the predictive mechanism emulates reality preconsciously.

Our reality emulator is crucial for motricity, driven by internal anticipatory images of future events, which prompt corresponding reactions or behaviors. These images are premotor patterns, planning platforms for goal-directed actions. From these patterns, consciousness emerges (Llinás, 2020).

Schiff, Ribary, Plum, Llinás (1999), Farber (2001), Kazantsev et al. (2004), and Llinás (2020) explain the prediction system's premotor operation using Fixed Action Patterns (FAP) to identify emotions. Emotions in prediction mechanisms create stimuli forming a premotor platform affecting action activation or deactivation. FAPs configure intelligence by enabling the best choice for fulfilling homeostasis. This suggests a biological intentionality in central nervous system cells, though evidence remains insufficient. What is clear is that preconscious mechanisms form the foundation for conscious processes.

This platform aims to conserve the living being's homeostasis, even intermittently. The human body has internal configurations to regulate life and fulfill biological and psychological needs. Evaluating pleasant sensations determines homeostatic fulfillment, which must include both basic and psychological needs. Fulfillment of these elements, even briefly, can be termed happiness. Consequently, the nervous system constantly monitors body states (Watts & Donovan, 2010).

Homeostasis enables neuronal configurations, including those linked to rationality, to activate in humans. Emotions measure homeostasis fulfillment, regulating human behavior. Most regulation is unconscious, essential for maintaining homeostasis. When consciously activated, rationality seeks the same principle of fulfillment. Damasio (2010) emphasizes that consciousness allows humans to regulate life through cultural instruments: economic exchange, religious beliefs, social conventions, ethical rules, laws, arts, sciences, and technology. The survival intention of eukaryotic cells aligns with the intention implicit in consciousness.

Life regulation, or homeostasis, is fundamental to all human challenges, including rationality. This creates a categorical imperative centered on survival and fulfillment. From birth, humans are driven by discontent, constantly seeking fulfillment. Fulfillment balances the self with the world, providing a sense of purpose. While fulfillment is an ethical and aesthetic aspiration, homeostasis is a scientific and biological reality. This pursuit of fulfillment drives the brain to manage life, creating strategies and functions to achieve its objectives.

## 4. Life Management as a Transemiotic Element of Human Rationality Synthesis

Let us recap some central considerations from the previous sections. To manage life, the human brain creates maps and develops mental images that help it operate various cognitive integration systems, such as prediction. This creation of maps helps the brain generate dynamic feedback on bodily states. It is homeostatic feedback in terms of biological and psychological realization. Mapping becomes both a method and an instrument. With the created maps, the brain predicts, intervenes, and manipulates them using reasoning. These maps result from human interaction, mimicking reality in maps as it is apprehended. These maps are dynamically created and constantly updated based on experience and homeostatic outcomes in the human body. All perceived sensations become maps that store the mental images created in the mimicking process. This image should not be understood solely as the result of form capture through vision but as an internal representation of reality. In summary, it can be said that what is understood as the human mind is the result of the constant and dynamic creation of brain maps (Damasio, 2010).

Brain mapping also depends on the values assigned to the configuration of mental images. These values are initially assigned by vital regulation grounded in homeostasis. This value assignment is not linear, even though mapping has an intrinsic logic. Value, above all, is subject to experience itself and the fulfillment of human realization conditions. It can be said that mapping occurs through value assignment to realization, and as mentioned earlier, this valuation can be both conscious and, most often, unconscious. In most cases, the created images do not pass through the plane of consciousness.

In this context, the apprehension of reality depends on the body's neuronal mapping concerning present

homeostasis. It is important to note that this mapping while having cerebral functional limitations, does not occur in a defined area. On the contrary, mapping integrates various regions. These mental maps are linked to body evaluation. The body is, therefore, the content processed by the mind. This form of assuming content by the brain that generates the mind occurs at both ends. Although the body is the reference pattern for evaluating the mind, what is evaluated returns to the body to become the body again. Hence, "the images of the body outlined in maps have a way of permanently influencing the very body in which they originate" (Damasio, 2010, p. 148).

The body-mind correlation should not be overlooked in the philosophical exercise of understanding reason. A theory of reason that does not assume this bodily and mental reality would be doomed to failure. The apprehension of reality, as the activating substrate of rationality, is due to a representation of the world through the body. The brain evokes consciousness thanks to the body, its mapping, and its homeostasis evaluation. Consciousness, as seen, operates preconsciously most of the time to validate, through updating the incorporated reality, a critical compliance analysis concerning the reflective identity it triggers within itself, thanks to somatic markers.

The fact that an organism's body can represent itself in the brain is essential for creating a reflective identity. However, representing the body in the brain has another necessary consequence: by representing our bodily states, we can also more easily simulate equivalent bodily states in others. Subsequently, the relationship established between our bodily states and the significance they have acquired for us can be transferred to the simulated bodily states of others, allowing us to attribute comparable significance to the simulation (Damasio, A., 2010).

Prediction helps us always be aware of our body, and somatic markers update the achievement needs of homeostasis. The body, therefore, becomes the substrate where feelings activate human action. Thus, it would be a grave mistake to assume an understanding of rationality without considering the human body and the understanding of emotions and feelings in configuring reason. In other words, the foundation of human reason, as a product of rationality, largely depends on the physiological configuration within the mind's action framework. This action framework is a reflective identity caused by the neuronal cartographies created through experience. The body creates a cartography where mental maps are defined to resolve the apprehension of reality. The body creates an internal apprehension mechanism based on emulating external reality to operate several preconsciously processes. Thus, human rationality is an apprehended reality that seeks (heuristically) resolution in the created maps. Consciousness, in this sense, would not be, per se, rationality.

Therefore, it is necessary to delineate consciousness from human reason. Consciousness, from a neuroscientific perspective, corresponds to a mental state in which human beings are aware of their environment and existence. Consciousness is often confused with the mind. However, Damasio (1996; 2010) clarifies that a mental state is conscious when feedback from the self-validates the environment and the subject's condition, partly through interoception. Because of this, consciousness depends on internal validations guided by a self that is updating and processing images for a specific work purpose. This work purpose may be determined by intentionality but will always be guided by the principles of homeostasis.

Consciousness, therefore, is a specific mental state. A wakeful mental state in which we possess knowledge that allows the evocation of our own existence. The crux of the matter is that this activation of self-knowledge objectively depends on sensory materials and qualitative evaluations of the perception of these materials. Thus, "conscious mental states are 'felt'" (Damasio, 2010, p. 243). It is not always the case that when a human being has something in mind, they are conscious of it. Humans have many things in mind during wakefulness, but not all pass through the filter of the self. This is a significant difference.

As observed earlier, the appearance of an objective self in neuroscientific terms depends on an interrelation between thought, human action, and the emotional level. But if emotions are such a revealing sign of consciousness, it is because the execution of most emotions is managed by the periaqueductal gray matter in close cooperation with the parabrachial nucleus. These structures together generate bodily feelings (primordial feelings), whose variations we call emotional feelings (Damasio, A., 2010).

Emotion, self, and thought are closely linked in human consciousness. Perhaps, and this should be scientifically verified, consciousness levels depend on emotional activation and feedback from the human self. Consciousness levels fluctuate. We are not always at a higher gradation of consciousness, which is evident in human practice. The degree of self-validation in a situation depends not only on circumstances but also on the level of emotional activation and the appearance of somatic markers. Likewise, it is essential to note that the appearance of consciousness also depends on the reality apprehended by humans, given multiple interactions with the environment. Therefore, a maturation of the neuronal circuit resolves rationality due to habituation and configuration over a lifetime. In other words, there is learning that could also automate and provide a specific response when the phenomenon called consciousness appears. Thus, consciousness, besides being affected by emotion, the self, and the circumstances in which it is updating, also depends on the internal apprehension generated, which

results from a learning process throughout life.

Additionally, there are configurative elements of consciousness itself. Damasio (2010) distinguishes four. The first refers to the object's perspective that humans have when apprehending (making it their own) a reality. From a neuronal point of view, this perspective depends on a series of layers being mentally represented, which the body starts to denote as its own. The primordial apprehension of the object is bodily in that it resolves, mentally, an apprehension consciousness through internal processes being carried out. This is defined as the second configurative element. Thus, when somatic markers are activated at this first level of reality apprehension, emotions feedback on the object's property. In other words, a feeling is activated in which the represented objects belong to the subject, validating them and not to another. Consequently, a third element emerges, which Damasio (2010) defines as agency: "[...] a feeling that I acted or have the virtue of acting with the objects [...] and that the actions my body performs have been ordered by the mind" (Damasio, 2010, p. 285). Agency orchestrates the action by the self as an operational platform. But this self will always have as its base a series of "primordial feelings" that "denote the existence of my living body regardless of how objects interact with it" (Damasio, 2010, p. 285).

Thus, consciousness could be understood in three levels of operation. A first level with primordial feelings (proto-self), a second level where incorporated images create association mechanisms at the cortical level (core self), and a third level where the association is more profound and fed back by the subject's life. That is a more profound association around the self (autobiographical self). Regarding the first level, Damasio (2010) notes that the proto-self is the necessary springboard for forming the sense of self that emerges in core consciousness. It is an integrated collection of different neuronal configurations that, moment by moment, map the most stable aspects of the organism's physical structure. The maps created by the proto-self are distinguished because they generate body images and felt body images. These are the body's primordial feelings, spontaneously present in the normal awake brain.

The proto-self is the functional mechanism of interoception. Therefore, this is where primordial feelings reside. Information entering the proto-self can alter this primordial feeling, resulting in the appearance of emotional feelings. As a result, the mental maps being created, updated, or recreated with mental images are processed and linked by association mechanisms in the cerebral cortex. Craig (2002), in his physiological description of the interoceptive process, shows that this process is subordinate to a primary source that cannot be altered. In other words, interoception depends on a primordial state of the human being in which various mental maps are interconnected to the same source. But this source only provides a sense of meaning. It only resolves in a primordial sense state that triggers primary emotional states. In other words, it alters an emotional state that will continue updating to resolve into a more complex level known as the core self (Damasio, 2010).

This proto-self helps agency emerge into another stage that Damasio calls the core self. As seen earlier, agency refers to the human ability to feel and act with the objects they apprehend. When this happens, the primordial feeling given by the proto-self transforms thanks to the mental result when the brain knows it recognizes the object and can manage it, at least mentally. Due to this, a second moment arises where the feeling of knowing the object triggers human endogenous attention. Attention that is precisely linked to the brain's limbic system. The core self is created by linking the modified proto-self with the object that caused the modification. This object then appears marked with the distinctive seal of feeling and heightened by attention (Damasio, A., 2010).

Therefore, the proto-self generates an image for the organism that is validated with its primordial feelings (in this sense, one could speak of exogenous attention that does not pass through the limbic system but resolves at the brainstem level) and that, due to an emotional response related to the object itself, achieves endogenous attention that activates a whole core self, making the brain focus on the object and capture more information for processing. This core self, in which endogenous attention enhances the object, is the main foundation of the conscious mind. However, there would be an additional state. A state in which what is apprehended connects and more deeply validates with the self and updates more profoundly with the mental maps that configure human identity. That is, the object's apprehension does not only occur in an exogenous mechanism involving primordial feelings that can be resolved at a subsequent level: an operational level in which a self-triggers resolution mechanism in which endogenous attention, linked to the limbic system, activates a series of feelings that amplify attention from exogenous to endogenous. In this sense, there would be a third level where what is apprehended is validated with life experience (memories and experiences) that configure not an organic core self but an autobiographical self (Damasio, 2010).

This autobiographical self results from a configuration of lived experiences fed back by the core self and passed through the plane of reflection, although its anchorage in the brain is unconscious in most cases. The autobiographical self primarily uses memory and life recollections. With these, it organizes incoming information and feeds back both the core self and the proto-self to reorganize the internal structure of each memory executively. Neurobiologically, autobiographical self-information is found in the cerebral cortex. Therefore, when it needs to send information to the proto-self, it must return all the electrochemical pulses located in the brainstem. In this sense, the complexity of constructing the

autobiographical self is much higher compared to the proto-self and the core self. The energy consumption of this construction is high and depends on the modulation built from the cartography performed in mental maps. Constructing the autobiographical self requires brainstem structures, the thalamus, the cerebral cortex, and a mechanism of synchrony and organization for the images in the cortex to associate integrally with the core self and feedback to the proto-self. This synchrony and coordination, as Damasio (2010) notes, are spontaneous organizers of a process. Therefore, the operation results as a whole do not concretize in the coordination devices but rather in other parts, especially within the brain structures that elaborate the images generating the mind, located in both the cerebral cortex and the brainstem (Damasio, A., 2010).

Thus, organization does not depend on internal physical agents but on natural factors like the order of object apprehension and the value assigned to the object by the self. This autobiographical self would be the biological correlate of what is commonly called reflection. Reflection, in itself, arises in the body and is subjective. It depends on the internal organization at both the proto-self and core self-levels, which will feed back and organize everything in the cerebral cortex to configure a response to the apprehended object. It is thinking about what has already been thought, referencing the body. Therefore, the integration of the three levels is crucial.

From all that has been seen, it is evident that life management produces reason. However, where would human reason be? A first impression might say that human reason is in the autobiographical self. Nevertheless, this analysis is incorrect. Human reason is already configured in unconscious mechanisms, although these mechanisms depend on the feedback given by consciousness.

Thus, consciousness, a product of the preconscious, makes humans depend on the apprehension of reality to respond to what is incorporated. This apprehension is bodily and depends on the foundational support of emotions. With this in mind, human will should be re-signified. This re-signification is not new in light of neuroscientific discoveries. Precisely, the psychologist Wegner (2018) points out that the will is the result of the operation of a somatic marker. A marker that will validate the action to be performed as a result of self-validation. However, he does not clarify which level of the self. Therefore, it would be worth questioning the hypothesis of whether there are levels of will, as there are of consciousness. Given this impossibility of delimiting human will on an objective plane, it is difficult to justify that human reason is exclusively the result of its operation. It is important to note that this does not declare human nature to be automaton-like. The self is constructed, although it operates thanks to the preconscious platform. This construction depends, consequently, on the apprehension of reality. However, to better understand how this apprehension functions, it is necessary to expand the explanation of the phenomenon of consciousness in neuroscientific terms

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## 5. Conclusion: Life, Consciousness, and Rationality

Consciousness, according to the analyses and discoveries made by Dehaene (2014), enables neuronal interconnection that integrates the senses coherently. In this sense, the objective of consciousness is to resolve apparent confusions that arise when objects are perceived. Dehaene and several other neuroscientists (Jones & Love, 2011; Bowers & Davis, 2012; Elqayam& Evans, 2013; Hahn, 2014) propose that the process by which consciousness resolves the ambiguity resulting from the primary apprehension of reality can be explained by Bayesian inference. Consciousness seeks to eliminate bias and create certainties through an apparently abductive process, as Peirce (2007) suggested, where the resolution does not depend on deductive or inductive mechanisms but rather through a quasi-intuitive processing of immediate contrast. Although this approach is theoretical, it could explain many phenomena of conscious processing and determine the operations that arise from it. However, due to the lack of studies directly demonstrating that Bayes' theorem explains conscious processing, it is necessary to step aside and analyze how consciousness itself results from an operational platform through the transemiotic approach developed thus far. An approach explaining how, from the level of signic decoding of mental representations caused by mental maps, these are ordered and arranged according to somatic markers.

To develop this further, we need to continue reviewing the discoveries of Dehaene (2014) and other neuroscientists regarding the operation of consciousness. One necessary point to note is the discovery of the objectivity of unconsciousness. Thanks to the work of He, Zempel, Snyder & Raichle (2010), it has been demonstrated that the neural calculation processing operating in unconscious states is governed by a complex probability distribution. This contrasts with when a state of consciousness appears, in which everything resolves almost immediately and is often charged with the belief mechanisms established in the brain's cartography. As Dehaene (2015) explains, the simple act of consciously attending to an object eliminates the probable distribution of its various interpretations and allows us to perceive only one of them. Consciousness acts as a discrete measurement device that ensures we have only one view, one glance, at the vast underlying sea of unconscious calculations.

The situation, as corroborated by Vul, Hanus & Kanwisher (2009), is that unconscious mechanisms, the platform of consciousness, operate with highly complex, efficient, and effective probabilistic mechanisms.

In this sense, a high number of probabilistic operations corroborate and operate several hypotheses simultaneously on the displacement platform. Consciousness, on the other hand, apparently captures one of these hypotheses being processed unconsciously at random. But this hypothesis is only one among a sea of probabilities working on the human being's unconscious plane.

Despite these discoveries, Dehaene (2014) infers that consciousness serves to think rationally because it helps create a rational strategy. This is true, but the question about the strategic configuration of consciousness moves away from the realm of neuroscience, for now, to cognitive psychology. The reason for this generates the following question: if consciousness activates a rational strategy, already using a bias of reduction concerning what is perceived, how does it configure a resolution strategy, and with what inputs, without using the unconscious operations that are automatically and constantly activated in brain mapping? The answer is quite evident. The brain cannot be split into two processes. It cannot deactivate unconscious operation when consciousness is active. Quite the opposite. The unconscious elements, or rather preconscious ones, are the platform from which consciousness emerges. A neuroscientific piece of evidence to consider is that when a conscious action is mapped, the results of neuronal electromagnetic flows move in two directions. That is, they operate not only upwards (cerebral cortex) but also downwards (brainstem) (Dehaene, 2014).

This is well understood when using somatic markers as an explanatory filter as a foundation in decision-making. Consciousness is a simulation that, while resolving in a specific direction, has inputs and a base that allows it to operate. This base is preconsciousness. Regarding this, Minsky (1985) noted that human decision-making might be determined by internal forces that are difficult to explain. This can be explained when it is evident that the brain emulates a bodily reality to be decoded. This decoding is determined by preconscious mechanisms operating in the input of processed information. For this reason, Wegner (2018) concludes that the mind produces a series of "appearances" to its owner that can be determined as their own if they feel they are their own. That is, if the brain's reality emulation passes to a conscious state, it must send an indicator to the body for the person to have a stimulus that validates the action as their own. This stimulus is emotional. Thus, in terms of will as actions guided by consciousness and validated as the subject's own, emotion must appear as an internal mechanism of acceptance of the emulated reality. Will, from this perspective, is the feeling that appears just when a human being consciously does something and additionally feels that this action is done by oneself (Wegner, 2018).

Returning to the question of whether rationality is a consequence of will, preconscious heuristics seem to demonstrate that it is not. Many decisions that we might call rational come from mechanisms where consciousness is not fully active. Libet, Gleason, Wright & Pearl (1993) demonstrated that many efficient brain response processes in decision-making are unconscious. To argue this, they showed that the conscious response time to actions often does not precede the action itself. Libet (1985) uses the following example: a person is driving a vehicle at high speed, and suddenly, someone crosses the street. The person avoids the accident by turning the wheel. The probability that the person rationalizes the action after overcoming the risk condition is very high. The problem is understanding why, unconsciously, they decide to turn the wheel. Libet's (1985) conclusion is that human will does not necessarily preside over free will since human responses and their consciousness often occur after the action itself.

This reaffirms that rationality is not an act of will in the strict sense of the cognitive operation that occurs in the brain, as a rational state of brain operation can be created without feeling that the action is done by oneself. One will only know when the brain validates the actions carried out. Rationality, in this sense, is a mechanism preceding the phenomenon of will. The situation is that our preconscious responses take inputs from emotions configured in the brain. It has even been shown that the brain has developed a rapid emotional response to react to almost everything it assumes as reality (Wegner, 2018; Bargh et al., 1996b). This is because all conscious processing must be validated by a self that determines the level of action appropriation and agreement with what will be done or has been done. The emulation must be corroborated, and this corroboration is done emotionally due to the process's efficiency. Therefore, in the cognitive experience of will, the mind, thanks to the body's cartography, configures a validation mechanism that is a clearly defined and determined action. The body, as Wegner (2018) and many others highlight, is the anchor of thought. Emotion helps fix the cognitive mechanism as it becomes a validation platform for the reality being experienced.

Thus, the definition of will is subject to the emotional processing of cognitive mechanisms and an affective validation of action concerning the subject. In other words, conscious will results from a somatic marking in which the objective self operates as the action validator. Therefore, will occurs when an emotion authenticates the action's owner as something done or achievable by them. For this reason, it is important to analyze the effect of emotions in the decision-making process.

Decision-making would be affected and even biased by somatic markers activated in the action evaluation. To achieve this, somatic markers are activated in reaction to feedback experienced by the objective self, constantly reaffirmed by the body's homeostasis processes (Damasio, Tranel & Damasio, 1991).

To understand this from the transemiotic perspective being developed, specifying how this process works biologically is necessary. The first thing to note is that decision-making depends on configuring consciousness on the cognitive plane. Consciousness configures a first base that supports the decision since it allows us to recognize the level of existence fulfillment. Consciousness is concerned with life management and, thus, regulates the decision (Damasio, 2018).

The above does not seem problematic until the crucial role of emotion in configuring consciousness is considered. Emotions, as complex sets of chemical responses allowing life regulation, are innate brain devices that do not require conscious activation. Their goal is to create a validation and mapping system of homeostasis in terms of being's realization. For this reason, emotion is the initial validation platform for the decision made. Emotions take the body as a place of development and action, generating an impact on various cognitive processes. This impact also occurs in consciousness. And most interestingly, as Damasio (2018) notes, biologically, consciousness can be understood as the result of a feeling.

If consciousness is the result of a feeling, how could this be demonstrated, and what is its impact on decision-making and, therefore, human rationality? To elucidate the previous question, one must start with the fact that emotional responses result from an evolutionary process over many years. This evolution is due to the proper function of emotion. The primary objective of emotions is to develop a specific reaction to a situation that elicits a response. In other words, emotions serve to react to situations based on homeostasis. The second function of emotions is more endogenous. This means that their goal is also to create an internal regulation in the body that helps respond concretely to various situations. Thus, emotions help generate responses and enable regulation to validate homeostasis. These are their two functions. The important thing is that emotions are always present and do not require an activation mechanism given by will.

Therefore, emotion works with the organism to define behaviors that help resolve the need for realization—biological realization in terms of survival and psychological realization in the sense of seeking fulfillment. In the case of humans, as seen, regulation occurs in these two senses. Thus, consciousness helps emotions be recognized. This recognition configures what is understood as feeling. Passing emotion through the mind's filter is what is understood as feeling.

Consciousness allows sensations to be recognized, promoting the internal impact of emotion and allowing emotions to permeate the thought process through sensations. Additionally, consciousness enables the recognition of any object (be it an emotion or otherwise), improving the organism's ability to respond adaptively and attend to its needs. Both emotion and consciousness are dedicated to the organism's survival (Damasio, A., 2018).

The human apprehension of reality has emotion as a potential element of action. When the brain perceives an object, for example, it contains potential neural patterns of activity provided by the brain mappings performed. These patterns affect and arrange a series of explicit responses that modify the body. The brain regions dynamize the neural patterns and seek to convert them into resolution actions in response to what reality apprehension demands. Consequently, the neural patterns become the basis of sensations. Thus, it is evident that perception, even in the first moment of reality apprehension, is affected by consciousness and, consequently, by the emotions that constitute the fulfillment platform of this first-order cognitive process (Damasio, 2018).

In this sense, consciousness would have two levels of operation. One operates with the basic elements to resolve the apprehension of reality and another that extends to provide deeper feedback on the actions taken. For Damasio (2018), this distinction is as follows: there is core consciousness and extended consciousness. Core consciousness refers to "the sense of self in a moment (the now) and in a place (the here)" (Damasio, 2018, p. 19). This consciousness seeks to resolve the subject's identity function concerning a specific here and now. This consciousness, to resolve the here and now, uses short-term memory but with very few inputs. On the other hand, there is an expansion of this consciousness that uses more resources, especially working memory and long-term memory, which consciousness provides the organism with an elaborate sense of self (an identity and a person, you or me, no less) and places the person in a historical point in time, deeply aware of the lived past, the anticipated future, and acutely aware of the surrounding world.

In humans, extended consciousness could be one of the triggers of what could be understood as rationality. However, since there is a connection between emotion, feeling, and consciousness, the above does not seem justified. In the most immediate action, even given by core consciousness, there is a rationality caused preconsciously by brain mappings performed throughout life. These mappings result from bodily representations that always validate the individual's homeostasis.

Representation becomes the motor of conscious experience. Representation flows through the emotional charge and cognitive resolutions resulting from the union of biological regulatory systems and the subject's fulfillment. For example, to achieve core consciousness, the brain's representation devices produce a nonverbal and imagistic report on how the organism's state is affected by processing the object. When this process highlights the object's image, it prominently places it in a spatial and temporal

context (Damasio, A., 2018).

Space, time, and I create a reality apprehension that allows action validation and recognition of the individual as an actor in the reality being apprehended. Consequently, consciousness depends on both internal construction and the appearance of a stimulus that converges in a resultant knowledge between the subject and the object's interaction. However, this knowledge hinges on the cartographies made by neural patterns that created the cognitive resolution modules.

Autobiographical memory, for example, which holds the subject's belief systems and organizes brain mappings done over life, creates a mechanism that uses more resources to resolve apprehension. This configures an autobiographical being stable in its base but continuously updated through experience (Damasio, 2018).

Thus, there is a core self that operates core consciousness and an autobiographical self that operates extended consciousness. Unlike the core self, the autobiographical self is based on a concept, both in the cognitive and neurobiological senses. This concept exists as implicit memories available in specific interconnected brain networks. Many of these implicit memories can be made explicit simultaneously and at any time (Damasio, A., 2018).

This interaction between the core and autobiographical selves is the basis for decision-making. Extended consciousness, in this case, is a prerequisite for deliberation in the sense that the autobiographical self has knowledge used as input in the evident resolution. To do this, extended consciousness creates a sense of action integrated into the identity validation done by the person. Thus, it develops a sense of the autobiographical self to which the resolution is attributed. This attribution, being a sensation, depends on emotion. An emotion that the autobiographical self transforms into feeling.

The above even has a biological explanation, given that even the simplest core consciousness requires joint activity involving regions throughout the brain. Consciousness depends primarily on the evolutionarily older regions, not the more recent ones, and those deep within the brain rather than those on the surface. Interestingly, the "second-order" processes proposed here are anchored in ancient neural structures closely associated with life regulation, not the modern neural achievements of the neocortex, which allow fine perception, language, and higher reason. That apparent "more" of consciousness depends on a "less," and the second order is ultimately a low and deep order. The light of consciousness is carefully hidden and venerably old (Damasio, A., 2018).

Consciousness depends more on emotion than on what we understood as reason. It is notable how emotion, sensation, and consciousness depend on the body. The body is the great intelligence that deliberates and seeks realization on multiple fronts. The body configures those representations that will later resolve into a being that chooses, decides, and acts. Representations, as a result of mental cartography, are possible due to a body that regulates both the biological and psychological dimensions. Homeostasis is the key to this whole issue of rationality. Homeostasis is evidenced in the plane of life as realization. Decision-making, as observed, is also a result of this.

In conclusion, consciousness is valuable because it introduces a new means to achieve homeostasis. I do not mean a more efficient means to balance the internal environment than the entirely unconscious machinery we have had in the brainstem and hypothalamus for so long. I mean a new means to solve different kinds of problems that are, however, connected to the problems of homeostatic regulation solved by pre-existing means. In other words, brainstem and hypothalamus devices can coordinate, unconsciously and with great efficiency, the functioning of the heart, lungs, kidneys, endocrine system, and immune system to maintain the parameters that allow life within the appropriate range. Meanwhile, consciousness devices are dedicated to solving how an individual organism can face environmental challenges not foreseen in the basic design so that fundamental survival conditions can continue to be met (Damasio, A., 2018).

Consciousness allows living organisms to adapt more effectively to changes in their environment and unforeseen situations that may threaten their homeostasis. Consciousness, in turn, helps perceive and understand the world to make informed decisions and respond appropriately to life's changing situations. In this sense, consciousness represents an evolutionary advance in organisms' ability to maintain homeostasis by allowing them to experience emotions and validate human action through established belief systems. Consciousness, in this measure, arises from the ability to represent the relationships between the organism and the world to favor the unconscious regulation of life. Consciousness also implies sensitivity to one's own and others' emotions, which helps create moments of empathy that function as a great adaptive device for humans facing their environment. Thus, consciousness allows rational agents to have a double homeostasis: biological and mental. This double homeostasis is the basis of moral conduct and social normativity that seek to preserve and improve individual and collective life. Ultimately, consciousness arises from the interaction between the brain and other parts of the organism, which mutually regulate each other to maintain a dynamic balance. To this end, biological homeostasis is configured, referring to the organism's ability to adapt to internal and external changes to preserve its survival, which acts jointly in humans to configure mental homeostasis, referring to the brain's ability to

generate mental representations of itself and the world, allowing it to anticipate, plan, and make decisions.

In this sense, feelings are the articulation point of these two homeostasis. Feelings make us empathetic towards others and drive us to follow ethical norms that favor "social homeostasis," the community's balance and harmony. This is because feelings result from perceiving changes in the body and brain when emotions arise from specific cognitive modulations. Feelings become subjective and conscious experiences generated in the cerebral cortex, a more evolved and complex brain layer; thus, they regulate mental homeostasis as they guide individuals' rational behavior.

Damasio (2018) argues that feelings are the mind's motivation, driving humans toward what produces pleasure, satisfaction, or happiness, and avoiding what causes pain, suffering, or sadness. From this perspective, feelings could be seen as the origin of ethics and culture, as they make humans sensitive to the well-being and suffering of other living beings. This could be exemplified as follows: When a person faces a morally ambiguous situation, feelings allow them to evaluate the situation and make a decision that aligns with their values and ethical principles. For example, if someone encounters an elderly person needing help crossing the street, empathy and compassion can motivate them to assist. This is because feelings inform us about our internal state and motivate us to act to preserve our life and well-being. Thus, feelings are the basis of moral valuation and cultural creation. In conclusion, feelings anchor biological and mental homeostasis by connecting emotions with reason, the body with the brain, the individual with society, and nature with culture.

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