

The Theoretical and Scientific Problems of Damasio's Conceptual Model of Consciousness



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Abstract

Here I assess Damasio's conceptual model of consciousness based mainly on the concepts of emotion, feeling, and consciousness by analyzing its conceptual implications and its theoretical and scientific problems. One of the conceptual implications of the direct interaction between the concept of "feeling" and the concept of "consciousness" is the concept of consciousness as "feeling a feeling", which is also recognized by Damasio. The concept "feeling a feeling" directly implies the concept of consciousness as "an emotional perception of an emotional perception". Each implication has further theoretical implications that form a web of theoretical and scientific problems. I also argue that, since Damasio's model of consciousness is a neuroscientific model, it should provide a rigorous integration between the high-order concepts and the empirical concepts that underlie them, which, for example, is the case of Dehaene's model of consciousness. Moreover, at the end of the paper, I suggest some conceptual changes that would minimize the theoretical problems of Damasio's conceptual model of consciousness.

Keywords: *Consciousness, Damasio, Conceptual model, Theoretical problems, Philosophy of Science, Philosophy of Neuroscience*

Damasio ([1], [2]) introduced us one of the most important and influential theoretical hypothesis of consciousness within neuroscience, which has impacted even on other areas, such as philosophy, cognitive sciences, and psychology. The maxim of consciousness as the *feeling of what happens* is spread throughout the specialized literature. And, like it or not, this definition really has an artistic and literary appeal. However, science cannot be based on definitions which are just artistic and poetic. Concepts within science must have an empirical appeal and must provide parsimonious tools for understanding natural phenomena ([3], [4]). To do so, every concept within a scientific theoretical hypothesis must address

observable phenomena in the world in a way that these concepts interact with each other so that the world makes sense. Therefore, these concepts must form an integrated whole, so that, according to Schaller [4], it is possible to improve the rigor and replicability of the hypothesis.

Schaller [4] advocates that most occurrences of non-replicability can be associated with a lack of formal conceptual approach, in which personal predictions are blended with the scientific hypotheses raised by their authors. Thus, Schaller, as an attempt to reduce this lack of rigor, proposes that authors must make a rigorous use of what he calls “if-then” logic to articulate scientific hypotheses [4, p. 110]:

“Rather than tacitly assuming that “hypotheses” are nothing more than subjectively plausible personal predictions, hypotheses can instead be explicitly articulated as depersonalized statements that follow from the systematic application of “if-then” logic. The basic principles are simple, and intuitively appreciated by most (...) scientists: Some set of underlying assumptions or assertions are specified; and then some set of further implications (e.g., in the form of “if-then” statements) are logically derived. These logically derived implications have the logical status of hypotheses”.

Since here I will assess Damasio’s conceptual model of consciousness, let’s take a classic “if-then” example of neurobiology. The prefrontal cortex has been highly correlated with cognitive control [5], then it is expected that theoretical approaches in neurobiology, when addressing the issue of cognitive control, must take prefrontal functioning into account. In other words, *if* there is cognitive control, *then* there must be prefrontal functioning, so that cognitive control and prefrontal functioning imply one another. Any noteworthy theory on the function of prefrontal cortex must take this relationship into account [6], because if this particular “if-then” relationship is true, theoretical hypotheses on this brain structure must be made in a way that this relationship easily fits into the proposed theoretical hypothesis (or model). In this way, it is quite visible that “if-then” logic is directly linked to *prediction*.

Thus, following this idea, concepts within a scientific model must provide both a parsimonious explanation of a natural phenomenon and tools for its prediction, that is, from these concepts we must be able to infer the occurrence of a particular phenomenon or even predict (infer) when it happens given particular natural circumstances. Thereby, any theoretical (conceptual) statement about a particular natural phenomenon must be very tight with its prediction.

Moreover, the “if-then” logic has another important implication: *if* we propose a conceptual account of a particular phenomenon, *then* we must commit with its conceptual implications [4]. For example, it has become established in the cognitive literature to address the subject of consciousness aside with the subject of metacognition ([7], [8], [9]). Therefore, this kind of theoretical approach must address how these concepts are linked to each other, *accepting the conceptual implications of this link*, which I call *conceptual integrity*, so that a concept interacts with another without giving rise to any kind of contradiction or circularity, forming an integrated whole.

My central goal here is to show how Damasio’s theory of consciousness does not fill those criteria. However, I will also try to suggest how those conceptual problems can be bypassed through specific conceptual changes or redefinitions (such as two separable and specific definitions of feeling), everything based on an impersonal assessment of Damasio’s conceptual model of consciousness.

1 Consciousness as “feeling a feeling” and its theoretical problems

It is important to realize that I am not going to delve into Damasio’s theory of consciousness here, since it is available in his books and it is already widespread in the literature on consciousness. For example, although important, I will not discuss on the link between consciousness and the self in Damasio’s theoretical model of consciousness, since it is not my primary goal here. Here I will focus only on the conceptual basis of Damasio’s theory of consciousness, that is, I will approach only the raw concepts that constitute his central model of consciousness, in this case, the concepts of emotion, feeling, and consciousness (as they are directly addressed by the author, without making any further interpretation), assessing how they *directly* interact with each other. I will not make any value judgments or attempts to interpret any implicit meaning, because a scientific work with a high degree of accuracy does not address concepts implicitly or indirectly ([4], [10]).

For example, I assume that it is possible that Damasio referred to a different type of feeling when the author approached the concepts “feeling a feeling” and “feeling of what happens”, however, it is not clear in his theoretical model of consciousness. If there really are different meanings for the concept of feeling, for example, Damasio, unfortunately, navigates between them too freely, without even providing explicit hints

to what possible types of feelings he is referring to. Therefore, without doing so, Damasio's model of consciousness does not provide tools for discussing implicit different types of feeling according to the strict "if-then" logic approached above.

But it should be clear that my goal here is not to undermine Damasio's work by any means. My point here is just to raise an impersonal assessment of his conceptual model implicit in his theoretical model of consciousness in order to show how important conceptual integrity is for any account of consciousness, both in philosophy and in the sciences of mind. Here it is not important how specifically Damasio defines consciousness, emotion, and feeling, but how these concepts interact with each other.

Both in the 1999 book and in the 2010 book, Damasio first approaches the subject of emotions and feelings rather than going straight to the discussion of consciousness itself, because, according to the author, it is not possible to approach consciousness without first considering these phenomena profoundly, since it would not be possible to have conscious activity without emotional processes. Thus, before entering into the discussion of the concept of consciousness itself, let's first see how Damasio defines these emotional concepts.

For the sake of simplicity, let's look just at the concepts of emotion and feeling addressed by Damasio in the 2010 book, since these concepts undergo some updates from the 1999 book.

According to Damasio [2], emotion is a largely automated program of action carried out in our bodies, modulating our facial expression, body posture, and physiological functioning [2, pp. 76]. *Feelings*, on the other hand, are the *perception* of what happens during an emotional state [5, pp. 81]. Since this book, feelings are always taken as a *conscious experience* of an emotional state¹. It is important to note that Damasio does not define feelings in any other way. There are no secondary definitions for feelings. The only concept directly addressed by the author is this one above. Now we can approach how Damasio defines consciousness.

In 2010, Damasio stated that consciousness is "*a state of mind in which there is knowledge of one's own existence and of the existence of surroundings*" [2, pp. 157, emphasis in the original], which only complements the definition of 1999, *the feeling of what happens*, because the interaction between the organism and the object is always accompanied by a feeling that tells us that the object (surroundings) belongs to us (knowledge of one's own existence) for a particular duration [2]. We do not only know about the existence of the object and ourselves, we feel it.

According to Damasio [2], every conscious state of mind is accompanied by this *feeling*. So here I will keep the concept of 1999 (which is also used the author in the 2010 book).

As it can be seen, these definitions are very poetic. Often in these books, Damasio uses an artistic or landscaped feature to address the issue of emotion and consciousness, so that it is possible that these definitions were also influenced by the aesthetical experience of the author, something that is problematized by Popper [10], since the latter argues that subjective experiences cannot justify scientific statements. Therefore, I am not here to admire the poetic background of Damasio's theory of consciousness, but rather to analyze the parsimony and scientific background from the analysis of the conceptual integrity of his model. Here I will not analyze how Damasio justifies his conceptual model within his own model of consciousness, but rather I will analyze the logical implications through the direct conceptual interaction between the main concepts of his model, in this case, the concepts of feeling, emotion, and consciousness.

But, however well-intentioned Damasio may be, his theory has intrinsic conceptual problems. Let's see how the concepts above interact with each other:

Damasio's definitions:

- Feeling is the perception of what happens during an emotional state;
- Consciousness is the feeling of what happens²;

(The author does not present other definitions of feeling)

So, since the concept of consciousness depends on the concept of feeling, it is possible to establish direct interaction between the above definitions:

- Consciousness is a perception of a feeling (feeling of a perception)³; or an emotional perception of an emotional perception (perception of perception); or feeling of a feeling.

The implication "feeling a feeling" is also recognized by Damasio [1, pp. 69] as a synonymous with "knowing an emotion" (since knowing, in Damasio's model, is also a type of feeling: the feeling of knowing, which is linked to the concept of consciousness as "the feeling of what

happens”). This implication was also attempted to be computationally formalized by Bosse and colleagues [11].

The “feeling of a feeling” is *per se* a very ambiguous definition, but even before analyzing that, there are other conceptual issues that must be addressed here.

In Damasio’s conceptual model, consciousness is approached as a “feeling of *what happens*”. Let’s take just the last part of the sentence: what happens. Well, how do we know what is happening? What are the mechanisms required for such a thing? I think the simplest answer is *through sensory and perceptual mechanisms*. Thus, the very definition of consciousness is linked to perception. We can simply replace “what happens” for “what we perceive”, then we have that consciousness is “the feeling of perception”, which has already been inferred in the conceptual analysis above. And since feeling is itself a kind of perception (in this case, a perception of an emotional state), we can infer that consciousness is a “perception of perception”.

Perception, according to Pomerantz [12], is the process by which it is possible to integrate and interpret sensory information. Thus, “perception of perception” requires two levels of integration and interpretation of sensory information. One could say that it somehow makes sense within Damasio’s theory, since it is necessary a type of map that maps the interaction between the organism and the object: the *second-order map*, which is the result of the interaction between two types of first-order maps (the organism and the object), each one requiring a type of perceptual processing (neural maps). In other words, at the same time that we perceive the object, we perceive a self in the act of perceiving (perception of perception). So, in one way or another, to be conscious about something, we need three perceptual processes: the perception of the body; the perception of the object; and the perception of the results of the interaction between the object and the body (both the physical body and the body maps of the protoself⁴). That is, we need the perceptual processing of the body and the object to give rise to sensory information (somehow given by their interaction) that must be integrated and interpreted [12] by another perceptual processing. In other words, we need a perceptual processing to also be a stimulus (sensory information). Thus, when we are aware of an object, it happens because the perceptual processing of the object (sensory information) interacts with the perceptual processing of the body through mechanisms of the brain stem, insular cortex, and somatosensory cortex [2], giving rise to *sensory* neural information (since it is originated within the brain) that

is then processed by perceptual mechanisms giving rise to a second type of perceptual processing, which is the second-order map.

As it can be seen, following a strict “if-then” analysis, one concept implies on the definition of another concept, forming conceptual loops such as “perception of perception”, which makes both their conceptual analysis and their theoretical application very difficult, thus contradicting the principle of parsimony on which science is grounded. Since the conceptual implication “perception of perception” is logically accepted by Damasio’s model of consciousness (as it stands), the complicated theoretical implications that it causes may undermine replicability, as discussed above [4]. Nevertheless, the theoretical problems do not stop here.

Another implication is that consciousness is the feeling of a feeling. As mentioned above, Damasio [1, pp. 69] addresses this expression as a synonymous with “knowing a feeling”. Knowing, in Damasio’s model of consciousness, is also a type of feeling: the feeling of knowing. The concept of feeling of knowing is directly linked to the concept of “the feeling of what happens”, since the feeling of knowing is “the feeling of what happens when an organism is engaged with the processing of an object” [1, pp. 28], that is, when the brain of the organism creates second-order maps, which is the same as core consciousness. Therefore, “knowing a feeling”, “feeling a feeling”, and (core) consciousness are the same thing. And, since consciousness is “feeling a feeling”, by taking the concept of feeling seen above, we have that consciousness is a perception of the body during an emotional state caused by an earlier perception of the body during an emotional state, that is, the perception of the body during an emotional state must cause another emotional reaction whose perception is consciousness. And I emphasize that this implication happens because Damasio does not provide another concept for feeling⁵. And another theoretical problem within this very implication is that feeling (at least since the 2010 book) is always a conscious experience, so while feeling defines consciousness, consciousness defines feeling, that is, consciousness is the feeling of what happens (or feeling a feeling), and feeling is a conscious experience of an emotional state: it is a circular definition. This theoretical problem also happens with the above discussion about perception of perception, because, since feeling is a type of perception at the same time that feeling is a conscious experience, then this type of perception is always conscious. Therefore, consciousness is a conscious emotional perception of a conscious emotional perception, causing another circular explanation, which impairs replicability [4]. And, as said

above, even if we tried to consider implicit meanings in his theory, the lack of rigor of which Damasio navigates between them makes a strict logical analysis of the theory (such as the “if-then” logic) very difficult.

Another important implication is that, since the concept of consciousness is linked to the concept of emotion, then consciousness occurs exclusively through an emotional reaction *for any kind of experience*. This implication is also recognized by Damasio, since the author states “no set of conscious images of any kind and on any topic ever fails to be accompanied by an obedient choir of emotions and consequent feelings” [2, pp. 182]. To analyze that, let’s take the conscious experience of red as an example. According to the theory, this experience is, above all, an emotional experience. According to the 2010 theory, we can say that when we see a red object, this sensory information changes the original status of the externally directed sensory portals maps (the body by itself), in addition to changing the master organism maps, since the organism needs to change its posture to capture the object, and, following the theory, it must also somehow cause changes in the master interoceptive maps, that is, the experience of red causes changes in the physiological state of the internal organs. *The perceptual experience of red is an emotional experience*. And, as discussed above, the red stimulus must cause an emotional reaction in the body whose changes are perceived in the form of a feeling, which, in turn, must cause another emotional reaction whose perception is ultimately the conscious experience of red. As it can be seen, following the conceptual implication above, every conscious experience must happen *through* the body *twice*.

Damasio [1, pp. 8] states that the body is the theater of emotion, which is emphasized in the 2010 book. So, since feeling is the perception of the body during an emotional state and consciousness is feeling (of a feeling), then every conscious experience also has the body as its theater. And here I am not just talking about embodied cognition. Saying that any conscious experience happens through emotional reaction in the body means that there is no direct cognitive trigger for any conscious activity *per se*, that is, although Damasio’s theory admits that these reactions also happen through body images (even physical changes in the body are only felt through the mediation of these images), these changes must also occur in the *physical body*, so a direct cognitive trigger is not theoretically accepted by Damasio’s theory of consciousness. Thus, even when we believe we have a conscious experience that does not theoretically requires an emotion reaction, such as the experience of red, it also requires body changes due to an emotional reaction to be

consciously experienced. Let's take another example. When someone tells you that a loved one has passed away, first of all the brain must make a cognitive appraisal of the statement, which requires several cognitive processes, such as attention, memory, language processing, and so on. But according to the theory, none of these processes becomes conscious before the changes in the body (both in the body maps and in the physical body), that is, there is no direct cognitive trigger, the body must react to this information before we become aware of both what was said and the emotion it caused. So it would also happen for what we are thinking and imagining right now. The conscious experience of the words you are reading right now is given by this same mechanism (through the emotional reaction in the body maps and the physical body).

As it can be seen, the concepts and definitions used by Damasio elaborate a web of numerous theoretical problems, where one concept defines the other at the same time that it defines the first, giving rise to circular explanations, in addition to giving rise to implications that are far from parsimonious.

2 *The scientific implications*

Bosse and colleagues [11] tried to formalize the concept of *feeling a feeling* proposed by Damasio [1]. However well-intentioned the attempt by Bosse and colleagues was, they took Damasio's concept of second-order maps without analyzing the theoretical problems of the concept of "feeling a feeling" itself, that is, without seeking to evaluate whether or not this concept can be taken objectively by empirical research, so much so that they did not even provide a model with two levels of "feeling", since this concept, taken by itself, requires an emotional process at two levels, as discussed above. Any scientific concept that can be applied empirically must be direct, objective, and parsimonious, and cannot be circular or ambiguous ([4], [10]). And, as we have seen above, it is not the case with Damasio's theory of consciousness.

Any scientific theory must provide solid concepts for empirical modeling. And, following our case here, Damasio's theory should provide a theoretical model that, in addition to explaining consciousness, should also provide tools for its prediction (e.g., given determined neural activity, it is likely that the participant is having a conscious experience). However, this particular model does not provide a neural model by which consciousness can be *directly* inferred (observed) based on a particular model of consciousness.

But before analyzing Damasio's case, let's look at another neural model of consciousness as an example: Dehaene's model of *global neuronal workspace*. It must be clear that I am not advocating Dehaene's model of consciousness here, in fact, I particularly have many differences with this model, but, as expected, I do not let those differences compromise my evaluation of its scientific merits.

Dehaene was primarily responsible for “converting” Baars' model of consciousness [13] into a neurobiological model of consciousness ([14], [15], [16]). According to Baars [13], consciousness is characterized by competition (filtering), an increased system activity, and the broadcasting and re-broadcasting of information. Dehaene's model provides a parsimonious and falsifiable explanation of how the brain creates consciousness (what the author calls signatures of consciousness), linking the concepts addressed by Baars to *empirical concepts* such as long-distance cortical connections, amplified brain activity (especially in the prefrontal and parietal areas), ignite of a late P3, stronger gamma waves, and brain wide-synchronization. We cannot forget that the correlative links made between the “high-order concepts” (such as conscious activity) and the “low-order or empirical concepts” (such as neuronal synchronization) are part of the same conceptual model. The empirical concepts are signifiers that address physical phenomena in the world (address the observation). Towards this particular example, Dehaene proposed a model that linked the “high-order” (computational) concepts proposed by Baars to empirical concepts that arose from empirical investigation (data), for example, linking the concept “increased system activity” to “stronger gamma waves, and brain wide-synchronization”, forming then an integrated whole, by which we are able to understand conscious activity through its neural correlates.

The empirical concepts proposed by Dehaene explain the neural mechanisms of consciousness comprehensively, that is, this model explains both the normal and pathological functioning of consciousness (such as blindsight, anosognosia, as well as any conscious impairment due to brain lesions), which also includes a full explanation for perceptual illusions. In addition, this model propose tools to predict conscious activity, that is, if one shows the neural patterns described above, it is very likely that this person is having a conscious experience. Through this model we can observe conscious activity “directly”, that is, if someone is showing determined neural activity, it is probable, according to the model, that this person probably has conscious activity. Here it must be clear that I am not considering that we can actually “see” consciousness

through neural activity, but, instead, that we can *infer* conscious activity through neural activity according to a particular model of consciousness. Any scientifically accurate model of consciousness must provide this information ([3], [4], [10]).

On the other hand, Damasio does not provide a neural model that is intrinsically related to his conceptual model of consciousness. *I am not saying that Damasio does not provide any neural model for conscious activity*, which is not true. I am saying that the author does not provide a neural model according to the conceptual model provided by himself, as well as according to the intrinsic conceptual implications resulted in the analysis of his model of consciousness, such as direct and observable functional links between a particular concept (and its conceptual implications) and its neural underpinnings [17]. For example, Damasio should explain how the brain gives rise to a feeling of a feeling (which is a conceptual implication directly related with his model of consciousness) and how it is linked to particular empirical concepts that support his claim (in a parsimonious way). Since Damasio's model of consciousness is, above all, a neuroscientific model of consciousness, it is not just the parsimonious and logical integration between the "high-order" concepts that matters, such as the link between "emotion" and "consciousness", it is also required to establish parsimonious and logical links between the "high-order" concepts (such as feeling a feeling) and its corresponding empirical concepts (neural model), so that it is possible to *directly* observe (infer) the *link* between the conceptual model and its empirical mechanisms without the need to abstract the link between the "high-order" concepts (such as feeling) and the empirical concepts (such as insular activity). And, one of the most important things, this explanatory model must be parsimonious and falsifiable. To analyze it, let's take the theoretical implications discussed above: the feeling of a feeling, and the (emotional) perception of (an emotional) perception, which are, as discussed above, direct conceptual implications of Damasio's conceptual model of consciousness.

As commented above, claiming that consciousness is a feeling of a feeling requires two levels of an emotional process (and, consequently, two levels of a feeling process), thus, Damasio should provide a neural model of how it is possible, that is, how an emotional process in the brain can occur on two levels, so that it would be possible to establish links between the high-order concept of "feeling a feeling" and particular empirical concepts, in a way that it would be possible to directly infer (observe) the occurrence of the high-order concept (such as conscious-

ness or feeling a feeling) through its neural underpinnings (empirical concepts) proposed by the model.

It is important to realize that requiring two levels of an emotional process is not the same thing as an emotion that causes another emotion or an emotional experience which is increased, as Jorg Ancrath's "angry for being angry", but rather an affective reaction divided into four levels to become conscious⁶, that is, an emotional reaction that is *felt as a feeling*. Thus, conceptually speaking, Damasio should provide a neural model (empirical concepts) that is directly compatible with this definition of consciousness (high-order concept). And the same model should provide an explanation for the theoretical implication of this definition (feeling a feeling): the perception of an emotional state of the perception of an emotional state (or an emotional perception of an emotional perception, or just a perception of a perception), explaining how it is possible for an emotional perception to give rise to a feeling, and how this emotional perceptual processing can occur on two levels in a way that the emotional perception of an emotional perception gives rise to consciousness. And, above all, this neural model must show how consciousness occurs in function of these neural processes, and why it would be the most parsimonious explanation for this phenomenon. We must be able to directly observe (infer) these processes proposed by the theoretical model at the level of neural functioning, that is, there must be a set of neurobiological processes (empirical concepts) directly related to the concept of "feeling a feeling" and its theoretical implications (an emotional perception of an emotional perception). These concepts must be *observable neurobiologically*.

Moreover, the neural model, in addition to being compatible with the conceptual model, must also provide tools for predicting the phenomenon, that is, when one shows the neurobiological processes predicted by the neural model (empirical concepts addressed by the model), it is very likely that this person is having a conscious experience. And, furthermore, the neural model must withstand empirical investigation, that is, how empirically accurate the model is, and whether it is *highly* correlated with the neural patterns shown by a participant who is having a conscious experience. For example, we must be able to attest the multiple levels of an emotional processing for any kind of conscious experience (the model must be testable and, consequently, falsifiable).

Another issue is that both the high-order (such as feeling a feeling) and empirical concepts (the neural model) provided by Damasio's theory of consciousness should be parsimonious, that is, it should provide sim-

ple and testable explanations for the phenomenon under investigation, so that any reader with scientific training could evaluate the model as a convincing and competitive explanation of consciousness. However, as discussed above, to do so the model should not imply any kind of circular or overcomplicated explanation, which unfortunately happens with Damasio's theory of consciousness, as seen in the first section.

Therefore, we should be able to observe how Damasio's high-order concepts is *directly linked* to a neural model (empirical concepts) that both explains and predicts conscious activity at least in any human subject, under normal and pathological circumstances, forming an integrated scientific conceptual model of consciousness.

3 Suggestions of redefinition

So what changes should Damasio's model undergo in order to minimize the theoretical (and therefore the empirical) problems that this theoretical model of consciousness has?

Conceptually speaking, the model would be clearer if there were different definitions of "feeling", such as three types of feelings, as the author did with the concept of "primordial feelings"⁷, which are not emotional feelings. Thus, although it is quite clear in Damasio's theory that the author is indeed approaching an affective type of feeling when approaching the concept of consciousness, perhaps the feeling that supports conscious experience should be reformulated into a non-emotional (non-affective) type of feeling. Thus, towards the concept of "feeling a feeling", consciousness could be a non-affective feeling of an emotional feeling, that is, a kind of emotional state that gives rise to a non-affective experience or non-affective feeling. But even so, the implication that all conscious experience is based on an emotional state would still exist. And, as we have seen, according to the model, every emotional state is given through the body, so every conscious experience would also only be given through the mediation of the body, which does not admit a direct cognitive trigger. Therefore, it would be important to deeply assess whether any kind of conscious experience is actually emotional. It may be interesting to cut off the concept of "feeling a feeling" and treat consciousness as a non-affective feeling exclusively.

And cutting off this concept of "feeling a feeling", the implication of "perception of perception" (or emotional perception of an emotional perception) would also cease to be a theoretical problem. There would be no perception of a perception in the brain, which is quite difficult to

be empirically corroborated (since it would require the realization of a perceptual processing at different levels, where each of them would be triggered by a respective emotional reaction). And, above all, both the conceptual duplication of “feeling a feeling” and “perception of a perception” would not give rise to the theoretical issue of how these processes at different levels should *necessarily* give rise to conscious experience.

Another suggestion would be the model to consider more deeply a bottom-up perspective beyond the top-down perspective used by Damasio ([1], [2]), that is, instead of just trying to infer the neural activity that supports consciousness through our experience (as feelings), it would also be important to deeply consider whether this “subjective” model is directly linked to a neural model of consciousness (whether the conceptual model can be directly inferred through a particular neural model), as in the case of Dehaene’s model presented above, since the empirical evidence is the only way to verify the conceptual model proposed by any theoretical hypothesis.

4 Conclusion

Here I tried to discuss the direct conceptual implications from the analysis of Damasio’s conceptual model of consciousness, without making any further interpretation or value judgment of the raw concepts of this model. Although from a personal point of view I greatly admire Damasio’s model of consciousness, the theoretical problems that his conceptual model of consciousness gives rise are undeniable. In general, I hope that the discussion developed in this paper will serve as a general example for the importance of a rigorous and scientific conceptual model of consciousness, providing tools for future theoretical and empirical approaches to this subject.

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Notes

- 1 Damasio does not make it clear whether primordial feelings are conscious or not. According to the author, primordial feelings are "(...) spontaneous reflections of the state of the living body" that (...) "result from nothing but the living body and precede any interaction between the machinery of life regulation and any object" [2, pp. 101]. So, since they result from the (sensation of) living body and are the basis of all emotional feelings, it is possible that they are at a subconscious level of the mind.
- 2 What already includes the concepts of "self in the act of knowing" and the "feeling of knowing".
- 3 Since consciousness is a feeling, and feeling is the perception of an emotional state, and the perception of an emotional state is a feeling, we can establish these implications through simple conceptual inference.
- 4 Consisting of the master interoceptive maps, master organism maps, and maps of the externally directed sensory portals [2].
- 5 With except of primordial feelings. However, according to the author, this kind of feeling does not give rise to consciousness directly.
- 6 An emotion that gives rise to a feeling that gives rise to an emotional reaction to then give rise to a secondary feeling, since the concept of feeling depends on the concept of emotion.
- 7 Which are defined by Damasio [2] as "(...) spontaneous reflections of the state of the living body" that (...) "result from nothing but the living body and precede any interaction between the machinery of life regulation and any object" [2, pp. 101].

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