Cultural Group Selection

Peter J. Richerson

Comment on Steven Pinker's *Edge* essay *The False Allure of Group Selection*

In these remarks I concentrate on the essay's misconceptions about cultural evolution, cultural group selection, and gene-culture coevolution.

The problems begin with the inclusion in Pinker's definition of fitness the idea mutations have to be random with respect to fitness for natural selection to exist. Since cultural evolution manifestly includes the inheritance of acquired variation (if I learn something interesting, I can teach it to you) defining natural selection in this way seems to exclude anything cultural from the effects of natural selection. This bit of definitional fiat is illogical. Selection works on any pattern of heritable variation. True, if social learning does not exist and organisms are thrown entirely on their own resources to invent what the can in whatever local environments they find themselves in, natural selection cannot do any work on the products of learning. This is approximately the case in many species where social learning is absent or of marginal importance. Humans are very different in this regard. We are a veritable adaptive radiation of adaptations that we acquire from others by imitation or teaching, creating patterns of heritable variation. When we make complex technology, such as a Polynesian ocean going canoe, or operate a complex social institution like a Polynesian ranked lineage system, most of us most of the time follow the cultural recipes acquired from our elders. Polynesians sailing bad canoes are liable to die at sea and faulty institutions may lead to environmental deterioration and social collapse in vulnerable island environments. True, individuals sometimes make deliberate and accidental innovations. As with a multidimensional, complex biological adaptation, adaptive innovations in already complex cultural adaptations are hard to find. Inventor's hard-thought-through innovations only rather seldom ultimately better than existing devices (1). Many religious innovators try out new doctrine for every Joseph Smith whose followers form a major new church. In the case of human culture, non-random variation and natural selection can both play roles in the evolution of cultural variation.

The two forces of slightly non-random innovation and natural selection together have a neat synergy. In a new environment where no one yet knows what the best practices are, selection can be extremely weak because the population has little variation to select upon. Waiting for random variation to produce such variation may take a long time. But suppose a few individuals in the population introduce adaptive variation at a rate a little bit higher than at random variation with respect to fitness. Or suppose that some people can borrow innovations from a neighboring successful group. These processes can give selection sufficient variation to work on much sooner than could random variation alone.

Natural selection is a slow and painful process even if it gets a boost from non-random innovation. In the case of culture non-natural selection based on innate or cultural biases can act to pick out favorable cultural variants. If such biases have evolved under the influence of natural selection, they will often act in the same direction selection would act, again speeding up the cultural evolution of adaptations relative to what selection could achieve by itself. This is the great adaptive advantage of culture. A system tying decision-making to inheritance can greatly speed up the adaptive process without

expecting individual innovators and innovation adopters to perform cognitive miracles. Cultural evolution can lead to complex adaptations much faster than can genes alone because the work creation and diffusion of favorable variants is distributed among many minds. Boyd, Henrich and I elsewhere have argued at greater length than is possible here (2) that Pinker's view of culture depends on an impossibly high degree of individual cognitive prowess that amounts to a magical "skyhook" in Daniel Dennett's (3) felicitious phrase. Even if natural selection plays a subordinate role, as Darwin believed it did in "civilized times" (4), a rich formal theory of cultural evolution (history in other words!) has been built on the framework of combining non-random innovation, selective innovation adaption, and natural selection (5).

Cultural group selection is a plausible force because the cultural variation between neighboring groups that might compete is typically much larger than the genetic variation between the same groups (6). The reasons are not far to seek. All human groups are more or less open. Groups intermarry and intermarriage is a very effective conduit for genes. This is less true of culture. The more rapid evolution of culture compared to genes means that directional forces are stronger relative to migration in the cultural than the genetic case, leading to more cultural variation. Active mechanisms also damp down variation within groups and protect between group variation. Human social groups are psychologically very salient entities (7) as Pinker acknowledges. Groups often have different norms and institutions and being able to conform to local norms and institutions is important for individual success, because institutions include carrots and sticks encouraging conformity to their dictates. Even individuals who personally dissent may nevertheless obey the group's rules. In many hunting and gathering societies, egalitarian norms prevent would-be dominant males from taking the resources of others or even hoarding resources they themselves have acquired. This has the effect of reducing individual selection within groups and making it easier for selection to act on any existing variation between groups (8).

Not surprisingly, children are adapted to learn norms the norms of their group very efficiently (9). Hence, immigrants, especially immigrant children, typically assimilate to the groups they or their parents join without appreciably diluting their host cultures. Infant chimpanzees raised as children, by contrast, are no more able to acquire norms than language (10).

Darwin (4) proposed that tribal scale selection was important in "primeval times" in the evolution of prosocial "instincts" such as empathy and patriotism. We certainly have ample ethnographic evidence of such competition (11), see also Boyd's commentary here. Such primeval selection might have been based mainly on cultural differences between groups as it has been in ethnographic times.

Contrary to Pinker's argument, the evidence for other-regarding dispositions in humans extends beyond the results from economic games he mentions. On the experimental side, see Batson's experiments testing his empathy-altruism hypothesis against purely individualistic alternatives (12). See also the evidence on the effects of psychopathic behavior on the functioning of human groups (13). Psychopathy involves a lack of empathy and habitual disregard of norms. It is highly disruptive to the organizations psychopaths inhabit. On many accounts based on the behavior of chimpanzees (14), human psychopaths (perhaps 1% of living populations) rather resemble our last common ancestor with the apes (and the selfish egoists of bare-bones economic and evolutionary theory). Psychopaths themselves typically suffer because their excessively self-regarding behavior is checked by institutions. Turchin's

commentary here points to ample evidence that variations in the willingness of individuals to trust fellow group members and to act altruistically on behalf of the group varies substantially between societies and explains much of what happened in recorded history.

Boyd and I have proposed that in the human species prosocial psychology arose by cultural group selection and gene-culture coevolution. Once our ancestors were taking some advantage of cultural transmission and evolution, simple social institutions would have become part of their adaptive repertoire, such as stable mating bonds that would have the effect of encouraging patrilateral as well as matrilateral kin interactions (15). Then, social selection within groups operating through primitive social institutions would have generated selection on genes in favor of Darwin's social instincts. Many rounds of gene-culture coevolution would have eventually built living humans who, given the right norms and institutions, are capable of considerable feats of cooperation. Bowles and Gintis have proposed a different gene-culture coevolution scenario (16).

I am not aware of any writings of Pinker's that confront the hypotheses and evidence for the importance of cultural evolution and gene-culture coevolution. Certainly he makes light of them in the essay here.

1. Petroski H (1992) *The Evolution of Useful Things* (Vintage Books, New York) p xi + 288.
2. Boyd R, Richerson PJ, & Henrich J (2011) The cultural niche. *Proceedings of the National Academy of Sciences USA* In press.
3. Dennett DC (1995) *Darwin's Dangerous Idea: Evolution and the Meanings of Life* (Simon & Schuster, New York) p 586.
4. Darwin C (1874) *The Descent of Man and Selection in Relation to Sex* (American Home Library, New York) 2nd Ed p 868.
5. Mesoudi A (2011) *Cultural Evolution: How Darwinian Theory Can Explain Human Culture & Synthesize the Social Sciences* (University of Chicago Press, Chicago) p xv + 264.
6. Bell AV, Richerson PJ, & McElreath R (2009) Culture rather than genes provides greater scope for the evolution of large-scale human prosociality. *Proceedings of the National Academy of Sciences USA* 106(42):17671-17674.
7. Haslam SA (2001) *Psychology in Organizations: The Social Identity Approach* (Sage Publications, London) p xvi + 411.
8. Boehm C (1997) Impact of the human egalitarian syndrome on Darwinian selection mechanics. *American Naturalist* 150(supplement):S100-S121.
9. Chudek M & Henrich J (2011) Culture–gene coevolution, norm-psychology and the emergence of human prosociality. *Trends in Cognitive Sciences* 15(5):218-226.
10. Hayes C (1951) *The Ape in Our House* (Harper, New York,) p 247.
11. Otterbein KF (1985) *The Evolution of War: A Cross-Cultural Study* (Human Relations Area Files Press, New Haven CT) p 165.
12. Batson CD (2011) *Altruism in Humans* (Oxford University Press, New York) p vi + 329.
13. Babiak P & Hare RD (2006) *Snakes in Suits: When Psychopaths Go to Work* (HarperCollins, New York) p xv + 336.
14. Vonk J*, et al.* (2008) Chimpanzees do not take very low cost opportunities to deliver food to unrelated group members. *Animal Behaviour* 75:1757-1770.
15. Chapais B (2008) *Primeval Kinship: How Pair-Bonding Gave Birth to Human Society* (Harvard University Press, Cambridge MA) p xv + 349.

16. Bowles S & Gintis H (2011) *A Cooperative Species: Human Reciprocity and its Evolution* (Princeton University Press, Princeton) p xii + 262.