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The role of writing and recordkeeping in the cultural evolution of human cooperation

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ABSTRACT

Efforts to account for the emergence of large-scale cooperative human societies have focused on a range of cultural advances, from the advent of agriculture to the emergence of new forms of political regulation and social identification. Little attention has been accorded to the role of writing and recordkeeping in cultural evolution. Recent insights garnered here from behavioural economics, palaeography, grammatology, evolutionary psychology, and anthropology suggest that writing and recordkeeping helps to solve the problem of cooperation in large groups by transcending the severe limitations of our evolved psychology through the elaboration of four cooperative tools – (1) reciprocal behaviours, (2) reputation formation and maintenance, (3) social norms and norm enforcement, and (4) group identity and empathy.

1. Introduction

Our species' ability to cooperate in large groups of unrelated individuals is perhaps our most important survival strategy. Humans rely on food, resources, labour, and information from fellow group members and routinely share these things with others. We do this on a scale that ranges from small hunter–gatherer societies of fifty or so individuals to large modern agriculturalist societies and nation states comprising thousands or millions of individuals. Such societies require individuals routinely to bear costs for the benefit of genetically unrelated individuals in a wide variety of ways, ranging from the remittance of tribute or tax to more extreme forms of self-sacrifice as cannon fodder on the battlefield. Explaining the evolution of this level of cooperation presents a theoretical puzzle because co-operators in a population are vulnerable to exploitation by free-riders who reap the benefits of cooperation without paying the costs.

A major achievement of evolutionary theory over the last half century has been the development of rigorous models that can account for cooperative behaviours, for instance via reciprocity (Axelrod, 1984), kin selection and the extended phenotype (Hamilton, 1964; Dawkins, 1976), and multilevel selection (Michod, 1999). As we explain in Section 2, current theory can explain most of the cooperation observed in the small-scale societies that characterised much of our evolutionary history. However, large-scale human societies present some unique challenges for these theories, due to both the nature and scale of cooperation and the fact that large-scale societies first appeared and proliferated in the Holocene, too recently to be an outcome of genetic cognitive adaptations. Section 2 outlines how human evolved psychology promotes cooperation in small-groups but is powerless to address the challenges of cooperation in much larger societies. A number of cultural adaptations have been proposed to overcome the shortcomings of our innate psychological tools but little attention has been

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accorded to the role of writing and recordkeeping in the evolution of cooperation in large-scale societies, the main focus of the current study.

2. The limitations of evolved psychology in large-scale societies

Humans evolved in small hunter–gatherer bands facing a wide range of collective action problems such as how to bring down large game, how to support each other in times of hardship, how to coordinate defence against predators (enemy groups, large carnivores, etc.), how to raise children, and how to protect group resources from being plundered and monopolised by self-regarding individuals. Many such problems were overcome through the evolution of psychological mechanisms designed to promote prosociality or detect and punish defectors within the group.

Some of the mechanisms supporting ingroup prosociality are likely to have evolved out of kin detection systems prevalent in earlier hominid species, such as sensitivity to cues of genetic relatedness (e.g. based on smell or other indicators of phenotypic similarity) (Manson and Wragham, 1991; Daly and Wilson, 1999; Henrich and Henrich, 2007). However, for the benefits of cooperation to be exploited in foraging bands of more distantly related individuals, the payoffs of cooperation on a larger scale would have had to outweigh the costs whether calculated in terms of inclusive fitness at the level of organisms or demographic success at the level of cultural groups (or perhaps at multiple levels of selection). Humans possess an evolved psychology that allows them to achieve cooperation within small groups of non-kin using a range of mechanisms.

One such mechanism is reciprocal altruism. Whilst a one-off anonymous act of altruism will, by definition, have negative fitness consequences for the altruist and should therefore be selected against, cooperative or altruistic behaviour can be favoured when the probability of future interactions allows for acts to be reciprocated. Repeated interactions between the same individuals have been shown to favour a strategy of reciprocity or 'tit-for-tat' cooperation (Axelrod, 1984). The net fitness gain of such an exchange is highest when the altruist can provide a large benefit to the recipient with minimal cost to themselves. The opportunities for such repeated reciprocal exchange when hunting in small groups (e.g. sharing meat following a large kill) is thought to have driven the evolution of cooperation in humans and furnished us with a psychology that constantly tracks favours given and owed within our social circle (Haidt, 2012).

In addition to direct reciprocity, in which individuals track the behaviour of those individuals they have themselves interacted with, cooperation can also be promoted via indirect reciprocity, whereby individuals have access to information about the cooperativeness of potential interaction partners (Nowak and Sigmund, 1998). Whereas in non-human primates antisocial behaviour would have to be directly witnessed in order to be detected and punished, the evolution of language made it possible for humans to acquire information about the behaviour of others indirectly, through gossip. Reputation management thus became crucially important to an individual's reproductive fitness, producing among other things a hypersensitivity to being observed by others (Bateson et al., 2006). Human reputational concerns promote cooperation by providing new information about potential partners and by changing incentives to defect by attaching a reputation benefit to cooperation and a reputation cost to defection.

Human cooperation is also normative. Like much of human behaviour, the decision to cooperate in a given situation is not pre-programmed in our genes, but is acquired from those around us. Social learning allows individuals to adjust their behaviour in the light of information about the local environment that has accumulated over previous generations – information that is stable but not so stable as to have been genetically selected (Henrich and McElreath, 2003). Human social learning includes social behaviours dictating how we interact with one another and allows for the establishment of cooperative social norms. Experimental economic games show that most of us are conditional co-operators, tailoring cooperation to the level of cooperation we see around us (Keser and van Winden, 2000; Brandts and Schram, 2001; Fischbacher et al., 2001; Fehr and Fischbacher, 2004). Whilst a few free-riders can undermine cooperative norms and lead to a break-down of cooperation, there is growing evidence that moral reasoning in humans is highly sensitive to issues of fairness (Haidt, 2012) and that in any small community there will be at least some individuals who are willing to punish wrong-doing even at a cost to self, a behaviour known in behavioural economics as 'punitive altruism' or 'prosocial punishment' (Fehr and Gächter, 2002). Cooperative social norms, together with the threat of punishment for norm violations is a key mechanism by which cooperation can be maintained in human groups.

Cooperation also involves human group psychology. Reputational information and/or shared social norms will predict cooperative behaviour most reliably within one's local group. What is more, neighbouring groups can compete for resources either directly via warfare or indirectly via competition. As a result, human psychology has become highly attuned to group membership and signals of group identity as a way of determining how far to extend trust (Brewer, 2007). Even trivial and arbitrary differences between groups are enough to trigger ingroup favouritism (Billig and Tajfel, 1973). There is also reason to think that many striking cultural characteristics of small-scale societies may have evolved via a process of cultural group selection (Henrich, 2004) to exploit this psychology for the benefit of groups. For example, a series of studies have shown that synchronised movement (a recurrent feature of collective rituals across the ethnographic record) increases cooperation within groups (Wiltermuth and Heath, 2009; Reddish et al., in press; Wiltermuth, 2012). Numerous other mechanisms promoting social cohesion have been proposed, including the sharing of food, laughter, and music (Morley, 2012). Dysphoric initiations have been linked to particularly high levels of prosociality within groups, such as military units or ancestor cults, and a variety of mechanisms have been advanced to account for this including costly signalling (Sosis, 2000, 2003; Sosis and Alcorta, 2003), dissonance reduction (Aronson and Mills, 1959), and identity fusion (Swann et al., 2012). As the list of potential mechanisms associated with cohesion and cooperation in small groups grows longer it has been suggested