

Online Supplementary Material

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Appendix 1. Clarifying Engel's Critique of Dualism. Monism And Dualism: An Old and Unfortunate Controversy

In his 1988 essay, "How much longer must medicine's science be bounded by a seventeenth century world view?"¹ Engel made a harsh critique of a medicine that, by adhering to a dualistic world view, regarded human experience as unworthy of scientific inquiry. Many readers of Engel and many critics of medicine have viewed the dualism between mind and body, and between viewing the patient as an object or a subject,² as fundamental obstacles to healing. This has led to approaches that claim to be more holistic and patient-centered.

Discussions of monism and dualism, though, should depart from a clear definition of these terms. It has been said that Descartes³ was the first to give a full description of the human being as a dualistic entity with a material body responsible for actions in the world, and a spiritual soul responsible for thoughts and emotions.⁴ The classical dualism (we will call it *ontologic dualism*), posits that there is a material reality juxtaposed on a spiritual one. The word *ontologic* pointed out the independent existence of both worlds. The soul, in this conception, would not be affected by the laws of physics, or for that matter, the death of the material body. Brown points out, though, that Descartes' vision was that the two realms can and do interact, whereas the evolution of the Cartesian world view in the 19th and 20th centuries led to a view that the body was more real than the mind.

Ontologic monism (the monism of being) posits that nothing can escape the laws of nature. Thus, the "world of the ideas" (as described by Plato) could not possibly exist without material support, such as a brain or computer. Bertrand Russell⁵ defended this kind of monism. He referred to it as "radical monism," in which all our thoughts flow from neural activity; this view is widely accepted by the scientific community. The corresponding view, "spiritual monism," a view held by some healers, posits that nothing is material, that the spirit (or soul) is real, and that all appearance of substance is illusory.

The philosopher Karl Popper⁶ attempted to resolve the monism-dualism problem by proposing an "interactional dualism" to explain the relationship between mind and body, subject and object, and spiritual and material manifestations of reality. Popper considered that the process of acquiring knowledge requires some degree of separation of the whole into its parts and the consideration that different levels might have different governing principles. For example, it is not possible to derive principles of animal behavior directly from the laws of quantum physics, nor is it possible to derive political theory from molecular biology. While considering that all thought has a material basis, he hesitates by considering that science cannot capture the complexity of human experience simply by applying the laws of physics. This dualism is not ontologic (referring to existence or being), but epistemologic (referring to knowledge and understanding): to understand our world, we need to fragment it into systems and subsystems, describing their interactions, and only then can we make predictions about human experience and our relationship to the world.

The scientist-philosopher Edward O. Wilson takes exception to this idea. Wilson posits that scientific advances in the human realm are accomplished when several fields of knowledge converge, or when connections can be made between them. He refers to this larger unifying principle as *consilience*. Wilson believes that, in the future, science will uncover the unifying principles that transcend all levels, from the molecular to the societal, and create connections between fields that are currently separate, such as psychology and molecular genetics. In other words, he believes that the roots of human behavior are in the laws of elemental particle physics and could be predicted mathematically in the same way that we can predict the movements of the planets.⁷ Wilson's view can be described as ontologic and epistemologic monism.

Some object that Wilson's dream scarcely could exist for two reasons. The first reason is that natural systems are complex and chaotic, and somewhat dependent on chance. The emergent properties of complex systems such as psychology, sociology, or economics can not be explained by deterministic laws because of one of the principles of complexity science: order emerges based not only on physical laws, but, more importantly, based on initial conditions of the system. For this reason, Popper and complexity scientists would suggest that consilience is only possible in delimited areas of science. A second reason is that our languages, even our formal languages of mathematics and logic, provide imperfect representations of nature—they are just approximations. For example, in physics, Heisenberg's uncertainty principle and, in mathematics, Gödel's theorem do not make "sense" when translated into everyday spoken English, and the laws of quantum mechanics challenge any logical interpretation. Even if consilience were a future reality, in this imperfect moment, science must be pluralistic—it fragments reality to understand it.

It is not clear exactly what was Engel's position in this controversy, but we suggest that he took a view articulated by Tizon⁸: ontological monism and epistemologic dualism. That is, he viewed mind and body as inseparable components of human existence. But at the same time, he presented systems theory—many systems interacting, each level with its own laws, and the whole system with some common laws—as a superior explanation of the relevant factors in health and illness, a position that can be clearly defined as epistemologic dualism. Engel's attack against dualism should be understood more in an ideologic than a philosophic level. Engel suggested that the reason physicians rejected the emotional side of their patients' illness presentations was because they perceived the human being as a machine to be fixed, separating the body (the machine) from the emotional soul (which was basically irrelevant to the task at hand).

One does not have to take a position against dualism in all of its forms. It is widely accepted that emotions can influence health outcomes. We cannot, however, manage psychological factors in the same way as we do genetic or environmental factors. We cannot necessarily claim that depression causes heart disease in the same way as genetics—depression and genetics operate using different mechanisms. Unfortunately, the lack of distinction between ontologic monism and epistemologic dualism opens the door to these kinds of confusions.

Although this philosophical controversy is not in the front of most clinicians' minds when they practice, Engel's influence has been to foster the capacity to engage in research and practice that requires epistemologic dualism (or better, pluralism) while maintaining an ontological monistic world view. Consilience, taking this view, is a utopian view, delimited by the capacity to imagine outside our conventional language and the structure of complex systems.

To finish our argument about the monism-dualism controversy, we would like to point out a subtle relationship between monism and models of causality. Early psychosomatic research demonstrated the influence of stress and anxiety on illnesses, such as asthma and coronary disease, seeming to confirm the unity of mind (soul) and body. A simple causal explanation is not validated by current research, however, which shows that anxiety and stress may have a role as a precipitant or coadjuvant, but not as a necessary cause of all cases of the illness in question.

References

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