

Death and Irreversibility

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There are currently two legally established ways to die: the irreversible cessation of circulation and respiration and the irreversible cessation of neurologic function, i.e., cardiac death and brain death respectively. There are both legal¹ and philosophical challenges to the characterization of brain death as biological death.^{2,3} Most recently, however, there have been technological challenges to both criteria for death. For example, extracorporeal membrane oxygenation (ECMO) has made it possible to maintain circulation of blood and oxygen in individuals without normal heart function. Individuals on ECMO do not have a heartbeat. An even more recent scientific development described in Zvonimir Vrselja et al. is a system named *BrainEx* (*BEx*) that was successful in restoring and maintaining circulation and cellular viability in *ex vivo* pig brains.⁴ *BEx* did not, however, restore any global brain activity that could lead to perception, consciousness, or any other higher-order brain functions. These recent technological challenges to both criteria for death may lead to the reinterpretation of irreversibility in both types of death.

One of the criticisms of the legal and biological definition of death is that it does not capture the ordinary or traditional notion of death. As some have pointed out, the inclusion of irreversibility in the biological definition of death is one of the ways in which the ordinary conception of death and the biological definition come apart. David Cole has argued that in its ordinary usage, death is not irreversible.⁵ For example, based on some religious traditions it is conceivable that deceased individuals might resurrect. A discontinuity between the biological and ordinary notions of death has been seen as a strike against the biological definition. This is especially true for brain death, which is often characterized as challenging the more traditional conception of death as the irreversible cessation of cardio-pulmonary function. Although I have argued against the distinction between commonsense or ordinary death and the biological conception of death,⁶ this editorial will explore the scope of irreversibility without relying on that particular argument.

If there are indeed two notions of death, ordinary death and biological death, there are ways to explain why irreversibility in each of those concepts might have a different scope. This might be one of those rare moments where a philosophical distinction, instead of augmenting a problem, might help resolve it. The issue of irreversibility raises questions about knowledge of possibilities. For example, even when we know that something is the case, for example, that an individual is dead, we can also know that things could have turned out differently because we can conceive of scenarios in which a person who is currently dead might have in some way recovered from death.

The standard view in the epistemology distinguishes three different possibilities: logical possibilities, metaphysical possibilities, and physical possibilities. Logical possibilities encompass any possibility that does not create a logical contradiction. For example, it is logically impossible for an object to be both round and not round at the same time. There are no other restrictions on logical possibility, anything that does not generate a contradiction is possible regardless of how implausible it

might be. This is why it is not a contradiction to say that a person who has died was resurrected. More restrictive types of possibilities are metaphysical, which are logical possibilities that are also compatible with the nature of any things that exist in the actual world plus any things that could have existed. Metaphysical possibilities also do not rule out resurrection. Perhaps, our world is not the type of world where individuals who are dead can come back to life, but there are other imaginable worlds where death might not be an irreversible state and where people, by a variety of means, might come back to life. Much of science fiction has certainly depicted these kinds of worlds. Finally, there are metaphysical possibilities that are also physical possibilities, which are possibilities grounded in the laws of nature. These physical possibilities are established by science. Science allows us to know what obtains in the actual world, and allows us to draw the boundaries of what is possible in the natural world. Thus, when an individual has undergone biological death, it means that there are no known scientifically justified possibilities by which that same individual could come back to life.

We can now use these established distinctions among the three different types of possibilities to explain two things: first, why there might be a difference between the ordinary notion of death and the biological notion of death; and second, to establish the scope of irreversibility in each notion of death.

If there are two notions of death—one ordinary and the other scientific—then it might also be the case that these two distinct concepts support different possibilities for reversal. Cole argued that it is not a contradiction in everyday parlance to speak of somebody dead as being in a reversible state. He argues that we can conceive of ways in which people could come back from death. Given that Cole is relaying the criterion of contradiction, he is invoking logical possibilities. In effect, he is arguing that it is logically possible for a dead individual to come back from that state. Further, as I have stated earlier, it might be metaphysically possible for a person who is dead to come back from the dead. All we might need to establish that possibility is to conceive of a world in which death is a reversible state. Given that ordinary death might not be restricted by physical possibilities, it might be appropriate to say that the scope of possibilities for ordinary death is wide enough to include both logical and metaphysical possibilities. Given such a wide range of possibilities, ordinary death is reversible because so few things are logically or metaphysically impossible, including coming back from death.

The same is not true for the biological conception of death. The biological conception of death is based on our current best theories of human biology and knowledge of which biological processes can be reversed. This explains why the biological definition of death might include irreversibility, which is because there simply are certain biological processes that are currently irreversible and that lead to the complete loss of biologic function. Moreover, that biological death relies on physical possibilities explains why irreversibility designates only currently irreversible biological processes. Knowledge of physical possibilities is not guided by conceivability; instead, physical possibilities are based on the knowledge of the biological nature of living organisms and knowledge of what types of processes in those organisms might lead to death. Thus, using the distinction between the three kinds of possibilities, we can explain both why ordinary death is reversible and why biological death is irreversible.

Finally, some have argued that death, even biological death, is in principle irreversible. Specifically, James Bernat has argued that brain death is in principle

not a reversible state.⁷ Perhaps, Bernat means to say that reversible death is inconceivable and that stating that death is reversible is to speak in contradictions. But to endorse this view is to abandon the empirical nature of the biological concept of death. We know what biological death is by knowing biological facts about human functioning. Whether biological death is reversible depends entirely on whether it is actually the case that certain kinds of biological processes can be reversed. Given that scientific knowledge of human biology is not yet complete, the precise limits of reversibility are not yet known. The Vrselja et al. study, according to the authors, did not succeed in reversing brain death because BEx did not restore the higher-order functions of the brain. But, this study might be the precursor of future discoveries that establish the possibilities of reversal for brain death. The conceivability of those possibilities, however, should not undermine our current criteria for death because brain death remains an irreversible state.

Notes

1. Klugman C. The bell tolls for death by neurologic criteria: Aden Hailu. Bioethics.net Blog; available at <http://www.bioethics.net/2015/12/the-bell-tolls-for-death-by-neurologic-criteria-aden-hailu/> (last accessed 4 Nov 2019).
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3. Shewmon DA. Constructing the death elephant: A synthetic paradigm shift for definition, criteria, and tests for death. *Journal of Medicine and Philosophy* 2010;35:256–98.
4. Vrselja Z, Daniele SG, Silbereis J, Talpo F, Morozov YM, Sousa AMM, et al. Restoration of brain circulation and cellular functions hours post-mortem. *Nature* 2019;568(7752):336–43.
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7. Bernat JL. A defense of the whole-brain concept of death. *Hastings Center Report* 1998;28(2):14–23.



The God of Death. Aztec terracotta sculpture. Location: Museo Nacional de Antropología, Mexico City, Mexico. Photo Credit: Scala/ Art Resource, New York, Reproduced by Permission.