Decoding Consciousness and Bioethics

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Perspectives on Consciousness and Its Altered States

Edited by

Alberto García Gómez
and Alberto Carrara

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PREFACE

ALBERTO GARCÍA GÓMEZ
& ALBERTO CARRARA

Human consciousness is one of the most fascinating mysteries sheltered by the brain, evidencing that what happens between our ears is more important than what happens outside our skull. Besides, how do we know whether someone other than ourselves is conscious? Are the Origins of Consciousness an Emergence or Divine Intervention? Is there a relationship between states of consciousness and the perception of beauty? Why should the law be concerned about consciousness or altered states of consciousness?

While these questions seem philosophical or purely theoretical, nevertheless they require a scientific evidence-based approach in order to be able to give answers, undertake certain actions, and understand their multiple implications. Defining altered states of consciousness and distinguishing the main neuropathological states from a clinical outlook are key tasks to help tackle other aspects of human consciousness. To contemplate answers to these questions and grasp the fundamental role of consciousness in our being human and self-awareness of our very own existence, our internal thoughts, as well as how we perceive others and the world, the 19th Summer Bioethics Online Course was dedicated to the fascinating theme, "Bioethics and Consciousness: an interdisciplinary and interreligious reflection on an essential dimension of the human person".

The summer course took place on July 2-3 and 9-10, 2021, and was organized by the Faculty of Bioethics in collaboration with the UNESCO Chair in Bioethics and Human Rights established at the Pontifical Athenaeum Regina Apostolorum and the European University of Rome. The course was coordinated by the Subgroup on Consciousness housed within the Neurobioethics Research Group, with the participation of researchers from other groups.

The theme of consciousness is at the center of contemporary bioethical debates. At the early stages of human life, the absence of self-consciousness is considered by some ethicists a valuable criterion in order to confer moral status to a human organism, i.e. the status of personhood, whereas others

argue that personhood is naturally acquired at the moment of conception. Conversely, it is argued that at the final stages of human life, an apparently irreversible and undetectable loss of any outward signs of consciousness is a sufficient condition for considering these patients apt to become organ donors. However, recently developed neural signal detection methods allow us to detect consciousness in patients with brain damage who are otherwise considered unconscious and unreachable. Of the utmost importance is the need to properly distinguish the precise condition of these patients and to make an accurate clinical diagnosis: persistent or permanent vegetative state, coma, minimally conscious state, and locked-in syndrome.

Moreover, two tensions are widespread in neuroscientific, philosophical, and social contexts. On the one hand, there are attempts of reductionism, whether in the merely neurobiological sense or in a functionalist sense. On the other hand, many substitutional approaches have emerged, seeking to identify personal self-consciousness with digitizable information or data. Therefore, further research is needed, as well as exploration from different perspectives regarding what is to be human and the role of consciousness in defining human beings.

The 19th Summer Bioethics Online Course was an interdisciplinary and interreligious study of human consciousness with the aim of understanding the plurality of meanings corresponding to the multi-layered complexity of personal dimensions of which it is composed. It culminated with the preparation and the publication of this book offering a comprehensive study of human consciousness from philosophical-anthropological, theological-spiritual, and socio-legal perspectives.

This is a collection of thought-provoking contributions of international experts concerning the role of bioethics in fostering dialogue between different, but related, fields of study concerning human consciousness and its altered states. Furthermore, scientists and various field experts, through some exceptional and rare outlooks, address consciousness by placing emphasis on an ethical reflection upon human consciousness and states of consciousness in an attempt to grasp its origin, the way it manifests, and its socio-legal relevance. Through a unique multidisciplinary approach, this book highlights the need to foster dialogue between bioethics and different states of consciousness for an ethical reflection through cognitive neuroscience.

CONSCIOUSNESS AND THE SENSE OF AGENCY IN PSYCHOLOGY AND NEUROSCIENCE

MICHELA BALCONI

Abstract

This Chapter's principal aim is to find the causal explanation of action and the mechanism of conscious control of action implicated to represent the sense of agency, with due considerations for specific implications of the sense of agency for consciousness, self-consciousness, and action. Secondly, we analyze intentions for actions and for agency in the present and explore the role that intentions have for agency representation in relationship with initiation, control and, execution of action. Thirdly, we focus on the concept of the "illusion of agency", intended as a critical perspective on the concept of free choice and overt representation of self for action. Lastly, the sense of agency as a precursor of empathic and social behavior is considered, in the light of mirror mechanism and simulation approach.

1. To be an agent: What is the "sense of agency" *vs* consciousness?

The *sense of agency* is an increasingly prominent field of research in psychology and cognitive neurosciences with specific considerations for theoretical and empirical implications of the sense of agency for consciousness, self-consciousness, and action. The preliminary step is to distinguish the awareness of our own action, and the sense of agency, since they represent different elements of self- awareness and self-monitoring in execution of action. Despite their distinctiveness, they contribute together to cause or generate an action or a certain thought in the stream of consciousness. The purpose of this discussion is to understand the causal explanation of action and the mechanism of conscious control of action implicated in normal and pathological states.

The concept of agency includes a tentative list of features and functions such as awareness of a goal, of an intention to act, of initiation of action and of movements, sense of activity, of mental effort, of control, and the concept of authorship. It remains unclear how these various aspects of phenomenology of action and agency are related, to what extent they are dissociable, and whether some are more basic than others. The sources of these features and functions should be specified and how they relate to action specification and action control mechanism. As well, the experiences of intentionality, purposiveness, and mental causation should be considered.

The primary question is *how do I know that I am the person who is acting* (i.e. moving, speaking, thinking)? Psychology and neuroscience of action show the existence of specific cognitive processes allowing the organism to refer the cause or origin of an action to its *agent* (Georgieff & Jeannerod, 1998). This sense of agency has been defined as the sense that I am the one who is causing or generating an *action* or a certain *thought* in my stream of consciousness (Gallagher, 2000). As such, one can distinguish self-generated actions from those generated by others, giving rise to the experience of a 'self-other' distinction in the domain of action and thus contributing to the subjective phenomenon of self-consciousness.

From a neuroscientific perspective, the presence of different neural correlates for the sense of agency may reflect different indicators for agency, sub-processes or levels of agency processing. The primary brain areas involved in the sense of agency are the ventral premotor cortex, the supplementary motor area (SMA and pre-SMA) and the cerebellum, which are housed in the motor system. Moreover, the dorsolateral prefrontal cortex, the posterior parietal cortex, the posterior segment of the superior temporal sulcus, and the insula are implicated in the sense of agency. The primary brain areas constitute a network of sensory-motor transformation and motor control, whereas the second rather represents a set of association cortices implicated in various cognitive functions: for example, the prefrontal cortex could be relevant in various cognitive functions, such as behaviour in the temporal domain (Vogeley & Kupke, 2007). More generally, motor system regions may subserve executive functions, whereas heteromodal associative regions subserve supervisory functions.

2. A preliminary distinction: action and awareness of action

We assume that the processes through which the component elements of the phenomenology of action are generated and the processes involved in the awareness and control of action are strongly interconnected.

Nevertheless, what is an action? For Marcel (2003), it is not only a bodily motion or a simple reaction to an external or internal stimulus. An action is thus not a mere bodily movement, but consists of two parts, the *movement* and the *intention-in-action* that causes that movement (Searle, 1983). Action has a certain *goal, end-point or effect*. The notion of intention can be distinguished as something of which an action is a realization from the notions of intentional directedness and of content. Quite apart from being a realization, action is defined by its directness, having definite endpoints and some degree of *voluntariness*. For this reason, it is necessary to distinguish an action from a habit and from whether it is caused in the mechanical sense. A movement or behaviour will be seen as an action to the extent that it is "agentive", indicating that it is self-generated and at one's will.

Physical actions and *mental actions* are distinct; the former, in general, involves the production of causal effects in the external world through movements of the body of the agent, while mental actions, such as pretending or remembering a name, do not. Firstly, we initiate an analysis of the phenomenology of physical actions, in terms of a sense of oneself as a physical agent producing physical effects in the world via its bodily interactions with it. Jeannerod (2006) holds a componential view of action, and argues that bodily movements are merely the overt part of actions that also necessarily involve a covert, *representational* part. It can be underlined that an action can be distinguished from a merely bodily movement based on the fact that the individuals are in some particular relation to the movements of their body during the time in which they are performing them and that this relation is one of *guidance*. Secondly, the agent of an action is aware of the virtue of controlling the person's action, rather than on the basis of observation or introspection (Balconi & Santucci, 2008). Rational control is the relevant notion of *control*, where this is described as a matter of practical reasoning leading to action.

Thirdly, we can distinguish *what* and *how* an action is performed, or the goal pursued and awareness of the means employed to achieve this goal. Specifically, the phenomenology of action itself concerns what is being done. About *what*, actions have a goal and they involve an element of *purposiveness*. In other words, we are aware, to some degree, that we are engaged in purposeful activity. About *how*, beyond being aware of the goal of our action, we have awareness of the specific manner of achieving the desired result.

We have previously stated that there is a constitutive link between the agent's awareness of an action and a sense of agency. Nevertheless,

empirical evidence suggests that, although *awareness of action* and *sense of agency* normally go together, they can sometimes come apart.

Here we focalized whether awareness of an action performed by oneself is sufficient to give one the sense that it is one's own action. As pointed out in several ways by Dennett (1991), we are not authoritative or incorrigible as to our conscious experience. There are many examples where people are unaware of their phenomenology or are unable to be aware of it. For example, attention constraints render it hard to be aware of all of one's phenomenology at a time. Alternatively, one may be generally aware of something without knowing exactly what the experience consists, as it happens for emotional experience. In other words, I may be aware of performing a certain action without knowing the exact form the content of that awareness takes.

Clinical data suggest, for example, that in schizophrenia the sense of alien control derives from the fact that patients are aware of the content of the action they execute but deny the agent of this action (see also chapter 8; Jeannerod, 2009). Similar dissociations between awareness of action and sense of agency can also occur in non-pathological conditions. Normal subjects can experience a sense of agency for actions someone else is doing in the *illusion of control*, and do not experience a sense of agency for something they themselves are doing in *illusions of action* projections (Wegner, 2002).

Many experimental investigations of the sense of agency in comparison with awareness of action have manipulated the sensory, particularly visual, consequences of a subject's actions. In a classical paradigm, a subject was asked to draw a line on a paper by seeing either their own or, unbeknownst to the subject, an "alien hand" (for example experimenter's hand). The alien hand's movements spatially deviated from the subject's own movement. Generally, subjects adjust their own actual movement to the false visual feedback unaware of the adjustment (Daprati *et al*., 1997; Nielsen, 1963; Slachevsky *et al*., 2001). However, the sense of agency cannot be considered as being solely influenced by *visual reafferences*. Only a few experiments manipulated internal signals such as proprioceptive or motor signals. If subjects are instructed to explicitly evaluate self-other agency, internal signals, such as intentions, as much as external signals, such as visual re-afferences, may influence the subject's judgments.

Therefore, what are the main differences between the awareness of action and the sense of agency for self?

We could not reduce the sense of agency to the *sense of ownership* of one's body despite the wide importance of their interactions (Gallagher, 2000). An action is not only perceived but it is also initiated, controlled or

inhibited. Thus, we have to take into account the dimension of the agent who is the *cause* of the action. In this perspective, I may not be the agent of all my bodily movements, such as passive movements when, for example, someone else raises my arm for me. It is only in a second sense that passive movements are mine because all I own, in these cases, is the moving body. Therefore, *to be able to self ascribe it* ("I am moving") should be added to the neutral state (performed action).

Thus, the sense of agency is intimately linked to the *sense of causality*, and it results from the intentional binding between *intentions*, *actions,* and *sensory feedback*, which are attracted toward each other, reinforcing the perception of their causal relations. Therefore, in order to understand actions, we need to analyze their causal antecedents, that is what initiates the occurrence of the action ("why am I writing") and what specifies the content of the action ("why I am doing it so"). Moreover, actions are not only preceded by an intention independent of the execution, they are also continuously represented in the *intention-in-action* till the end of the action. The sense of agency is not only the experience of an act of will distinct from bodily movements, but also the *experience* of the *continuous control of action execution* (Balconi, 2010; Crivelli & Balconi, 2010).

3. The key determinant mechanisms for the sense of agency

A large body of evidence suggests that the sense of agency, especially the judgement of agency, strongly depends on the degree of congruence versus incongruence between predicted and actual sensory outcomes (Fourneret & Jeannerod, 1998; Vosgerau & Newen, 2007). Congruence of the predicted with the actual outcome would lead to the attribution of the sense of agency to oneself, whereas incongruence would indicate another agent as the cause of an action (Balconi, 2010; Crivelli & Balconi, 2010).

Some cues must be considered as contributing to the sense of agency or its disruption: efferent or central motor signals; reafferent feedback signals from proprioception; vision, actions intentions or thoughts relevant to prior-action; primary knowledge, and cues from environmental context.

The predominant explanation for the sense of agency of our own actions is the "central monitoring theory" or "*comparator model*" that postulates monitoring central and peripheral signals arising as a consequence of the execution of an action. This theory holds that the (central) efferent signals at the origin of an action are matched with those resulting from its execution (the re-afferent signals) and that this comparison provides cues about where

and when the action originated (Blakemore, Wolpert and Frith, 1998; Blakemore *et al*., 2001; Frith, 1992).

Synofzik *et al*. (2008) observed in a recent discussion on the general validity of the *comparator model* that the sense of agency can be determined by factors that are independent from any specific comparator output at the level of action control and action perception. Awareness and attribution of agency critically rely on *higher-order causal inferences* between thoughts and actions on the bases of belief states and intentional stances (Wegner, 2002). A clear example of this fact is that we often perform movements acknowledging that they were incongruent to our prediction. Yet we do not attribute their cause to an external origin, but still recognize ourselves as being their agents. In this case, agency is inferred on the basis of *higher-order cognitive processing* exploiting environmental and contextual cues, but is not evoked by an efference copy or any comparator output.

As an alternative to the comparator model, a second model, *simulation model*, was proposed (David *et al*., 2008), which proposes a functional role for the motor system. While predicting the behaviour of others, we use our own experiences to simulate those of others (Goldman, 1989). Nonetheless, simulation theory, assuming shared representations for self and other, cannot explain why we normally do not confuse our own and others' actions. The mirror neuron system does not provide an explicit representation of other agents, and an additional mechanism must be assumed, realizing the representation of myself or someone else as the agent.

The determination of the sense of agency should be properly linked to other constructs, and underlining this is the main factor that directly contributes to this sense of agency — the *intention* of action. More generally, we may state that three principal mechanisms intervene in defining the sense of agency for an actor: the *sense of intentionality* or intentional causation, based on the efferent binding of an action and its effect; the *sense of initiation* that binds intention and movement onset; *the sense of control* of actions and thoughts. These three points will be examined thoroughly.

Haggard and colleagues showed, through several experiments, evidence that supported the idea that voluntary, but not involuntary, movements and movement consequences are temporally bound together in conscious awareness (Haggard & Clark, 2003; Haggard *et al*., 2002). Experimental subjects judged the perceived onset of voluntary movements as occurring later and the sensory consequences as occurring earlier than it was actually the case. Once an intention-to-act was formed, actions and action consequences are more likely attributed to oneself even if they were

externally generated. It is intended as sense of intentional causation, and intentional binding phenomenon that is valid for themselves and observed action in the others. This was considered as the tendency of subjects to naturally perceive themselves as actually causally effective.

Moreover, Wegner and colleagues (Wegner & Wheatley, 1999) investigated the influence of action-relevant thoughts that increased the feelings of self-efficacy over movements, where intentional binding is represented as a link between intention and action and it serves many functions. It may be important during motor learning, for example (Haggard, 2003): I can learn to correct an error if I can associate it with the corresponding intention. It may be useful in the construction of the agentic-self, since subjects may have the ability to relate the content of their intentions to the actions and environmental consequences that they produce. In sum, this concept is directly linked to the tendency of subjects to naturally perceive themselves as *causally effective* and *proficient* (Wegner & Sparrow, 2004).

It was observed that the intentional binding may be related to increased activation of the supplementary motor area (SMA) or pre-SMA, and insula. These brain areas have been associated with awareness and execution of self-generated actions, action preparation, and the subject's own intention-to-act (Cunnington *et al*., 2006). Evidence for the relevance of the supplementary motor cortex to the experience of intentional actions also comes from neurological conditions: lesions in the SMA have been associated with the so-called anarchic hand syndrome, wherein patients experience unintended actions of their own hand, as if the hand had an "independent will".

Generally, the sense of intentional causation *cannot be the unique and primary* factor of the sense of agency. That is, it is a necessary, but not sufficient, component to generate the sense of agency insofar as it can be present when one observes actions performed by other agents. For example, we often cannot remember our prior intentions and yet do not disown the actions. It is not clear how this effect can effectively support the sense of "I" for action, since binding effect and sense of intentional causation also occur when we observe other people's actions.

4. Self-consciousness and the illusion of agency?

There are several senses and kinds of self-consciousness — some are primarily awareness of oneself as a mental entity whereas others are physical entities. Some are long-term and persist overtime whereas others are more occurrent and dwell in the present-tense. Some are detached

awareness of oneself and others are more immediate or immersed. One form of self-consciousness is the sense of self as a physical agent; that is the sense of being an entity that exists in the physical world and has physical effects via its physicality. However, there is also a second sense of self-consciousness, a mental self that is the non-physical realization, such as the experience of one's intentions as one's own.

The concept of consciousness, whether physical or mental, is or is not necessary for the sense of agency? Some *but not all* of the processes of action production and agency depend on *conscious experiences*. In fact, generally a basic form of self-consciousness (awareness or the attribution of who caused the action) is not informed by conceptual thoughts or reflective processing (Gallagher, 2000).

Thus, do we conclude that agency is an unconsciously determined illusion? In general it should be considered that it is important for people to feel that they are in control of their actions. Subjects are profoundly interested in maintaining the fiction that they have conscious will. This illusion seems to have positive effects concerning health (Kühn & Brass, 2009) and retrospective construction of the feeling of *free choice* occurs especially in cases when we are uncertain about the degree of deliberateness of an action.

Some important distinctions should be made also about the consciousness of *self in action* and the consciousness of *action per se*. The latter is related to the terms of goals of the action. Self-awareness of the goal targeted is one way of being conscious of the action undertaken to reach that *goal*. The former is related to being conscious of oneself as causal self.

In addition, a contrast may be observed between *overt* and *covert* aspects of the goal. Whereas the detailed target of the movement remains outside consciousness, the overt goal of the actions, concerning the selection of objects, their use and adequacy for the task under execution etc., can be consciously represented. Nevertheless, the covert aspects of the goal can be consciously accessed. To demonstrate this, subjects in an experiment were instructed to indicate the moment when they became aware of a change in the configuration of a target occurring during their movement. For example, when driving a car, we have to make a change in trajectory because of an unexpected obstacle in the path: we consciously see the obstacle after we have avoided it (Castiello *et al*., 1991; Jeannerod, 2006). In general, the awareness of a discordance between an action and its sensory consequences emerges when the magnitude of the discordance exceeds a certain threshold.

The view of consciousness that arises when it is related to action is a lengthy process that can appear only if adequate time constraints are fulfilled. Secondly, the type of consciousness that is linked to the experience

of embodied self is discontinuous. It operates on a moment-to-moment basis, and it is bounded to particular bodily event. The embodied sense of agency carries an implicit mode of action consciousness, where consciousness becomes manifest only when required by the specific situation. The information derived from such an experience generally has short life and usually does not survive the bodily event for very long.

On the contrary, the sense of consciousness experienced when executing an action gives us a sense of continuity, arising from the belief that our thoughts can have a causal influence on our behaviour. Nevertheless, we generally ignore the cause of our actions, while we perceive ourselves as causal. The dissociation between the two levels of the self, the *embodied self* and the *"narrative" self*, has been considered as the origin of an illusion: the narrative self tends to build a cause-effect explanation, whereas the embodied self, by avoiding conscious introspection, reaches simpler conclusions about an action, its goal and its agent by monitoring on-line the degree of congruence between central and peripheral signals generated by the action. In general, the role of consciousness, both short- and long-term type, should be to ensure the continuity of subjective experiences across actions.

5. The sense of agency for self and for others: the "perceptual" basis of empathy

Some processes are in relation to the sense of agency, such as *imitation* and *perspective-taking*, and more basic, domain-general processes such as *executive functions* and attention. Imitation and perspective-taking also imply the distinction between oneself and others. Both, a first-person perspective and a sense of self agency, have been proposed as key constituents of self-consciousness (Gallagher, 2000; Metzinger, 2000). Moreover, viewpoint-specific spatial cues have been discussed as indicators for the sense of agency — knowing where the body is and what tools are available helps to determine what the person could have authored. Other actions are generally associated with allocentric, as opposed to egocentric, representations.

Auditory stimulation was used in an experimental context to illustrate the dissociation between self-generated from other-generated action. Evidence from studies in human subjects suggested that auditory stimuli are processed differently depending on whether they are a consequence of self-generated action. Shafer and Marcus (1973), for example, showed that cortical potentials evoked by self-produced tones have significantly smaller amplitudes and faster component latencies than those produced by a

separate machine. More recently, Blakemore, Rees and Frith (1998) found that both, predictability and self-generated action, affect event-related potential (ERP) modulation. The researchers demonstrated that different cortical areas are implicated in predictability versus self-generation of action, showing that the effect of hearing an auditory stimulus depends not only on its predictability, but also whether the stimulus is produced by self-generated movement. The two effects are not simply additive, since there is a modulatory effect of motor activity on stimulus predictability.

In line with previous considerations, according to the transparency property of subjective experience states that is relatively *transparent* or obvious to the subjects, the states disclosed by bodily experience are or are not at the same type as the states they can observe through external perception (O'Brien, 2003). At a certain level of conscious experience, others' sensations and actions are presented to subjects similar to their awareness of one's own sensations and actions.

The transparency effect explains how empathy, imitation, and coordination are possible, insofar as these competencies depend on the perceptual ability to compare one's sensations and actions with others'. A second relevant aspect concerns the type of knowledge underlying both, our own and others' behaviour; the fact that there is an asymmetry between the first-person and the third-person perspectives: by observing others' behaviour, I may be aware of their sensations and actions from the outside, but I do not need observation in my own case since I know from the "inside" that, for example, I am in pain.

Nevertheless, *how* the bodily experience of sensation and action may be transparent with respect to external perception is an important question to be answered. Recent models attempted to find a solution without supposing different modes of perception for internal versus external experience, or that they involve different ways of experiencing the world. Rather, the basis for the sense of ownership is a constitutive relation between bodily experience and its intentional object, which makes such experience implicitly *reflective* (Dokic, 2003).

Moreover, shifting the object of analysis from that of self-perception to the other-perception, recent models proposed a substantial analogy between the two levels, stating that *social cognition* (or cognition of others from both perceptual or action point of view) may be considered a sort of *extended field* of the subjective experience.

Specifically, Gallagher (2008) wants to defend the role played by direct perception in social cognition. A theory that employs direct perception is quite different from the standard psychology and cognitive science theories of social cognition — the *theory theory* (TT) and *simulation theory* (ST).

These two dominant theories both posit something more than a perceptual element as necessary for our ability to understand others that is "mindread" or "mentalize". In contrast, certain phenomenological approaches, as direct perception model, depend heavily on the concept of perception and the idea that we have a direct perceptual grasp of the other person's intentions, feelings, thoughts, etc. Both TT and ST start with perception understood as a third-person process, as an observation of the other person, but the addition of certain cognitive elements to each perception allows us to understand the other that we observe. Specifically, TT contends that the way in which we understand another person depends on a practice of mentalizing, wherein we theorize how mental states inform the behaviour of others. ST claims that such a theory is not needed because our own mind serves as a model that can simulate the other person's mental states. In this model, we observe another person's behaviour in specific environments, and by simulation we model their beliefs and desires as if we were in their situation.

On the contrary, the concept of inter-subjective perception involves a relatively smart process. It is stated that young infants are visually attracted to movement, particularly biological movements. More generally, infants vocalize and gesture in tune with the vocalizations and gestures of another person (Gopnik & Meltzoff, 1997). Without the intervention of theory or simulation, and in a non-mentalizing way, they are able to see bodily movement as expressive of emotion, as goal-directed intentional movement, and to perceive other persons as agents. This should not require advanced cognitive abilities, inference or simulation skills: rather it is a fast, automatic, and highly stimulus-driven perceptual capacity (Scholl & Tremoulet, 2000). This general model also supposes that the mirror resonance mechanism (see Rizzolatti *et al*., 1996) may be thought of as a structural component of the personal process when it is a perception of another person's actions. In other words, it is hypothesized that mirror activation is not the initiation of simulation, rather it subtends a direct inter-subjective perception of what the other is doing (Gallagher, 2008).

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NEUROBIOETHICS OF CONSCIOUSNESS: A MULTIDIMENSIONAL STRATIFICATION OF HUMAN CONSCIOUS EXPERIENCE

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Abstract

Consciousness has been discussed – and still will be – more than any other dimension both in neuroscience and in philosophy. Together with free will, conscious experience represents one of the two anthropological concepts par excellence that shape and form the human person. Neurobioethics is the systematic and informed reflection dealing with both neuroscience and its interpretations. Therefore, it is a philosophical endeavor focusing on neuroscientific data. Neurobioethics of Consciousness embodies an interdisciplinary consideration of the Neural Correlates of Consciousness to deepen both the nature and the structure of our complex identity experience. In this chapter, a multidimensional stratification of human conscious experience is proposed based on a circular top/down and bottom/up approach that highlights the intrinsic and irreducible embodiment and embeddedness of our mind, body, and environment. The Neurobioethics of Consciousness' approach adopted here combines the first-person experience of a unified living organism with the third-person perspective of the embodied and embedded human activities of conscious experience. The stratification depicted in this chapter can be helpful in order to better understand our fragile human sense of identity and ownership, which are the premises and the 'matter' of our free voluntary experience and the basis of personal responsibility.

1. Introduction

Undoubtedly, clinical practice and human self-understanding have both benefited from contemporary neuroscientific developments. Progress, in order to truly serve people's welfare, needs to be guided, directed, encouraged, corrected, and improved. This task presupposes a certain view

of the nature of the human person, that is, an underlying anthropology[1]. Not all the conceptions of human beings and their constitution will convert themselves into clinical, economic, political, social, and cultural conceptions that promote their integral development[2].

Currently, interdisciplinary research on the nature of the human person includes not only the traditional disciplines of philosophy, psychology, sociology, and medicine, but also empirical results of various neurosciences and neurotechnologies and their respective interpretations. This fruitful dialogue has coalesced into a single concept, that of neurobioethics[3]. Neurobioethics is the systematic and informed reflection dealing with both neuroscience and its interpretations. Therefore, it is a philosophical endeavor focusing on neuroscientific data.

There are two anthropological concepts that function as "catalysts" in neuroscientific research and in the corresponding philosophical-cultural (and mass media) thought of our postmodern day: the concepts of *consciousness* and *freedom* (or free will). Not surprisingly, a clear understanding of the underlying meanings of these terms shapes and constitutes our vision of the human person. We are faced with two paradoxes. If, on the one hand, the reality of consciousness (understood as subjective experience, i.e., the first-person experience of oneself as a bio-psycho-socially integrated being), seems to be a fact, or rather, the "central reality of human existence"[4] (the peculiarity that allows us to "build" our own and unique personal identity), conversely, we often tend to reduce it to an epiphenomenon of neuronal states, activated in the correct mode. The same paradox is also found in the reality of free will: on the one hand, it is considered essential and necessary (the foundation of social and responsible

[1] Fuchs T (2006). Ethical issues in neuroscience. Curr Opin Psychiatry 19 (6): 600.
[2] In English, the concept of 'personal integral development' is condensed by several authors in the term 'flourishing'. The American neurobioethicist James Giordano, for example, has linked this concept to the Aristotelian-Thomistic matrix of contemporary neuroethical thought to identify a set of principles for 'proper human flourishing'. See JR, Giordano J (2014). A Principled and Cosmopolitan Neuroethics: considerations for international relevance. Philos Ethics Humanit Med. 9 (1): 1-13.
[3] The term 'neuroethics' dates back to 1973, although its characterization and diffusion has begun to take shape and texture since 2002. Pontius A A (1973). Neuro-ethics of "walking" in the newborn. Percept Mot Skills 37 (1): 235-45. Marcus S J. ed. (2002). Neuroethics: Mapping The Field. Conference Proceedings. May 13-14, 2002 San Francisco, California. New York, The Dana Foundation.
[4] Tononi G, Koch C (2015). Consciousness: here, there and everywhere? Phil Trans R Soc B 370: 1-18.

actions), yet on the other hand, it is identified (or eliminated[5]) with the functionality of certain areas or networks and hubs of the brain. The extremes of these two paradoxes arise from the same popular contemporary "trend": localizationism, which states that each brain region codifies for a specific type of human activity. According to German psychiatrist and philosopher Thomas Fuchs, there is a real tendency to believe that we are our brains[6].

Consciousness and free will are related to each other. On the one hand, human beings can only accomplish a responsible action, that is, they can only act responsibly if their will is equipped with the characteristic or quality that we term "freedom", or in other words, if they are free. In turn, a necessary condition for performing a voluntary and free action is that the same human agents perceive themselves as an integrated whole, i.e., individuals perceive their identity, and as the center and the driving force behind one's action. A prerequisite of all this is that the human person, in order to act freely, be in a state of awareness, that is, they must be, on various levels[7], conscious. Furthermore, the greater their awareness of oneself, of the world around them, and of their past, present, and future relationship with it, the greater the responsibility of their free choice. From the considerations above emerges a sketch of a certain reciprocal relation between consciousness and identity on the one hand, and free will and personal responsibility on the other.

Considering the contemporary neuroscientific and philosophical perspectives concerning the so-called Neuronal Correlates of Consciousness (NCC) as our starting point, the aim of this Chapter is to multidimensionally structure these human conscious experiences in a sort of ever-more-complex layering, using a circular *bottom-up/top-down* dynamic that highlights the intrinsic and irreducible embodiment and embeddedness of our mind, body, and environment. Neurobioethics of Consciousness embodies an interdisciplinary consideration of the NCCs to deepen both the nature and the structure of our complex identity experience. This perspective is not reductionist, but "ecological" and bio-psycho-social,

[5] The term 'eliminativism', in the philosophy of mind, is the trend inaugurated by the Churchlands, Paul and Patricia Smith. According to them, mental states would not be more than neural or neuronal states. For a summary on the current philosophy of mind, I recommend the excellent volume: Jaworski W (2011). Philosophy of Mind. A Comprehensive Introduction. Oxford: Wiley-Blackwell.

[6] Fuchs T (2006). Ethical issues in neuroscience. Curr Opin Psychiatry 19 (6): 600-607.

[7] Bayne T, Hohwy J, Owen A M (2016). Are There Levels of Consciousness? Trends Cogn Sci 20 (6): 405-413.

wherein the mind and brain are both conceived as embodied and embedded in the living human body's relationship with its internal and socio-cultural environment[8].

2. Multidimensional bottom/up structure of human consciousness

As the term 'consciousness' is polysemic, we need to consider various connotations of this term to better understand some sort of priority, inclusion, and coextension.

Some scientists consider 'personal consciousness' as a functional and dynamic modality of humans who are formed at a given moment in life and evolves and matures practically every day. This first comprehensive meaning of the term 'consciousness' refers to a phenomenon that belongs to a higher integrative level of psychic activity.

From a methodological point of view, *i.e.* based on the methods and empirical instruments that can be used in clinical and experimental neuroscience, the guiding criterion is that of accessibility, *i.e.* the ability to grasp, in some way, individual conscious manifestations. According to this criterion, three different meanings of 'consciousness' can be distinguished: (a) awareness, (b) shared explicit self-consciousness, and (c) a more exclusive and personal form of consciousness, referred to by some as the 'phenomenal consciousness'.[9]

From a phenomenological point of view, there exists a qualitative dimension of 'consciousness' termed "aboutness" (*intentionality*): as conscious beings, we are constantly in relation with the world around us, and with our inner world that reaches out to something.[10] In this sense, a state of consciousness is always aware of something; something that foresees, at least potentially, the execution of an action. It is not unusual to conceive the state of consciousness as nothing more than a particular form of perception, or conception, imbued with the planning of an action, which can also remain virtual. It is a thinking toward action, caught in its first germ.

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[8] Fuchs T (2011). The Brain – A Mediating Organ. J Conscious Stud 18 (7-8): 196-221.

[9] Boncinelli E (2012). Quel che resta dell'anima. Milano: Rizzoli, 35.

[10] Fuchs T (2006). Ethical issues in neuroscience. Curr Opin Psychiatry 19 (6): 605. Fuchs expresses himself it the following way: «From a phenomenological point of view, the principal quality of consciousness is intentionality or 'aboutness': As conscious beings, we are always related to the world, directed towards, or caring about something».