



Review

Reviewed Work(s): A Different Kind of Animal: How Culture Transformed Our Species
by Boyd, Robert

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Boyd, Robert. 2018. *A Different Kind of Animal: How Culture Transformed Our Species*. Princeton: Princeton University Press.
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Thomas J. H. Morgan

Robert Boyd's latest book originated as a two-part talk given at the Tanner Humanities Center in Utah. The center invites speakers from across a wide range of disciplines to discuss their work with the aim "to advance and reflect upon the scholarly and scientific learning relating to human values." Boyd gave two lectures, the first outlining his theory that humans adapt primarily through culture, the second explaining how the combination of norms and punishment explains our species' uniquely cooperative nature.

Like many Tanner lectures, Boyd's were published as part of Princeton University Press' "University Center for Human Values Series." An unusual feature of that series is the inclusion of responses to the author's work by other scholars. In this case the commentaries come from the evolutionary biologist H. Allen Orr, philosopher of science Kim Sterelny, anthropologist Ruth Mace, and economist Paul Seabright. Reviewing a book that already contains four quite-thorough reviews is a somewhat unusual experience, and I will endeavor to present a sketch of Boyd's argument alongside specific points of contention raised by the reviewers.

The first chapter, "Not by Brains Alone," starts by arguing that human adaptation is different from that of other species because while they adapt through genetic change, we do so through culture. Boyd makes this point through a combination of species-level facts and case studies. For instance, while rodents have a

global distribution similar to that of humans, unlike us they have achieved this by radiating into thousands of species. Boyd's book is perhaps at its most engaging when he delves into historical case studies that show this in action. He describes in great detail the inability of Victorian-era European explorers to survive in the Australian outback even when they observed the native populations thriving and saw what they ate. The key difference, Boyd argues, is that the local population was armed with cultural knowledge that had evolved over thousands of years and that the explorers were unable to reinvent.

No commentary in this book—or my own review—contests the idea that culture is central to human adaptation. However, Boyd then moves on to the core of this chapter, which is his proposal for *how* cultural adaptation occurs. Unlike much evolutionary thinking on human adaptation, Boyd rebuffs what he calls the "library model"—the idea that our intelligence allows us to rapidly develop successful solutions to novel problems, which can then be stored in our culture for use by later generations. Instead, Boyd argues that the cultural evolutionary process itself, not our genius, is what gives rise to valuable knowledge. To undermine the role of individual intelligence, Boyd uses two points. The first, as illustrated by the explorer example, is that, without the assistance of culture, individuals, no matter how smart, are doomed

to fail. The second is that even with the help of culturally inherited knowledge, people don't really understand why good ideas work. Boyd illustrates this by drawing on his own research concerning traditional house-building techniques among Fijian islanders, as well as that of his one-time student Joe Henrich concerning food taboos. In both cases, Boyd argues, interviews with the islanders suggest they don't understand why this knowledge is adaptive, but they adopt it nonetheless. Boyd takes this as evidence that individuals (and not just the Fijian islanders) blindly copy cultural knowledge, often with little comprehension of why it is valuable, and he uses a quick description of a mathematical model to illustrate how such blind copying can be favored by selection.

The role of individual intelligence in human adaptation is an area of active debate (Pinker 2010; Boyd et al. 2011; Morgan 2016; Muthukrishna and Henrich 2016) and so it is little surprise that the commentaries flagged this section for further discussion. Orr raised the point that the sort of high-fidelity social learning that is necessary for human culture demands a certain level of intelligence due to its cognitive requirements and so it seems implausible to entirely divorce individual intelligence from human adaptation. This argument reflects an increasing consensus that human social learning abilities have coevolved with other aspects of our cognition (Kerr and Feldman 2003; Henrich 2016; Morgan 2016), with some suggestions that these links are sufficiently tight that we can reasonably talk about the notion of a general intelligence, or *g* (Laland 2017). Yet other researchers argue that much of human intelligence is the product of cultural, not genetic, evolution (Heyes 2012, 2018). If true, culture and intelligence would be inexorably linked, with culture developing new "cognitive gadgets" that in turn foster further cultural evolution.

Sterelny also pushes back on this point, arguing that while copying without understanding might work for cases where the transmitted

knowledge is straightforward to implement (such as food taboos) it wouldn't work as well for cases of skill learning where easily transmitted knowledge is just the tip of the iceberg. This point has been made elsewhere, for instance it has been argued that much of the knowledge behind complex skills is difficult to communicate or invisible to the learner and so untransmittable (Premo and Tostevin 2016). Sterelny uses the example of stone tool manufacture ("knapping") to additionally suggest that some skills are simply too dangerous for selection to favor their acquisition via social learning without understanding. My own experience with knapping supports this argument (Morgan et al. 2015); even with a dedicated teacher, cuts are common among novice knappers and in one instance a novice struck off a sharp flake that flew across the room and lodged itself into the wall a couple of inches to the side of my head. Despite these concerns, I find Boyd's overall argument—that we are not as smart as we might suppose, and that culture does a lot of heavy lifting for us—highly convincing.

The rest of the chapter then addresses a range of other questions concerning Boyd's vision of cultural adaptation. The most important being: How does the process of cultural inheritance produce complex artifacts without individual understanding as a designing force? However, while Boyd uses examples of non-human artifacts to argue that complexity doesn't require understanding, I would have liked a more thorough treatment of how cultural accumulation proceeds. In its place we get a quick tour of a wider range of topics, including the relative speeds of cultural and genetic change, why only humans have a complex culture, and cultural phylogenetics. While interesting, I don't feel these get to the heart of the chapter, which is how the process of cultural adaptation occurs. So I was left wanting more.

Boyd's second chapter, "Beyond kith and kin," at first feels quite separate from the first. Addressing the evolution of our species' unique tendency to cooperate with each other at scales

and rates far beyond that of other species. However, it is Boyd's solution to this question that brings the two chapters together: we cooperate because of culturally inherited norms.

Boyd starts by discussing alternative theories for cooperation. First, he covers kin selection, which states that cooperation is expected when the cost to the altruist is less than the benefit to the recipient multiplied by the genetic relatedness of the two. This theory has been remarkably successful in explaining the cooperation seen among non-human species, including social insects, but falls flat in humans. While Boyd's discussion of kin selection is accurate, I worry that he over-emphasizes the role relatedness plays in this equation. This is perhaps true of the theory of kin selection as a whole, where for a time it seemed that the relatedness-enhancing reproductive system of haplodiploid species like ants and wasps was the key to explaining their social behavior. However, while it is undoubtedly true that relatedness is lower among human groups than among social insects, not all social insects are haplodiploid (e.g., termites) and so relatedness is often not extremely high. For this reason many social insect researchers emphasize how the costs and benefits of cooperation change as populations grow (Bourke 1999, 2011), with large groups characteristic of both our species and the social insects.

Second, Boyd turns to reciprocity, which suggests that cooperation can be maintained if individuals track each other's behavior and cooperate only with those who have previously been cooperative. Here, Boyd shows decisively that such a mechanism quickly breaks down due to errors in cooperation recognition leading to cascades of defection. Moreover, as Boyd points out, reciprocity is rare to non-existent in nature.

So, let us turn to Boyd's theory of norms. In essence it is simple: we cooperate because social norms tell us to, and our group mates will punish us if we break these norms (and are caught). However, Boyd himself quickly identifies a potential problem with this argument: punish-

ment, being costly to the punisher but beneficial to the group, is itself a form of cooperation that needs explaining. Boyd's solution is the same as before: we have norms for punishment of norm-violators, which, by definition, are enforced by punishment of those who don't punish when they should. Avoiding the cognitive demands of an infinite regression of norms for punishment (e.g., A should punish B because they failed to punish C, who should have been punished because they failed to punish D, who failed to punish E, and so on...), Boyd suggests all we need is the norm that "norm violators should be punished" and therefore the cognitively simpler ability to recognize that "A should punish B because B violated a norm."

Another question Boyd asks is why are cooperative norms so widespread given that *any* behavior, cooperative or not, can be stabilized through normative punishment? Part of the answer, Boyd argues, is cultural group selection: the process by which groups with group-beneficial norms outcompete others and so their norms spread by conquest, migration, or copying. Boyd's treatment of this theory is robust (for a similarly accessible description see Henrich 2016), although importantly he notes that it cannot be the only solution because in many cases (such as the recent norm change against smoking in Western countries) norm changes seem to appear endogenously from within a population. The details of this process are still unknown and an active focus of Boyd's current work.

While the commentary by Mace recognizes the popularity of cultural group selection in contemporary anthropology, she remains unconvinced. She argues that it is unlikely to explain the spread of norms for cooperation because these behaviors show too much variation within groups to be selected at the group level. Boyd pushes back against this argument in his response. However, it is a critique I have heard elsewhere too, so further work is likely needed to address the relationship between within-group variation and the viability of cultural group selection.

The final commentary, by Seabright, raises the general point that Boyd's treatment of norms is overly simplistic, noting (1) the difficulty of proving norm violations, (2) that multiple norms can conflict, muddying expectations, and (3) the scope for self-interested maneuvering even while norms are obeyed. Boyd accepts these points but doesn't see them as a serious impediment to his theory as societies have mechanisms to cope with them: In small-scale societies, the monitoring of each other's behavior reduces the possibility of norm-violators avoiding detection, while group discussion of appropriate punishments clarifies how conflicting norms can be balanced. In large-scale societies, different mechanisms, like legal institutions and police

forces, are required. What we don't see, however, are the cascades of defection predicted by reciprocity, or the "kin-only" cooperation predicted by kin selection.

In summation, Boyd's latest book is a clear exposition of his cultural evolutionary view of human evolution. By applying evolutionary reasoning to the unassuming ingredient of copying, we see how we can get complex cultures without intelligence and cooperating groups of individuals without prior good intentions. This view is a little humbling, taking our most distinguishing features from our hands and placing them, instead, at the feet of cultural selective processes. Nonetheless, the success of this approach over the past thirty years is testament to its explanatory power.

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