

Fodor's *Bubbe Meise* Against Darwinism¹

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Fodor writes of the 'alleged conclusion' of his 'putative argument,' but these modest phrases belie the immodesty of what he claims to establish—that 'contrary to Darwinism, the theory of natural selection can't explain the distribution of phenotypes in biological populations.' Fodor's argument begins with the claim that such an explanation would have to use the concept of there being selection for a trait. The sticking point is that statements of the form 'there was selection for trait *T*' contain an opaque context. Fodor says that for such statements to be true, either selection must involve an intentional agent ('Mother Nature') who consciously chooses or there must be laws 'about the relative fitness of having the traits.' But Mother Nature is a myth and there are no such laws. Although Fodor's 'alleged conclusion' is about a theory and its ability to explain, his argument has an entailment that is more purely metaphysical—there are no truth makers for propositions about selection-for. If there are no truth-makers, I guess such statements cannot be true. Fodor's argument therefore leads to a view of statements about selection-for that resembles how emotivists view ethical statements.

What does 'selection-for' actually mean? Fodor's discussion of counterfactuals, Mother Nature, and laws skips over a simple point. Selection-for is a causal concept. To say that there is selection for trait *T* in a population means that having *T* causes organisms to survive and reproduce better (so having the alternative(s) to *T* that are present in the population causes organisms to survive and reproduce worse). In contrast, to say that there is selection of trait *T* just means that individuals with *T* have a higher average fitness than do individuals who lack *T* (Sober, 1984). The word 'cause' does not occur in this second definition. The expression 'selection for *T*' is opaque while 'selection of *T*' is transparent. And 'selection for *T*' is

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¹ 'Bubbe meise' is Yiddish for *grandmother's tale* and it is often said to mean what 'old wives' tale' means in English. I tend to think that it means *an absurd concoction* and has nothing much to do with whether the tale is traditional. In any event, Fodor's granny has long been one of my favorite philosophers, so it is with regret that I have drawn the conclusion expressed in my paper's title.

opaque precisely because T occurs nontransparently in 'a's having T causes ...'.² The thesis that statements of the form 'there was selection for trait T in population p ' are never true therefore boils down to the thesis that statements of the form 'having trait T caused better survival and reproduction in population p ' are never true. This radical conclusion flies in the face of the fact that biologists often think they have excellent evidence for saying that agricultural pests experienced selection for DDT resistance, that there has been selection for dark coloration in moths, and on and on.

Fodor's beef is not the usual complaint about adaptationists—that their reasoning is sloppy or that their evidence is inconclusive. These are epistemological criticisms. Fodor is here wearing his metaphysical hat. Even when biologists do experiments (either in the laboratory or in the wild) to figure out what traits in a natural population are being selected-for, they are engaged in a fool's errand. I regard this entailment of Fodor's argument as a *reductio* of its premises. But where do the premises go wrong?

Fodor mentions the example of the selection toy that I discussed in my book *The Nature of Selection* (p. 99). Here is what he says about it:

Roughly, Sober imagines a mixed batch of marbles, some square and some round, that is run through a filter all the holes of which are round. Suppose that all the round marbles are red and all the square marbles are some other color. Then the sort will pass only red objects even though, Sober points out, there is a strong intuition that what this device sorts *for* is not color but shape.

One might argue that, in the case imagined, although what underlies the intuitions about selection for is, as usual, the counterfactuals (green round marbles would have gone through had there been any) the counterfactuals are covered by, as it were, a *very local* law whose domain is restricted to this kind of machine. But this strikes my ear as forced, and it's anyhow unnecessary. Rather, what grounds the counterfactuals in Sober's example is the structure of the mechanism; given how it works, it can't let anything through that isn't round. So, one's intuitions about which trait is selected for follow not from what one takes to be the laws that govern selection *per se*, but rather from what one takes to be the story about how this kind of machine works. In fact if one takes Sober's example to exemplify the general case, there can be no theory of selection *per se*: The metaphysics of selection will be as heterogeneous as the kind of mechanisms that do the selecting.

Fodor here concedes that there is a fact of the matter about what traits are selected-for in the selection toy. There is selection for being round, not for being red, even

² Fodor correctly notes that the event terms in 'event e_1 caused event e_2 ' occur transparently, but this does not undercut the fact that F and G occur opaquely in 'a's having F caused b 's having G ,' although a and b occur transparently.

though the two traits are coextensive in the batch of marbles. I think the same is true of natural selection. The fact that ‘selection for *T*’ is opaque doesn’t mean that selection-for floats free from the facts; the facts, after all, include causal facts. Fodor thinks there are no laws about the selection toy; rather, it is properties of the ‘mechanism’ that ground the fact that there is selection for shape but not for color. Suppose for the moment that this is so. The question then is—why aren’t there similarly ‘mechanisms’ in nature that ground facts about selection-for? The last sentence quoted shows that Fodor thinks that ‘mechanisms that do the selecting’ do exist out there in the wild. Apparently, Fodor here repudiates the premise in his ‘putative argument’ that says that Mother Nature and laws are the only two options for grounding facts about selection-for.

This passage and some others suggest that Fodor may not be aiming to show that there are no facts about selection-for, even though his ‘putative argument’ entails precisely that conclusion. Perhaps we should ignore the passages in which he argues that there are no truth-makers for propositions about selection-for and focus on the parts of the paper in which he tries to show that there can be no *theory* about this, and that there can be no such theory because there are no *laws* about selection-for. After all, his ‘alleged conclusion’ is that ‘*the theory of natural selection* can’t explain the distribution of phenotypes in biological populations.’ And he takes his argument to show that ‘*the theory of Natural Selection* reduces to a banal truth: “if a kind of creature flourishes in a kind of a situation, then there must be something about such creatures (or about such situations, or about both) in virtue of which it does so” [my italics, twice].’

Fodor thinks there are no laws about selection-for because of his views about the form that such laws would have to take:

It simply isn’t true, for example, that being big is in general better for fitness than being small except when there are effects of interacting variables; or that flying slow and high is in general better for fitness than flying fast and low except when there are effects of interacting variables; or that being monogamous is in general better for fitness than being polygamous etc except when there are effects of interacting variables ... etc. It’s not that the underlying generalizations are there but imperceptible in the ambient noise. It’s rather that there’s just nothing to choose between (e.g.) the generalization that being small is better for fitness than being big and the generalization that being big is better for fitness than being small. Witness the fact that the world contains vastly many creatures of both kinds.

Fodor thinks that laws about selection-for must have the form:

- (1) If *F* and *G* are alternative traits in a population, there will be selection for *F* and against *G*, *ceteris paribus*,

where this means:

If *F* and *G* are alternative traits in a population, there will be selection for *F* and against *G*, except when there are effects of intervening variables.

For Fodor there are no laws that have these forms because there's 'nothing to choose between' them and the following two, with which they are incompatible:

(2) If *F* and *G* are alternative traits in a population, there will be selection for *G* and against *F*, *ceteris paribus*,

If *F* and *G* are alternative traits in a population, there will be selection for *G* and against *F*, except when there are effects of intervening variables.

Fodor's phrase 'nothing to choose between' is to be understood metaphysically, not epistemologically. There is no fact of the matter as to which of (1) and (2) is true. Hence there are no laws about selection-for.

The obvious thing that is missing in both (1) and (2) is a placeholder for the kind of environment the population occupies. By 'environment,' I mean both the abiotic environment (like the weather), the biology of organisms outside the population of interest (like its predators, prey, parasites, and diseases), and the other traits that organisms in the population possess (Williams, 1966; Brandon, 1990). Here is a candidate law that remedies this defect:

If producing equal numbers of sons and daughters and producing more daughters than sons are the alternative reproductive strategies that a parent might follow in a randomly mating population, and if the cost of rearing a son is the same as the cost of rearing a daughter, then there will be selection for following the first strategy and against following the second.

This is a simplified statement of Fisher's (1930) model of sex ratio evolution. Fodor may feel the need to add '*ceteris paribus*' to this. I tend to think that this phrase is too vague to be of much use, though I concede that there may be further details that one will need to add to the antecedent. Fodor may claim that there is no way to turn the conditional into something true unless '*ceteris paribus*' is added. I disagree, since I think that Fisher's theory is a mathematical truth; the consequent follows mathematically from the antecedent once everything is stated carefully (Sober, 1984). But this quarrel about whether '*ceteris paribus*' is necessary or helpful does not matter to the main point. There is *everything* to choose between (1) and (2) once the selectively relevant environment is characterized properly.

Biologists don't usually use the word 'law' to describe such generalizations as Fisher's. Rather, they call them 'models'. Still, they have the properties that Fodor is looking for when he talks about 'laws'—they are general, they don't refer to

specific places, times, or individuals, and they support counterfactuals.³ It is true that they often contain idealizations, but Fodor says he is ok with that. Laws with idealizations in them (e.g. ones that describe infinite populations and the like) are still laws. In applying idealized models to real-world populations, one must show that their idealizations are *harmless* (Sober, 1993); this may be what Fodor means when he refers to ‘independently justified idealizations.’ The theory of selection-for is a collection of such models. There are a number of models of sex ratio evolution, and there are groups of models for other interesting phenotypes as well—for example, for the evolution of altruism and selfishness (Sober and Wilson, 1998).

Long before he turned a jaundiced eye on Darwinism, Fodor (1975) made the important point that laws in higher-level sciences are often able to capture generalizations that the more fine-grained vocabulary used in lower-level sciences will be unable to describe. This is because the higher-level science describes properties that are *multiply realizable*. The property of producing equal numbers of sons and daughters and the property of performing an altruistic act (that has specified costs and benefits, described in terms of their fitness effects) are both multiply realizable, but that does not prevent there being laws (or models) about the kinds of circumstances in which there is selection for those properties. It is ironic that this Fodorian point is one that Fodor denies.

Fodor offers another reason for thinking that there can be no laws of selection-for. He mentions it in the passage quoted above about the selection toy, and returns to the same thought at the end of the paper when he offers this analogy:

For each person who is rich, there must be something or other that explains his being so: heredity, inheritance, cupidity, acuity, mendacity, grinding the faces of the poor, being in the right place at the right time, having friends in high places, sheer brute luck, highway robbery, or whatever. Which things conduce to getting rich is, of course, highly context dependent ... [T]he extreme context sensitivity of the ways of getting rich makes it most unlikely that there could be a theory of *getting rich per se*... In particular, it's most unlikely that there are generalizations that are lawful (hence counterfactual supporting, not *ad hoc*, and not vacuous) that specify the various situations in which it is possible to get rich and the properties in virtue of which, if one had them, one would get rich in those situations.

³ If these models are mathematical truths, does that mean they are not laws? This is not Fodor's argument and I tend to think that this way of arguing for there being no laws of natural selection is sterile and terminological. Whether evolution is *lawful* does not depend on whether dynamical models are a priori or a posteriori.

There are many causes of getting rich and they are enormously heterogeneous; hence there are no laws of getting rich.⁴ Notice that these about '*ceteris paribus*' play no role in this argument.

Since Fodor's analog for someone's 'getting rich' is a trait's 'being selected-for,' consider why he doubts that there could be a theory of '*being selected-for per se*.' If there is selection for an even sex ratio in population p_1 and selection for a particular altruistic trait in population p_2 , what of substance is there to say concerning what these two instances of selection-for have in common? I agree—not much. But a substantive theory does not have to describe a necessary-and-sufficient condition for someone's getting rich or for there being selection for a trait. Multiple sufficient conditions suffice. The kind of circumstance that leads there to be selection for producing equal numbers of sons and daughters differs from the kind of circumstance that leads there to be selection for altruism. It is this that the theory of natural selection describes. Or rather—this is an important *part* of the theory. The theory includes both source laws and consequence laws (Sober, 1984). There are many kinds of circumstance that lead there to be selection-for. What knits these different sources together is a set of consequence laws, which describe the consequences for trait evolution of selection, both when it occurs alone and when it occurs in combination with other possible causes of evolution. The situation here is rather like the one in classical physics. There are a number of forces—gravitational, electrical, etc.—and each is described by its own source law. These source laws are knitted together by a single body of consequence laws. Gravitational and electrical forces each obey $F = ma$ and a principle of composition of causes.⁵

The distinction between source laws and consequence laws is relevant to the first step of Fodor's 'putative argument' where he claims that the theory of natural selection can't explain the distribution of phenotypes in populations because to do so would require using the concept of selection-for. Not so. Consequence laws about selection-of provide causal explanations of phenotypic distributions, although adding source laws about selection-for provides a more detailed picture of the causal facts. For example, if the individuals in a population interact in pairs and the average fitnesses of altruistic (A) and selfish (S) individuals are the ones given in the accompanying table, then it is more probable than not that A will increase in frequency precisely when $r > c/b$, where $r = \text{Pr}(\text{actor is } A \mid \text{partner is } A) - \text{Pr}(\text{actor is } A \mid \text{partner is } S)$. Notice that this generalization is stated in terms of the fitnesses of the two traits. It tells you when there will be selection of trait A .

⁴ Rosenberg (1994) argues that there is only one knowable law in biology and that this is because fitness is multiply realizable. It is instructive to compare Fodor's appeal to multiple realizability with Rosenberg's. I criticize Rosenberg's argument in Sober, 1997.

⁵ When Fodor says that 'evolutionary processes can select for a given phenotypic trait only insofar as its interactions with other phenotypic traits can be discounted,' he is confusing selection-of and selection-for. Correlation of characters influences whether a trait favored by selection will get selected. See Brosnan, forthcoming, for discussion of how this should be modeled.

The fitness of an actor depends on his own phenotype and also on the phenotype of the actor's partner.

		actor's partner is	
		S	A
actor is	S	x	$x+b$
	A	$x-c$	$x+b-c$

Table 1 *Fitnesses of altruists and selfish individuals*

These are my main kvetches about Fodor's *bubba meise*, but I do want to mention some reservations that I have concerning what he says about historical narrative (*HN*) explanations. Fodor stipulates that these use transparent constructions like 'event e_1 caused event e_2 ' but not opaque constructions like 'selection for trait T '. Given what selection-for means, I take it that *HN* explanations have no truck with constructions of the form ' a 's having property F caused b to have property G '. If this is what *HN* explanations are, I doubt that they play much of a role in historical sciences. Historical inquiry typically involves asking which *properties* of one event brought about this or that property of another. Also, Fodor contrasts *HN* explanations with covering-law explanations, and mentions the origin of the Grand Canyon, the Solar System, and the Universe as *explananda* that are susceptible of *HN*, not covering-law, explanation. But don't geologists and physicists cite laws (or models), or think of them without bothering to mention them, in explaining such events? And if they can't think of them, don't they wish they could?

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