

The evolution of costly displays, cooperation and religion: credibility enhancing displays and their implications for cultural evolution

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Initial receipt 25 June 2007; final revision received 6 March 2009

Abstract

This paper lays out an evolutionary theory for the cognitive foundations and cultural emergence of the extravagant displays (e.g., ritual mutilation, animal sacrifice and martyrdom) that have so tantalized social scientists, as well as more mundane actions that influence cultural learning and historical processes. In Part I, I use the logic of natural selection to build a theory for how and why seemingly costly displays influence the cognitive processes associated with cultural learning — why do “actions speak louder than words?” The core idea is that cultural learners can both avoid being manipulated by their models (those they are inclined to learn from) and more accurately assess their belief commitment by attending to displays or actions by the model that would seem costly to the model if he held beliefs different from those he expresses verbally. Part II examines the implications for cultural evolution of this learning bias in a simple evolutionary model. The model reveals the conditions under which this evolved bias can create stable sets of interlocking beliefs and practices, including quite costly practices. Part III explores how cultural evolution, driven by competition among groups or institutions stabilized at alternative sets of these interlocking belief-practice combinations, has led to the association of costly acts, often in the form of rituals, with deeper commitments to group beneficial ideologies, higher levels of cooperation within groups, and greater success in competition with other groups or institutions. I close by discussing the broader implications of these ideas for understanding various aspects of religious phenomena.

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Keywords: Credibility enhancing displays; Religion; Cultural transmission; Ritual; Cooperation; Dual inheritance theory; Cultural group selection

1. Introduction

Researchers from across the behavioral sciences have long proposed a connection between apparently costly displays — often in various ritualized forms such as firewalking, ritual scarification, animal sacrifice and sub-incision — and deep levels of commitment to group ideologies, religious beliefs and shared values that promote solidarity and in-group cooperation (Atran & Norenzayan, 2004; Cronk, 1994; Durkheim, 1995; Irons, 1996; Rappaport, 1999; Sosis & Alcorta, 2003). This paper provides a novel approach to understanding these observations by considering how natural selection might have shaped our cognitive processes for cultural learning so as to give salience to certain kinds of displays or actions, and what

the implications of such cognitive processes are for cultural evolution. Since my goal is merely to get this approach on the table, where it can compete with alternatives, I aim to provide a *prima facie* case for considering these ideas, and not a set of conclusive tests.

The argument proceeds in three parts. Part I lays out a theory for the evolution of one particular component in the suite of cognitive adaptations that make up the human capacity for cultural learning. The core idea is that, with the evolution of substantial communicative capacities in the human lineage, cultural learners are potentially exploitable by manipulators who can convey one mental representation but actually believe something else, or at least misrepresent their depth of commitment to a particular belief. To address this adaptive challenge, I propose that learners have evolved to attend to *credibility enhancing displays* (CREDS) alongside the verbal expressions of their models (i.e., those individuals from whom people learn). These displays

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provide the learner with reliable measures of the model's actual degree of commitment to (or belief in) the representations that he has inexpensively expressed symbolically (e.g., verbally). Learners should use such displays in determining *how much* to commit to a particular culturally acquired mental representation such as an ideology, value, belief or preference. After laying this out, I summarize supporting findings from psychology.

Building on this, Part II explores whether such a learning bias could create interlocking sets of beliefs and costly practices that are self-stabilizing. That is, can this adaptive learning bias lead to the emergence of stable combinations of beliefs and costly practices (displays) in a social group that could not otherwise persist (remain stable)? My formal model reveals the wide-ranging conditions under which costly practices (acting as CREDs) and associated beliefs are self-stabilizing. Such stable cultural evolutionary states are interesting because they show how particular displays or acts, which appear costly to one who does not hold the relevant corresponding belief, can be sustained by cultural evolution.

Part III considers the possibility that such an interlocking system could also sustain costly practices that elevate the commitment of group members to beliefs that promote group benefits, larger-scale cooperation and solidarity, and — in particular — favor success in competition with other social groups (or institutions). This competition among stable culturally-evolved states favors social groups that are increasingly constituted by combinations of (a) beliefs that favor in-group cooperation/harmony and out-group competition, and (b) practices (e.g. rituals) that maximize participants' commitment to those beliefs.

To assess the plausibility of this account and compare it with existing approaches based on signaling, I summarize evidence indicating that (1) belief-practice (ritual) combinations are spread by cultural group selection (CGS); (2) participation in costly rituals is associated with prosocial in-group behavior, because costly rituals *transmit* commitment to group-beneficial beliefs/goals to participants; and (3) institutions requiring costly displays are favored by cultural evolution because costly displays by members transmit higher levels of belief commitment and thereby promote cooperation and success in intergroup or interinstitution competition.

Together these three parts lay out a process, initiated by an evolved learning bias, that connects costly, even extravagant, displays to cooperation and commitment to a group's beliefs and ideology. The more costly the displays are, the potentially deeper the degree of transmitted commitment.

I close by discussing how such processes may illuminate a number of puzzling aspects of religion, including why (1) religions are often associated with prestigious paragons of virtue who make (or made) costly sacrifices; (2) martyrdom is so persuasive; (3) religions and rituals are loaded with sacrifices of various kinds; (4) gods and ancestors want costly acts; and (5) religious leaders often take costly vows, such as those involving poverty and celibacy.

2. The evolution of our cultural capacities

The application of the logic of natural selection to the evolution of social learning has produced an array of novel theoretical insights, hypotheses and empirical findings (for reviews, see Henrich & McElreath, 2006; Richerson & Boyd, 2005). One central line of inquiry arising from this research program has focused on how selection has shaped our cultural learning processes in order to more effectively acquire ideas, beliefs, values, preferences and practices from others in our social world. The set of related hypotheses about these cognitive-operational details can be partitioned into two categories, those based on *context* (e.g., cues about a model's prestige or success) and those related to mental representations' *content*. Below, I briefly review some work in this area in preparation for laying out the *CRED hypothesis*.

Contextual learning mechanisms use cues that allow learners to more effectively extract and integrate adaptive information from the range of individuals available in the learners' social world (Henrich & McElreath, 2003). One class of cognitive mechanisms, often glossed as *prestige-biased transmission* (Henrich & Gil-White, 2001), proposes that learners use model-based cues to figure out who, among their potential *models*, is most likely to possess adaptive information suitable to the learner's situation (e.g., his/her role in the social group). Theory suggests, and a wide range of empirical findings have shown, that both children and adults preferentially pay attention to and learn from others based on cues of prestige, success, skill, age, ethnicity (marked by dialect, dress, etc.) and sex (Henrich & Henrich, 2007: chapter 2). These effects influence a wide range of representations, including opinions, economic decisions, food preferences, social strategies, beliefs, technological adoptions and dialect. Moreover, these biases appear to operate across domains of expertise, as those with skill or knowledge in one field (e.g., basketball) are granted influence in other arenas (e.g., fashion or politics). Given this, and anticipating what is to come below, a highly prestigious individual motivated by self-interest could express a degree of commitment to a belief or opinion different from her own, which — once adopted by others — could yield benefits to her and costs to the learners.

Evolutionary approaches to culture also provide a rich set of cognitively informed hypotheses regarding how the *content* of representations influence their transmission (Boyd & Richerson, 1985: chapter 5; Sperber, 1996). The general insight is that learners should pay particular attention to and remember representations likely to contain adaptive information. Specifically, learners should be more likely to pay attention to and store representations when these are judged, *ceteris paribus*, more (1) fitness relevant, (2) potentially actionable and (3) plausible or compatible. Regarding the first, natural selection should favor more attention and recall for representational content of greater relevance to fitness, at least in ancestral environments.

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