



The Neuro-Significance of the Human Faculty of the Will: Emphasizing and Understanding the Operations of the Will in Medical Science

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Abstract

Human life is a conglomeration of many operations working synchronistically in chaotic manner. What we refer to as conscious living has underneath it a series of unconscious activity that are well timed and effectively orchestrated to deliver. A good example is in the activity of white blood cells (WBCs), whose activity and action are triggered when there is a foreigner in the body. Their effectiveness has dubbed them the soldiers of the human body, responding to threats and seeking out ways to nullify any that has arisen, even when the human person is unconscious of the threat. We can cite many other examples to make concrete the assertion that the human life is a conglomeration of much operation working synchronistically in chaotic manner. However, what is important to this research at present is to ascertain the function of the human will in all that pertains to the human life. This is on the conscious plane (for the other cited example on WBCs, are on the unconscious plane). The human will (volition) is an operational faculty that is not attached to any specific organ in the body (albeit in the brain, since its expression is cognitively mediated); the human will is not a physically concrete, but its effect is however felt. Its domain is the conscious plane, and it is there that its effect is felt. The human person is a conscious determiner of his acts and even when medical (biological) science, consider this to be tied to the functioning of the brain; it is to be stated that the human person is not his brain. In consciously determining his acts, many cranial areas are employed; however, it is not these cranial areas that determine the eventual choice that is made. Thus there must be something else. The hypothesis in this research favors the will. This is what we seek to elaborate upon.

Keywords: Will; Brain; Neural Connections; Intellect; Biological science; Medical Science; Medicine

Abbreviations: WBC: White Blood Cells; PFC: Prefrontal Cortex; SMA: Supplementary Motor Area; PSSC: Primary Somato Sensory Cortex; IPC: Inferior Parietal Cortex; VPMA: Ventral Premotor Area; BA: Broca Area; WA: Wernicke's Area; FG: Fusiform Gyrus; AG: Angular Gyrus, PMC: Primary Motor Cortex.

Introduction

It ought first to be noted that the force of the will is very much seen in the activity carried out by the individual. For instance, I "will-ed" to bring to light this research. This has led me to reading and typing, it has led me to accessing

materials from person that has pondered on the reality of the human will. Another instance will be, someone comes knocking on the door, and although you are indoors, your will is not to see him. That individual will keep knocking, till he decides to leave, on the presumption that you might not be around. Let's take another instance, from the film "Final Destination 1". The teen that creates a havoc because he has had a premonition that the airplane is going to crash, wills to alight from the plane. He is being forced to sit down, but he insists on alighting. I recall vividly the experience of my grandmother, who had already been certified terminally ill. She was given days to live. In her dying moments, my father, who would visit her sick bed often, keeps reminding her of the graduation of her beloved grandchild from school. This constant reminder enabled my grandmother's will to live, the will to see this happen to her beloved grandchild. And she lived past the days defined my medical practice (she stayed alive until she heard of the graduation, even though she never attended, she would die days after). When the doctors were quizzed, they could not supply an explanation to what happened, only asserting that sometimes medical science and prediction is not exact. And yet I ask what of the other times that they were exact? What does this do to science? Should it renew our believe in scientific prediction or it should make us wonder to see if there can be a science to really explain what science has failed to explain. These instances all indicate how power our ability to will is. We might say that these instances are linguistic instances, but such linguistic instances are borne out of first-hand experiences. And yet we may allude to the fact that there are acts carried out by the human person outside the influence of the will. This is seen in the cases of mania, in which control is beyond the individual. Again this can be seen in other instances of psychological trauma like depression and the likes. In such cases, the will can be said to be in fault. These cases also bring to the fore the fact that the will cannot be severed from activities of and in the brain. It also makes known a reality that has always been known but has recently been relegated to the background, which is that the will is the faculty of operation in the human person. It is that faculty that commands every voluntary operation of the human person.

How Scientifically Verifiable is the Will?

The faculty of the will, we are all sure, exists. Using K. Popper's falsification theory (1968), in which he exempted evolution from such theory, since it lies within the purview of empiricism, thereby making evolution outside the "empirical science, however not necessarily false" [1], we can also say that the existence of the Will is not necessarily false. More to that, since its effect has a medically scientific relevance, it goes to imply that the will is and should be pondered upon by medical science. The effects of the will has shown (and shows itself) in what pertains to decision making or the

making of choices. It also shows itself in the determination that spurs one on to the attainment of these choices and decisions. We can say that the when it comes to choices to be made or decisions to be arrived at certain areas of the brain have been singled out, top of which is the Prefrontal Cortex (PFC). Other non-PFC areas include the hippocampus [2-4], the anterior cingulate cortex, amygdala, nucleus accumbens and corpus striatum [5-7]. So we can classify these regions as the PFC and the non-PFC regions. The determination that fuels the attainment of the decision arrived at or the choice settled upon, that is the determination to act in line with the choice that has been arrived at is linked to the PFC. Reeling off the example of Phineas Gage, it has been hypothesized that a damage to the PFC, in particular the ventromedial part (VMPFC), leads to a series of distorted emotional display ranging from hyper or hypo emotionality, impulsivity, distortion in decision making [8].

We should also note that the elaboration of the human will can be done in reference to decision making and voluntary action. In respect to the voluntary action of falls under the purview of the human will, the cranial areas that have been singled out includes: the medial frontal neurons of the supplementary motor area (SMA), the pre-SMA and the anterior cingulate cortex (ACC) [9,10]. When voluntary action is about to be carried out, more neurons are called into action, leading to either an increase or a decrease of the firing rate. As these neurons are integrated together, they tend to fire together, leading to a union front from whence the voluntary action of the will is carried out [9,10]. That which is being supposed is that once the threshold garnered from these neuronal assemblies are exceeded, then there is a dispatch of volition [10]. We ought to add here that the SMA (not forgetting), has been known and attested to function in the line of imagining movements and not actually willing or causing a voluntary movement in the human person [11]. Voluntary movement, to those who oppose the cranial locale of this to the SMA and its environs, is considered to be located in the parietal lobe [12].

We can conclusively assert that there are varied areas in the brain that are linked to the exercise of the will: the PFC and the non-PFC areas. It is via these areas that the scientific study of the will has and is yet been carried out.

What is the Faculty of the Human Will?

The debate about the human will covers a broad range of disciplines including philosophy, psychology, biological science etc. The reason why the will is important for biological (medical) science is fittingly because it is where every human act finds its origin. Science has tried to either arithmetically calculate the operation of the will or relegate it as a phantom piece that should be overlooked. The latest and most widely

spoken of or considered is the Libet experiment in the 1980's the considered the time taken for an action to be executed. Libet would eventually make known the conclusion saying that it is the unconscious process of the brain that do indeed control the conscious part of the voluntariness of the human action. Libet would assert that it is the readiness potential (RP, his own terminology) that kick starts the operation that eventually will culminate into the individual willing to act. So rather than say that the human person has a will, one that is free to decide or not, we say that the human person is determined by processes in the brain that are unconscious, but come up to the conscious level as the exercise of the will. So that which is important is the RP, and not the will. However as regards the RP conclusion of Libet, with modern day analysis, we are sure that:

- The RP/W (readiness potential/Will to move) causality is not well defined. This is because there are cases where the RP has been triggered without any concurrent movement occurring [2].
- RP's have been noted to be triggered even in anticipation of a stimulus [13].
- The RP remains the same whether a decision to move has been reached or has not been reached [14].
- (Based on computational analysis) neural activatedness occurs after the readiness potential has been initiated [15].

What we have succeeded in delineating by the above four points is that the scientific computation of the will still eludes our grasp, yet we do know that it does really exist. The above four points still point to the fact that volition is consciously orchestrated and not unconsciously activated. In fact, we can jump the gun by asserting that it is this conscious movement of the human volition that kick starts the automatic unconscious process in the brain. To ensure that the above assertion is not dubbed as folk-psychology, we seek to provide an analysis to this.

The will is not tied to any single neuron or community of neurons. Therefore we should aptly designate it as a faculty. Let us ease into the aforementioned conclusion of the will as a faculty, by explaining what is being said.

Present day representation of the Will can be traced to the Cartesian era that conceived of the will as the faculty that drives every action and reaction in the human being [16]. Prior to this era, the concept of volition had a christian coloration as it saw the likes of Augustine and Aquinas define it as that capability that aligns the human person to go off towards the attainment of the good. Since God is considered as the maximum good of all that there is, then it is supposed that the will naturally inclines itself to God. The freedom of the will comes in when the will deliberately goes against the maximum good and attaches itself to one that is selfish,

in which we say that the human individual has committed sin or has committed a crime [16]. The Cartesian rendition of volition has placed this subject under ethics in every philosophical consideration and it has further been employed in matters that pertain to law. With modern day science, we now know that when parts of the brain (as earlier noted) are lesioned, then the expression of the will is affected. In what pertains to mania and its process, there is also seen the faulty operation of the will of the human person. I am guessing, this is why the likes of Libet and all who endorse his research maintain that there must be a cranial explanation to what relates to the will. The psychological rendition of the will is linked to the capacity to make choices. But this has already been noted in this paper, and we have yet asserted that this reasoning is very much Cartesian in nature. When one's capacity to make choices has been affected, then cases of mania or brain damage are considered.

The will as a faculty is connected to the human brain. This is because it is the brain that controls the cognitive aspects of all that pertains to the human person. The choices that the human person makes are called rational choices, and it is to this that we say that the human will is linked to the human brain. Does it mean that the brain determines how the will is going to act? What we should hold on to at this point is that the human will is a faculty that is geared towards the individual good of the human person. It is an individual good that is so called because it has been judged to by the human person through the usage of his cognitive capabilities. When these capabilities are impaired then the will makes choices that are out of cognition, which will therefore be dubbed as maniac. More to this, when parts of the brain have become conditioned to the attainment of a good that has negative consequences as in the case of (addiction), we also say that the will acts out of cognition and again it is dubbed as mania.

Every area of the brain have been noted to play out a certain role as relates to motor functions, speech, emotional functioning etc. We are certain now that there are areas of the brain that are moderate human daily functioning. So many of these areas that mediate certain human functioning in the brain are separated by distance, yet they perform the same function as in the case of mirror neurons that are seen in regions like the Supplementary Motor Area (SMA), the Primary Somato Sensory Cortex (PSSC), the Inferior Parietal Cortex (IPC), the Ventral Premotor Area (VPMA), Broca Area (BA), Wernicke's Area (WA), Fusiform Gyrus (FG), Angular Gyrus (AG), Primary Motor Cortex (PMC) [17]. What should be added to this knowledge already known is that the will operates in tandem with the cranial process that determine the human functions that are mediated by the latter. The will is not to be side tracked in what pertains to human functioning, this is because the choice and the mode of action that is to be carried out by the human, does first

arise from a desire to act or choose. When there is a plethora of choices, then the intellectual (cognitive) part of the brain is called into action, as regards seeking out the best possible choice amongst the many. This therefore aligns itself with the Augustinian and the Thomistic teaching that the human will is directed towards the attainment of the good. The will aims for the good, and the intellect (the area of cognition), steps up to weigh, considering the pros and cons of the choices available. The individual with these two functioning in sync, goes on to make what we refer to as a “well-informed” choice. As much as the human person is both corporeal and incorporeal (according to dualism), we can add here that this reality encapsulates the entirety of his being that is to say that we can fittingly refer to the brain as the corporeal side and the will as the incorporeal side. And since the corporeal and incorporeal work in perfect sync, it is sometimes believed that the human person is either only corporeal or only incorporeal (as the monists hold on to).

The factor of time in choices to be made is also to be considered. This is because there are some choices that demand a near instant action and there are those that take up a useful amount of time before such action is meted out. We ought to add here that in either situation the will of every individual is aimed at not what is going to cause him or her pain, but that which is good. So even in the moment where a choice is to be made, it is made on the principle of the good. This good is subjective and dependent on the intellectual analysis provided by the brain (this is why something can be considered good for one but not good by and for another). We ought to note that this is why Kant advanced his ethical theory of the Categorical Imperative, for if the human will is allowed to choose its own good subjectively then there would be no order in the society. Thus it was necessary for Kant to insist that every subjective inclination towards the good should follow an already laid down standard of the good [18].

The Logic of Relations between the Will (Volition) and the Brain

It might seem possible to assert that there is a relations of cause and effect between the will and the brain. The question that thus follows is, which is which (is the will the cause and the brain the effect or the other way round)? Again from Libet’s experiment, we can be sure that the unconscious process of the brain is the cause and the consciousness of the will is the effect. But we have series of contradictions (as already noted above) showing that the brain and its process (as regards the RP), does not cause the conscious activity of the will. In philosophical logic, a relation is that whose being consists in being towards another. Therefore, there are two kinds of relations that exists: real and logical. The first is one that exists in reality and the second that which exists

in the realm of thought or reason. Between the will and the brain, there is a relation that is real but an outlining of the premises of this real relation is logical. More to this, we can further assert that there is a relation that exist between these two (the will and the brain (W-B)) and the human person in general. What is interesting here is that this W-B relation to the human person is still relation in its specified usage. That goes to say that relation in itself aims for something that is outside the subject (relations aims for the other), for instance, a son-father relations must witness the movement of the father (for he is so called if he has a child) towards the son (and he is so called if he has parents), and the son towards the father, for something to be double, there must be the existence of something that is half as much [19-21]. Thomas Aquinas distinction of the real and rational relation [2]. We cannot consider the will and the brain as having a rational relations, since the human volition exists in reality. More to this, since the human volition cannot be empirically pointed to, but its effect can and is felt in relation to the brain (this rendition is opposed in the brain in relation to the volition, since the brain can be empirically pointed to and experienced), we should insist that the W-B relations is a rational one that exists in real time. This is why science has failed to detect fittingly the specific position of the human volition - for we know that it is there because we feel its influence, however, since we cannot empirically identify its location, the W-B relations is a logical one.

The Activity of the Human Will (volition) in Medical Science

We have already asserted that the will works in perfect sync with the brain. It also implies that the functional importance of the will as regards medical science is proximately connected to the operation of the brain first then followed by every other aspect of the human body. We have already concluded that the relation between the human volition and the brain is a logical one that exists in real time. It is thus proper to show how effective this syncing operation of the W-B makes medical science flourish. A fitting example to make certain what is being said is in the medical process that has been named Neuroplasticity.

Neuroplasticity or brain plasticity, is an ability of the human (or the mammalian) brain to rewire or reconfigure itself when and if the need arises. It is an indication of the premise that the human brain is not hardwired after birth, but can undergo changes as the need arises, irrespective of the age involved [9,22,23]. Neuroplasticity is an umbrella term that covers a whole array of brain reconfiguration such as gliogenesis, neurogenesis, changes in structure of the dendrites, growth of axons, growth of new blood vessels from existing structures, formation of new synapses, myelination

etc. While these changes can be formed from experience, it can more importantly be formed volitionally in the case of learning, practicing a skill, exercising, adapting to a new environment [3,24-27]. We dub these activities volitional because learning and all that concerns practicing a skill or even exercising has the full force of a choice or a decision backing it. It has determination spurring it on. Therefore ultimately it has the input of the human volition in full force. Neuroplasticity's occurrence validates the existence of the volition in full force. Even in physiotherapy, which includes the activity of exercise, neuroplasticity is still ongoing and therefore we say in extension that the will is yet in full force.

What is visibly noticeable in neuroplasticity is that these cellular elements of the brain sprout again and are rerouted, advancing in different or altered pathways and connecting with other neurons. Old neural links fizzle out while new links are emphasized and deepened. The brain's cells do not do all these on their own, they do this by and with the mechanism of the conscious action that is happening to the human person which is as already known, orchestrated by the choice to act in such manner. We should think of it as a group of ants that are seeking to get to a food source, there is a certain haphazardness of the movement from the ant-home to the food source. After a while a trail is found and it is that trail that they all adhere to as they move out of their home to the food source, back to their homes. This haphazardness of movement comes at the initial stages in which the ants are seeks to find a route that will be acceptable to all of them. The human person also experiences this haphazardness during neuroplasticity. This happens because the force of habit has not yet been formed, and so the action is very much consciously orchestrated. A man who has lost the usage of his limbs due to stroke and is undergoing physiotherapy will encounter difficulty as he re-initiates the usage of his limbs by voluntarily calling it to action. In such wise, he experiences pain, he experiences difficulty, one that was non-existent before the advent of the stroke episode. What is happening to his brain is that the neurons are undergoing a haphazardness of route formation. Once this is formed, there is a need to strengthen the neural connections by consistency in practice. The more the practice of the action is carried out, the more the connection in the brain is deepened, till it reaches the time when there is a fluidity of action, and this is what we call habit. This fluidity of action enables us to act without paying conscious attention to what is being acted upon, because it arose from a consistently employed conscious action of the will.

In order to further ground the just stated, several research groups have reported cases in which certain areas of the brain experience an increase in weight and volume arising from activities such as exercises, skill learning etc. This is what can be referred to as the brain deepening and

making firm the neural connections that define the actions [11,28-30]. The research conducted by Martensson, et al. [26] for instance, yielded the fact that after an intense learning of a new language, participants showed alterations, particularly on the left side in the cortical thickness of the inferior frontal gyrus, the mid-posterior superior temporal gyrus and dorsal middle frontal gyrus Draganski, et al. [22], observed and noted that there was transient bilateral expansion in grey matter in the mid-temporal area and in the left posterior intra-parietal sulcus, in participants who had mastered the art of juggling over a three month span as compared to those that did not.

It might be considered as not yet scientifically grounded, but the will to live, is also important to medical science and to patients who are terminally ill. In a research done by Guy and Stern [31], it was shown that most patients who were terminally ill, but expressed the will to live, lived longer than those patients who had given up on the hope of living because they were pronounced terminally ill. As already noted [32-35], there is no scientific grounding for this, but experience has shown that this is a reality. More to this, many individuals who have experienced a near death experience will note that all they could hold on to was the desire and the will to live. Again this is not and cannot be empirically verified, but it is a reality that indicates the force of the WILL in medical science [36-38].

Conclusion

More should be done and more will be done as medical and brain science advances. The point to note here is that even though it is clear that the human volition is something that we cannot verify with the principles of science, it is also clear that it should not be shoved aside because its effects has been noted to show itself in the human situation over and over again. Medicine is concerned so much with the way the body is supposed to function, that it sometimes forgets that the body itself is a self-operating unit that is able to thrive, if its pathway is not hindered or altered in any manner [39]. The volition of the human is part of being human, and it shows itself useful in what pertains to the self-operating stance of the human nature. Once a patient's will is broken, it should be supposed from the aforementioned that medication meted to that patient will be of no effect to the patient's road to recovery. Medicine should seek to engender the will of the human person, giving it more credence than it already is. This is because the volition of the human person is a force that should be reckoned with. My proposal is that the effects of the will be narrowed down to how efferent and afferent neurons respond when instigated and triggered by an action to be carried out (this is because human volition is seen to be expressed via the operational pathways of these two types of neurons). The modalities and operational pathways that are

visibly noted in the brain should be somewhat considered in reference to the individual's own personal volitional (always keeping in mind what the human volition means) itinerary [40]. I mean the limitation that is perceived in what pertains to the human brain and its scientific (medical) study is that of first person-third person impasse. Therefore it should be asked, how can this impasse be surmounted? For what concerns the human will in relation to the study of the brain has this impasse as one that needs to be dealt with [41]. What we do know now is that Libet's experiment with regards human volition was very flawed, but it did indicate the relevant force of the human volition. Such study should not therefore be drowned because there are no scientific apparatus yet to be used in such study. The human volition is a force waiting to be understood.

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