

Culture and social behavior

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Comparative research from diverse societies shows that human social behavior varies immensely across a broad range of domains, including cooperation, fairness, trust, punishment, aggressiveness, morality and competitiveness. Efforts to explain this global variation have increasingly pointed to the importance of packages of social norms, or institutions. This work suggests that institutions related to anonymous markets, moralizing religions, monogamous marriage and complex kinship systems fundamentally shape human psychology and behavior. To better tackle this, work on cultural evolution and culture-gene coevolution delivers the tools and approaches to develop theories to explain these psychological and behavioral patterns, and to understand their relationship to culture and human nature.

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Introduction

Social behavior varies dramatically across human populations and throughout history. This applies to many of the domains that psychologically oriented researchers typically consider, including cooperation [1,2,3^{••}], trust [4,5], fairness [6,7[•]], in-group favoritism/cheating [8,9], costly punishment [10], aggressiveness [11], morality [12], and competitiveness [13]. Let's begin with three examples.

Cooperation and punishment

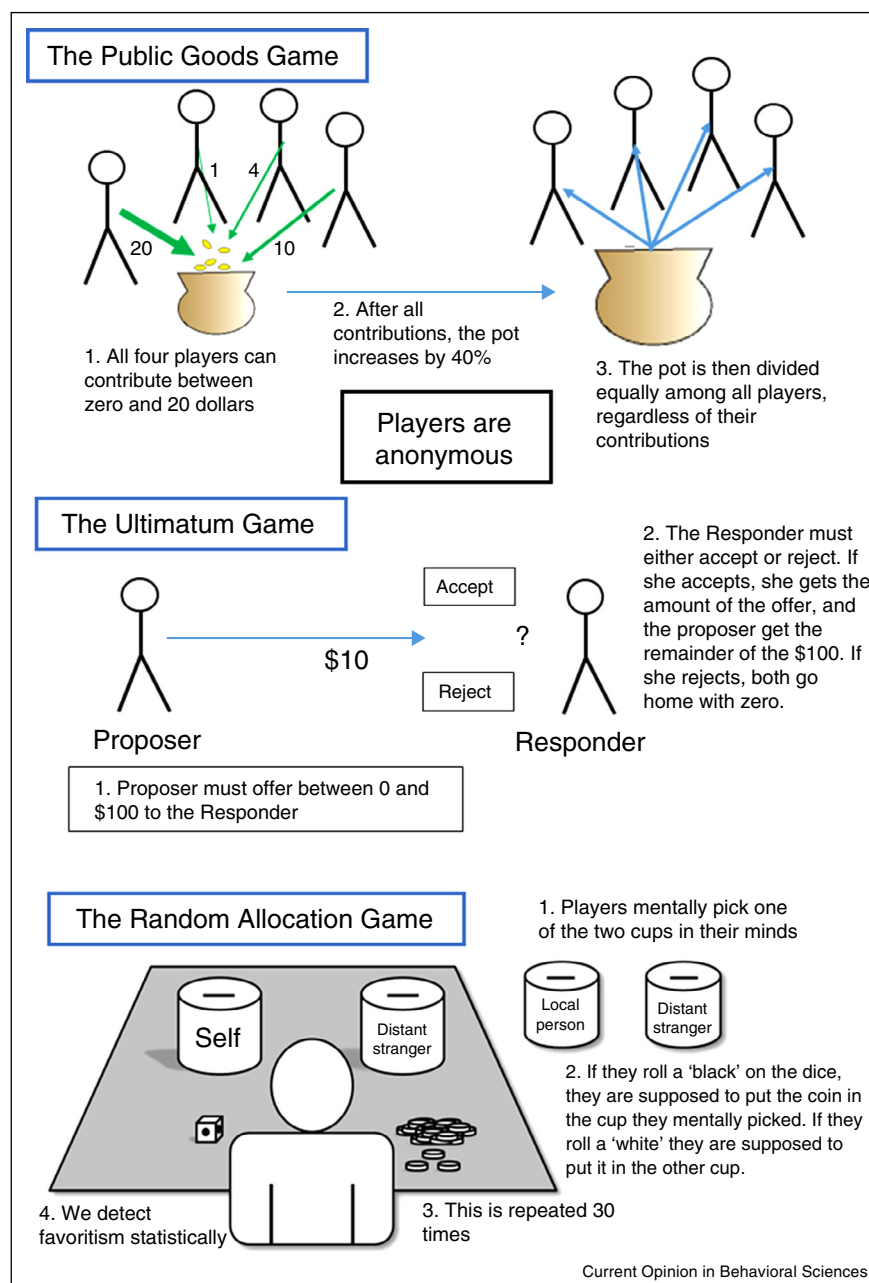
To study cooperation and punishment, Herrmann and his colleagues [3^{••}] performed repeated **public goods games** (see **Figure 1**) among university students in 16 different populations around the globe, ranging from Boston and Melbourne to Seoul and Minsk. In the standard repeated game, mean contributions (a measure of cooperativeness) in round one were nearly twice as high in Copenhagen (at ~80% of the maximum) compared to Muscat (at ~40%),

with nearly everything in-between. **In some populations, contributions declined as people played. In others, they did not.** Then, when opportunities for participants to pay to punish other players were added to the basic game setup, the diversity across groups increased even more. Contributions in the first round now ranged from roughly 30% in Istanbul, Riyadh and Athens to nearly 80% in Boston, Copenhagen and St. Gallen (Switzerland). Most striking was that, unlike the usual experiments among Western, Educated, Industrialized, Rich and Democratic (WEIRD) populations [14] where **opportunities to punish result in the sanctioning of non-cooperators and in high rates of cooperation,** the addition of punishment opportunities made things worse in several places. **In these places, participants punished not only low contributors but also high contributors,** which stifled any increase in the overall contributions. This 'antisocial punishment' is not some experimental oddity, and likely captures something real and important about human psychological variation since it is strongly negatively correlated with measures of 'norms of civic cooperation' and the 'rule of law' from these populations. This means that even strong treatment effects related to cooperation, like adding peer punishment, cannot be readily generalized from WEIRD samples [15].

Fairness and punishment

My colleagues and I first deployed **Ultimatum Games** (**Figure 1**) across 15 diverse societies [16,17] from around the globe, including hunter-gatherers, horticulturalists, and pastoralists; then, a few years later we replicated and extended these findings in a second project using three different bargaining experiments. Overall, we studied multiple communities in 24 different populations, and replicated our more unusual findings from the first phase. Offers varied from 20% to over 50% in some populations. In the Ultimatum Game, non-student Americans, whether from Los Angeles or small-town rural Missouri, offered about 48% of the large stakes. On the punisher's side, Americans rejected low Ultimatum Game offers so often that **even a purely self-interested proposer would have to offer 50%.** Meanwhile, in some populations, no one ever rejected any positive offer, and we found everything in-between. Most notably, nearly half of our populations rejected offers *greater than half* with increasing frequency as offers approached 100%. Not caused by confusion or misunderstanding, this phenomenon is virtually unknown among WEIRD populations, but seems to be rather common elsewhere, including in both China and Russia [18,19]. Subsequent developmental studies in six diverse populations reveal that costly preferences for equality in such experiments begin to emerge by age 7, creating

Figure 1



The three major economic experiments described in the text.

substantial group differences by middle adolescence [20,21].

In-group favoritism/parochialism

Hruschka and his colleagues [9^{••}] developed a novel experiment called the **Random Allocation Game** (Figure 1) that permitted participants to anonymously cheat to favor either themselves or their local community over a distant stranger. They administered their

experiment in Bolivia, Bangladesh, Fiji, Arizona, Iceland and China and found immense variation, with **Americans and Icelanders showing no favoritism toward themselves or their local groups** over distant compatriots. These findings are consistent with traditional non-incentivized survey measures of in-group favoritism or parochialism, such as collectivism, nepotism and compatriotism, based on data from dozens of countries [8].

Findings like these are daunting to many experimental researchers because disciplines like psychology, neuroscience and economics are not well equipped, either theoretically or institutionally, to deal with population-level psychological and neurological differences. Many psychologists, for example, tend to think of cross-cultural research as a nuisance [22], necessary only to confirm the universality of their findings (which are usually based on WEIRD undergraduates [23,24]). To the contrary, the immense psychological and behavioral variation we observe across the globe should be seen as an intellectual opportunity, one that inspires new theoretical and methodological approaches [25]. The world is full of untapped psychological variation and natural experiments that can be used to develop and better test theories, theories that begin to map the linkages between psychology, institutions, biology, ecology and cultural evolution. Let us consider four packages of social norms — institutions — that have been linked to psychological differences (see Figure 2).

Institutions and Psychology

Markets

Market institutions are sets of social norms that regulate exchange among strangers, or at least among those without close ties of family, friendship and community. Drawing on cultural evolutionary theory in our studies of impersonal prosociality (described above), my colleagues and I theorized that market institutions would coevolve culturally with social norms, including internalized motivations, for impersonal trust, fairness and cooperation. We

found and replicated large correlations between our measures of market integration and mean offers in three economic games intended to measure impersonal fairness. Building on this work, Rustagi and his collaborators [26,27] established one of the causal pathways, from markets to motivations, by taking advantage of a natural experiment in the Ethiopian Highlands. There, because people were geographically anchored by hereditary land tenure, the distance of a community from the market could be used as an exogenous proxy for market integration, and used to infer causality. This work revealed a strong relationship between proximity to the market and cooperative behavior (also, see Ref. [28]). In the laboratory, a converging line of evidence shows that **priming markets increases impersonal trust** [29]. Together, these studies suggest that **market institutions coevolve culturally with psychological differences in sociality**.

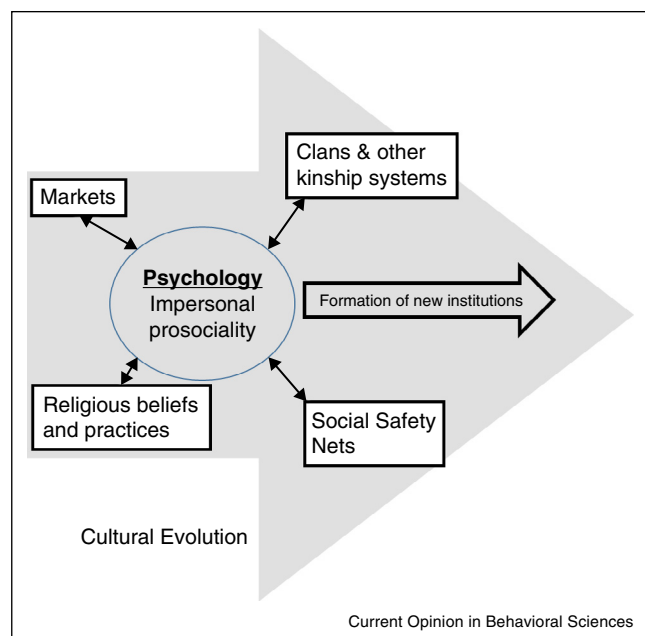
Religion and ritual

Norenzayan and colleagues [30*,31,32] have argued that particular religious beliefs and ritual practices have spread culturally because they alter people's social behavior in ways that increase the success of their communities in competition with other groups. For example, believing in powerful moralizing gods who monitor and punish violations of prosocial norms may make people more likely to adhere to those norms. Empirically, across the globe, adherents to world religions, **with these big moralizing gods, offer 6–10% more in bargaining games compared to those who adhere to traditional religions** [7*]. Converging with this, dozens of priming experiments now confirm that unconsciously reminding religious people (but not atheists) of 'god' causes them to behave more prosocially in economic games [30*,33]. Similarly, recent work shows how various ritual elements influence our sociality, including synchrony, music-making, costly acts, and the terrifying experiences created by many rites of passage [34*,35–43]. At the macro-level, the psychological effects of **particular religious beliefs and practices may aggregate up to speed economic growth, increase fertility and reduce crime** [44–47]. Collectively, this work indicates that religious beliefs and rituals are also cultural coevolving with aspects of social psychology.

Ecology and clans

Talhelm and colleagues [48**] hypothesized that certain ecological conditions, in particular those conducive to intensive paddy rice cultivation, should favor the formation of highly cooperative groups. In the Chinese case, this ecological pressure likely generated tightly knit patrilineal clans. To test this, the team measured in-group favoritism in two ways in universities spread across China, and then tapped the natural variation in rice-growing across Chinese provinces. The results reveal a strong positive correlation between rice-growing and in-group favoritism. The authors take a step toward showing causality by using an exogenous measure of rice suitability (how ecologically

Figure 2



The interface between psychology, institutions and culture.

good the land is for rice) to predict actual rice-growing, and then use these estimates to predict their psychological measures. This removes concerns that a collectivistic psychology might cause more rice growing, as well as concerns that a third variable might cause both collectivism and rice-growing. Such findings provide a cultural evolutionary theory that links ecology, social structure, and psychology, and may help explain cross-national differences in innovation [49].

Monogamous marriage

Most human societies have been polygynous, permitting high status men to marry multiple wives (at the same time). In general, the wealthier the society, the greater the degree of polygynous marriage. However, medieval and later European societies were rather unusual in being normatively monogamous, and this institution has been spreading globally only recently, arriving in Japan in 1880, China in 1953 and Nepal in 1963. Polygynous marriage continues in most of Africa, and parts of the Middle East. Converging lines of evidence now suggest that this ‘peculiar institution’, as historians describe it [50], dramatically affects male psychology, and potentially male hormones, by suppressing male–male competition. In polygynous societies, as higher status males marry additional young wives, the competition rises substantially in the mating and marriage markets. Needing to dramatically raise their status just to get into the ‘game’, low status men become risk prone and steeply discount the future, leading to increases in crime rates and substance abuse. Meanwhile, in monogamous societies, getting married and having children domesticates men, lowering their testosterone and producing a psychological response that often includes substantial child investment. Overall, through a combination of psychological effects, normatively monogamous marriage may reduce crime, competitiveness, domestic violence, infant and child mortality and spousal homicides [51].

Social safety nets and security

Hruschka and his collaborators have used experimental and survey measures to reveal positive correlations between in-group favoritism with material security, using both participants’ own subjective measures and national-level measures of institutions [8,9]. The team measured material security individually using a scale that assessed people’s anxiety about having enough food in both the short and longer-term. Parallel work that exploits quasi-experimental situations in Sierra Leone and the Republic of Georgia shows that the experience of war creates enduring increases in in-group favoritism, but only if the experience occurs within a developmental window from roughly age 7 to 20 ([21], also see [52]).

These lines of research suggest that institutions such as those related to marriage, markets, religions, kinship and safety nets have substantial impacts on human psychology

and social behavior. It also suggests that people from market-integrated, non-kin-based societies with moralizing gods and normative monogamous marriage will have a rather odd social psychology. But, how do we theorize institutions? Where do institutions come from?

Neither psychology nor economics is currently theoretically well-equipped to explain the origins of institutions [53]. To get there, to build a theory of cultural evolution capable of explaining where institutions come from, researchers have gone back to the basics, to reconstruct our understanding of human evolution and the nature of our species [54,55,56,57]. These approaches, rather than ignoring our species extreme reliance on culture, have used the logic of natural selection and mathematical modeling to ask how natural selection might have shaped our learning psychology to most effectively extract ideas, beliefs, motivations and practices from the minds of others. This intellectual move dissolves the destructive dichotomy between ‘evolutionary’ and ‘cultural’ explanations and fully incorporates cultural explanations under an expanded Darwinian umbrella. The hypothesized cultural learning mechanisms can, and have been, empirically tested in both the laboratory and field, in infants, children and adults from diverse societies [54,58–63].

This foundation then allows theorists to model cultural evolution by building on empirically established psychological mechanisms. The result is *cultural evolutionary game theory* [64]. This powerful tool has already been deployed to understand the emergence of a wide range of social norms and institutions, including those related to social stratification [65], ethnic groups [66], cultures of honor [67], signaling systems [68], punishment [69–71] and various reputational systems [72,73]. Of course, this research program is really just getting started.

Finally, many researchers want to study those psychological processes that make us uniquely human. The problem is, at this point, there has been so little systematic comparative experimental research across diverse populations that we currently lack any reliable way to know when we are tapping innate psychological processes, or the products of centuries of cultural evolution, that have constructed unique institutional forms, such as those related to religions, rituals, families, markets and marriage. The way forward is to embrace the globe as one’s laboratory, and design research programs that harness the immense range of opportunities it provides.

Conflict of interest statement

Nothing declared.

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