

Book Review

The wrong kind of wrong: a review of *What Darwin Got Wrong*

Jerry Fodor and Massimo Piatelli-Palmarini. New York: Farrar, Straus and Giroux; 288 pp. \$26.00

At its best, philosophy provides the theories that empirical scientists test and critically evaluates the results of their work: it is the conceptual wing of the natural sciences. At its worst, it has a reputation for getting itself tangled up in language games, introducing concepts and arguments that serve more to muddle than to clarify. In its finer moments, Jerry Fodor and Massimo Piatelli-Palmarini's (hereafter, FPP) new book, *What Darwin Got Wrong*, is an example of the first kind of philosophy (Fodor and Piatelli-Palmarini, 2010). It provides the kind of cautionary note that seems all the rage amongst philosophers writing about "Darwinism" at the moment: a scolding to those of us who are perceived as running amok in the playground of adaptationist explanation (e.g., Buller, 2005; Dupré, 2001; Richardson, 2007). While I happen to find most of these scoldings a bit tiresome—how often do we have to be reminded that all traits of organisms aren't adaptations, or that hypotheses should be evaluated against alternatives?—this book doesn't break any new ground in that regard. Where it really stands out is in advancing a rather startling claim: that the theory of natural selection is, in a nutshell, wrong.

To understand where FPP are coming from, it's useful to make a distinction between "epistemological" claims and "ontological" ones. Epistemological claims are about knowledge, what one can and can't know, whereas ontological claims are about what's actually possible, or what actually exists. The former kinds of claims about adaptationism are, of course, a dime a dozen nowadays. Gould and Lewontin's position in their 1979 paper (Gould & Lewontin, 1979) is perhaps the best-known example: while adaptation can happen, and adaptations exist, you can never really know for sure if something is an adaptation. A weaker version of this claim was made by George Williams in his 1966 book *Adaptation and Natural Selection*: that adaptation is an "onerous" concept that should be invoked only when necessary to explain the facts (Williams, 1966). While the strong claim is probably too strong, I hope that most of us would agree that the weaker one is eminently sensible.

Unfortunately, however, that's not (primarily) what FPP are arguing. As Fodor himself said in a reply to critics in a *London Review of Books* article on the same topic, "I don't

do epistemology" (Fodor, 2007). Instead, FPP's argument is an ontological one: that natural selection can't select "for" anything. And given that natural selection is the differential reproduction of individuals (or genes or designs or types) because of their properties, then if the "because of their properties" part doesn't work—which is what biologists mean by "selection for"—then natural selection doesn't work.

The first part of the book lays out some currently trendy but more mundane arguments about how natural selection isn't as important as we, or Darwin, might have thought it was in explaining the properties of organisms. For example, FPP go on at length about how variation-generating processes aren't "random" and insinuate that this is somehow fatal for natural selection. To be sure, variation-generating processes aren't "random" in the sense that the variants we see in any organism are generated by complex, previously evolved developmental systems. But, contrary to what FPP claim, they don't need to be random for selection to occur. Although FPP aren't alone in this mistake—it's a staple of intelligent design types—if one looks closely at an introductory biology textbook, one can see that it's not one of Darwin's "postulates," the set of conditions necessary and sufficient for natural selection to occur. The introductory text I use in my class, *Boyd and Silk's How Humans Evolved* (2009), gives these as (1) competition for resources, (2) variation in fitness, and (3) the inheritance of variation. No randomness there!

But the real eye-opener is the second part of the book, where FPP offer their argument that natural selection is impossible, a priori. What they argue is that there are no facts of the matter about what natural selection selects for, in any given case. To make this argument, they rely heavily on what they call "coextensive" characters, or what biologists would call correlated characters: traits that cannot be, or have not been, independently varied over evolutionary time, like the whiteness of bone and its strength (I don't know for a fact that these have not separately varied, but let's assume they haven't). In essence, their argument is that unless these traits have varied independently over time, there is no fact of the matter about whether natural selection "selected for" whiteness or "selected for" strength. We cannot, therefore, claim that the strength of bone is an adaptation. This is not, they repeatedly emphasize, just a matter of epistemology, of us knowing which of the two properties played a causal role in the evolution of bones; it's that there is no fact about which one did.

Now, it's true that there are both epistemological and ontological entailments of correlated characters. These are

well known in the biology literature (though for some reason, FPP hardly mention this; see, e.g., Lande & Arnold, 1983; Pearson, 1903). If traits cannot be separated, then if one trait causes differential reproduction and the other is neutral—or even pushes in the other direction, but not strongly enough—then the first trait will spread in frequency, carrying the other along (FPP call this “free riding”). Epistemologically, this means that it might be difficult or impossible to know which one was the causal agent in evolution. Ontologically, it means that natural selection can’t operate on the traits independently—or more precisely, their separability is inversely related to their degree of correlation. But crucially, it doesn’t mean that one trait isn’t doing the causing.

You might have noticed that there is nothing particularly special about natural selection in this regard. When I hit a baseball with a bat, the bat is made of wood, it is round, it has a certain mass, it is wood-colored, and it has some baseball player’s signature on it. Which of these properties causes the ball to fly out to center field? In fact, FPP’s real beef appears to be not with natural selection in particular, but causation more generally. They don’t say this themselves, but it seems that it’s where the real source of their problem lies (another review of the book, by philosophers Ned Block and Philip Kitcher, comes to a similar conclusion; Block & Kitcher, 2010).

What do we mean when we say that A causes B? The way we evaluate causation as observers is via a kind of counterfactual, either done by a thought experiment or a real (or natural) experiment. Suppose, for example, we observe that the steel hulls of ships rust in seawater. We might be inclined to say that the seawater causes the rusting. To find out, we could put the ships in some other liquid, or take them out of the water, and see what happens. Moreover, we might speculate that some property or component of the seawater causes the rusting, like salt or temperature: to find out, place the ship in fresh water, or seawater that’s very cold or very hot.

Now here’s a question: in order for the seawater to cause the ship to rust, does it have to do the experiment? Of course not. For that matter, does anybody? Nope. In fact, if there had only ever been one ship in the world, and it had only ever been placed in seawater, and it rusted, that would not change the ontological fact that the seawater caused the rust (it would, however, affect our epistemological ability to know that for sure). For some reason, though, FPP insist that the concept of “selection for” is different in this regard: you can’t have selection “for” anything unless the counterfactual, in the form of a thought experiment or a natural experiment in the world, has been done.

FPP claim that the concept of “selection for” is empty because it is an intensional concept. What this means, in a nutshell, is that it has “aboutness,” or reference. Words and concepts are intensional: the word “cow,” for example, is about cows. Similarly, the idea of selection for whiteness of bone refers to the whiteness of the bone, rather than its strength, as what’s been selected for. All adaptations have

“aboutness” in this sense: wings are for flying, eyes are for seeing. Crucially, as FPP point out, the “aboutness” of intensional terms is a matter of framing, or interpretation: the meaning of the word “cow,” for example, isn’t a property of the word itself, but is a matter of culturally evolved language conventions and the intentions of speakers to use the word conventionally. Similarly, in the case of adaptations, eyes don’t have “this is for seeing” stamped on to them (unfortunately for us). Adaptationists would say the “for-ness” of eyes comes from the form–function fit of eyes, and importantly, how that form–function fit came to be; it’s a matter of causal history, just like the explanation for why “cow” means cow is historical (or at least part of it is).

To FPP, the intensionality of “selection for” is damning for the theory of natural selection. As Darwin and everyone since have pointed out, there is no actual “intender” in evolution, no “decider” who determines that it’s strength, rather than whiteness, being selected for. FPP believe that despite claims to the contrary, “selection for” covertly implies an intentional agent. For the agent to have known that it selected for trait A and not B—for there to be a fact of the matter about what was selected for—it either would have had to go through the alternatives physically, or by doing a mental counterfactual. No mind, no counterfactuals.

To me, it seems an odd move to critique a concept as covertly mentalistic and then to do an analysis that assumes that it is (especially when the people who actually use the concept—biologists—insist that it’s not). So let’s remove minds from the equation, and aboutness, and everything that involves framing of any kind. What selection is, it is generally agreed, is the differential reproduction of variants. Despite Darwin’s perhaps lamentable use of the term “selection,” this differential reproduction is caused bottom–up by the variant properties of the things themselves, not by any chooser. Therefore, the properties that cause the differential reproduction are the properties that are “selected for.” Period, end of story.

It’s not always easy to tell why FPP are singling out natural selection for criticism when their critique would seem to apply to causation more generally. They repeatedly point out, for example, that there are few or no “laws” of selection other than selection itself. Not only would I agree with that, I would suggest that if you thought otherwise, you misunderstood the explanatory role of natural selection in evolution. “Natural selection” is a label that refers to cases of differential reproduction of variants, nothing more. Darwin’s postulates are a kind of causal syllogism where the premises—the three bare-bones conditions of competition, variation, and inheritance—lead to the outcome via simple causal entailment. Crucially, those postulates don’t also explain what causes the differential reproduction of variants in any given case. That depends on the details of the case.

The heterogeneity of possible mechanisms of differential reproduction is notoriously enormous, comprising all ways that organisms might vary in design in ways that impact their fitness. And as all good evolutionists recognize, what causes

differential reproductive success in any given case is always a matter of local context, just like all causation. FPP seem to regard this as fatal for the notion of natural selection: they seem to think that if there are no universal “laws” such that rigid bones always and everywhere lead to higher fitness than flexible bones, then it can’t be the case that a particular kind of bone evolved because it’s rigid. But evolutionary biology is full of cases in which what’s good in one case isn’t necessarily good in another, or where a particular adaptation enhances fitness in a statistical majority of cases while harming it in others. That doesn’t change the fact that what caused the adaptation to evolve was differential reproduction, statistically summed across cases. The context dependence of causation is no more a problem for natural selection than it is for causation more generally. And it certainly doesn’t prevent it from happening.

Some of philosophy’s best and worst moments involve “language games.” Unlike some of my nuts-and-bolts-only colleagues, I don’t consider this a bad thing. Every scientific theory, after all, is a set of symbols that refers to things in the world, and our job is to come up with ones that are as right as possible, ones that capture real causal relationships. At its best, philosophy does just that: interrogating our language and making it more precise. But in its less productive moments, it produces language games that are the equivalent of tic-tac-toe: useful to pass the time, but not for much else. A good example, perhaps, is Zeno’s paradox: the a priori argument that an arrow, when released, will never reach its target, because it first has to get halfway there, and then halfway again, and so on, ad infinitum. Unfortunately, in the time it takes you to make the argument, the arrow hits you.

FPP’s argument is a bit Zeno-like: if you bought it, you’d think that natural selection would have to stand there, scratching its head, unable to decide whether the whiteness of bone or its strength would help us run away from the lion. In fact, of course, natural selection just happens. During the

time it took FPP to write their book disproving natural selection, bacteria around the world just went on evolving resistance to antibiotics. And you know what was being selected “for”? Antibiotic resistance. I guess the world might be a better place if bacteria read more philosophy.

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References

- Block, N., & Kitcher, P. (2010). Misunderstanding Darwin: Natural selection’s secular critics get it wrong. *Boston Review*.
- Boyd, R., & Silk, J. (2009). *How humans evolved*. (5th ed.) New York: W. W. Norton and Co.
- Buller, D. (2005). *Adapting minds: Evolutionary psychology and the persistent quest for human nature*. Cambridge, MA: MIT Press.
- Dupré, J. (2001). *Human nature and the limits of science*. New York: Oxford University Press.
- Fodor, J. (2007). Why pigs don’t have wings. *London Review of Books*, 29 (20), 19–22.
- Fodor, J., & Piattelli-Palmarini, M. (2010). *What Darwin got wrong*. New York: Farrar, Straus, and Giroux.
- Gould, S. J., & Lewontin, R. C. (1979). The spandrels of San Marco and the panglossian paradigm: A critique of the adaptationist programme. *Proceedings of the Royal Society of London, Series B*, 205, 581–598.
- Lande, R., & Arnold, S. J. (1983). The measurement of selection on correlated characters. *Evolution*, 37, 1210–1226.
- Pearson, K. (1903). Mathematical contributions to the theory of evolution. XI. On the influence of natural selection on the variability and correlation of organs. *Philosophical Transactions of the Royal Society of London, Series A*, 200, 1–66.
- Richardson, R. C. (2007). *Evolutionary psychology as maladapted psychology*. Cambridge, MA: MIT Press.
- Williams, G. C. (1966). *Adaptation and natural selection*. Princeton, NJ: Princeton University Press.