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Extending Literary Darwinism

Culture and alternatives to adaptation

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Literary Darwinism is an emerging interdisciplinary research field that seeks to explain literature and its oral antecedents (“literary behaviors”), from a Darwinian perspective. Considered the fact that an evolutionary approach to human behavior has proven insightful, this is a promising endeavor. However, Literary Darwinism as it is commonly practiced, I argue, suffers from some shortcomings. First, while literary Darwinists only weigh adaptation against by-product as competing explanations of literary behaviors, other alternatives, such as constraint and exaptation, should be considered as well. I attempt to demonstrate their relevance by evaluating the evidentiary criteria commonly employed by Literary Darwinists. Second, Literary Darwinists usually acknowledge the role of culture in human behavior and make references to Dual Inheritance theory (i.e., the body of empirical and theoretical work demonstrating that human behavior is the outcome of both genetic and cultural inheritance). However, they often do not fully appreciate the explanatory implications of dual inheritance. Literary Darwinism should be extended to include these recent refinements in our understanding of the evolution of human behavior.

Keywords: Literary Darwinism, adaptationism, Dual Inheritance, evidentiary criteria, evolutionary psychology

Intro

“Literary Darwinism” seeks to explain such human behaviors and achievements as storytelling, fiction and literature (referred to here as “literary behaviors”) from a Darwinian perspective, and this is no doubt a useful endeavor. There is an increasing amount of research that unequivocally demonstrates that an evolutionary approach can contribute to our understanding of human behavioral phenomena, including artistic production and appreciation.

However, some scholars within this field seem to consider evolutionary theory as a rough-and-ready manual that enables explaining ad hoc any aspect of human behavior of interest. Yet, although evolutionists agree about the basics of the theory, evolutionary theory itself continuously evolves. Rather than being an explanatory automaton, as it is sometimes naively regarded and applied, it is a research program in progress.

Here I wish to discuss two problems surrounding an evolutionary approach to literary behaviors. First, there is the question of adaptation. The problem is not so much — or not only — the question of whether a given literary behavior is an adaptation, but rather whether some accounts lack in scientific rigor when evaluating that hypothesis. For instance, the term “adaptive” is often treated in these accounts as synonymous with “evolutionarily beneficial” while it is important to distinguish between these two concepts. Moreover, assessing whether a trait is an adaptation requires comparatively evaluating and scrutinizing one by one alternatives to the adaptation explanation. Second, the role culture plays in literary behaviors is not straightforward and requires special attention. Many accounts in Literary Darwinism rely heavily on standard evolutionary psychology (EP). It is beyond doubt that the EP-approach to literary behaviors has spawned interesting insights, hypotheses and avenues of empirical research. However, EP is just one school of thought studying behavior from an evolutionary perspective — with specific explanatory focus and assumptions. Standard EP often treats culture either as a factor we can leave out of the evolutionary equation or as a simple functional extension of genetic evolution (Dutton, 2009; Boyd, 2009; Lumsden & Wilson, 1981; Wilson, 1999; Cosmides & Tooby, 1989). Yet, there is increasing theoretical and empirical evidence that culture should be treated as an inheritance system that evolves partly independent from genetic evolution and, moreover, which may affect genetic evolution. This body of work is termed “Gene-Culture Coevolution” or “Dual Inheritance” (Boyd & Richerson 1985; Richerson & Boyd 2005). The cultural evolution approach to fiction, for example, allows formulating a plausible alternative view to the one exclusively based in standard evolutionary psychology: literary behaviors as culturally evolved practices building on pre-existing biological traits.

Adaptationism

An adaptation in biology is a trait with a current functional role in the life history of an organism that is maintained and evolved by means of natural selection. An adaptation refers to both the current state of being adapted and to the evolutionary process that leads to the adaptation. Simply put, an adaptation is a trait that is selectively altered for the beneficial effect that trait has. For example, the eye clearly

contributes to survival of an organism as a means to effectively assess its environment, and eyes have been modified by selection for the perceptive role they have. They did not evolve in their entirety for some other function. Adaptationism is a research program, quite central to evolutionary study, which is devoted to testing whether a particular feature of an organism qualifies as adaptation.

In line with this, the first — and sometimes the only — question many Literary Darwinists ask is what the adaptive value or adaptive significance is of fiction, storytelling, and literature (see the writings on this topic by, among others, Brian Boyd, Dennis Dutton, Leda Cosmides and John Tooby, Joseph Carroll, Eduard O. Wilson, Geoffrey Miller, Ellen Dissanyake). They argue, for instance, that a number of criteria for demonstrating adaptation are met. One procedure often appealed to is a cost benefit analysis, claiming that the evolutionary benefits of a literary behavior outweigh its costs. Another claim is that a given literary behavior is universal among humans, that it develops reliably and spontaneously in children, that the literary behavior involves innate dispositions, and that there is a tight fit between the substrate of the behavior (the cognitive device) and its behavioral output. It is often argued that these conditions are all met and that they — taken together — suffice for demonstrating adaptation. A more careful analysis, however, shows that this is not the case. The problem is that these conditions alone — even when they are fulfilled — do not allow refuting certain alternatives to adaptation. Careful adaptationists commit to a procedure that overcomes this problem. Or as Williams (1966) put it in his seminal account on natural selection: “[adaptation] should be used only as a last resort” (Williams, 1966, p. 11). The idea is that we should only make an inference of adaptation after demonstrating that all alternative hypotheses to adaptation for a particular effect are highly unlikely as complete explanations for the trait. Fortunately, Literary Darwinists do sometimes consider alternatives to adaptation. But unfortunately, they usually only consider one, which is the by-product hypothesis. The by-product hypothesis states that a given trait did not evolve because it was selectively advantageous, but because it was a byproduct of selection for another trait. Yet, there are other alternatives to adaptation that need to be scrutinized before turning to adaptation. The two most important alternatives, next to by-products, are “constraint” and “exaptation” (see below). It seems that these alternatives are especially ignored in evolutionary psychology (more so than in evolutionary biology). The reason may be a historical rather than a scientific one: the foremost advocate of a careful adaptationism, the late palaeobiologist Stephen Jay Gould, made himself unpopular with a rather direct attack on those he called “pan-adaptationists”, evolutionists who hold the idea that virtually all of the characteristics of living organisms are adaptations. This is not the place to go into the details of this clash of evolutionists. I just mention this because a lot of evolutionary psychologists threw the baby out with the bathwater. As Williams

(who is, contrary to Gould, not controversial at all) already stressed, considering alternatives to adaptation is paramount to a science of evolution. I will now discuss these three alternative evolutionary explanations in the context of literary behavior.

Exaptation and constraint

Remember that an adaptation is a trait that is selectively altered for the beneficial effect that trait has. In such a case the effect of the trait is called an evolutionary function. Adaptations thus have, by definition, evolutionary functions. But a trait may also have a beneficial effect for which it was not selected. In that case it qualifies as an *exaptation*. Thus, an exaptation is a pre-existing trait (i.e., one that has already evolved) that acquires a new beneficial effect without being modified by selection for this effect (i.e., it takes on a new role, but was not designed for it by selection) (Gould & Vrba, 1982; Gould, 1991). Crucially, although not always appreciated (which may explain the neglect), the new fitness enhancing effect is acquired without subsequent phenotypical modification by selection for the effect (Andrews et al., 2002). Take, for example, the ability to read and write or to drive a car, which are all part of the behavioral phenotype of many contemporary humans. These behaviors have obvious current utility but the cognitive mechanisms on which they rely were not selectively altered for that utility. They build on pre-existing biological traits. If a prehistoric *Homo sapiens* would be teleported to our time, she would be able to acquire all these capabilities just as we have learned them through social learning.

Taking exaptation seriously, it follows that we need to reconsider the validity of some of the central criteria for adaptation summed up above. First, consider the cost benefit analysis. Although quite hard to measure empirically, it may be demonstrated that a given literary behavior entails a net benefit. For example, an intensive course in novel writing may pay off in terms of increased social intelligence, with measurable neural growth in the areas involved in empathy and theory of mind. Moreover, it may be demonstrated that increased social intelligence also enhances survival and reproduction (otherwise natural selection cannot act on it). Thus, in this hypothetical example, novel writing is genuinely evolutionarily beneficial, which excludes the by-product hypothesis because the latter entails that novel writing does not have a beneficial effect. That would leave us with exaptation and adaptation, which both require the trait to be evolutionarily beneficial. Unfortunately, the hypothetical findings on novel writing do not allow us to refute exaptation. In order to do that, we would need to demonstrate that the biological traits underlying novel writing were selectively altered for the purported beneficial effect. Since writing is likely a culturally evolved trait that relies on pre-existing biological (i.e.,

cognitive and motor) traits, novel writing quite likely is too. Therefore the cost benefit analysis by itself does not demonstrate adaptation.

The evolutionary concept of *constraints* is relevant as well and entails an alternative that needs to be considered before moving on to claims of adaptation. A constraint opposes the modifying influence of selection on the phenotype. This concept seems especially relevant to testing evolutionary hypotheses of literary behaviors because these behaviors typically rely on a number of biologically inherited traits that serve important roles in other contexts. Or, in other words, scientists haven't been able to find any biologically inherited traits that are exclusively (nor especially) devoted to literary behavior. Storytelling, fiction and literature use cognitive capacities that are used in "real life" as well, such as the ability to track agents, to share attention, to hold mental representations in the mind and to evaluate scenarios for future actions, and so on. In fact, all cognitive traits literary behaviors rely on have quite vital roles for which they are under strong selection pressure. Clearly, this puts a strong constraint on any of the traits upon which literary behavior rests. Therefore, we can conclude that selection cannot operate on these biological traits for any beneficial effect literary behavior may have (a precondition for adaptation). Thus, the concept of constraint further adds to the picture that literary behaviors unlikely qualify as biological adaptations.

The second conjecture Literary Darwinists appeal to, namely, that given that a literary behavior involves innate dispositions counting as evidence for literary behavior being an adaptation is not valid either. Involvement of innate dispositions in a behavior does not allow refuting any of the alternatives to adaptation. Even a by-product may involve innate dispositions. As long as it is not demonstrated that any of these innate dispositions have been selectively altered for a beneficial effect of literary behavior, it does not qualify as adaptation. For this reason, concepts such as the "art instinct" are somewhat problematic. As Dutton argues (following E. O. Wilson), the arts "extend" evolved traits. But either we consider them as being integral parts of the traits they are extensions of (and in that case, the term art instinct is misleading because it suggests a separate category that is biologically meaningful) or we do consider the arts as separate from the traits they are extensions of, but in that case the biologically inherited traits on which they rely have to have been selectively modified for the beneficial effects a given art practice may have, and as I pointed out above, there is virtually no support for this claim. The other commonly referred to evolutionary criteria, universality and reliability of development, need to be reconsidered in the context of cultural evolution, which is the topic of the next section.

Cultural evolution

Cultural inheritance is considered as an inheritance system similar enough to genetic inheritance to be considered as evolving in a Darwinian fashion (i.e., selection pressures acting on cultural variants). Cultural variants (such as ideas, opinions, values, behaviors, etc.) that are acquired through social learning often cannot be considered as extensions of genes. Evolutionists have demonstrated theoretically and empirically that cultural and genetic evolution sometimes operate independently and even antagonistically. For example, selection may favor academics who produce papers, increasing their “cultural fitness” at a cost of their “biological fitness,” i.e., producing babies (Richerson & Boyd, 2005). Thus cultural evolution may lead to behaviors that are maladaptive from the perspective of genes. Dual Inheritance or Gene-Culture Coevolution allows investigating the relative roles of cultural and genetic inheritance from a Darwinian perspective.

Taking cultural evolution seriously is necessary to address the evolution of literary behaviors. Consider the following example. Disgust, which is comprised of a diverse but highly coordinated set of elements, including affective, behavioral, and cognitive components, initially evolved to monitor food intake and protect against parasites and pathogens (Ekman, 1992; Rozin et al., 2008). However, in humans many other additional stimuli may elicit disgust, including a certain class of social norms called purity norms (Kelly, in press). Now, research has shown that urban legends in part succeed on the basis of emotional selection, for example, the ability to evoke disgust: Heath and Sternberg (2001) demonstrated that people are more willing to pass along stories that elicit stronger disgust or versions of stories that elicit the highest level of disgust. Obviously, the fact that a disgust response influences the success of urban legends is an evolutionary side effect and not an extension of its evolved function. Urban legends exploit the human disgust response in order to spread; in that sense they are what Dawkins (1976) dubbed “memes,” parasitic pieces of culture rather than functional extensions. The same seems to be true of romantic novels that capture their audience in virtue of eliciting negative emotions. Consider the reported gulf of “copycat” suicides following the publication of Goethe’s *Die Leiden des jungen Werther* (The Sorrows of Young Werther). Negative emotions, such as fear, anger and disgust are just much more evolutionarily relevant than positive ones. Often they require immediate action in order to survive. Therefore, they elicit a problem-solving attitude in experiencers (they make you think), heightened attention and memory. Consequently, it is easy to see why they play such a prominent role in the evolution of literary behavior. To be sure, Literary Darwinists sometimes do incorporate social learning and cultural transmission into their accounts. However, in doing so, they rarely — if at all — consider how cultural evolution may deviate behavior from what would

be expected on the basis of genetic evolution as just described. For example, Boyd (2009, p. 25) writes: "I . . . use 'biocultural' and 'evolutionary' almost interchangeably," lumping genetic and cultural evolution explicitly together. Yet the example above of disgust illustrates that a biologically inherited predisposition, which is an adaptation for a function, can become co-opted in a culturally evolved practice in which it does not serve that function (Sperber & Hirschfeld, 2004). Thus, my point here is that cultural content often exploits responses of human evolved psychology for which they didn't evolve.

Literary Darwinists and other evolutionists of human behavior sometimes treat *universality* of a trait as evidence that the trait is a biological adaptation. The idea is that natural selection would weed out any evolved traits that are incidentally maladaptive. Therefore, a maladaptive trait that is universal among humans and relatively old would surely not persist. However, the above example of negative emotional selection already contradicts this assumption. Moreover, a trait may even be evolutionarily beneficial and universal and nonetheless not a biological adaptation. Take the example of the ability to read and write again. Reading comes close to be a human universal nowadays (world literacy is currently nearing 90% according to UNESCO (i.e., some 776 million adults lack minimum literacy skills)) but we wouldn't claim humans have a reading instinct. Evolution has no foresight, our ancestors did not evolve cognition to allow us at some point in time to be able to read. Therefore universality is not a valid criterion for demonstrating adaptation.

The penultimate evolutionary criterion I wish to address here is *reliability of development*. Sometimes evolutionary psychologists claim that if a cognitive trait develops reliably and spontaneously early in childhood this is an indication that it qualifies as an innate adaptation coming to expression. For example, some authors have linked the early emergence of pretense and pretend play in infants to fiction, arguing that pretend play is a beginning phase of a capacity for fiction (e.g., Boyd, 2009). However, much recent research in developmental psychology demonstrates the importance of social learning from a very young age on. Studies suggest that pretend play, rather than being a spontaneously developing innate adaptation, in fact results from copying parents (a child perceives its parents filling a cup with a teapot and feels the urge to do the same, regardless of whether the cup and teapot are toys that contain no tea) (Rakoczy et al., 2005; Striano et al., 2001). Cross-cultural evidence might further corroborate these findings. For example, in Mali, children in savannah villages do not know to play (pers. comm. Willie Van Peer).

Finally, there is the criterion of *special design*, that there exists a tight fit between the behavior (with its alleged evolutionary function) and the biological substrate that produces it. For example, the eye is so well designed for the function of visual perception that it seems quite unlikely that it evolved for another function. Literary behavior also exhibits this tight fit with human cognition. This

is demonstrated by the fact that people sometimes compulsively engage in fiction. But given the considerations above, namely that literary behaviors rest on cognitive traits that were selected in other, real life, contexts, it seems reasonable to explain the tight fit between human cognition and fiction, the other way around from how Literary Darwinists explain it: fiction evolved by culturally adapting itself to human cognition. In fact for example Boyd (2009, p. 64) makes this claim himself when he contends that fictional “stories arose out of our interest in social monitoring,” in so doing inadvertently contradicting his own view of fiction as adaptation.

Conclusion

First, I argued that claims of literary behaviors being biological adaptations on their own are theoretically and empirically weak (and even unsound) and reliant on shaky evolutionary standards. As yet we are not in a position to draw such conclusions. Researchers should take the alternatives to adaptation more seriously. Moreover, they should not only weigh adaptation against the by-product hypothesis, but also take exaptation and constraint into consideration. With respect to function it is important to distinguish between “evolutionary function” and “evolutionarily beneficial effect”, the former being a specific type of the latter.

Second, I advocated that the standard evolutionary psychology approach Literary Darwinists usually apply, should be extended, taking culture into account as a crucial factor in the explanation of the evolution of human (literary) behavior. Gene-culture coevolution provides a sound Darwinian framework for this extended approach. Literary Darwinists sometimes refer to research in gene-culture coevolution but they mostly do not fully appreciate the extent to which — when it is used as the primary explanatory framework —, it allows developing a more sophisticated understanding of the evolution of (literary) behaviors.

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