

CHAPTER 17

The Trouble with Invisible Men

How Reputational Concerns Motivate Generosity

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INTRODUCTION

“I looked about me at the hillside, with children playing and girls watching them, and tried to think of all the fantastic advantages an invisible man would have in the world.”

- H.G. Wells, *The Invisible Man*

Typically portrayed as unrestrained, capricious, and immoral, literature and film have traditionally turned a suspicious eye towards invisible men. For example, in *The Republic*, Plato ([380 B.C.E.] 1955) describes a debate between his brother, Glaucon, and his mentor, Socrates, on the nature of justice and human morality. Glaucon argues that just behavior of humans is simply an artifact of their desire to avoid formal and informal punishment, making his case via a thought experiment regarding what would happen should men possess rings that could make them invisible. Glaucon argues that even those we perceive to be moral would become evil if granted the power of invisibility: “There is no one, on this view, who is iron-willed enough to maintain his morality. . . when he is able to take whatever he wants from the market-stalls without fear of being discovered” ([380 B.C.E.] 1955).

Glaucon’s message is the same as Wells’: given freedom from both formal and informal sanctions, people will behave antisocially. Indeed, were the members of a whole society somehow unable to monitor one another, the implication is that we would find ourselves in a cruel, Hobbesian state of nature characterized by avarice and egoism. According to this line of reasoning, the only thing sparing us from anarchy is our visibility, and thus, our reputational accountability. These thought experiments relate to one of the most fundamental questions of the social sciences, one that scholars have wrestled with for centuries: what are the roots of human morality? What creates moral order? Do we limit ourselves, or do others? Are we good because we are *good* or only good because we are *watched*?

Here, we focus on understanding the bases of one morally-charged domain of human behavior: prosocial behavior. Prosocial behaviors are acts which benefit others, often at a cost to the self. In the larger literature on morality, prosocial behaviors are examples of prescriptive

and positive morality: benevolent actions that are socially valuable, but which groups typically do not expect of individuals (Janoff-Bulman et al. 2009). Understanding the mechanisms driving acts of generosity is important for social science because they are widely believed to be fundamental to the maintenance of social order (Comte [1851] 1973, Durkheim [1893] 1964, Sorokin 1954).¹ Though central to sociology, explaining prosocial behaviors is challenging, since individuals can benefit more by not helping others, instead pursuing their narrow self-interest.

Indeed, both lay people and many social scientists tend to assume that people are fundamentally selfish, driven primarily by pursuit of their own gain (Miller and Ratner 1998). Though the assumption that humans are by nature entirely selfish is untenable (Piliavin and Charng 1990, Dovidio et al. 2006), self-interest is without question, a tremendously significant motivator of behavior. The strength of self-interest motivates an important research question: what factors lead individuals to set aside narrow self-interest in favor of prosocial behaviors that are often costly to them?

Traditionally, social scientific research on prosocial behavior has focused on the role of either *material incentives* or *altruistic motives* in explaining prosocial behavior. These two classes of explanation follow very different logics. For example, in explaining routes to cooperation via material incentives, researchers have studied the role of material sanctions (Olson 1965, Yamagishi 1986) and the prospect of longer-term material benefit (Axelrod 1984) for behaving collectively. At the same time, other researchers have emphasized the role of having a “prosocial value orientation” (Liebrand 1986, Liebrand et al. 1986, van Lange 1999) or “altruistic personality” (Oliner and Oliner 1988) in explaining why people would sacrifice to help others.

Increasingly, researchers have also begun to focus on a third class of explanation for prosocial behavior based on *reputation*. A recent explosion of research across the social sciences has established a close link between prosociality and reputational standing. Substantial research from sociology (Willer 2009a, Simpson and Willer 2008), economics (Andreoni and Petrie 2004), biology (Milinski et al. 2002a, Zahavi and Zahavi 1997), psychology (Hardy and van Vugt 2006, Barclay 2004, Flynn et al. 2006), and anthropology (Chagnon 1988, Lemonnier 1996, Smith and Bird 2000, Price 2003) confirms the link between prosocial behavior and reputation. This research shows that generosity can lead to a diversity of social benefits, including respect, influence, cooperation, and trust. The logic is that, in light of the many reputational benefits due to those who behave generously, it is not surprising that prosocial behaviors are relatively common (Willer 2009b).

Research in this new and emerging literature is enormous, including contributions from the diverse fields noted above. In this chapter we review some promising strains of research in this domain, including the dynamics of reputational gain as a reward encouraging prosociality, how reputation systems are maintained in groups, and evolutionary models relating reputation and prosocial behavior. We begin our review by detailing research on the many reputational and reputationally mediated rewards for prosocial behavior, and then discuss theory and research causally linking these gains to individuals’ decisions to behave prosocially. We

¹ Consistent with convention in the social sciences (Dovidio et al. 2006), we define “altruism” as the psychological *motivation* to increase another’s welfare, even at a cost to self, while “generosity” and “prosocial behavior” refer to *actions* that benefit others.

also look at the role of reputational hierarchies based on status in structuring patterns of prosocial behavior in groups. Because reputations are critical to the administration of sanctions, we discuss the dynamics of social and affective sanctions, informal bases of social control that are common in everyday life and effective in large part because individuals are deeply concerned about their reputations. Then, we briefly review the literature on information sharing in group's reputation systems, before concluding with a review of mathematical and computational models highlighting the critical role reputation systems may have played in the evolution of prosocial behavior.

HOW PROSOCIAL BEHAVIOR LEADS TO REPUTATIONAL BENEFIT

Perhaps the aspect of reputations that people care the most about is their standing in terms of *status*. Different from being liked and more specific than having a “good reputation,” status refers to an individual's relative standing in a group based on prestige, honor, and deference (Berger et al. 1972). Those who are higher status command more respect and wield more influence (Berger et al. 1977). Research in diverse settings, including highly controlled laboratory studies (Hardy and van Vugt 2006, Willer 2009a) as well as ethnographic field studies (Chagnon 1988, Patton 1996, Lemonnier 1996, Price 2003), shows that individuals who are more generous are viewed as higher status by fellow group members.

For example, the Status Theory of Collective Action (Willer 2009a, b) argues that costly contributions to group efforts earn individuals status gains because they signal that the individual is “group motivated” (Ridgeway 1982), a trait that is considered meritorious by group members. Willer (2009a) showed across a series of experimental studies that costly contributions to group efforts lead to improved status standing and greater interpersonal influence. Further, the effects of contributions on status standing were statistically mediated by the perceived group motivation of the contributor, confirming that contribution earns an individual status by signaling his/her underlying desire to benefit the group.

In addition to the status gains that result from prosocial behavior, generosity can tend to material benefits as well. For example, research from behavioral economics, social psychology, anthropology, and evolutionary biology on “indirect reciprocity” (Alexander 1987) proposes that prosocial behaviors are rewarded with, and motivated by, reputational benefits. Whereas, direct reciprocity approaches describe the tendency of individuals to directly return favors to others who have helped them in the past, indirect reciprocity occurs when an individual is rewarded for being generous to someone else in the past. Material and other rewards earned for one's generosity are mediated by reputation in the case of indirect reciprocity, and research suggests that individuals do pursue reputation for its own sake, and not only as a route to further material rewards (Huberman et al. 2004). A number of theories of indirect reciprocity have emerged in recent years, e.g. costly signaling (Zahavi 1995, Zahavi and Zahavi 1997, Smith and Bird 2000), image scoring (Nowak and Sigmund 1998), and image standing (Sugden 1986; Leimar and Hammerstein 2001, Panchanathan and Boyd 2004).²

² See Nowak (2006) for a review.

Taken together, research in this vein shows the magnitude and diversity of benefits due to individuals for developing a positive reputation: trust (Barclay 2004), respect (Hardy and van Vugt 2006, Willer 2009a), leadership positions (Milinski et al. 2002b), material gifts (Milinski et al. 2002a, Willer 2009a), access to profitable relationships (Barclay and Willer 2007), cooperation in diverse settings (Willer 2009a), social influence (Willer 2009a), and advancement in formal organizations (Flynn et al. 2006). The suggestion of this literature is that, in light of all these future rewards, it is not surprising that people give to groups and other individuals.

REPUTATIONAL BENEFITS ENCOURAGE PROSOCIAL BEHAVIOR

While the research reviewed above establishes a close connection between acts of generosity and the reputational benefits that are likely to follow, this does not necessarily imply that generosity is motivated by the pursuit of these reputational benefits. Indeed, research on human altruism has built a strong case that altruistic motivations are a real and significant cause of prosocial behavior (e.g., Batson 1991, Piliavin and Charng 1990). Still, researchers have also established that the pursuit of reputation serves as a complementary motive, also encouraging generous acts (Simpson and Willer 2008). This body of research has established two primary ways in which reputational gains motivate generosity: one based on instrumental, goal-directed behavior, the other based on learning.

First, prosocial behavior may often be driven by an instrumental pursuit of improved reputation. Several demonstrations show that people give more when greater reputational gain can be had (e.g. Milinski et al. 2002b, Semmann et al. 2004, Barclay 2004, Andreoni and Petrie 2004), and will even jockey to give more than one another, a phenomenon known as “competitive altruism” (Roberts 1998, Barclay and Willer 2007). Occupations that involve more prosocial aspects often pay at lower levels, suggesting that the prestige available to apparently generous employees serves as a “compensating differential” motivating their labor (Frank 2004). Research shows that even minimal cues that one’s behavior is being watched – the presence of a pair of eyespots present in the individual’s field of vision – can compel individuals to behave more prosocially (Haley and Fessler 2005). These authors further suggest that past demonstrations of apparent altruism in laboratory settings may simply reflect pursuit of reputational gain. Thus, at least some prosocial behavior is instrumentally motivated by the pursuit of future reputational rewards.

Another route from reputational rewards to prosocial behavior is more nuanced. Reputational rewards for past generous acts may increase the future rate of those acts through a learning mechanism, as any reward an individual values that regularly follows some action should tend to encourage higher rates of that action in the future. Following Macy’s (1990; 1995) work on the role of reinforcement learning in collective action, Willer (2009a) proposed that receiving status for past contributions to group efforts could increase future giving by buttressing the contributor’s underlying group motivation. In a sense, one’s motivation to help the group is socially constructed, responding to others’ feedback and signs of respect.

This claim was tested in an experimental study that manipulated status feedback to collective action contributors at high versus low levels (Willer 2009a, Study 4). Participants who received high status feedback tended to give more to the group in the future, an effect that was mediated by reported motivations to help the group. Contributors receiving high status feedback also identified with the group more and felt greater solidarity with its members.

STATUS AND THE ORGANIZATION OF COLLECTIVE ACTION

With few exceptions (e.g., Oliver et al. 1985, Oliver and Marwell 1988), the vast literature on collective action has assumed undifferentiated, homogenous actors facing a collective problem in the production of some public good. However, sociologists and social psychologists are in general agreement that undifferentiated groups are exceptional, if they exist at all. At least since Bales (1970), researchers have shown that a group that comes together to pursue a common goal quickly develops a status hierarchy. Once in place, this status hierarchy has powerful and lasting effects on group dynamics and group decisions. While prior work outlined above shows that differences in contributions to collective action produce status differences in groups, less is known about how existing status differences among group members affect collective action.

Simpson and Willer (2010) apply Status Characteristics Theory (Berger et al. 1972, 1977) in proposing ways in which status differences in groups help “organize” collective actions via three inter-related processes: a potential contributor’s relative status affects *when* she gives to a collective action, *how much* she gives, and how much *others* give. These three processes deal, respectively, with the initiation of, contributions to, and continuation of collective action. Taken together, they suggest that status hierarchies help structure patterns of contribution to collective action. The result may lead groups with clear status hierarchies to successfully coordinate behavior, and thereby promote the efficient production of public goods.

Note that while sociologists have typically focused on the dysfunctions of status inequalities, Simpson and Willer argue that status hierarchies may also be functional for groups, providing “emergent” solutions to collective action problems. As a result, it is likely that status differentiated groups may produce larger public goods since these hierarchies encourage early and large contributions from high status members, whose contributions then influence higher subsequent contributions from lower status members.

For example, Kumru and Vesterlund (2008) randomly assigned participants to high or low status positions, based on an arbitrary scoring of a difficult quiz. After participants were informed of their own and others’ status, they made decisions about how much of their private endowments to contribute in two-person, sequential decision public goods games. Thus, in addition to status information, participants also had full knowledge of each other’s contributions. For instance, the second contributor made his or her contribution decision with full knowledge of the initial contribution amount. In half the groups, the high status participants were designated to make the first decision about how much of their private endowment to contribute; in the remaining half, the low status participant made the first decision.

If high status persons expect to have influence over those lower in status, we should observe higher contributions by high status first contributors than low status first contributors. In addition, if high status contributors accurately forecast the impact of their contributions on those lower in status, we should observe higher contributions by second movers when they are low status relative to first movers. This is precisely the pattern of results reported by Kumru and Vesterlund (2008). Most important, this pattern resulted in groups where high status members made their decisions first producing larger public goods than groups in which low status member made their decisions first.

This research shows how status standing affects initial contributions, and how early contributions by high status group members then influence subsequent contributions from low status members. However, in order for status hierarchies to fully organize solutions to

collective action problems those high in status need to take the lead by making initial contributions. Do status differences influence the sequencing of contributions, or do the beneficial effects of status reviewed thus far require an additional mechanism, e.g. a monetary incentive, to motivate high status members to initiate collective action? If high status members take the lead, following the results outlined above, they should contribute at high levels, and these high contributions should influence those lower in status to contribute at similarly high levels. This would mean that status hierarchies provide an endogenous solution to collective action problems.

In a preliminary investigation of the hypothesis that status hierarchies lead those higher in status to initiate collective action, Simpson and Willer (2009) assigned participants to high or low status in three-person groups, where the two other group members were actually computer simulated actors. The participants, all university undergraduates, were either given information suggesting that the other group members were higher status (graduate students) or lower status (high school students) relative to the participant. As expected, participants who were high in status relative to others initiated collective action by contributing earlier than their lower status counterparts. This finding suggests that collective action groups with extant status hierarchies do not necessarily need an explicit mechanism to encourage high status members to initiate collective action. Instead, the sequencing of contributions may occur as a direct consequence of the status hierarchy.

THE POWER OF SOCIAL AND AFFECTIVE SANCTIONS

The above research establishes that reputational gains matter to people in part because they promise both social and material benefits, and that these rewards compel people to behave more prosocially. Another crucial way in which reputations matter and promote prosocial behavior is their integral role in sanctioning systems. Indeed, information about people that is conveyed through their reputations is a precondition for the effective functioning of sanctioning systems. While research on sanctioning has traditionally focused on the role of material sanctions, recently this area has broadened to also study social and affective sanctions. It is very likely that in informal groups, social and affective sanctions such as expressions of approval or appreciation of prosocial acts on the one hand, or disapproval and disdain for anti-social acts on the other, are far more common in the course of everyday life than material fines or rewards. Unlike material sanctions, social and affective sanctions are informally deployed in the course of everyday interaction and may have several important advantages in compelling prosocial behavior, relative to material sanctions.

Much research on sanctioning systems as ways to motivate prosocial behavior in groups can be traced back to Olson's (1965) classic work on collective action. According to Olson, material sanctions, side payments for contributions or fines for noncontribution to collective efforts, can be effective because they transform an individual's payoff structure to make contribution in their individual self-interest. In this way, sanctioning systems help reduce or eliminate the individual temptation to free-ride. Past research has demonstrated that material sanctions are effective at encouraging greater generosity toward the group (Yamagishi 1986). Further, individuals are willing to sanction others who fail to act generously, even when such sanctioning is costly (Yamagishi 1986, Fehr and Gächter 2002). Importantly, individuals seem to recognize the benefits of sanctioning systems: recent work by (Gurerk et al. 2006) shows

that, when given the option, individuals prefer a system allowing costly, material punishment to a system without sanctioning.

Findings from a new line of research, however, have led researchers to question the utility of formal, material sanctions for promoting the well-being of groups (e.g., Dreber et al. 2008, Fehr and Rockenbach 2003, Mulder et al. 2006, Nikiforakis 2008, Tenbrunsel and Messick 1999). For example, Mulder et al. (2006) find that the use of material sanctions undermines trust among group members because these systems “implicitly communicate that there is reason to doubt that group members will cooperate ‘by themselves. . .’” (148). Further, contribution behavior in the presence of material sanctions leads individuals to attribute others’ contributions to the threat of sanctions rather than to intrinsic motivation. Research has also demonstrated that material sanctions can undermine individuals’ trustworthiness (Fehr and Rockenbach 2003) by creating antagonistic relations between group members. Finally, research shows that when material counter-punishment is allowed, cycles of retaliation emerge leading the use of material sanctions to decline, and with it cooperation (Nikiforakis 2008). In sum, systems using formal sanctions to deter free-riding can have deleterious side effects, including lower trust, trustworthiness, and cooperation.

Though often neglected in research, there is good reason to think that nonmaterial, social, and affective sanctions play at least as large a role as material sanctions in the maintenance of social order. Here, “social sanctions” refer to direct communications of disapproval, expressions of shame, and public embarrassment (Blau 1964, Masclet et al. 2003, Noussair and Tucker 2005). As such, social sanctions are penalties that “do not impose tangible costs on the offender, though they may decrease his or her utility” (Noussair and Tucker 2005). Social sanctions deter free-riding because individuals strongly desire social approval from others, and alter their behavior to avoid disapproval (Ellingsen and Johannesson 2008, Hollander 1990). Arguably, the use of social sanctions is more common than formal sanctions. While few individuals have the authority (or desire) to impose monetary fines on others, most group members can express disapproval or apply peer pressure when others behave selfishly.

Despite their apparent utility and ubiquity, only two published studies to date evaluate social versus material sanctions as deterrents to free-riding (Masclet et al. 2003, Noussair and Tucker 2005). In one study, Masclet et al. (2003) compare behavior in a public goods game across three conditions. In a monetary punishment, or formal sanctions condition, participants could reduce others’ earnings at a cost. In a nonmonetary punishment (i.e., social sanctions) condition, participants could send “disapproval points” to others that were costless to both sender and receiver. In a control group, individuals were able to send neither monetary nor nonmonetary sanctions. Findings indicate that social sanctions significantly increase cooperation compared to groups with no punishment, though formal sanctions were slightly more effective at deterring free-riding. Yet, because of the monetary costs incurred through using formal sanctions (to both senders and receivers), overall earnings were similar in the two conditions.

Building on Masclet et al. (2003), Noussair and Tucker (2005) focus on the combination of formal and social sanctions for generating cooperative behavior. They find that, in a combined system, where participants can use either social or formal sanctions, contribution levels and payoffs are higher than when only one of the two types of sanctions are available. More precisely, the benefit of the combined system is that it is cheaper than a system using only formal sanctions, and more effective at increasing contributions than a system using only social sanctions.

This research suggests that social sanctions generate payoffs similar to formal sanctioning systems, and may be especially useful when used in conjunction with formal sanctions. However, it remains to be seen whether social sanctions, like formal sanctions, negatively affect group member perceptions and impede sustained cooperation. Future research should address whether social sanctions help sustain prosociality in groups without producing the negative side effects that result from material sanctioning systems.

Information Sharing and Reputation

Recent research has also begun to illuminate the role of reputational information sharing, or *gossip*, in the maintenance of basic social order. Gossip, defined here as communicating in a morally evaluative manner about others when they are not present, is usually perceived in a negative light. Yet, there is reason to believe that gossip plays an important and ubiquitous role in helping solve social dilemmas (Dunbar 2004, Sommerfeld, Krambeck, Semmann, and Milinski 2007, Wilson et al. 2000).

A major function of gossip is the spread of information about the character of others. Through gossip, individuals can keep tabs on other's behavior without being physically present. Moreover, gossip allows for the spread of evaluative information (i.e., reputation) about others (Dunbar 1996, 2004, Foster 2004), thus providing individuals a pretext with which to interact with others in their social network. Because of such information sharing, people's reputations often precede them. The spread of reputational information serves as a policing mechanism, helping social groups both deter and punish selfish behavior.

A significant body of research reviewed above shows that individuals forgo short-term material benefits in order to develop a good reputation. Individuals have good reason to do so. Having a tarnished reputation can hinder many of life's most important pursuits, such as developing successful trade relationships, forming friendships and social alliances, and being viewed as a viable romantic partner. It can also lead to ostracism from one's social group (Ouwerkerk et al. 2005, Spoor and Williams 2007, Williams 2007). Historically, when humans mainly existed in small, hunter-gatherer tribes, ostracism equated to a death sentence. However, even in present day, where mobility from one social group to another is more feasible, those ostracized suffer significant hardships in finding a new group and establishing themselves as an accepted member of that group. Without gossip, reputational information could not spread throughout a social network. As a result, there would be no reason for individuals to fear gaining a widespread negative reputation or to fear being ostracized from the group. At worst, individuals would develop a tarnished reputation only in the eyes of the person they defected on or cheated, and possibly observers of the transgression. The powerful reputational incentive to behave prosocially in social dilemma situations disappears.

Few experimental studies directly test the role of gossip in social dilemmas. The most relevant study examined gossip's influence in an indirect reciprocity game where paired participants decided to either keep a portion of an endowment for themselves or donate a larger portion of their endowment to their game partner (Sommerfeld et al. 2007). Some rounds involved receiving gossip about a partner's previous game behavior with other participants. Participants received this gossip about their current partners prior to playing the indirect reciprocity game with them, thus providing useful reputation information that could guide one's decisions about how to play. The results of this study revealed that gossip did influence game

decisions. As expected, positive gossip about a player led to a higher likelihood that a partner would cooperate with them, and negative gossip led to a lower likelihood of cooperation. In this study, gossip was not examined as a deterrent – the experimental setup did not use the threat of being gossiped about as a means for influencing behavior. In a separate study, however, Piazza and Bering (2008) examined how threat of gossip associated with one's reputation could influence economic behavior. These researchers found that participants were more generous when they knew that their decisions in a distribution task would be relayed to an individual with whom they had gotten to know personally. Thus, even the possibility of having one's reputation tarnished for behaving selfishly seems to be enough to foster prosocial behavior. Although neither of these studies examined social dilemmas involving groups (rather than dyads), and neither specifically examined the influence gossip can have in policing free riders, the results do suggest that gossip can help solve social dilemmas by conveying reputational information and by fostering prosocial behavior. Furthermore, these studies coincide well with Enquist and Leimar's (1993) evolutionary modeling which found cooperation could be an evolutionary stable strategy only if gossip conveyed reputational information amongst the group. Without such gossip, however, free riders would take over the population, eliminating all cooperators.

But what motives underlie gossip? Although gossip has prosocial effects for recipients and groups, it also represents valuable information that is (typically) freely shared by individuals. A logical explanation would be that reputational information is reciprocally traded among allies (or friends) via gossip in the same way that other resources are exchanged (Trivers 1971). Another possibility is that gossiping may be a strategy for advertising one's own conformity to the social norms of the group (Baumeister et al. 2004). Such advertisement may help gossipers signal their underlying prosociality, communicating to others their trustworthiness. On the flip side, gossiping may also be a way of advertising that the gossiper is not someone who can be easily exploited. Through gossip, individuals may effectively communicate that they are part of a larger social network in which reputational information is readily diffused. Thus, any cheating would result in negative reputational information being broadcasted about the offender throughout the social network (Willer 2009b).

The proximal psychological motives driving gossip, however, remain largely unexamined. In the one experimental examination of the topic, Feinberg and Willer (2010) tested three potential reasons for gossip: (1) it relieves negative, and promotes positive, affect, (2) it punishes immoral and unjust behavior, and (3) it helps innocent others. In their first study, participants witnessed a social transgression during an economic game. Participants in the gossip condition were then able to send a short note to the next interaction partner of the transgressor. Participants' emotions were measured before and after sending the gossip note. Results showed that gossiping decreased negative emotion and increased positive emotion, relative to the control condition. Examination of the notes themselves showed that participants chose to gossip both to punish the transgressor as well as to help the future interaction partner. An analysis of the predictive value of these two motives suggested that the primary motive was to help rather than punish. In a second study, they added a third condition which involved gossiping to an uninvolved third party who would never interact with the target of the gossip. This condition was included to examine if the emotional benefits of gossip are only obtained when the information shared can potentially help someone. The results revealed that gossiping to a third party had similar, though muted, effects on positive and negative emotions. These results suggest that gossiping about transgressions in general both relieves negative and promotes

positive emotions, though the effect is stronger when the recipient of the gossip will be helped by the information.

In both studies, the option to gossip was voluntary, yet more than 95% of participants chose to gossip even when there was no clear benefit for doing so. Self-reported motivations and content analyses of the actual gossip notes suggested that the primary motive behind gossiping was to help others. These findings raise the possibility that gossip, commonly considered antisocial and petty, is in fact an important form of prosocial behavior.

Formal Models of Reputation and the Evolution of Prosociality

Thus far, our review has focused on empirical research on the role of reputation as a proximal, situational cause of prosocial behavior. It is possible, however, that reputational dynamics can also help us understand the distal causation of prosocial behavior in humans via either biological or cultural evolution. The evolution of prosocial behaviors in humans is considered puzzling from the perspective of natural selection since individuals can presumably achieve greater fitness by not engaging in costly acts that benefit others. In recent years, mathematical and computational modeling in the social and biological sciences has increasingly questioned this reasoning, developing models of the evolution of prosocial behavior that emphasize the role of reputation and other informational mechanisms. These models consistently show that the evolution of human prosociality is far less puzzling if information on individuals' past behavior is widely available. Information on others' past levels of prosocial versus antisocial behavior encourages evolution of prosocial behavior by enabling, (1) assortative interactions among prosocial individuals that make prosociality a more profitable strategy and reduce the profits due to the narrowly self-interested, and (2) costly sanctions for antisocial behavior that reduce the fitness of this strategy.

Partner selection, which leads to biased assortative interactions among individuals with different levels of prosociality, is one mechanism that favors the evolutionary fitness of prosocial individuals. When relevant behavioral information is known, prosocial individuals can preferentially interact with other prosocial individuals, leaving antisocial individuals to disproportionately interact with one another (Orbell and Dawes 1993, Frank 1988, Macy and Skvoretz 1998). As a result of this biased assortment of interaction partners the benefits of prosociality will be disproportionately felt by other prosocials while the harms done by antisocial behavior fall disproportionately on the more antisocial. This pairing of similar individuals reduces the risk to prosocial individuals of being exploited by less cooperative others while reducing the rewards that antisocial individuals gain from more cooperative others. An individual's resulting fitness, in an evolutionary sense, will then be proportional to their prosociality. As a result, prosocials will, by cooperating with one another, become more numerous. Meanwhile, antisocials will compete with each other, becoming relatively less numerous and possibly extinct.

This "assortativity" can be induced through very simple preferential interaction mechanisms. In evolutionary models featuring unilateral giving, a preference to give to individuals with a good reputation over ones with a worse reputation makes prosocial behavior a more profitable strategy that is stable across generations in both static and dynamic networks (Takahashi 2000, Fu et al. 2008). Additionally, the positive effects of reputation-based partner selection on the amount of prosocial behavior in a population are robust to imperfect

information. Axelrod et al. (2004) showed that in a population of agents with inheritable mutations, the existence of individual “tags” observable by others that signal prosocial inclinations combined with a preference for interacting with other similarly tagged agents was sufficient to produce stable pockets of prosocial agents and a trend towards increasing overall prosociality (c.f. Riolo et al. 2001). The levels of cooperation among tagged populations remained higher than among untagged populations even when the tag was a noisy indicator of prosociality, though this effect declined as the correlation between tag and prosocial behavior decreased.

Beyond simple preferential interaction, the costly sanctioning of uncooperative behavior (i.e., altruistic punishment), can further reduce the fitness of individuals who behave antisocially. In simulations featuring diverse populations of agents with varying propensities to cooperate and punish uncooperative others, the existence of high levels of cooperation is dependent on the presence of sufficient levels of punishment (Bowles and Gintis 2004, Fowler 2005, Eldakar and Wilson 2008). This punishment may take the form of “strong reciprocity,” where cooperative agents also engage in punishment of noncooperation (Bowles and Gintis 2004, Boyd et al. 2003, Gintis 2003), or “hypocritical punishment,” where uncooperative individuals punish other uncooperative individuals (Heckathorn 1989, Eldakar and Wilson 2008). Regardless of the form of punishment, when the proportion of punishers is sufficiently high, individuals who punish bear very little cost relative to those that do not (Boyd et al. 2003), minimizing the selection pressures that might otherwise undermine the evolution of sanctioning behavior.

Although sanctioning enables the development and persistence of cooperation in some circumstances, some studies question the real usefulness of altruistic punishment. Dreber et al. (2008) found that individuals that punish never outperform their opponents. Indeed, relative to their opponents, altruistic punishers usually perform worse. Sanctioning individuals only succeed through fostering consistently high levels of cooperation allowing both partners to reap high rewards. Less prosocial, nonsanctioning individuals may have lower overall levels of cooperation, but can outperform their partners, creating a relative fitness advantage. Recent research suggests that sanctioning may not be as necessary as proponents of strong reciprocity assert. In fact, altruistic punishment is necessary for only a small proportion of the conditions under which prosociality can evolve (Ohtsuki et al. 2009).

These studies complement empirical research linking reputation and prosociality. Even as researchers from diverse fields offer strong empirical demonstrations of the power of reputational concerns to ensure prosocial behavior in situations, models are increasingly emphasizing the causal role of reputation in the evolution of human prosocial behavior. These models show how reputation-based assortative interaction dynamics and sanctioning systems both are sufficient to favor prosociality in natural selection. It is also worth noting that these assumptions are also highly plausible, arguably much more plausible than the minimalist evolutionary models that make prosociality puzzling in the first place. As empirical research presented above demonstrates, it is sensible to assume that people would have at least minimal reputational information on one another, both from personal experience and reputational information sharing with others. Finally, although these models are typically presented as representing biological evolution – in which individuals possessing less fit strategies die off and those with more fit strategies proliferate – they could also be viewed as models of an individual or social learning dynamics – in which less profitable strategies are discarded in favor of ones that are more profitable.

CONCLUSION

We began this article by noting that portrayals of invisible men in literature and film invariably emphasize their immorality.³ Invisible men are viewed as greedy and untrustworthy, not only unrestrained, but somehow also corrupted by their power. The suggestion is that individuals' antisocial urges are primarily regulated by image concerns. We behave morally, when we do, because we are watched. When we are watched, we become accountable, as our actions bring consequences for our reputations.

Here, we have reviewed several strains of research on the role of reputation in prosocial behavior. Our review establishes that individuals receive diverse social and material benefits for behaving prosocially. Further, these rewards for developing a "good" reputation influence decisions to behave prosocially, both as a reward individuals instrumentally seek, and as a positive reinforcement that leads individuals to learn to behave generously. We also discussed research indicating that status hierarchies, traditionally viewed as an antisocial basis of inequality, may actually increase group productivity by structuring patterns of contributions to collective efforts in functional ways.

Another function of reputation systems is the delivery of information critical to the maintenance of social and affective sanctioning systems. A recent line of research makes a related point: that reputational information (i.e. gossip) that is critical to the effectiveness of reputation systems is spontaneously diffused among individuals because of social and affective processes. Finally, a variety of mathematical and computational models asserts that reputational processes could have encouraged the evolution of prosociality via biological and/or cultural evolution.

Where past approaches to explaining prosocial behavior are broadly classifiable as either emphasizing sincere (altruism) or strategic (material incentives) motives, research on reputation blurs this distinction. While behaviors that are on face calculated efforts to better one's social standing (e.g., Barclay and Willer 2007) are classifiable as strategic, this is not the only way in which reputation may shape prosocial behavior. As reviewed above, some theory and research suggest that individuals may also be affected by reputational benefits via a learning process: once individuals contribute to groups they earn improved status, once this status is communicated to them via gestures of respect their motivation to help the group is increased and more costly contributions to group efforts follow (Willer 2009a). Thus, it may be that the role of reputational concerns in fostering prosocial behavior defies the classic distinction between altruism and strategic self-interest, shaping individuals' prosociality via both mechanisms.

Our review also discussed the relative impacts of social and material sanctions, an area that has gained some recent attention. Thus far the literature has focused on material sanctions, but the study of social and affective sanctions is promising both because these sanctions are likely more common in everyday life, and also because they bypass many of the negative by-products of material sanctioning systems. While material sanctions are typically more effective for guaranteeing pro-group behaviors because they transform individual self-interest (e.g., Olson 1965), their longer-term degradation of trust and prosocial motivation may

³ Klosterman observes for example, that throughout his novel, Wells "seems maniacally preoccupied with illustrating how the invisible man was an asshole" (2009).

make them inappropriate applications. Future research should better establish the differences between these two classes of sanctions, and specifically investigate the interaction between the presence of different forms of sanctions and reputation systems in groups.

Research on reputational information sharing in groups is a neglected, but critical area. Until recently, it has been assumed that reputational information readily diffuses widely across group members. While this may be so, it is a fascinating phenomenon, amounting to a form of second-order altruism where individuals give away information of real, material value free of charge. Even more interesting is recent research showing that the underlying psychological motivations driving gossip (Feinberg and Willer 2010) may mirror those found to compel empathic helping (Batson 1991).

Finally, we have also discussed some mathematical and computational models in the area. Overwhelmingly, these models have focused on how reputational benefits may have aided in the biological evolution of human propensities for altruistic behavior. Far less studied, but likely promising, is how models of the cultural evolution of generosity might also profit from consideration of reputational dynamics. In addition, further modeling of reputational dynamics is necessary as social scientists strive for a more general understanding of the structure of status hierarchies within and across groups.

We also hope that future research investigates the interplay between altruistic motives and reputational concerns. Is it the case that individuals who appear altruistic are in fact simply pursuing some form of reputational gain? Should this literature linking reputation and prosocial behavior be read as offering an explanation for generosity that challenges the existence of altruism? Or, perhaps instead, more altruistic individuals are also less egoistic in their desires for reputational advancement? Perhaps it is egoists who behave prosocially (when they do) in an instrumental effort to better their reputations? While at least one article has begun investigation of this question, finding support for the notion that more altruistic individuals care less about reputational gain (Simpson and Willer 2008), more research is needed on this fundamental question.

In general, research on reputation must continue to grapple with the formulation of key concepts (Martin 2009). Where we have referred broadly to “reputation,” it is very likely that people care about many dimensions of their reputation, and likely in different ways that vary across individuals. Reputation entails many aspects of how one is perceived, including how respected someone is, how generous they are seen to be, how well liked, how dominant. Social scientists have only begun to break apart these closely related concepts, but continuing to do so is critical not only to understand the dynamics of pro-community behaviors, but also the microsocial order more generally.

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