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Postscript on the Baldwin Effect and Niche Construction

Peter Godfrey-Smith, Daniel Dennett, and Terrence W. Deacon

Peter Godfrey-Smith

My essay credits Deacon's *The Symbolic Species* with a new version of the Baldwin effect that overcomes, at least in principle, accusations that the "effect" is trivial. Dennett objects that he cannot see much difference between what Deacon said and Dennett's own exposition in *Consciousness Explained*. Here is the difference. In Dennett's case, a learning individual hits on a "Good Trick" and "raises the bar" for getting by successfully in that population. "Over generations, the competition becomes stiffer: eventually, unless you are born with (or very nearly with) the Good Trick, you are not close enough to compete" (as quoted by Dennett). But this is not a "niche construction" phenomenon in the sense I associate with Deacon's proposal. The selection pressure in Dennett's case was there all along, but was "dormant" because of a lack of the right kind of variation in the population. Suddenly the right kind of variation appears (thanks to the learning individual) and selection is able to operate. In Deacon's cases something different is happening. Rather than a selection pressure being activated by the appearance of new variation in the population, the social life of the population changes in a way that creates a selection pressure that did not exist before. Note that in Dennett's case, an innately specified version of the Good Trick would do very well, if it happened to arise, at any stage in the process. (The population could jump from stage 0, to stage 2 without any particular role for stage 1.) In the Deacon case, it is only the change in the social ecology (due to stage 1 behaviors) that makes an innately specified, highly sophisticated version of the trait so advantageous. This version of

the Baldwin effect may well not be original with Deacon, but I do not think the discussions cited by Dennett hit the same point.

Daniel Dennett

I can see that Deacon's proposal draws attention to a particularly interesting variety of Baldwin effect, but I still don't see that it is anything more than a special case (a particularly interesting one) of the phenomenon I took myself to be describing. I doubt if it is wise to talk about selection pressures that are present but "dormant" because the relevant phenotypes aren't present. If I understand Godfrey-Smith correctly, there are right now a kazillion dormant selection pressures on *H. sapiens*. Suppose smoking banana peels (remember the Mellow Yellow hoax?) provides protection against HIV. There is, then, a dormant selection pressure in favor of a proclivity to smoke banana peels even if nobody ever thinks to try it out. There are no doubt microbes in the depths of the ocean whose effects on human beings, were any ever to encounter them, would be variable; so right now there is a dormant selection pressure in favor of those human phenotypes that happen not to be vulnerable to those microbes. And so forth. Perhaps this is unobjectionable, since "dormant selection pressures" don't take up any space or energy, but I wonder.

Godfrey-Smith says that in the Deacon scenario, "the social life of the population changes in a way that creates a selection pressure that did not exist before." Really? Why shouldn't we say that the selection pressure in question existed, but was "dormant"? It just needed a double (or multiple) triggering to be awakened. If the selection pressure for smoking banana peels exists in dormant form (and is not created by the behavioral innovation that makes it visible to selection), why shouldn't we equally say that it takes a series of (social) actions and reactions to wake up a Deacon selection pressure?

I join Godfrey-Smith in appreciating Deacon's point that interaction between individuals creates (or awakens—this has not yet been shown to be importantly different) a novel (or heretofore dormant) selection pressure. But is something more being loaded into the term "social"? What is the importance of social interactions, in contrast with other interactions?

I take it that the Good Trick of picking up a stick and wielding it as a club against game would be just a boring old Baldwin effect with no new selection pressures (they were always there, just dormant). But what if the game starts turning on us and fighting back when we go at it with clubs? Is this a “social” interaction that can engender altogether new selection pressures? If not, then is wielding a club against conspecifics who wield back a novel, Deacon-style Baldwin effect? Or does the Deacon social interaction effect come into play only when, for instance, females start playing sexual selection games that favor males who carry big clubs (mine is bigger than yours, etc., etc.), an effect that arguably depends on there being a widespread new practice (just one club-wielder will not provoke or sustain female interest in club size)?

Good Tricks depend on the environments in which they can operate. Some environments are simple and others involve much layering of context to come into their own. Someone who would be an excellent bluffer in poker needs to find a poker game in which to display his superiority. At the end of his postscript, Godfrey-Smith points to what he thinks is a residual difference: “Note that in Dennett’s case, an innately specified version of the Good Trick would do very well, if it happened to arise, at any stage in the process. (The population could jump from stage zero to stage 2 without any particular role for stage 1.) In the Deacon case, it is only the change in the social ecology (due to stage 1 behaviors) that makes an innately specified, highly sophisticated version of the trait so advantageous.” But what Godfrey-Smith is pointing to is the existence of something like an arms race with a series of innovations and counterinnovations in it, and this is not restricted to *social* ecology. A club-wielding hunter with an innate propensity to plan a path of retreat in case his prey countercharges (stage 2) will similarly have no selective advantage in a world where the prey haven’t yet learned to fight back (stage 1).

Terrence Deacon Responds

In my opinion both Godfrey-Smith (GS) and Dennett (DD) appear to miss the point, though they miss different points in each case and get things right in others, so I wonder how much of this is a “semantic” issue.

I would not at all want to suggest that we start to consider something like “dormant” selection pressures (though I have no problem with the ubiquitous presence of a sea of near-neutral variations). I have a suspicion, however, that GS introduces this unfortunate suggestion to make a different point than DD comments on, but which gets lost in this exchange. Dennett’s caricature of a behaviorally implemented arms race of Good Tricks does not in my interpretation even quite qualify as an account that Baldwin would recognize. Baldwin at least recognized that selection could act on something like a norm of reaction for a trait. Although the concept was introduced later, Baldwin pretty accurately sketches it in 1896. In later formulations Baldwin seems also to be suggesting that something like a “frequency dependence” effect of a behavior (also in advance of his time) plays a role. Both of these are implicit in my *Symbolic Species* (SS) account, and at least the latter, frequency dependence, is implied in the paper by GS. This point is made by his persistent comparison of my argument to “niche construction” and his efforts to distinguish the argument in SS from that view, as well as from Baldwinian theory proper (even if I didn’t do a great job of making either distinction).

I also want to accept DD’s “cross-this-line” challenge to me about what I “might” mean by “social.” I *do* indeed want to load something more into the term “social” than seems to be imagined here, certainly more than in his account, and which I believe gives us something more interesting than “cranes” even if quite a bit less interesting than “skyhooks.”

The virtual future is limitless. The great value of the Darwinian evolutionary paradigm is the way it helps us understand how what once was “noise” (e.g., unselected-uncorrelated variation) can become new “signal” under changing circumstances. There is nothing revolutionary in my thoughts about this. I consider myself to be a pretty well committed Darwinian. Talking about “latent” or “dormant” selection will likely get us into the same kind of hot water that the term “preadaptation” gets us in, or that psychologists and philosophers find themselves in when talking about unexpressed predispositions. And I don’t think “exaptation” is much better. Luckily there is something a bit more concrete to consider when talking about ranges of phenotypic variation, norms of reaction, canalization, and the fact that genetic and phenotypic random walks are constrained in interesting and relevant ways (note: most traits develop in the context of com-

plex epigenetic linkages, episases, and pleiotropies—all of which add more than just plausibility to such otherwise hollow concepts as “coordinating conditions,” “phylogenetic inertia,” or “adaptive potential.”

All I am interested in are the ways that the brain-language coevolutionary dynamic might accomplish this “recruitment of new signal” differently than do simpler Darwinian mechanisms. One doesn’t even have to stray from the so-called ultra-Darwinian fold to recognize that the formulation of natural selection theory is pretty generic, and that there is plenty of room for interesting tail-wagging-the-dog possibilities within its confines. The original Organic Selection conjecture was not after all about undoing Darwinism, but reinforcing it, as is my modest effort. No “skyhooks” please, and no Lamarckian loopholes. But there may be other kinds of hooks (not just cranes) from other directions that *do* merit consideration of a different kind. Hence my pleading guilty to Dennett’s latter probe about how I think about the nature of at least certain “social” factors.

The social phenomenon in question—language—is not just a passively constructed niche, like a beaver dam, not just a sexually selected runaway effect like peacock feathers, but is a complex dynamic niche, with something like a “life of its own,” or at the very least a powerful *self-organizing dynamic* that can’t be reduced to mere social dynamics, much less passive caricatures of natural selection. Dennett should appreciate this more than anyone else in the group, and I was surprised that GS seems to drive this point while DD seems to dismiss it. The ability to symbolize things and relationships in the world, and the factors that allow symbolic systems to self-organize, are new elements that take evolution in unexpected directions. This is not just because language is subject to a partially uncorrelated evolutionary dynamic of its own, but also because of the way symbolic representational processes can recruit new kinds of “noise” into the larger symbol-gene system, which can provide both a whole new realm of variations and of reciprocal selection pressures. The transindividual and transgenerational niche-like effects of cultural-linguistic evolution introduce a complex system dynamic, which vastly complicates things. I refer to this as *coevolution* in the subtitle of SS for just this reason. It’s not just Darwin or even Baldwin, as I think GS has accurately noted.

My sympathy for reintegrating systems thinking into evolutionary theory (though in my opinion to do so doesn’t replace or even weaken the

centrality of Darwinian processes) becomes a full-fledged endorsement once symbolic processes are brought into the mix. The extent of the feed-forward circularity of the selection processes linking brain and linguistic evolutionary/self-organizational processes requires us to take into account, or at least (in our current state of theoretical simplicity) appreciate, the way complex systems dynamics have been an inescapable factor in human evolution. There is a new level of “chaos” and “bias/noise amplification” that we must contend with, and for which our current intuitional models are inadequate. This is niche construction, but of a self-organizing asynchronously evolving all-encompassing niche. Who but the most unimaginative hyperreductionist could imagine that it’s just “evolution as usual”?

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