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# Human prosociality from an evolutionary perspective: variation and correlations at a city-wide scale☆

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**Abstract**

Prosociality is a fundamental theme in all branches of the human behavioral sciences. Evolutionary theory sets an even broader stage by examining prosociality in all species, including the distinctive human capacity to cooperate in large groups of unrelated individuals. We use evolutionary theory to investigate human prosociality at the scale of a small city (Binghamton, NY), based on survey data and a direct measure of prosocial behavior. In a survey of public school students (Grades 6–12), individual prosociality correlates strongly with social support, which is a basic requirement for prosociality to succeed as a behavioral strategy in Darwinian terms. The most prosocial individuals receive social support from multiple sources (e.g., family, school, neighborhood, religion and extracurricular activities). Neighborhood social support is significant as a group-level variable in addition to an individual-level variable. The median income of a neighborhood does not directly influence individual prosociality, but only indirectly through forms of social support. Variation in neighborhood quality, as measured by the survey, corresponds to the likelihood that a stamped addressed letter dropped on the sidewalk of a given neighborhood will be mailed. We discuss the results in relation to evolutionary theory, the experimental economics literature and the social capital literature in an effort to integrate the study of human prosociality across disciplines.


*Keywords:* Altruism; Community-based research; Evolutionary theory; Experimental economics; Prosociality; Selfishness; Social capital

The two faces of human social behavior — selfishness and altruism — have long presented the human behavioral sciences with a paradox. Daily life is replete with examples of selfishness, from students who insist that the dog ate their homework to CEOs who plunder entire companies for their own gain. Yet, people also perform acts of kindness, from lending cups of sugar to dying for their country. Is altruism just a disguised or enlightened form of selfishness, or does it require a separate explanation?

This question has been asked in all branches of the human behavioral sciences (e.g., social psychology, sociology, political science, economics, anthropology). Evolutionary theory broadens the scope by examining the evolution of altruism and selfishness in *all* species (Sober & Wilson, 1998). When these terms are defined at the behavioral level, then selfishness is *locally advantageous*; almost by definition, selfish individuals survive and reproduce better than the altruists with whom they interact. However, altruism can still succeed as a behavioral strategy to the degree that altruists confine their interactions to each other and avoid interacting with selfish individuals. In this case, a population structure develops in which groups composed primarily of altruists contribute more to the total gene pool than groups composed primarily of selfish individuals. The groups need not have discrete boundaries and the segregation need not be complete, but only sufficient for the collective advantages of altruism to outweigh its vulnerability to exploitation from within.

All evolutionary theories of social behavior reflect this basic dynamic, including the coefficient of relatedness in inclusive fitness theory, the phenotypic matching that occurs when conditional strategies such as tit-for-tat adopt the behavior of their partner in game theory models, and the

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within- vs. between-group components of multilevel selection theory (see Wilson & Wilson, 2007 for a recent review). Together, these theories provide a satisfying explanation for selfishness and altruism in nonhuman species, from microbes that overexploit their resources in a "tragedy of the commons" situation (e.g., Kerr, Neuhauser, Bohannan, & Dean, 2006) to insect colonies that truly qualify as "superorganisms" (e.g., Seeley, 1995; Wilson & Holldobler, 2009).

The same theoretical framework can be used to study human altruism and selfishness. It can even go beyond the study of human genetic evolution to include faster processes of human behavioral change. Game theorists refer to a "replicator dynamic" as any process whereby the most successful behavioral strategy increases in frequency through time, which can include such things as learning and imitation in addition to genetic evolution (Bowles, 2003; Gintis, 2000). Any replicator dynamic counts as an evolutionary process, vastly expanding the relevance of evolutionary theory to contemporary human affairs.

Even though evolutionary theory can be used to study altruism in humans and nonhumans alike, it is also clear that humans represent a very special case. Our hunter–gatherer ancestors cooperated far more within their groups than any other primate species (Bingham, 1999; Boehm, 1999). Cumulative cultural evolution has expanded the scale of human societies to many millions of genetically unrelated individuals. One key ingredient for this kind of ultrasociality appears to be low-cost social control (Boyd & Richerson, 1992). If selfishness can be quickly detected, communicated and punished without imposing too large a cost on the punishers (a form of second-order altruism), then selection for behaviors with collective benefits can dominate selection for within-group selfishness. Another key ingredient appears to be social transmission processes that create *behavioral* variation among groups without requiring *genetic* variation among groups (Richerson & Boyd, 2005). When this happens, genetic inheritance mechanisms are replaced by cultural inheritance mechanisms.

The field of experimental economics has been especially influential during the last decade in revealing human social preferences and how they interact to promote either altruism or selfishness at the behavioral level, depending upon the circumstances. In experimental games that include altruism and selfishness as behavioral options, most people are moderately altruistic but quickly "turn selfish" to protect themselves in the presence of other selfish individuals. When punishment is added as a behavioral option, some individuals will punish selfishness, even at their own expense. Punishment takes the altruism out of first-order altruism by making it disadvantageous to cheat, but punishment itself counts as a form of altruism (what economists call a second-order public goods problem) to the extent that it provides collective benefits at personal cost (Fehr & Fischbacher, 2003, 2005). Gossip, reputation, friendship, establishing norms by previous discussion, repeated interactions and manipulating elements of the physical environment all contribute to the suppression of selfishness within groups and promotion of behaviors that deliver collective benefits. Experimental economists are increasingly turning to evolutionary theory to explain how these particular social preferences arose by genetic and cultural evolution (e.g., Gintis, Bowles, Boyd, & Fehr, 2005; Hammerstein, 2003). Although most experimental economics games are performed in the laboratory, they are also starting to be performed in field situations (e.g., Carpenter & Cardenas, 2008; Carpenter, Harrison, & List, 2005), including an important worldwide comparison of small-scale traditional societies (Henrich et al., 2004). These field-oriented studies are comparable to field studies of nonhuman species in evolutionary biology, which are required to understand the relationship between organisms and their environment and provide the starting point for more controlled experiments.

The literature on social capital provides another rich source of information on human altruism and selfishness (e.g., Halpern, 2004; Putnam, 2000; Sampson, McAdam, MacIndoe, & Weffer-Elizondo, 2005). Social capital can be broadly defined as the benefits of investing in social relationships, similar to financial capital and human capital (investing in individual capacities such as education). An extensive literature shows that human welfare depends heavily on social capital and also that social capital varies widely among human social environments. This literature has the virtue of being primarily field based and therefore documenting human altruism and selfishness as it takes place in the real world. However, it has not yet been integrated with evolutionary theory or the recent experimental economics literature.

In this article, we describe a study of human altruism and selfishness in everyday American life at a city-wide scale. Our study resembles the social capital literature in documenting variation among the neighborhoods of a city, but our approach is guided by evolutionary theory, including the recent experimental economics literature. We think that much can be gained by integrating across disciplines to achieve a single coherent framework for basic and applied research on human altruism and selfishness.

We begin by describing individual differences in altruism and selfishness, as measured by a survey given to public school students in Grades 6–12. Then we show how altruism correlates with various aspects of the social environment, including family, neighborhood, school, religion and extracurricular activities. Finally, we validate and extend the survey results with a study that measures variation in altruism among neighborhoods at the behavioral level. We have performed a number of additional validations that will be reported in more detail elsewhere and will briefly be described here.

At this point, we would like to introduce a terminological change. We began with the terms "altruism" and "selfishness" because they have been influential in framing the debate within evolutionary theory. However, the term altruism has a strong connotation of self-sacrifice in addition