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Scientific Contribution

A Study of Contemporary Brain Death Controversies: The Boundary between Neurological Facts and Metaphysical Foundations

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Abstract:

Proponents of whole brain death declare a patient to be dead with the irreversible cessation of whole brain functions. They believe the brain to be the integrator of an organism. The opposing faction maintains the patient not to be dead as an organism due to the continued functioning of circulation, respiration, and integration. This article first reviews James Bernat's notion of brain death. Although his view is widely reflected in the contemporary definition and criterion in determining death, Jeff McMahan and Alan Shewmon disagree with it, especially about his belief of the brain's role in integration of the organism. Their critiques refute Bernat's studies on brain neurology. Next, the article clarifies the metaphysical theories that aim at establishing the philosophical grounds of each neurological position. I maintain that Bernat's view about an organism works appropriately in explaining the relation between a human animal and a human person and circumvents the human identity problem, when referred to as the metaphysical theory 'animalism', and that McMahan's 'embodied mind account of identity' and Shewmon's 'hylomorphism' are defective in explicating the concept of what a person is and the identity of a patient prior to/posterior to his/her brain dead condition, and thus, do not work for supporting their neurology. I argue that Bernat's view could be used to decide a point of no return for a brain dead patient from the identical existence rather than determining death, and that Shewmon's metaphysics would not necessarily work to criticize the whole brain death criterion.

Keywords: Brain Death, Animalism, Embodied Mind Account of Identity, Hylomorphism

1. Introduction

Until the development of the mechanical ventilator in the 1950's, the standard of death was traditionally based on the irreversible cessation of cardiopulmonary function. Without the help of advanced medical devices, a severely brain injured patient quickly went into cardiac arrest and died. However, as the ventilator is now commonly used in medical institutions, it has allowed the brain dead patient to preserve circulation, respiration and somatic integration. In such cases, there is a controversy among physicians and philosophers about whether or not the patient is actually dead. Supporters of whole brain death maintain that the patient is no longer alive. According to the neurological standard of death, they maintain that an organism dies when whole brain functions irreversibly cease because the brain is believed to play a major role in the integration of the organism and the interaction of the organs. On the other hand, the opposing faction holds that brain death is not the death of the organism because the cessation of circulatory and respiratory functions does not necessarily happen soon after brain death, and the integration is maintained. The body can live without brain function. Thus, they hold that brain death is different from somatic and organismal death.

The early part of this article clarifies how physicians and philosophers examine each position in brain death controversies in neurological terms. They all adopt different concepts of 'an organism' and 'death', and the distinction allows for different views on brain death. As a result, they form different standards. The discussion of the neurological study of brain death in this article begins with the review of James Bernat's notion about death. Bernat is a major proponent of the whole brain death standard, and his view is widely reflected in the contemporary criterion in determining death. Thus, the review is required prior to mentioning further arguments on the brain death issue. Then, I clarify Jeff McMahan and Alan Shewmon's disagreement with Bernat's whole brain death formulation, especially about the brain's role in the

integration of the organism. After examining whether modern medical study can prove a brain dead patient dead as an organism, the later part elucidates the metaphysical theories that Bernat, McMahan, and Shewmon refer to for their neurology. I will make clear metaphysical foundations for each position, which we could not understand if we merely followed brain death controversies on neurology. The main aim of this part is to ponder whether the metaphysical theories can explain the relation between a human animal and a human person without infringing upon identity. Identity matters when we discuss issues regarding human life and death. We live on the assumption that we maintain identity. If we have irreversibly lost identity, we will be less or no longer concerned about the being that lacks it. The argument about whether a brain dead patient is alive or dead, of course, is necessary when discussing brain death controversies on neurology, but it will not be sufficient. We have to recognize that many countries over the world adopt the whole brain death criterion no matter if a brain dead patient may be alive as an organism, rigorously analyzing organismal death. That is, brain death is already admitted death at least for public policy. The crucial matter on contemporary brain death issues is to examine whether there is any philosophical ground that would allow a physician to cease medical intervention for a brain dead patient, although s/he may be alive as an organism. This study focuses on human identity in a brain dead patient in order to obtain the ground, clarifying metaphysical foundations for Bernat, McMahan, and Shewmon's neurology, and investigates how their neurology and metaphysical theories would work to explicate the existence of the patient, maintaining consistency between them.

2. Bernat's Whole Brain Death Formulation and Its Critiques

Bernat analyzes the nature of the death of human.[1] He presents five assumptions about death. First, Bernat maintains that death must be univocal, at least as concerning the death of higher organisms (e.g.,

mammals). Second, he holds that death is fundamentally a biological phenomenon. Although there are a variety of beliefs and customs with regard to death, only a living organism can die from the medical point of view. Third, he states that death is irreversible. Once a patient dies, s/he never returns. If the patient is restored, we must understand that s/he has returned from dying, not from the dead. The fourth point is related to the previous one. Death is an event which is irreversible, not a process. All organisms must belong either to the living or the dead. Finally, Bernat maintains that only a physician can determine death because it is a biomedical event and not a social convention.

After maintaining these five assumptions, Bernat has primarily defined death as the permanent cessation of the functioning of the organism as a whole. The organism as a whole does not merely mean the sum of its parts, but rather imply the entity that has a set of vital functions of control, integration, and behavior in itself. He claims a patient loses the vital functions when s/he is brain dead. Some critics, however, disagree with Bernat's view because even when a patient is diagnosed as brain dead, s/he may still possess a hypothalamic neurosecretion of antidiuretic hormone, which is enough to prevent diabetes insipidus, and this implies some level of vitality. In order to reply to this critique, Bernat holds that the secretion of antidiuretic hormone is a function of the organism, but it is not a *critical* one because whether the secretion remains in the patient's body is not essentially related to maintain his/her life processing. Indeed, the patient can survive without the secretion and maintain all vital functions.

Then, Bernat revised his original definition of death to the permanent cessation of the *critical* functions of the organism as a whole which are necessary for preserving life.[2] According to Bernat, the critical functions of the organism as a whole consists of three categories: (1) control of circulation and respiration which are required for all cellular metabolism, (2) the integrative system involving chemoreceptors, baroreceptors, and neuroendocrine feedback loops to maintain

homeostasis, and (3) consciousness which is necessary for the organism to respond to requirements for hydration and nutrition. These functions correspond to the individual parts of the brain respectively: (a) the brain stem subserves the vital function of respiration and circulation, (b) the brain stem and hypothalamus subserve the critical integrative function, and (c) the brain stem subserves the wakefulness component of consciousness, and the thalamus and cerebral cortex subserve the awareness component of consciousness.[3] Bernat maintains that the criterion of death, which fulfills the definition above, is the irreversible cessation of these functions of the whole brain.[4]

McMahan criticizes Bernat due to his insufficiently unified grasp of death.[5] McMahan first maintains that Bernat's view of 'death' to be univocal cannot be established because death can be understood in different ways. He argues that there are two fundamentally different kinds of death: (1) 'death' which refers to our ceasing to exist due to the irreversible loss of the capacity for consciousness, and (2) 'death' which refers to a biological death with the organismal loss of the capacity for integrated functioning. Contrary to Bernat's concept of death, McMahan holds that the only thing brain death addresses is ceasing to exist at a consciousness level, when the functions of the cerebrum, the higher-brain, irreversibly cease. Thus, he supports a higher-brain death standard. Ceasing to exist is not the death of an organism, and brain death is essentially different from the phenomenon that the organism loses integrated function as a whole. Nevertheless, McMahan argues that death can be referred to as ceasing to exist when the cerebrum functions irreversibly cease.

After McMahan mentions his disagreement of Bernat's view of death, his criticism can be almost summarized as his denial of Bernat's view that the brain largely works for the integration of the organism. Bernat has held that the central integrator is the brain which is irreplaceable, and no other organs can replace the regulative function of the brain. McMahan, on the other hand, argues that a mechanical

substitute for the brain stem can replace the regulative function of the brain, and thus, can become the central integrator of the human organism. Indeed, the machines used in an intensive care unit work as the substitute for the regulatory functioning of the brain stem.[6] He further points out that a number of somatic functions are integrated through decentralized integration. Decentralized integration of functioning occurs without brain function. Shewmon's extensive medical research supports McMahan's claim. Shewmon maintains that a body without brain function can remain alive with a ventilator and other medical intervention, preserving its integrative function. According to Shewmon, the responsibility for somatic integration is not localized in any single organ. Rather, it is holistically taken by mutual interaction among organs and tissues. There are a number of somatically integrated functions that are not mediated by the brain: (1) homeostasis of a countless variety of mutually integrating chemicals, macromolecules, and physiological parameters, (2) elimination, detoxification, and recycling of cellular wastes throughout the body, (3) energy balance, involving interactions among the liver, endocrine systems, muscle and fat, (4) maintenance of body temperature, (5) wound healing, (6) fighting of infections, etc.[7]

Besides, Shewmon insists that the term 'integration' is not clear when Bernat uses it. If we consider integration as the processing together of information from various sources, the brain possesses countless integrating functions (e.g., eye-hand coordination, identification of voices, etc.). Nevertheless, most of these functions in the brain are not related to somatic integration. Many of the brain-mediated and somatic integration functions are entirely different matters.[8] Shewmon also maintains that some of our physiological phenomena are construed both as brain-mediated and as somatic integration. For example, breathing is generally considered to be brain-mediated, but it can also be regarded as somatic integration. If breathing is considered in the function of moving air in and out of the lungs, it is a brain-mediated function. Breathing, however, operates not only from brain function but also from the phrenic

nerves, diaphragm, and intercostal muscles whose functions do not entirely disappear without the brain mediation. Furthermore, Shewmon explains that if breathing is considered to be respiration, which is the exchange of oxygen and carbon dioxide, the brain does not mediate it because it takes place across the alveolar lining of the lungs and as the electron transport chain in the mitochondria of every cell.[9] Thus, he maintains that respiration in this sense is not merely mediated by the brain but is caused by the reciprocal action among other somatic organs and cells.

From his belief that all the interactions including respiration are not necessarily mediated by the brain, Shewmon holds that although the brain plays a role in the mutual interactions among organs, it is not essential to them. The brain is a modulator and enhancer rather than an integrator. It plays a large role in enhancing a well-functioning immune system but does not wholly integrate the somatic immune system. Somatically integrative functions are more effective when the brain modulates them, but they do not disappear entirely without brain function.[10] Somatic integrations, which are unmediated by the brain, remain when the patient is brain dead. Shewmon argues that brain death is not truly death as an organism. He insists that a brain dead patient is alive with a preserved identity.[11] While a brain dead patient maintains circulatory and respiratory function, his/her integrative action continues to operate. It is difficult to regard a brain dead patient with those functions as dead. Thus, Shewmon concludes that the patient is alive as an organism which is identical to the entity prior to brain death because his/her life processing operates continuously. He supports the circulatory and respiratory standard, in which the organism is dead only with the irreversible cessation of somatic circulatory and respiratory function.

3. Different Views about the Integration of an Organism

After looking back over McMahan and Shewmon's critiques of

Bernat, we can find that there is a fundamental difference about how they understand the death of the organism. McMahan and Shewmon believe that the life of the organism is still preserved without relying on the functions of the brain, while its somatic integration continues with a ventilator. Due to the fact that brain death does not necessarily lead to somatic disintegration, they conclude that a brain dead patient is not dead as an organism. Bernat, however, maintains that the organism dies when the brain functions irreversibly cease. According to Bernat, the organism must have a central system which is essential to its operation as a whole. The most important part of the system is the brain which is the one part that is irreplaceable without which the organism would be believed to no longer function as a whole. Bernat argues that the organism could not preserve its life processing and anti-entropic capacity without the brain.[12] As mentioned previously, Bernat insists that the critical functions of the organism are derived from the individual parts of the brain, and a brain dead patient is dead when brain function irreversibly ceases. Death is a biological phenomenon and is an irreversible event, and a patient never recovers from death, as presumed in the assumptions. Bernat regards a brain dead patient as fulfilling these conditions of death. As McMahan argues, the machines of an intensive care unit, however, seem to work as a substitute for the integrative function of the brain. Thus, it seems that the brain is neither irreplaceable nor essential to maintain life processing. A brain dead patient can preserve physiological phenomena for a long time with these medical machines. Therefore, it is doubtful to regard brain death as the irreversible condition in which any sign of life will not be utterly seen and from which a patient will never recover.

Furthermore, as McMahan and Shewmon criticize Bernat about the integrating role of the brain, Bernat's view about death is problematic if it means that the brain alone covers all somatic integration, and brain death is the death of the organism due to the loss of the integration. Bernat simply mentions that the integration of the organism includes chemoreceptors, baroreceptors, and neuroendocrine feedback loops to

maintain homeostasis, and the brain stem and hypothalamus subserve it, as stated above.[13] Therefore, it is no wonder that Bernat's critics construe the integrative role of the brain as including the whole somatic integration which maintains homeostasis and doubt its credibility. Shewmon's critique of the brain's integrative role works at this point in stating that many of the somatic integrations, which are not mediated by the brain, remain in a brain dead patient, and whereby s/he is still alive as the organism. Besides, Shewmon maintains that asystole does not follow from brain death, and thus, it is difficult to regard a brain dead patient as dead. He uses a number of data regarding brain death in order to support this claim, and produces counterevidence to the whole brain death standard.[14] The patients in these cases preserved a physiologically stable condition for a considerable time after they entered brain dead conditions, and they did not have asystole. Thus, Shewmon concludes that brain death is not truly organismal death from these facts.

McMahan and Shewmon's critiques of Bernat's neurology are well-grounded, proving the brain's functions to be no longer critical to life. It seems that Bernat's whole brain death standard would not apply in determining death. McMahan and Shewmon's arguments on neurological brain death controversies are powerful, and Bernat's view about death on neurology would not convince them to regard a brain dead patient as organismal death. I, however, want to clarify the metaphysical theory which Bernat's neurology would be referred to as. I will also make clear the other metaphysical theories which McMahan and Shewmon have arrived at in the conclusion of their critique of whole brain death. I will examine whether Bernat's view about an organism has the expediency of explaining the relation between a human animal and a human person, if metaphysically grounded. Bernat's whole brain death criterion may be refuted in neurology, but only the metaphysical theory, which would provide philosophical grounds for Bernat's view about an organism, could explicate human existence without an identity problem. I will clarify the defect of the metaphysical theories which McMahan and Shewmon rely

upon in order to establish philosophical foundations for their neurology. I maintain that the theories would not work as the foundations. After clarifying the metaphysical theories for each neurology, I argue that Bernat's view could provide a physician with philosophical grounds for the cessation of medical intervention for a brain dead patient due to the irreversible loss of identity, metaphysically grounded, although it would not work to determine a brain dead patient to be dead as an organism. I also claim that the metaphysical theory Shewmon refers to will not necessarily criticize the whole brain death criterion.

4. Animalism and Embodied Mind Account of Identity

The crucial matter in understanding Bernat's view about an organism is mainly found in the brain's biological function, not its higher mental function, which is essential for life. Bernat states that the organism has three critical functions, namely the circulatory/respiratory function, the integrative function, and consciousness. The individual parts of the brain, in turn, subserve them. Although consciousness is included in these functions, its role is to respond to requirements for hydration and nutrition, and thus, it is not a higher psychological function. Therefore, Bernat emphasizes the brain's biological function as critical. When these critical functions irreversibly cease, the organism is thought to be dead. This point of view can be referred to as the metaphysical theory 'animalism'. Eric Olson and Peter van Inwagen established this theory, by which the essence and identity of the human being are preserved via biological continuity rather than psychological continuity.[15] Bernat, Olson, and van Inwagen think that biological continuity disappears with the irreversible cessation of whole brain function resulting in the death of the organism, and support the whole brain death criterion.

I will carefully explain animalism since the explanation will clarify the metaphysical foundation of Bernat's neurology. According to animalism, we are material beings composed of cells and are essentially

animals rather than psychological beings. The human animal becomes a person with the development of mental capacities, as the mindless fetus becomes a person. The possession of a mind is not relevant to identity. A person is a human animal with certain mental traits. The crucial matter with regard to animalism is the lack of the distinction between the human person and the human animal. For animalists, the person is not a substance concept, but a phase sort. Teachers, pianists, and athletes represent phases. Similarly, personhood is merely a phase which is not essential to human existence because a human being can be alive without possessing it. On the other hand, biological life persists throughout the existence of the embryo and a patient in a permanent vegetative state. Olson, an animalist, argues that our persistent condition is the same as other organisms and is determined by biological continuity. Thus, he argues that the human animal is a substance concept.[16] According to animalism, having a first-person perspective and personhood is merely a capacity of a certain being rather than a substance concept that is essential to it.

Contrary to the concept of animalism, McMahan argues that an embodied mind, not a human animal, conditions the essence of human existence. An embodied mind appears when the brain begins to work in producing mind. This view is known as the 'embodied mind account of identity'. According to the account, the criterion of identity is determined by physical and minimal functional continuity of the brain.[17] This theory focuses on not simply mental continuity as essential to human existence, and thus, is different from the psychological account of identity. It rather emphasizes something that underlies mental continuity as essential, namely the physical and minimal functioning part of the brain where consciousness is produced. We are essentially an embodied mind and are different from a human animal that is an organism. Human existence as mind is a part of the life of the organism.

According to McMahan, a person as an embodied mind is not identical with an organism, and they possess different persistent

conditions. McMahan claims that there are two kinds of death for each existence, respectively. One type is the death of a person that is found in the irreversible loss of the capacity for consciousness. The other type is an organismal death due to the irreversible cessation of somatic integrated functioning.[18] We cease to exist as a person when we have irreversibly lost the capacity for consciousness although our organism remains alive. McMahan maintains that the notion of death primarily indicates a biological sense, but it could be extensively used for a person. Thus, he argues that a person dies when s/he ceases to exist due to the irreversible loss of the capacity for consciousness.[19] Our organismal life, except for the brain which directly produces consciousness, would not matter for human existence because it would not be relevant to that which is essential to us, namely an embodied mind. For McMahan, when we cease to exist as embodied minds and have irreversibly lost identity, we die as a person, and the death of a person, not that of an organism, is crucial for us.

According to McMahan, a brain dead patient is alive as an organism, although s/he ceases to exist as a human person, and his/her embodied mind dies. If a brain dead patient were considered to be dead as an organism, a locked-in patient, who requires as many life support systems as a brain dead patient does, would have to be regarded as dead. A locked-in patient is conscious but cannot move because almost all the muscles, except for the eyes, are paralyzed due to the damage of the brain stem. S/he, however, can be alive with the support of a medical device. Similarly, a brain dead patient has lost spontaneous breathing and integration but can maintain circulatory/respiratory functions, digestion, and other functions such as immunity and the ability to heal his/her tissues on a ventilator.[20] Thus, it is difficult to determine a brain dead patient to be dead as an organism as it is problematical to regard a locked-in patient as dead. A brain dead patient is alive as an organism. Nevertheless, existence as an organism is not vital to humans because we are essentially embodied minds that the brain function produces and cease to exist due to the irreversible cessation of the function. According to

McMahan, an embodied mind is a part of an organism.[21] Psychological and biological existences are different types of being which reside in different regions of the body.

The embodied mind account seems to work better than other psychological accounts because it may be able to escape from the identity problem where too many thinkers appear in an organism, of which the psychological approach often runs afoul. According to general psychological accounts, human persistence is conditioned in psychological continuity, as the name suggests, not the biological, which animalism emphasizes in the maintaining of identity. A human person is substantially different from a human animal due to the possession of self-consciousness, although they consist of the same body. However, it seems that the human animal, which shares its brain with the human person, is able to think in the same way as the person does. If so, two conscious beings will appear in an organism even though the psychological approach distinguishes a person from an organism. This is the too many thinkers problem that raises a question of which conscious being is essential to us. The embodied mind account may be able to evade this problem because it does not assume a human animal to directly use the brain in the same way as an embodied mind, a human person, does. It rather presupposes that an embodied mind, namely a person or its potential, exists in a certain area of the brain, while an organismal life resides in the body. An embodied mind exists with the brain's production of thought and is essential to human existence. The embodied mind account mentions that a human person possesses thought non-derivatively with the brain's direct involvement in the production of thought, while a human animal, which is not identical to the embodied mind, can think only derivatively. Therefore, it seems that this account could avoid the problem of too many thinkers, due to the fact that the embodied mind and the organismal life are conditioned in different places in the body, and thus, there is the distinction between non-derivative and derivative thought.

I do not presume that the embodied mind account can escape too many thinkers problem successfully. Suppose that the organism could be reduced to the size of the brain in a thought experiment. Both the organism and the person could be composed of the same matter, namely the brain.[22] In such a case, it seems that we could not presume the organism to think derivatively, as the embodied mind account supposes, because the organism is formed by every part of the brain in which the person resides and uses it to produce thought in the same way as the person does. If so, it would be rational to regard the organism and the person as non-derivative thinkers, and it will lead to too many thinkers problem again contrary to the expectation of the embodied mind account.[23] Although McMahan supposes the person to be a part of the organism in order to prevent the problem, the thought experiment of the organism reduced into the brain clarifies the existence of too many conscious beings in the same matter again.

The only way to evade the problem is not to reduce essential human existence to a psychological being or an embodied mind, which is distinct from the organismal life. The animalistic account, in which biological continuity preserves the essence of the human being, is more appropriate than the psychological account and the embodied mind account in order to explain the relation between a human animal and a human person without infringing on identity. Having personhood or its capacity is a certain phase in the organismal life and is not a substance concept. We are essentially biological beings and can possess the property of personhood as the brain function develops. Whether one retains the property of personhood is not relevant to essential human existence. The life of a human being starts as an embryo that has no mental activity, and develops into an adult human life. There is no mental continuity between the embryo and the person, but biological continuity between them is preserved and is essential to their identity. Similarly, even if a patient is in a persistent vegetative state due to the loss of the cerebrum function, s/he will persist as the same entity prior to that condition in terms of biological

continuity. The animalistic account assumes a psychological being to be merely a phase sort, not a substance concept.[24] Thus, this account evades the problem of the too many thinkers. Animalism is a more trustworthy metaphysical theory than the embodied mind account in explaining the relation between a human animal and a human person.

Animalism can explicate human existence without falling into the identity problem. The dilemma of animalists, however, is that they presume brain function to be essential to the integration of the organism. Olson states that the brain's integrative function cannot be replaced. Only the brain stem essentially works for the integration and other life processing of the organism. Thus, he regards a brain dead patient, who preserves the circulatory and respiratory function on a ventilator, as dead. Olson maintains that the ventilator has no metabolism, which is necessary to life, and thus, it could not be a part of the organism. Life is something that acts spontaneously with the metabolism and other natural abilities inherent in the organism. If Olson's notion were correct, I wonder if the embryo, which possess no brain stem function and is dependent on a placenta to maintain life processing, would not be an organism. This is contrary to our intuition. The embryo is an organism and is alive. Similarly, the brain dead patient is also alive as an organism whether or not s/he relies upon the ventilator that preserves the integration and circulatory/respiratory function. Thus, the existence of brain function is not relevant to whether an organism is alive or not. Olson mentions that the embryo is alive due to fact that it has the primitive streak that becomes the neural tube, the ancestor of a spinal cord and a lower brain, while the brain dead patient is dead. I, however, argue that whatever remains, which would change into a brain, is not significant to organismal life. The organism is alive with the possession of the integration and life processing no matter how it depends upon medical apparatus. If animalists arbitrarily presume the primitive streak as the beginning of human life, they should regard a brain dead patient as having lost human identity due to the irreversible destruction of the brain, not the death of

the organism that survives without the brain.

5. Hylomorphism and the Identity Problem

Using a number of neurological case studies, Shewmon insists that a brain dead patient can maintain integration and other physiologically stable conditions. Thus, he argues that a brain dead patient is alive as an organism, preserving identity. As stated previously, Shewmon's neurology works properly against the whole brain death criterion. I, however, want to clarify the metaphysical theory upon which Shewmon relies in order to provide philosophical grounds for his neurology, and point out how the theory may not support the neurological standpoint contrary to his intention. He referred to 'Aristotelian and Thomistic hylomorphism' to establish metaphysical foundations of the neurological position, assuming the brain dead patient to be identical to him/herself prior to brain death, and thus, to be alive.[25] According to hylomorphism, a substance consists of matter and form. Matter is material that becomes substance when form shapes it. Form represents a principle that constitutes the substance by shaping matter. Form residing in matter realizes its potential, and as a result, constitutes substance.[26] The faculties that the matter of the organism possesses include vegetative, sensitive, and rational power. Retaining any of this power, the organism is said to be alive.[27] The hylomorphic account presupposes that a living thing exists, possessing a soul that is the form of the organism. As to a human being, a vegetative soul resides in a human body after birth, and it is replaced by a sensitive soul, and the soul is then replaced by a rational soul, as the organism grows. This is called a successive soul theory. A human soul is distinct from an animal because a human being is the only organism possessing advanced rational power. The hylomorphic account presumes that possessing rational power or its potential is substantial to the human being; it is not accidental. We are essentially different from the other animals with that potency.[28] Thus, the patient will be substantially

different from and will not be identical to the one prior to brain death when a rational power or its potential is lost due to a brain dead condition, according to hylomorphism.

As already mentioned, Shewmon's neurology is reliable, proving that somatic integrative functions and other life processing remain in a brain dead patient. Thus, whether brain function irreversibly ceases is not relative to the death of an organism. While the organism preserves life functions, possessing no asystole regardless of the help of a ventilator and other medical intervention, it is certainly alive. If a brain dead patient were not thought to be alive as an organism, we would have to deny the existence of a locked-in patient, who relies upon the ventilator and as much medical intervention as a brain dead patient. Since we believe the locked-in patient to be alive, it is rational to consider the brain dead patient to be so as well. Someone may point out the distinction between the cases of the brain dead and locked-in patient in terms of higher consciousness. That is, a brain dead patient has irreversibly lost that potency and is dead, while a locked-in patient clearly possesses it and thus, is alive. This sort of argument, however, misses the core issue of the brain death controversy, in which a brain dead patient is regarded as dead due to the irreversible cessation of brain's biological spontaneous circulatory, respiratory, and integrative functions. Thus, a brain dead patient and a locked-in patient are not very different in that they have lost those functions. Since the brain dead patient can retain somatic integration and life processing, which are not relevant to the brain's functioning, s/he is certainly alive as an organism, as Shewmon's neurological cases clarify.

Shewmon's problem with regard to the brain death controversy is due to the metaphysical foundation that he refers to in supporting his neurological position. As stated previously, the hylomorphic account allows an organism, having rational soul, to change substantially. Hylomorphism supposes the matter peculiar to a human being to possess rational power or its potential. Thus, it is not surprising that the theory considers the brain dead patient to be substantially different from and not

identical to the one prior to brain death, due to the irreversible loss of a rational soul. Contrary to this proper understanding of hylomorphism, Shewmon assumes a patient to maintain his/her identity before and after brain death. The reasoning perhaps derives from the fact that the hylomorphic account states that the organism is alive in the presence of any vegetative, sensitive, or rational power. That is, Shewmon seems to think that even if the brain dead patient has lost a rational soul realizing a rational power, s/he is alive, retaining vegetative or sensitive power with a ventilator and other medical assistance, thus, preserving identity. I, however, argue that this sort of interpretation of hylomorphism is problematic due to the unexplainable factor of the identity of a brain dead patient. As mentioned above, the hylomorphic account assumes a human soul to be distinct from an animal's soul due to rational potential. When whole brain function irreversibly ceases, the patient will be substantially different due to the loss of a rational soul possessing a rational power or its potential, even if it is alive as an organism with a vegetative or sensitive soul realizing each power. Therefore, hylomophism does not quite support Shewmon's neurological position, in which a brain dead patient is believed to be alive, preserving no substantial and identical change.

McMahan and Shewmon's neurological positions refute Bernat's, but the metaphysical theories that they rely upon include the problem of the concept of what a person is and the problem of identity prior to/posterior to brain death. The animalistic account works appropriately in explaining this concept, stating a person to be a phase sort, not a substantial concept. The account can explain the relation between a human animal and a human person, having no metaphysical problem of human identity. Animalism, however, regards a brain dead patient as no longer being an organism due to the irreversible cessation of whole brain function, and this view is problematic with that conception. As the neurological case study presents, a brain dead patient is alive, preserving somatic integration, with the aid of a ventilator and other medical

assistance. The presence of brain function is not essential to organismal life. I argue that Bernat's view regarding death and an organism, which is philosophically grounded by animalism, should be used efficiently for determining a point of no return for a brain dead patient from the identical being, although it does not work in determining his/her death as an organism. If animalism arbitrarily decides the primitive streak in an organism where the brain is formed as the beginning of human life, a brain dead patient should be regarded as losing human identity due to the destruction of the brain, not as dead. The patient is alive as an organism, preserving the indication of organismal life including somatic integration and life processing, regardless of the assistance of a ventilator. Nevertheless, a physician's removal of medical intervention for the patient could be justified by the irreversible loss of his/her identity if s/he would want to do so due to not being concerned about not being identical to his/her humanity. A physician would require a valid consent from a patient prior to a brain dead condition for the cessation of a medical treatment because s/he is not dead as an organism with this condition. Furthermore, understanding the assumptions of hylomorphism appropriately, a brain dead patient will lose identity due to the irreversible loss of a rational power or its potential, although it is alive as an organism. A brain dead patient survives with vegetative and/or sensitive power, but s/he will be substantially different with an irreversible brain dead condition. Contrary to Shewmon's view, the hylomorphic account will not necessarily work to criticize whole brain death but could also work to provide the ground to cease medical intervention for the patient due to the loss of his/her identity.

Notes

[1] Bernat, J. (1998) "A Defense of the Whole-Brain Concept of Death." Hastings Center Report 28, no.2: 15-16.
[2] Ibid., 17.
[3] Ibid., 17-18.
[4] Bernat, J. (2006) "The Whole-Brain Concept of Death Remains Optimum Public

Policy." Journal of Law, Medicine, and Ethics. Spring: 38.
[5] McMahan, J. (2006) "An Alternative to Brain Death." Journal of Law, Medicine, and Ethics. Spring: 44-45.
[6] Ibid., 45.
[7] Shewmon, D. A. (2001) "The Brain and Somatic Integration: Insights Into the Standard Biological Rationale for Equating 'Brain Death' with Death." Journal of Medicine and Philosophy: 467.
[8] Ibid., 463-464.
[9] Ibid., 464.
[10] Ibid., 471.
[11] Shewmon, D. (1997) "Recovery from 'Brain Death': A Neurologist's Apologia," Linacre Quarterly. February: 72.
[12] Bernat, J. (2002) "The Biophilosophical Basis of Whole-Brain Death." Social Philosophy and Policy 19: 334-335.
[13] Bernat. "Defense," 17. Refer to page 5 in this article.
[14] Shewmon, D. A. (1998) "Chronic 'Brain Death': Meta-Analysis and Conceptual Consequences." Neurology 51. December: 1539 and 1542.
[15] Olson, E. (1997) The Human Animal: Personal Identity without Psychology. Oxford University Press: 20.
van Inwagen, P. (1990) *Material Beings*. Cornell University Press: 182.
[16] Olson. *Human Animal*, 30.
[17] McMahan, J. (2002) *The Ethics of Killing*. Oxford University Press: 68-69.
[18] McMahan, 424.
[19] McMahan, 425.
[20] McMahan, 431-432.
[21] *Ibid*., 92.
[22] Olson. *Human Animal*, 44-45. van Inwagen. *Material Beings*, 172-181.
[23] Hershenov, D. (2005) "Persons as Proper Parts of Organisms," Theoria. Volume 1, Issue 71: 36-37.
[24] Olson. *Human Animal*, 31-32.
[25] Shewmon, D. "Recovery from 'Brain Death,'" 35 and 71.
[26] Aristotle (1984) On the Soul, *The Complete Works of Aristotle*, edited by Jonathan Barnes: 414a15-20.
[27] Ibid., 413a21-25 and 413b10-13.
[28] Lee, P. and Haldane, J. (2003) "Aquinas on Ensoulment, Abortion, and the Value of Life." Philosophy 78: 255-278.