

The Intelligent Design controversy: lessons from psychology and education

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The current debate over whether to teach Intelligent Design creationism in American public schools provides the rare opportunity to watch the interaction between scientific knowledge and intuitive beliefs play out in courts rather than cortex. While it's easy to believe the controversy stems only from ignorance about evolution, a closer look confirms what decades of research in cognitive and social psychology have already taught us: that the relationship between understanding a claim and believing a claim is far from simple. Research in education and psychology confirms that a majority of college students fail to understand evolutionary theory, but also finds no support for a relationship between understanding evolutionary theory and accepting it as true [1, 2]. We believe the intuitive appeal of Intelligent Design owes as much to misconceptions about science and morality as it does to misconceptions about evolution. To support this position we present a brief tour of misconceptions: evolutionary, scientific, and moral.

Numerous studies have shown that students hold highly systematic misconceptions about evolution [3]. These misconceptions conform to internally consistent alternative theories of evolution (akin to Lamarck's) and are remarkably impervious to instruction [2, 3]. In particular, most people construe evolution as the simultaneous adaptation of individuals rather than the collective adaptation of a population. On this view, populations evolve because the environment increases the probability that organisms will bear offspring with adaptive traits rather than increasing the probability that organisms with adaptive traits will bear offspring [2]. This misconception may result from a poor understanding of random processes coupled with a tendency to overgeneralize properties of artifact design to evolution [4, 5]. Alternatively, biological "essentialism," the commonsense assumption that the outward appearance of a species is determined by some kind of a hidden cause or "essence," may predispose individuals to

construe evolution as the transformation of each species member's essence rather than the selective propagation of individual traits [6, 7].

Because people fail to understand the mechanisms of evolution, they also fail to appreciate how empirical evidence bears on evolutionary claims. For example, most college students fail to understand that the presence of an adaptation implies past differential reproduction, or that the absence of within-species variation precludes the operation of natural selection altogether [8]. If a theory is *scientific* in virtue of its ability to generate testable hypotheses, then individuals who fail to understand how evolutionary claims can be tested may not appreciate why evolutionary theory has a stronger claim to scientific legitimacy than Intelligent Design, which purports to provide a *scientific* alternative to evolution.

Misunderstanding the content and scientific status of evolutionary theory may seem sufficient to account for the general public's ambivalence, but a surprising finding reveals that this cannot be the whole story. As alluded to previously, understanding the rudiments of natural selection is not correlated with accepting natural selection as a mechanism of evolution [1, 2]. Perhaps people are reluctant to accept natural selection because they believe it has undesirable implications. Brem, Ranney, and Schnidel (2003) found that the overwhelming majority of their participants believed evolution to have negative social consequences, like justifying racism and selfishness, and negative philosophical consequences, like denying free will and a purpose to life. These views presumably stem from mistaken beliefs about biology (e.g. that race is a biologically meaningful category or that ultimate explanations reveal proximate intentions) coupled with the naturalistic fallacy (i.e. the belief that one can derive how we ought to behave from a description of how the world actually is). But their findings reinforce the lesson that

understanding a claim and believing a claim are at best fair-weather friends: knowing more about evolution actually strengthened students' perceptions that evolution has negative consequences.

So what leads some people to accept evolutionary theory while others reject it? Brem, Ranney, and Schnidel (2003) found that students who accepted evolution were exposed to anti-evolution messages as often as creationists, but to pro-evolution messages more often than creationists. They were also more likely than creationists to believe that evolution has no social or moral consequences, positive or negative. The data don't provide a definite answer, but they do suggest that beliefs about evolution cannot be regarded in isolation. A proper understanding of evolutionary theory and its consequences requires more than a few lessons in biology. It also requires lessons from philosophy of science about what constitutes a scientific theory and an empirical test, and lessons from moral philosophy about the difference between empirical claims and moral claims. Perhaps this is what ought to be taught alongside evolution in America's public schools.

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