**A Defense of Brain Death[[1]](#footnote-1)**

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1. Introduction

In 1959 two French neurologists, Pierre Mollaret and Maurice Goullon, coined the term *coma dépassé* to designate a state beyond coma. In this state, patients are not only permanently unconscious; they lack the endogenous drive to breathe, as well as brainstem reflexes, indicating that most of their brain has ceased to function. In 1968, an ad hoc committee of the Harvard Medical School, led by Henry Beecher, formulated a brain death criterion of death. Until then, the most widely accepted criterion of death was the complete cessation of circulation of blood and the cessation of vital animal function such as respiration [1]. With the advent of medical ventilators designed to move air artificially in and out of lungs, patients whose brain had ceased to function could continue to have a heartbeat for a period of time. Before ventilators, if a whole brain, including cerebrum and brainstem, stopped functioning, the lungs would stop functioning because the respiratory cycle is dependent on a part of the brainstem called medulla oblongata. Lack of oxygen, or hypoxemia, would cause the heart to stop within several minutes. The Harvard ad hoc committee argued that death could be masked by artificial respiration and that an additional criterion of death was required that would utilize diagnostic tests other than those for cardiac death, i.e., circulation and respiration. In the US and in many other countries, brain death has since become an established, and legally recognized, criterion for determining that an individual has died [2].

 It is noteworthy that the Harvard committee [1], the 1981 [3] and 2008 Presidential Commissions [4] for the study of ethical problems in medicine, and proponents of the whole-brain death criterion have maintained that brain death is not a different kind of death; rather the criterion of brain death refers to the way in which death is determined. Despite the insistence that brain death is not an alternative definition of death, or a different type of death, cessation of brain function is still thought of as different from cardiac death. Even some medical professionals still maintain a kind of intuitive distinction between cardiac and brain death, where a brain dead individual is thought of as not quite dead [5]. Within the literature on brain death, most commentators, with differing degrees of emphasis, discuss the importance of maintaining the biological definition of death, which is the cessation of function of the organism as a whole. Some of them maintain that brain death could fulfill this traditional notion; others argue that brain death fails to capture it.[[2]](#footnote-2)

 There are two different types of argument against the criterion of brain death. One argument is that brain death is not death of the organism as a whole because even without a functioning brain, the body maintains its integrity, thus, the brain is not required for the functioning of the organism as a whole. Within this line of argument there have been those who argue that despite the requirement of whole-brain death, clinical tests, which are the only ones required for the diagnosis of brain death, cannot show that the entire brain has stopped functioning. Halevy and Brody argue that the clinical diagnosis of death in fact can miss pockets of functioning areas in the brain [7]. D. Alan Shewmon, however, presents a more forceful argument against the brain being the primary organ required for the somatic, or bodily, organization of the human organism. In a series of publications, Shewmon attacks both the argument that cardiac death follows soon after brain death even for individuals with ventilator support and the argument that without the brain the body promptly loses its integrity [8]. Shewmon argues that with an intact spinal cord many of the integrative functions of the body survive the death of the brain [9].

 The second type of argument against the whole brain criterion of death is the higher-brain criterion of death. The proponents of this position argue that the humans are essentially persons and that the death of the person is the death of the organism as a whole. This view presumes that the concept of a person can be aptly characterized by appeal to certain abilities such as consciousness and other psychological features, most of which are likely to be located in the higher brain, or the cerebrum. Based on the higher-brain death account, the death of the brainstem is not required, because it is irrelevant to the maintenance of the person: patients who are in vegetative states or in a coma are no longer persons and are considered dead. Since the higher-brain death account does not require that the entire brain cease functioning, the lingering pockets of function identified by Halevy and Brody would not be challenging to this criterion. Furthermore, Shewmon’s attack on whole-brain death is also not effective against the criterion of higher-brain death because this criterion requires only the death of the cerebral cortex, not somatic disintegration.

Proponents of the criterion of higher-brain death argue that death is not a biological concept, challenging the notion that death can be defined biologically as the cessation of the functioning of the organism as a whole. Some argue on metaphysical grounds that the death of the person occurs when there is discontinuity of personal identity, which most likely occurs when a human organism loses the ability for consciousness, memory, and other crucial psychological aspects [10-11]. Robert Veatch agrees that death cannot be defined biologically; he argues, however, that it is not the end of personhood but the end of embodied consciousness that signals death [12]. Furthermore, for Veatch, death is a morally laden concept. The occurrence of death signals the loss of moral standing; those who have died no longer have a claim on our moral regard. Thus, a determination of death can trigger a certain set of death-associated behaviors, such as burial, removal of organs, and so forth.

In this paper, I argue that the whole-brain death criterion instantiates the biological definition of death. I do this because even though legally recognized as one of the two criteria for death, brain death has not been universally accepted as a biological notion on par with cardiopulmonary death either by bioethicists or by the medical community or the public. In the US, the less than universal acceptance of brain death as death is evidenced by the legal provisions in some states to allow families who claim moral or religious objections to the brain death criterion to ask for what are called “reasonable accommodations.” These accommodations might include a delay in the diagnosis of brain death or a delay of the removal of the ventilator.[[3]](#footnote-3) Furthermore, as has been noted in the literature on brain death, the establishment of brain death as an additional criterion for death has been crucial for cadaveric organ donation and whether brain death is death in the biological sense can have a significant impact on the permissibility of organ donation after brain death.

To defend whole-brain death as biological death, I challenge two assumptions in the brain death literature that have shaped the debate and have stood in the way of an argument for whole-brain death as biological. In section 2 of this paper, I challenge what I what I characterize as the brain and body dualism prevalent in the debate. Those who argue against brain death by prioritizing somatic or bodily integration, presume that a biological definition of death (the irreversible cessation of the function of the organism as a whole) may take into account only the integrated functioning of the body either by excluding the brain all together, as Shewmon [8] does, or including only the functions of the brain that support bodily integration. Based on this view, an individual dies when the body is no longer functioning in an integrated manner, and because the brain is not necessary for somatic integration, brain death would not be death in this sense. Narrowing the term ‘organism’ in this way, however, to designate only bodily integration, I argue, is not justified and is what prevents the inclusion of all the functions of the brain into the conception of the functioning organism as a whole. I reject the exclusion of brain function from the conception of a functioning organism, and argue that somatic integration is only one aspect of a functioning organism.

In section 3 of the paper, I present evidence for unconscious psychological processes to challenge the second assumption within the brain death debate--the strict association of psychological function with consciousness. This way of characterizing psychological phenomena both unduly prioritizes consciousness and narrows the scope of psychological function considered relevant for a functioning organism. Moreover, as I argue, for proponent of the higher brain criteria, the linking of psychological phenomena to consciousness leads to the abandonment of brain death as a biological conception of death.

In section 4 of this paper, I argue that brain and body dualism should be abandoned and that the term ‘organism’ in the biological definition of death should apply both to the functioning of the body and the brain. Additionally, I reject the identification of psychological phenomena with consciousness and broaden the scope of psychological functions considered relevant for the functioning of the organism as a whole. I then redefine the cessation of the organism as a whole to include three elements of integrated function without prioritizing any of those elements. The three elements are: the loss of integrated bodily function, i.e., somatic integration; the loss of psychophysical integration required for processing of external stimuli and the behavioral outputs of psychological states; and the loss of integrated psychological function, such as memory, learning, attention, and so forth. The loss of all three elements of integrated function is death of the organism.

2. Dualism in the Brain Death Debate

There are two versions of dualist approaches in the brain death debate, mind and body dualism and brain and body dualism. My argument in this section is that the two types of dualism are related in the debate. The exclusion of the brain from the conception of the functioning organism is motivated by the view that inclusion of psychological aspects into a conception of a functioning organism requires endorsement of mind and body dualism. But as I will show, mind and body dualism does not entail brain and body dualism and because of that the latter type of dualism is unsupported.

I will first describe mind and body dualism, which might take the form of substance dualism or property dualism.[[4]](#footnote-4) Substances dualism is the view that there are two substances in the world, the mental substance and the physical substance. Property dualism is the view that although there is only one substance there are two types of properties, physical and nonphysical properties. Mental states, which are a type of psychological state, are nonphysical properties based on this view. Dualism can be contrasted with physicalism, which is the view that there is only one substance and that all properties are physical properties, including psychological states.

 In the brain death debate there are several proponents of variants of mind and body dualism. Lizza [11] is a proponent of what could be interpreted as property dualism. He argues that that the relationship between the human organism and the person is that of constitution, but he also argues that scientific laws about human biology cannot account for all the properties of a person. There are subjective and psychological features of the person that cannot be captured by biology. If we assume that all physical features of a person can be accounted for by a relevant scientific branch, then those features that are not captured by a physical explanation are not physical.

McMahan hesitantly favors a type of dualism [14]. He accepts that a functioning brain is necessary for continuity of personal identity, but he does not accept the view that the mind is just the brain. “…if each of us is a substance and each is essentially a mind, then minds are substances, at least in whatever sense in which it is true that you and I are substances. So the mind should not be identified simply with its particular contents. Nor can we say simply that the mind is the brain” (McMahan [14], p.103).

Shewmon is a proponent of Aristotelian hylomorphic dualism [15]. “In this view, the soul is not a spiritual thing like a ghost or an angel that inhabits or is somehow extrinsically related to an essentially mechanical body (substance dualism) but is both the immaterial principle of the intellectual and volitional powers, which operate through the brain but are not reducible to brain activity) and the vital principle, or substantial form, of the body, making it to be precisely a living body” (Shewmon [15] 265). Based on Aristotle’s view, the soul is the form and the body is the matter, and the combination of the two is required for the existence of a person. Shewmon explicitly states that the soul is immaterial despite its integration with the body, which means that Shewmon is not a physicalist (Shewmon [15], p. 265).

The second kind of dualism prevalent in the brain death debate is established between the body, without the brain, and the brain as the generator of psychological function, i.e., brain and body dualism. With Shewmon at the helm of the movement, many of the critics of the brain death criterion prioritize somatic or bodily integration when it comes to biological death. Proponents of a higher-brain death criterion responded by countenancing that biological death applies only to somatic integration and agree that whole-brain death is not death in the biological sense. To argue for higher-brain death they either prioritize psychological aspects of the individual, arguing that a human being is essentially a person, or they argue, as Veatch does [12], that death cannot be defined biologically but must take into account the moral dimensions of the event.

The upshot is that the biological definition of death is taken to apply only to the body, not taking into account the brain’s role in producing psychological function, and the inclusion of psychological aspects of the person is taken to mean that one is abandoning the biological criterion. This is evident in the following attempts to integrate psychological and biological function. Shewmon [15] attempts to do this by proposing the integration of the two aspects of the person, the psychological and the biological, by arguing for hylomorphic dualism. Veatch [12] notes the cleft between what could be called the bodily criteria of death and the psychological criteria for death, and he attempts to bridge the gap as well. He argues: “for me…an organism cannot exist as an integrated whole if one of its crucial, essential elements is missing. It is integration of body and mind that is critical, not mere integration of various somatic parts” (Veatch [12], p. 365). Veatch further argues that the human is more than a body (Veatch [12], p. 365), which is true if from the concept of body one excludes the brain. But because of the inclusion of the mind into the conception of organism, Veatch abandons the biological conception of death and prioritizes a morally-laden one.

Although both types of dualism, mind-body and body-brain dualism are objectionable, the latter is particularly unmotivated. When surmising the elements necessary for the maintenance of the functioning of the organism as a whole, there is no principled reason to exclude the functions of the brain. Brain-body dualism does not coincide with the dualism between the mind and the body and cannot be supported using arguments underlying that distinction. The justification for mind and body dualism is the argument that mental states are nonphysical and cannot be accounted for by scientific theories that only account for physical properties. Mind-body dualism can be used to distinguish between the physical and the nonphysical properties of an individual, but not between the different physical parts of the individual based on their role in realizing human psychology. The ‘body’ in mind and body dualism encompasses all physical aspects of the individual, including the brain. Thus, being a mind and body dualist does not require being a brain and body dualist.

If we then reject brain and body dualism as ungrounded, we can argue that the term ‘organism’ should be used to apply both to the body and to the brain. This means that amongst the functions of the body we can include psychological function produced by the brain. This expansion of the term ‘organism’ is not difficult to support because it does not commit us to a particularly stringent kind of physicalism. More precisely, what is required is the acceptance that a functioning brain is necessary for psychological function, but not the argument that psychology is reducible to neuroscience or other more basic forms of scientific explanation. Moreover, accepting this type of physicalism is incompatible only with types of mind and body dualism that maintain that the mental aspects of an individual can be separated from and maintained without any underlying physical processes, something akin to an argument for an immaterial soul. In order to integrate psychological aspects of a person into the definition on organism, all that is needed is the commitment to the claim that in order for persons to have psychology they have to have a functioning brain. The integration of psychological function into the functioning of the organism as a whole does not require abandoning a biological conception of death.

3. A Broader Construal of Psychological States

For many proponents of the higher-brain criterion of death consciousness is deemed important for the maintenance of a person, and the irreversible loss of consciousness signals death. Veatch [12] argues that death is the end of embodied consciousness. Lizza [11] argues for the importance of the subjective experience for the maintenance of personhood. McMahan [14] also maintains that death of the person coincides with the loss of capacity for consciousness. Hence, individuals who have lost the capacity for consciousness, such as patients in permanent vegetative states, are considered dead. Even authors who are not proponents of the higher-brain criterion of death identify consciousness as the most important among psychological phenomena. For example, Shewmon argues that biological death, or as he phrases it ‘passing away,’ coincides with the “permanent absence of both consciousness and circulation of oxygenated blood” (Shewmon [15], p. 278). Even Bernat numbers consciousness among the critical functions of the organism permanently lost with brain death (Bernat, [16], p. 38).

 The cited authors do not provide reasons for prioritizing consciousness over other psychological attributes or mental features. A reason to presume, however, that consciousness is considered essential is that many of the authors take the view that mentality in general requires consciousness. Based on this view, an individual must have the capacity for conscious to have psychological states. It is also likely that the coupling of consciousness with mentality motivates many of the authors in the debate to opt for mind and body dualism, as was discussed in the previous section.

 There are, however, both conceptual and empirical reasons to doubt that consciousness is necessary for mentality. There are philosophers who reject the characterization of mental states as necessarily conscious states and establish the possibility of unconscious mental states. For example, higher-order theories of consciousness distinguish between mental states and conscious states [17-18]. Based on higher-order views, there is a hierarchy of mental states; there are first-order states, second-order states, and sometimes third-order states. All the states are mental states. But in order for a first-order mental state to become conscious, one needs to have a second-order state *about* that first-order state. Similarly, a second-order state can become conscious only if one has a third-order state *about* it. For example, imagine I am speaking with a friend, and after five minutes of conversation, I notice he has a mustache. Given that I have been looking at his face for the duration of our conversation, it is likely that I had a number of perceptual, first-order, states about his mustache. But only after a number of minutes I became conscious of those perceptual states and aware that he has a mustache. I did that by having a second-order state about the first-order perceptual states, about the color, size, direction, and other features of my friend’s mustache.

There is also empirical evidence against the notion that psychological states have to be conscious. Experiments utilizing the subliminal prime paradigm have helped demonstrate that perception can be unconscious [19]. For example, multisensory information can be unconsciously coupled, as in the McGurk effect, where visual information of an individual moving their lips to say *ga*, coupled with the auditory stimulus of the syllable *ba*, will produce the conscious perception of the syllable *da* (Dehaene [19], p. 62). Even further, there is evidence that what becomes conscious is often prescreened by unconscious attention. If attention is conceptualized as a sifter that is required to distinguish relevant from irrelevant information when attending to a task, then there is evidence that attention can operate unconsciously (Dehaene [19], p. 75). Finally, there is evidence that the unconsciously perceived signals can inhibit automatic responses, an ability previously thought to require consciousness. Participants asked to perform a repetitive task, for example, clicking a key whenever a picture appeared on a screen, were able to inhibit that response when a stop signal was presented. Surprisingly, the stop signal had an inhibitory effect even when it was presented subliminally (Dehaene [19], p. 85).

The evidence presented here can be taken to challenge even Bernat’s view that consciousness is one of the critical functions of the organism because it is required to seek nutrition and hydration (Bernat, [16], p. 38). If consciousness is not always needed for perception, attention, and even halting of automatic behavior, then there is no reason to think that consciousness is required in all instances of seeking nutrition and hydration. I take this not to be an argument against the inclusion of consciousness into the functioning of the organism as a whole, but a reason to expand our conception of psychological function required for nutrition and hydration.

In conclusion, given both the philosophical arguments against the strict association of consciousness with mental states and the empirical evidence that psychological processes can operate subliminally, there is no reason to continue privileging consciousness, as is done in the brain death debate. It is better to think of consciousness as one among many psychological processes. Hence, when thinking about brain death, we should not think only about the permanent loss of consciousness, but about the permanent loss of all other psychological abilities typical of humans. A broader construal of psychological states, going beyond the prioritization of consciousness, should increase the amount of relevant aspects that comprise the functioning of the organism as a whole, which leads to the conclusion that the complete loss of the brain results in the cessation of functions relevant for somatic integration as well as the loss of all psychological function.

4. Three Elements of Integrated Functioning

Previously, in section 2, I argued that the human organism should be construed to encompass both the body and the brain. In section 3, I argued for the expansion of our conception of psychological function to include not just consciousness, but many more aspects of brain function, such that the demise of brain function should be seen as resulting in the loss of psychological states broadly construed. If the term ‘organism’ applies both to the functioning of the body and the brain, then the cessation of function of the organism as a whole should take into account three elements of integrated function: 1) somatic or bodily integration; 2) psychophysical integration; and, 3) psychological integration.

 My distinguishing among these three elements mirrors parts of Bernat’s formulation of the critical functions of the organism. He formulates the critical functions of the organism in the following way: 1) consciousness because it is required for the organism to respond to requirements for nutrition and hydration; 2) control of circulation, respiration, and temperature control, needed for the maintenance of cellular metabolism; and 3) integrating and control systems involving chemoreceptors, baroreceptors, and neuroendocrine feedback loops to maintain homeostasis (Bernat, [16], p. 38). On my characterization, critical functions 2 and 3 are joined into the element of somatic integration, while critical function 1 is subsumed under the element of psychophysical integration. In addition to consciousness, which Bernat includes only for its role in nutrition and hydration, I take into account a broader array of psychological processes as crucial for a functioning organism. Unlike others in the debate, I do not prioritize either somatic integration or consciousness, but argue that each of the elements contribute similarly to the functioning of the organism as a whole.

Much of the debate on whether brain death satisfies a biological definition of death centers on the role of the brain in somatic integration. Shewmon maintains the disintegration of the body after brain death is manifested through hemodynamic deterioration and loss of homeostasis, which then leads to imminent and irreversible cardiac arrest [9]. But he argues that somatic disintegration is the result of spinal shock (not brain death) and if the patient survives long enough, it will subside and, for individuals maintained on ventilators, the spinal cord will maintain somatic integration. According to Shewmon, the brain is not required for somatic integration and brain death is not the death of the organism.

I argue, however, that somatic integration is only one of the elements of the functioning of the organism as a whole. Hence, even if one is persuaded by Shewmon’s argument that the spinal cord can maintain somatic integration in brain dead individuals, this would not be enough to argue that such individuals are not dead. As I argued in section 2, there is no reason to prioritize somatic integration over all other functions of the organism. Based on my view, only the first element of integrated bodily function is that of somatic integration, which includes “control of circulation, respiration, and temperature control, needed for the maintenance of cellular metabolism; and integrating and control systems involving chemoreceptors, baroreceptors, and neuroendocrine feedback loops to maintain homeostasis (Bernat [16], p. 38).”

The second element is the psychophysical integration required for processing of external stimuli and the behavioral outputs of psychological states, for example, the kinds of psychophysical integration required to avoid danger or to seek nutrition and hydration. In addition to the loss of integrated bodily functioning, brain death will cause loss of sensory and motor integration required for voluntary behavior. This will result in loss of the integrative brain functioning required for vision, hearing, sense of smell and touch, as well as maintenance of balance. The cessation of brain function will result in the loss of speech comprehension and speech production. Brain-dead individuals lack the ability to represent objects in space and lose the ability to localize their body in space, which results in the inability for spatial behavior. As I argued in section 3, perception, attention and even inhibitory behavior can operate subliminally, thus in addition to the permanent loss of the ability for consciousness, brain dead individuals lack many more psychological abilities required for nutrition and hydration. Thus, I propose that Bernat’s critical function 1 be expanded to include all the psychological mechanisms required in psychophysical integration, not just consciousness.

The third element is integrated psychological function required for memory, learning, attention, and so forth.[[5]](#footnote-5) Brain-dead individuals lack the ability for memory, learning, and a variety of other higher functions including consciousness and attention. When thinking about the loss of integrated biological functioning of the organism, all of those functions of the brain required for psychological and psychophysical integration should be included, in addition to the brain’s role in somatic integration.

Conceptions of death are used to distinguish between dead individuals and severely disabled individuals. If one adopts the view that somatic integration is all that counts, then brain-dead individuals might be characterized as severely disabled. If one, however, adopts the view that somatic integration is not enough and that what is required is also psychological and psychophysical integration, then brain death is death. Brain-dead individuals lack psychological integration, psychophysical integration, and aspects of somatic integration. My view does not aim to prioritize either bodily or psychological aspects of a person because I wish to avoid the complexity required in establishing certain properties as essential for the continuation of human organisms and others for the survival of persons. All three elements of integrated functioning are similarly required for the functioning of the organism as a whole.

Based on my view, individuals with severe brain injury, who are in a coma, vegetative state, or in minimally conscious state, should be considered alive. All those states are classified as disorders of consciousness. Patients who are in these conditions have diminished, disturbed, or absent awareness (awareness of self and the environment). Patients in vegetative states and minimally conscious states exhibit diminished arousal (wakefulness) while individuals in coma lack arousal. Arousal depends mostly on areas in the brain stem such as the reticular activating system, while awareness is thought to depend on the functioning of the cerebral cortex. Coma is usually a temporary state, characterized by complete lack of arousal and complete unresponsiveness to stimuli. Individuals who recover partially from coma might become vegetative or minimally conscious. Patients in vegetative states (also referred to as unresponsive wakefulness syndrome) have sleep-wake cycles and exhibit evidence of arousal. Those in minimally conscious states have sleep-wake cycles, show evidence of arousal, as well as evidence of awareness of self and the environment [20]. The tools most frequently used to determine whether an individual is in a vegetative state are clinical history and behavioral observations, and those are not enough to determine whether the individual has lost all cortical function or is only seemingly unresponsive to the environment [21]. The rate of misdiagnosis for vegetative states is up to 43% [22].

Functional MRI (fMRI) has been used to demonstrate that individuals previously thought to be vegetative had some remaining cortical function. Owen et al. [21] studied a 23-year-old patient who was considered to be in a vegetative state after sustaining a traumatic brain injury in a car accident. In order to test for cortical activity, Owen at al. [21] conducted an fMRI study during which they gave spoken instruction to the vegetative patient to imagine playing tennis or imagine walking through her house. The fMRI of the vegetative patient showed significant activity in the supplementary motor area while imagining playing tennis. When she was asked to imagine walking through her house, the patient showed significant activity in parahippocampal gyrus, the posterior parietal cortex, and the lateral premotor cortex --areas associated with memory, special organization, and motor function, respectively. The fMRI findings in the patient were indistinguishable from that of a normal person involved in the same mental imagery tasks. The study shows that despite the fact that the patient fulfilled the criteria of vegetative state, she retained the ability to follow spoken command.

A number of additional studies confirmed the usefulness of fMRI in detecting cortical function in patients previously diagnosed as vegetative [23-25]. A study using electroencephalography (EEG) showed that EEG is better than the clinical exam using only behavioral responses in detecting cortical function and ability to follow commands in patients with severe brain injury. EEG is less costly than fMRI, and that it can be used to detect cortical function in behaviorally unresponsive individuals is encouraging because it is more likely that this technique could be established as a standard diagnostic tool [26]. In addition to the evidence of cortical brain function in patients previously diagnosed as vegetative, there is also evidence that zolpidem, a medication approved as treatment for insomnia, can also improve brain function and promote arousal in vegetative patients [27-28]. Because of the currently high rate of misdiagnosis for vegetative states, as well as the potential for recovery from those states, it is not warranted to endorse the death of the higher brain as a criterion of death.

Based on my view, even individuals who are accurately diagnosed as being vegetative and show no evidence of cortical activity should be considered disabled, but not dead. In addition to the somatic integration that is retained through the functioning of the spinal cord and functioning of the brain stem, vegetative patients display some psychophysical integration as well. Patients in vegetative states retain the ability to breathe on their own, they have sleep-wake cycles, and they can swallow (Laureys, Owen, and Schiff [20], p. 539). Individuals in minimally conscious states display an even greater level of psychophysical integration because they can follow simple commands, they retain some gestural or verbal responses, and they can produce intelligible speech and even exhibit purposeful behavior (Laureys, Owen, and Schiff [20], p. 539). All of this does not add up to the end of functioning of the organism as a whole, and thus patients in vegetative states and minimally conscious states are not dead, but severely disabled individuals.

5. Conclusion

In this paper, I defended the view that the whole-brain criterion of death fulfills the requirements of a biological definition of death. I have argued that a biological definition of death should not be interpreted as referring only to somatic integration. Instead, the conception of cessation of the functioning of the organism as a whole should apply to both the body and the brain. In addition, I maintained that psychological functioning, broadly construed, should be considered relevant for the functioning of the organism as a whole. Finally, I proposed that integrated functioning of the organism as a whole should be redefined to include three elements of functioning: integrated psychological functioning, including memory, consciousness, and emotion; integration of psychological and physical processes, such as responding to fear; and somatic integration. I argue that my redefinition of integrated functioning of the organism as a whole to include three elements of functioning can be used to support the view that brain death is death in the biological sense.

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 [↑](#footnote-ref-1)
2. Bernat et al. [6] establish the paradigm for the discussion of death, and distinguish between the definition of death, the criteria for death, and the tests performed at the bedside to determine whether an individual has died. Currently there are two criteria for death, the cardiopulmonary criterion that requires the end of circulation and respiration and the whole-brain death criterion that requires the cessation of function of the entire brain. The cardiopulmonary criterion has been universally accepted as an instantiation of the biological definition of death, but there is still controversy about whether the brain death criterion fulfills the biological definition of death. In this paper, I focus on the question whether the whole-brain death criterion fulfills the biological definition of death and I use the phrases ‘definition of death’ and ‘conception of death’ interchangeably to designate the biological definition of death. [↑](#footnote-ref-2)
3. In a most recent case in Reno, Nevada, the parents of a young man who had been declared brain dead in St. Mary’s Regional Hospital challenged the removal of his ventilator and IV tube. Although a county court ruled that the ventilator and IV tube should be removed, the Nevada Supreme Court in November 2015 overturned that ruling [13]. [↑](#footnote-ref-3)
4. My brief description of mind and body dualism in this section is included to aid the readers’ understanding of this view as it appears in the brain death literature; a review of the vast literature in philosophy of mind on this topic is outside of the scope of this paper. [↑](#footnote-ref-4)
5. My argument does not rely on there being elements of psychological integration that can actually exist in the absence of the abilities to perceive external stimuli and behave. It might be that most of our psychology requires some degree of psychophysical integration. I contend only that one can distinguish three discrete elements of biological function even if no individual can have integrated psychological function without some degree of psychophysical integration. [↑](#footnote-ref-5)