

CAN FREE DECISIONS BE BOTH INTENTIONAL AND NEURAL OPERATIONS?

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1. Introduction

In this contribution I shall address the philosophical problem of the relationship between human freedom and its neural basis. One of the main tasks of philosophy of mind is to clarify the free will issue and the causal role of our nervous system in the genesis of human operations. In the tentative solution of the problem I will follow a Thomistic inspiration, while initially trying to approach the topic from a phenomenological side, i.e. from our common experience. I assume what we know in current neurological research concerning mental operations, not in a detailed way but rather at the level of principles.

Normally we have a non problematic experience of our daily free actions, namely of our voluntary and corporeal actions such as walking, speaking, drawing, moving our hands, laughing. These actions are controlled by our nervous and muscular systems, and ultimately they are decided “by ourselves”. The capacity to produce these acts is called *freedom*. Should “our self-decided” acts be determined by any other cause different from ourselves, then we would not be free (by definition). The “subject” and “source” of these acts is the *Self*, i.e. our own person considered as a responsible agent, and this is also stated by definition, in the sense that, if we were not capable to act in this way, there would be no Self, and the very word “Self” would be meaningless. Moreover, since our free actions originate from our personal reflections or from intellectual considerations, our freedom

seems to be related to *rationality*. Finally, our free and rational actions certainly are deeply rooted in brain activations, in a very specific causal sense. Any minimal neural defect blatantly shows this linkage between brain and mind.

The following questions arise: which kind of causality is at play in the brain in its functional relationship to the generation of free actions? Could it be possible the other way around, in the sense that the “initiative” should be assigned to the Self, which would (unconsciously) *move* the brain? Should we choose between these alternatives: either the generations of “authentic free actions”, or “plain brain activity”, in order to explain so simple an action as “I *decided* to invite my friend to dinner, and presently I am *inviting* him to dine with me”?

2. The psychological analysis

We can describe free actions in common-sense terms, which are neat and meaningful. For instance, I can say: “I want to open the wardrobe in order to take my overcoat, since it is cold”. This description is also an *explanation*. The statement indicates a reason that explains my behaviour, a reason which enables us to understand *why* I am acting in a determinate way. Anybody could ask me: “Why are you opening the wardrobe?”. More articulated, my answer could be: “I am opening it because I want to take out my overcoat. I know that the overcoat is kept in this wardrobe and I also know that the best way to protect myself from the cold is to wear an overcoat when I go outside”. These expressions allude both to *wishes* (I want to be protected from the cold) and to *beliefs* (I know that this is a wardrobe containing an overcoat, and I know that an overcoat is a good protection from the cold). Both assertions are combined in the sense that from the comparison between wishes and beliefs I can draw a conclusion through a process of *reasoning*: “if an overcoat protects from the cold and it is inside the wardrobe, then if I want to be protected from the cold I should open the wardrobe and take out the overcoat to wear it”). On acting in this way, I can say

that I am operating *in a rational way*, that is to say, “by reasons”, or “justifying” my behaviour in an explicit conscious way.

Any possible defect in these closely structured acts would make my behaviour *irrational* (for example, if I do not correctly connect my desire with what could satisfy it, or if I do not get the insight that in order to take out the overcoat I must open the wardrobe), and this is what happens when people perform strange actions because they are mentally disabled or for any other reasons.

The action I have just considered is a typical example of our rational behaviour. Machines can automatically operate according to some given outcomes, but they do not know that, and they have no desires (even in the case of “intelligent” computers). Animals, on the other side, do operate according to desires, but they are not able to think rationally regarding their possible actions. An ape, for example, can learn to get into the kitchen and to look for a juice, “knowing” that the drink is in a certain place, but no rational reflexion or abstract reasoning would precede or justify its instinctive intuition.

Freedom is involved in this framework when we notice that we might follow another line of action and that this is up to our decision. I might decide not to open the wardrobe for several reasons, for example, because I have a more urgent priority for my actions, or because I prefer not to wear a cloth that I consider too old or not too smart, or maybe because I discover another way to avoid the cold. The possibilities to change my behaviour according to more and more variables are infinite. Ultimately, who decides is *myself*, but I am open to infinite possibilities thanks to my thought and will. Anyway, normally we decide according to *reasons* and *motives*, otherwise our decisions would be irrational or not at all decisions.

A general scheme of a free action might be the following: *a free action results from personal love towards a good which is intellectually known* (anything, as a possible object of love, can be called a *good*: persons, physical objects, situations, actions), from which a human agent draws *rational implications connecting the object of his love with actions to be done or with useful things to be obtained* (see Sanguineti 2007). Here I am employing the word “love” in a very broad sense, which

practically coincides with the verb *to want* or *to wish*. The term *love* means a personal commitment, intellectually known, to something that we desire to possess, to do, to contemplate, to enjoy, for its own sake. In the example proposed above: “I open the wardrobe, which is a *useful* action which I have decided, because *I love* my health, and because I see the connection between that action and my health”.

Since we always love some goods in themselves (things, persons, ourselves), it follows that we normally create chains of actions in order to acquire, to possess or to defend the objects we “love” in themselves. The knowledge of the useful things or actions connected with what we love (the *means* of the traditional philosophy) might be called the *reasons* of our actions and decisions, whereas the commitment to what we love (family, work, friends, God, institutions, health, honour, self-esteem) constitutes the *motivations* of our behaviour (they can be called *values* as well).

Therefore, the practical reasoning guiding our decisions and actions deals with *the connection between the goods we love, often presupposed, and the corresponding useful actions*. Sometimes we do not make the right connection, perhaps for lack of coherence or because our love is not too strong. Of course, we are free to discuss our motivations and not only our reasons to act (i.e. to verify the real consistency of our priorities and values). Deliberating regarding the “means” implies a kind of “computation”, “evaluation” or “calculation” about the actual effectiveness of the means. In this case we are employing, we could say, an “utilitarian reason”, or a “computational reason”. But the primordial root of our actions is love, which is placed in a higher level. Consequently, we can love in an unfair way, or love unworthy things, or perhaps we can choose inadequate means in order to achieve our goals (values, ideas, beloved things), and all these items can be matters of discussion.

One of the main tasks of ethics is to establish some hierarchical order within the multiplicity of the possible objects of human love: friends, sciences, arts, religion, nation, politics, etc. We have always some priorities, frequently based upon natural inclinations or social trends inherited from the cultural background. Ethical investigations intend to go deeper in this field and to study this

human problem in a more systematic way, from which moral norms and criteria can be justified or inferred.

Free actions, then, do not simply arise from caprice or arbitrary drives (at least, not always). Their “causes”, though not automatically determinant, are our deep motivations and the subsequent reasons we find. Also relevant in this regard is the *permanent background* characterizing every person who chooses, a background made up both by our inclinations “to love some things”, whether natural or socio-cultural, and by personal beliefs normally presupposed in any decision.

The choice to do something can be triggered, of course, by factors such as personal initiative, a special and urgent need, a natural or social circumstance, an invitation, emotional pressure and many other possible elements, but the real act of decision will be taken *provided the “triangle” motivation/reasons/action is put into act*. Should I be constrained to do something contrary to my inclinations, my choice would be violent, though it could be also authentic. I can be forced to accept a robbery for my life’s sake, since I “love” my life more than the things I possess. Even unwillingly, in this case “I choose” to accept without resistance to be deprived of my properties.

Notice the special role played by beliefs as a part of our psychological background. An honest citizen in the times of the Roman empire could make free and good decisions when selling or buying slaves, without any criticism regarding the legitimacy of slavery. In his historical context, he had no possibility of deliberating in regard to this ethical question. Therefore, we cannot morally condemn this citizen for accepting an unjust social structure. These examples do not deny freedom. They just show its limits. A free action arises from a background of natural inclinations which are also rational (love of life, of our neighbours, of God) and which are specified in some ways by cultural habits and beliefs, however good or bad, true or false they may be. Freedom is not cold rational indifference regarding our actions. Only rationalism conceived freedom as indifference. As we can see, our intimate experience testifies to the existence of very simple free acts such as taking a bus, reading a book, meeting a person, buying some food. When analyzed, all these acts display some degree of complexity, which dramatically grows in critical moments, by virtue of

pressures, doubts, conflicts, emotions or violence.

The framework I have right now proposed for the analysis of free actions can be completed with the following remarks:

a) Three main elements make up the structure of a decisional act: *cognitive inclinations* (love, appetite, entangled with an act of perception), *rational deliberations*, and *actions*. I see some food, hunger makes me perceive a material object as a piece of food and makes me desire it, then I deliberate whether it is convenient for me and how to attain it, and eventually I get to the food and eat it. The perception of food is entangled to the feeling of a need (emotional or appetitive evaluation). Lacking the capacity of feeling hunger, I would perceive edible substances in a different way, as if they were rocks or any other material object. In other words, the good that “seduces” us or towards which we feel an attraction is an object perceived under the light of an inclination or a passion, an attraction manifested as a certain “affective sensation” or as a feeling such as hunger, thirst, or even higher emotions (anger, joy), more cognitive and more immaterial.

b) Our psychosomatic acts pertain:

- 1) to a *lower vegetative-organic level* (organic sensations);
- 2) to a *higher animal level*, cognitive and emotional;
- 3) or to *the highest human level*, specified by freedom and rationality.

I shall call *intentional* the last two levels, since their operations are related to cognitive objects (“intentional” should not be reduced to rational operations).

Within the three levels we can introduce the “duality” between a *stable background*, which can be *natural* or *acquired*, and the consequent emerging *operations* corresponding to each one of the levels. Thus, the three-layered psychosomatic structure is the core of our complex nature. The layers are dynamically intertwined. Accordingly, we can:

- 1) feel hunger, thirst, physiological sex (vegetative level);
- 2) we undergo higher emotions such as sympathy, pity, fear, tenderness, sadness;
- 3) at the level of will, we experience still higher sentiments like hope, optimism, admiration,

religious feelings. Animals have affections belonging only to the two first levels.

The dynamic source of our decisions, then, can be located in one of these layers and in their multiple activations, single or combined, though some of them can also “inform” others (e. g., friendship can inform piety). We can experience a compulsory need to eat for physiological reasons (hunger), but also for social, cultural or other “higher” motivations (friendship, feasts, customs), and all this is subject to deliberation. Ultimately, we are freely self-guided not by our sheer feelings, since our behaviour is based upon what we know to be true and objectively good. Our intelligence and our will, in their mutual interactive relationship, are able to inform the lower operations of our personality. The whole systemic framework is “wired up” with a stable psychosomatic background constituted by habits and virtues (also vices!), like habits of friendship, work, fortitude regarding obstacles, decisional capacities and the like.

The psychological analysis of free actions, therefore, cannot be simplified to the extent of merely considering trivial actions such as “I want to move a finger, then I move it”. The person who decides to marry, for example, is obviously free in many respects (choice of the partner, the time or place to marry, etc.), but he or she decides as well on the basis of natural inclinations operating in the psychosomatic layers of our personality so far mentioned (vegetative-physiological sexuality, sensitive-emotional sexuality, anthropological inclination to spousal love), while at the same time a person happens to marry within a certain margin of luck and randomness, so to say, since finding the right person to create a family implies several casual factors which rely upon many contingent and independent elements.

Accordingly, human free actions, unlike the “pure decision” of angels, result from a combination of necessity (human natural inclinations), chance (in the context of social complexity) and freedom. All this does not eliminate freedom, but creates its context and introduces various limitations to our thoughts and actions. Our freedom does not arise from nothing, and it is never rootless. Our free actions are performed within a “free space” that can be wider or narrower. Virtues help our will to grow in its decisional power, just as vices lessen and spoil this power. Physical, cultural and

environmental conditions create a kind of frame wherein our freedom can be expanded. He who is ill, or is in prison, has less external spaces (physical spaces) of freedom, but nevertheless he is able to perform free actions which can be very important from the moral point of view. On the other hand, a vicious person (a criminal, a liar, a thief, a sexual obsessive), whatever health and wealth he may be endowed with, becomes weaker and more fragile in his power to choose, since she or he is strongly conditioned by passions and affective disorders which will damage his capacity to make good choices.

3. Brain activations: the problem

What I have so far presented is clear and hardly deniable. In order to decide, rectify, reflect, deliberate, resist pressures, we don't need to know neuroscience. Whatever may be the role of the brain, its activity is plainly silent regarding the complexity of our processes of consciousness, thoughts, deliberations, memories. Brain is hidden to our consciousness space. Obviously, lesions, impairments and many mechanical, electric or chemical disturbing elements affecting the nervous system can compromise the capacity of reasoning, planning, decision-making, or can diminish the lucidity of our working memory, or of our ability to control emotions. But these are only conditions and not properly *causes* of cognitive and voluntary acts and their intentional contents. In the dialogue *Phaedo*, Socrates argues in the following way against the typical materialist philosopher who is all the time looking for material explanations of our human actions:

It seemed to me that he was just about as inconsistent as if someone were to say, “The cause of everything that Socrates does is mind” – and then, in trying to account for my several actions, said first that the reason why I am lying here now is that my body is composed of bones and sinews, and that the bones are rigid and separated at the joints, but the sinews are capable of contraction and relaxation, and form an envelope for the bones with the help of

the flesh and skin, the latter holding all together, and since the bones move freely in their joints the sinews by relaxing and contracting enable me somehow to bend my limbs, and that is the cause of my sitting here in a bent position. Or again, if he tried to account in the same way for my conversing with you, adducing causes such as sound and air and hearing and a thousand others, and never troubled to mention the real reasons, which are that since Athens has thought it better to condemn me, therefore I for my part have thought it better to sit here, and more right to stay and submit to whatever penalty she orders (Plato, *Phaedo*, 98).

Plato's words suggest that the "proper" causality of our intentional and free actions lies upon our own psychological dynamism in its interaction with other people's intentional behaviour (the Athenians), and that our own organism would display a rather secondary kind of causality, necessary (*sine qua non*) but not sufficient, nor "adequate" (not properly fitted) in order to explain the causes (namely, the reasons) of human actions. The text I have quoted certainly goes in this direction.

This seems quite obvious, but it is not enough. Our immaterial mind, which is not a physical organism, with all its plans, projects, desires, decisions, apparently moves our body. In what sense or how does it manage to do it? This philosophical problem is an old one. The Platonic claim is that the soul or the intelligence are able to *move* matter. Socrates and the judges in Athens (human persons) *do move* (not in an organic way, but intentionally, therefore with responsibility) their body, their muscles, their brain. These latter elements deal with the material fulfilment of what has been decided at the spiritual level. Descartes' claim converges with this position.

Modern science (physics, chemistry, biology) treats physical causality in a rather "closed" way, looking for epistemic self-sufficiency or autonomy (but the psychological explanation given above is all the same self-sufficient in some way: we don't need neuroscience to understand human actions). Physical events are regulated by physical laws and nothing outside them is needed to explain them. Monist materialism, then, tends to "reduce" freedom to an illusion, since all what we

do would be nothing but the effect of the physical causality of our brain. Whatever they may claim, so far no physical law, and therefore not any possible brain activation, if we regard this organ from an electrical and chemical perspective in a neurophysiological context, has ever been able to explain events like the painting of the Sistine Chapel, the writing of a mathematical book, or Einstein's finding of relativity principles. There is no way to explain the *causes* of these achievements with the recourse to material phenomena. According to Searle (2007), the causal power of freedom is still a mystery, though he accepts the idea that non deterministic physical processes could open the space for freedom emerging as a new higher item within a physical context constituted by the brain.

It may seem that this a problem of levels. A higher level exerts an influence over the lower and more material level. Since Plato's time up to now, this phenomenon is illustrated, in the absence of better explanations, with the aid of metaphors. Usually the superior part of our personality (the soul, the Self, the intelligence) is compared to a driver, a pilot, a guitarist, a writer, a sculptor, a king, the software of a computer, etc. In all these images there is always an upper monitoring level which "knows how to use" various assembled material elements, according to their own rules, just as I can write using a pencil, or I can sing thanks to my vocal cords, or I can smile as far as I use my flexible lips. See, for example, the following metaphor of the person playing chess, used by Grant Gillett:

It is clear that the rules of chess govern my moves (as long as I am playing chess) and my knowing the rules equips me to play the game. But the rules of chess do not cause me to move in particular ways; I could always make other moves than those allowed and so just opt out of playing that game. If the rules of chess do constrain my moves it is because I elect to go on playing the game and to structure the moves I make in the way required to do so (Gillett 2001, 20).

This example can still be more detailed. The chess player should adjust his moves first to the rules of chess, which are not physical items, and secondly to the physical constraints of the pieces of chess (in order to seize the piece well, to transport it and to place it in the due part of the chessboard). Most importantly, his moves must be intelligent, if he wants to win, and this is not told

by the rules (it is a higher level). Above the mere following the rules, the player is compelled to be creative, in order to discover the successful moves that make the playing of chess interesting, rational and innovative.

All these metaphors are helpful, but limited. The problem is that it is not transparent *how* our intentions, decisions and commands “move our brain”, though we know very well that the commands controlling our bodily movements arise from very specific areas and circuits of our brain (motor cortical areas). This fact (how *my* decision moves my brain) is not intuitive and is not empirically testable by looking at brain alterations through neuro-imaging or the like, in contrast to what we can do by observing the process of our digestion in order to understand it. Therefore, to tackle this problem we have no other way than trying to give a philosophical account of it.

4. The intentional brain

Now I'll try to delineate an explanation of this kind, borrowing the Aristotelian *hylomorphic* thesis according to which an act, a form, or a structure can “inform” a group of elements constituting the “material basis”. This duality (form and matter) can be extended in the sense of an ontological multi-layered view as a way of understanding complex physical things, including human persons. “Multi-layered” explanations are both ontological and epistemological. In other words, there are real ontological levels in our personality, integrated within the psychosomatic unity of the human person. At the same time, the layers can be seen as epistemic levels grounding different scientific approaches and different languages for any of them.

I have already mentioned the fundamental three levels of our psychosomatic personality: vegetative, intentional and sensitive, and intentional in the sense of spiritual. Now I come back to them trying to be more explicit regarding their neural components (always in a philosophical perspective, without going to scientific details).

The basic layer corresponds to the sensitive-vegetative operations. This is the specific and basic animal (also human) level. Of course, many organic and vegetative functions and operations, pertaining to a lower level, are accomplished without any sensation, as happens in plants and in most of our organism. Sensitive-vegetative operations can also be called *somatic sensations*. It's not that now we have a "new world" supervening over the material body (the world of sensations) as an extrinsic addition from above. What rather happens is that we are facing *a new way of being a body*. Sensations such as pain, pleasure, hunger, thirst, are situations of an organism able to "feel" some of its actions or passions (one thing is having a hand, another is feeling one's hand, or feeling its movements).

This is the first degree of the multi-layered structure of the organism, according to which an action or a structure "informs" a material basis and it is sustained by the latter. In this case, the upper layer can also be called the *sensitive consciousness*, thanks to which the notion of a "self-feeling body" becomes intelligible (just as it happens in proprioceptive sensations, in somatic sensitivity and in the sense of balance). In this level we are going beyond merely physical or chemical properties of material substances deprived of consciousness (minerals and plants). Now we have, so to say, matter reaching a higher quality level, not only because of its complexity, but also in its intrinsic features, without attaining the spiritual level.

Isn't it strange to hear about a "suffering matter", a "passionate piece of matter"? Yes, it is, unless we use *matter* and *material* in an analogous (not metaphorical) sense. "My eyes see": to *see* is not material in a lower sense of *material*. You cannot describe the act of seeing using space-temporal parameters normally employed in physics and chemistry. Yet *seeing* is a perfect material act, not spiritual, once you accept a "higher" sense of *being material*.

These acts (pleasure, pain) can be called *psychosomatic*. If we remain at the level of the terms used in natural scientific language (pertaining to physics and chemistry), we would *not* be "epistemically entitled" to understand the language of inner qualities (the so called *qualia* in analytic philosophy). A body is fully involved in these actions or passions (I feel my breathing, my heart's beating, my

finger's pain), and yet these qualities are essentially different from "external" actions or properties that can be displayed on a screen because they are externally observable.

As we know, neuronal activations are an essential aspect of sensitive actions and passions. Then, we can conclude that *psychosomatic acts are really one act* (not the conjunction of two acts, a "mental" and a "physical act", which would imply dualism), *but an act characterized by two dimensions*: one *psychic* (better than "mental") and the other one *physical*. If we attempt to describe pain in a vocabulary *exclusively* taken from physics and chemistry, we would end up reducing it to a purely neural activation, observable from outside, and then we would simply cancel the psychic dimension. But this is highly counter-intuitive.

The vegetative-sensitive level has to do with the state of the organism. Above it, both in animals and humans, there appears *a new higher level which we can call sensitive-intentional*. I call it *intentional* because it regards external objects captured by cognitive acts. Notice a new term in our psychosomatic vocabulary: *object*. The object is not a physical thing as such, but a thing (substance, property, action), normally physical, *as perceived in its real content* (not necessarily fictional or non-existent). "I see this flower": here the flower is both a real thing and an object of my knowledge. Through my psychic operation (the act of seeing), I attain the real flower and not a merely inner phenomenon of my subjectivity (this is called the property of *intentionality*).

This second level is constituted by our perceptual actions, or by the images and inner representations disentangled from external perception, and by the recognition (usually accompanied by emotions) of objects and meaningful relations, as when an animal feels anger or sympathy when perceiving another animal and also notices aggressive or sympathetic feelings in others. Perceptions and emotions go hand in hand in these cognitive acts. Thanks to this level, animals actually "see" others' emotions and intentions, provided they receive sensible messages from other individuals (I am referring to the so-called *mind-reading* acts).

The sensitive-intentional acts are psychosomatic as well, but they are not related to the state of the organism. Let me go to further details in this account. These acts are strictly *neural acts*. They are

accomplished altogether by the nervous system, including the peripheral organs of the senses (exteroceptive sensations). Seeing, for example, is an operation accomplished by the organ of sight in its functional connection with a cortical area (in the occipital lobe). To see is obviously a physical act, but it is *physical* in a very different sense regarding the “physical” transmission of an electric impulse, in spite of the fact that the act of seeing includes the transmission of electric and chemical energy, as happens in any other neurophysiological act.

Vision is intentional since it is an act intrinsically related to the objects seen in the environment. This “immanent action” (in the Aristotelian sense) is more complete whenever the object which is seen, imagined or remembered, is caught as a “meaningful pattern”, as it happens, for example, when we see some very simple movements of a hand and we grasp them as a teleological action of, say, taking a cup of coffee in order to drink coffee, or may be to wash the cup, or to put it in a cupboard.

As it is well-known today, mirror neurons are involved in grasping these sort of actions via not only visual ways, but also sensory-motor circuits. Viewing these actions in others includes the activation of motor-areas which are normally active when we personally perform the very actions we see (understanding their meanings) in other agents. An insightful perception, in other words, includes in this case potential action (know-how). The sight is here only one example. The same can be said of many other kinds of sensations and sensitive emotions. Self-knowledge, action, perception, emotion, mind-reading and sharing others’ emotions are extremely linked in many specific ways still to be investigated in science and philosophy.

The way from perception to action shows that animal and human sensitive acts, cognitive and affective and both vegetative and intentional, create an intentional behaviour. To create it means to *cause* it. Thus, from the *description* of psychosomatic acts we come to their *explanation*. This is relevant for the problem of freedom. If we conceive free decisions as a kind of interference between the spirit and the purely physical neural activations, as Descartes did, then we end up in drastic dualism, as it is suggested in the former Plato’s quotation. But we cannot relate freedom and matter

in so “savage” a way. As a reaction against this position, dualism provokes the claim of materialism. It is much more natural, instead, to try to understand how an “intentional brain”, which is not reduced to a mere assembly of cell masses, can be the appropriate source of physical sensitive acts (perceptions, emotions, memories, sensitive insights).

The brain cannot be just reduced to an “instrument” for the accomplishment of these operations, as the traditional metaphors (the pilot, the chess player) would suggest. The brain itself *is* an intrinsic dimension of the psychosomatic acts. Hence, we can understand why these acts need specific localizations and a very precise and variable configuration in terms of networks, that is to say, a neural “systemic architecture” which is the material root (classically: the *material cause*) of the sensitive and intentional behaviour.

Localizations, circuits, networks and “correlations” between psychic and neural functions, taking account of the remarkable brain plasticity in its higher levels, make us set up the problem of “mental *causality*” in the proper way. It’s not here the case that “the mind moves the body” (the typical dualistic set-up). We can better view the problem in a more unitary account. Physical objects are involved in this overall causation. Indeed, objects, when perceived, do *move* the animal (or the human person) in some *sensitive area* of the organism (the organs of sense, the brain), from which there follow multifarious psychosomatic networks operating from one part of the brain to other parts of it, or even to different regions of the organism governed by the nervous system.

We can say, then, that *some psychosomatic operations constitute the cause of other psychosomatic operations*, just as in Aquinas’ thought the problem of “mental causality” was not framed in terms of “mind-body causation”, but in terms of causation between the various faculties of the soul-as-the-form-of-the-body. The final outcome of these processes is the *intentional behaviour*, as the meaningful movements of our hands, our facial expressions or our linguistic utterances.

An animal, for example, perceives a sign of ferocity in another animal’s face and then becomes frightened, an emotion that induces it to be more alert or to look for a safer bodily position. Now the “cause” of this series of acts, which are neither purely physical, nor purely psychic, is to be found in

a combination of several elements, a complex set wherein we can distinguish specific somatic sensitive parts, and neurophysiological as well as intentional levels (integrated as a whole. Their distinction is analytic, and it's due to our need of abstraction).

If we say that the cause of the emotion of fear experienced by this animal is the activation of a certain area of its brain (the amigdala, in connection with other areas), we are indicating a very important causal factor, although a partial one. The cause of the fear is likewise the external object that has induced this emotion, such as the aggressive attitude of another animal, which in turn has been induced by many other intentional factors (for example, a protective reaction, or the impulse to attack a possible victim of predation). Eventually, fear generates a behavioural response, and so on. Fear, as any other emotion, *is* actually an activation of the brain, of course, but remember we are dealing with an “intentional brain”, a brain informed by sensibility, representations, memories and affections. These intentional aspects of the brain are dynamically connected with other parts of the brain engaged with the motor control of the body.

5. Voluntary acts

The intellectual and volitional higher level, specific of our human personality, explains the genesis of free actions. The spiritualistic philosophical tradition rightly emphasized the fact that these acts transcend the bodily condition, specially because of their universal intentionality (or “openness”) regarding truth and good, which is the foundation of their independence concerning concrete physical situations. We can understand events, properties or relations which can be real, virtual, potential, imaginary, contrafactual, essential, accidental, with a neat distinction between these “states of being as such”. This means that our intelligence operates *in the horizon of being as such* (it understands everything as something which *is* in some way, though being has different senses: actual being, potential being, essential being, etc.).

Consequently, we can love (in some way) *any kind of reality*, at least in order to contemplate it, or to use it, or to improve it, or to live with “it”, in a reciprocal communion of friendship or love, when they are persons. Certainly we undergo physical limitations. We cannot do whatever we like or fancy, and our spiritual acts can be obscured by ignorance, weakness or by pathologies caused by neural disturbances. But spiritual operations transcend as such the corporeal dimension and they even go beyond the limits of the universe (we can think of many other possible universes).

Ultimately they are open to God, to spiritual realities and to the eternal life which is the definite destination of our personal existence.

Here I cannot go deeper in these issues, which deserve a special philosophical and theological treatment. What I rather want to emphasize, granted we assume the positive existence of the spiritual dimension of the human person, is its intrinsic relation to our body. More concretely, our spiritual operations (free will, intellectual comprehension) are essentially related to the specific parts of our nervous system which constitute the material basis of the sensory layer of our personality. This relationship is an integration as well, not an interaction. My smile, my act of greeting another person, is not the effect of a voluntary action, but it is a part of it (an action can be unique, yet integrated by several elements).

I do not think that these operations, specially when they concern moral, religious or scientific issues (for example, ethical decisions, prayers, meditation), are strictly circumscribed within some special brain areas, as some authors seem to claim when they discuss topics concerning “neurotheology” or some questions in the field of neuroethics. In my view, which I claim to be in the line of Aquinas’ thought, the “embodiment” of spiritual operations, not well explained by some spiritualistic trends, is accomplished in a very natural way *through the higher sensitive intentional operations*, since the latter share with the former the fact of being cognitive and affective. Therefore, the intentional brain is to be thought of as a basis, a material cause, a platform or a necessary (not accidental) support of our “incarnate spirit” or “embodied soul”.

A pattern recognition, for instance when we read a newspaper, relies upon a specific brain

activation (linguistic cortical areas), which henceforward facilitates the actualization of an intellectual comprehensive operation of understanding the written signs we have seen on the paper in terms of universal concepts (think of a description of a crime in the news). Eventually, there emerge in the mind, on considering cases like that (*this* particular crime), the abstract notions of justice, human rights, persons, and so on. This cognition, in turn, stimulates the simultaneous arousal of a series of emotions, such as anger, irritation, impatience, longing for justice. All these emotions can be assigned to cerebral areas, since they are sensitive feelings, with well-known physiological consequences and side-effects (sweating, blood pressure, hormonal outcomes, heart-beat rhythm)¹.

The whole system involves, as we can easily imagine, several brain networks working at once with innumerable interconnections². Yet, we are not exclusively dealing with neural and sensitive actions, as it happens in animals. The complex intentional mechanism here is “connected” with voluntary and personal adherence to values, such as loving justice or looking for intelligible targets (in the field of science, arts, morality, society, persons). Animals are completely insensitive regarding these objects. Animals simply don’t understand science, justice, good, truth, beauty, religion, or God.

From the very specific associations between perceptions, thoughts, values, will, emotions, a personal decision will eventually arise. The decision is rational as well as voluntary and *emerges* as a non automatic self-determination in a given context (thought, values, etc.). What is more, a decision involves the project of a future action to be performed by the self-agent, and it expresses

¹ Emergence, supervenience and downward causation are concepts helpfully employed for a non-reductive explanation of the way in which higher levels are not fully produced by lower levels and have an influence over the latter not in terms of a simple efficient cause. See, in this sense: (Andersen *et al.* 2000; Auletta *et al.* 2008; Clayton *et al.* 2006; Ellis 2008; Murphy *et al.* 2007).

² For an account of the brain circuits underlying voluntary decisions, see Haggard (2008).

itself in sensitive feelings (desires concerning actions), in such a way that a connection with the brain motor system should be easily established. This last connection with the motor areas is, then, the last stage of the neuropsychic framework from which free and rational behaviour follows.

Summarizing: the neural circuit *cognition/emotions/bodily actions* belongs to the sensitive layer of the neuropsychological personality and at the same time *participates* on the rational level, receiving insights from the intellect, together with the capacity of loving generated by the faculty of will. This conjunction, not “interactive” but unitary in terms of intrinsic participation, explains why our freedom operates *with* the brain and never without it (this is fully compatible with the transcendent emergence of the spirit, which in thomistic terms is called *full immateriality*).

Without the sensory platform, which is an intrinsic part of the intentional brain (emotions, perceptions, signs, language), our higher spiritual faculties (intelligence and will) would not be able to operate, and they would remain plainly potential, like a power which cannot be activated. Our freedom can do nothing without our brain, yet it is much more than the brain. Of course, the ongoing action should be attributed to the person, not to the brain or to the faculties (see Bennett and Hacker, 2007), but the person cannot act without the due activation of his abilities.

Therefore, our freedom, with its brain roots, should not be reduced to the fact that our behaviour is not fully determined by physical laws. Even animals’ intentional behaviour is not, since an animal is not an automatic deterministic machine. The indeterminacy of our acts relies, indeed, on the biological concept of complexity specially seen as a feature of our brain, which is an organ extremely plastic and ready to build billions of possible synaptic combinations. But our freedom’s indeterminacy does not mean indifference towards actions, since it is grounded on the ability of loving anything inasmuch as it is acknowledged as a *good*, which implies the capacity of making decisions as an outcome of our ability to deal with truth (to judge according to what is true or at least seen as true).

Sometimes our choices arise from passionate drives with little deliberation. Yet we are normally able, unless we undergo a mental illness, to examine the reasons and motivations of our deeds in

order to check whether they are upright and fair. Following the example given above, when somebody reads a crime report in the newspaper, along with his spontaneous angry reaction, he remains capable of further investigation in case of wishing to be certain of the reliability of the report or to better ascertain whether his moral judgment is correct or requires revision. These rational adjustments for a better assessment regarding what we think or what we feel play a fundamental role in our choices and actions. With some effort and reflection, in ordinary contexts we can always attain a fuller insight into our personal priorities, values and goals. The capacity of “rationally going back” to our behaviour (this is the precise meaning of reflection), in order to assess it or to lead us into further actions, shows to what extent we are free to act in one way or another, or not to act, not simply driven by spontaneous impulses or wishes.

I come to the conclusion. The neural networks underlying our voluntary acts are not basically different from those connecting perceptions, emotions, memory, “practical insight” and motor functions in higher animals. The difference between humans and animal lies on the fact that our perceptions, memories, affections, planning, notwithstanding their relative autonomy due to their cerebral roots, can be fully integrated, by way of participation, to our capacity to love, which is the core of our freedom. This capacity is intrinsically associated with our universal reason (“universal” in the sense that it’s open to every possible being).

There is no room for a drastic opposition between a disembodied voluntary act and a series of purely physiological events taking place in our brain. This dualistic claim is untenable. Our brain is raised to the intentional level because our body is informed by our spiritual soul. They both make up the unity of the human person.

In other words, *our organism is a personal body*, and we can also say that *our person is embodied*. The neural activations taking part in our decisions and actions represent only a partial dimension of our free agency. Truth and good, intentional objects, remain as a permanent background of our intentional capacities. They are reinforced by the development of habits and virtues. Truth and good, thus, being a powerful help to revise and to rectify again and again our behaviour, constitute

the genuine root of our freedom.

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