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Paying It Forward vs. Rewarding Reputation: Mechanisms of Generalized Reciprocity

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Generalized reciprocity is a widely recognized but little studied component of social capital in organizations. We develop a causal model of the multiple mechanisms that sustain generalized reciprocity in an organization, drawing together disparate literatures in the social, organizational, and biological sciences. We conduct the first-ever critical test of two key mechanisms: paying it forward and rewarding reputation. These are fundamentally different grammars of organizing, either of which could sustain a system of generalized reciprocity. In an organization, paying it forward is a type of organizational citizenship behavior (OCB) that occurs when members of an organization help third parties because they themselves were helped. Rewarding reputation is a type of OCB that occurs when peers monitor one another, helping those who help others and refusing to help those who do not. Using behavioral data collected from members of two organizational groups over a three-month period, we found that reputational effects were strongest in the short term but decayed thereafter. Paying it forward had stronger and more lasting effects. Dominant theories assume that rewarding reputation is the main cause of generalized reciprocity, but our analysis demonstrates that generalized reciprocity in an organization occurs for multiple reasons. We use the empirical findings to develop propositions about the mechanisms of generalized reciprocity in organizations and link these to management practices. Our study contributes to social exchange theory, macro-level prosocial behavior, OCB, positive organizational scholarship, and management.

Keywords: prosocial; reciprocity; organizational citizenship; social networks; social capital; online communities; positive emotions; reputation

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Introduction

Reciprocity is a universal principle and widespread practice in groups, organizations, and communities. Reciprocity is one of the “principal components” of moral codes (Gouldner 1960, p. 161). It resides “at the core of the exchange concept” (Blau 1963, p. 140). A form of reciprocity, generalized reciprocity, is “the touchstone of social capital” (Putnam 2000, p. 134; see also Adler and Kwon 2002, p. 25; Baker and Dutton 2007). Unlike direct reciprocity, which follows the principle of “I help you, and you help me,” generalized reciprocity follows the principle of “I help you, and you help someone else.” Commonly known as “paying it forward” (e.g., Hyde 2000), an example would be when you help a fellow employee because other employees helped you (Deckop et al. 2003). Generalized reciprocity also follows the principle of “I help you, and someone else helps me.” For example, a product designer who gives technical advice to another designer earns a reputation for helpfulness that may be rewarded by a third designer who helps the first (Hargadon and Sutton 1997).

Generalized reciprocity is a way of “organizing,” an ongoing process of “interlocked behaviors” where one person’s behavior is contingent on another person’s behavior, whose behavior is contingent on yet another person’s

behavior, and so on (Weick 1979). Paying it forward and rewarding reputation are different grammars of organizing (Weick 1979), each with their own rules, conventions, and patterns of interlocked behaviors. Paying it forward means that helping others is driven by positive affect: “You help me, and I feel grateful, so I pay it forward by helping a third party.” This third party is then more likely to pay it forward and help a fourth party, who is more likely to help a fifth, and so on. Rewarding reputation works in an entirely different way. Helping others is driven by strategic action and intentional reputation building: “I help you because I know that a third person is watching and is more likely help me if I help you.” This third person is more likely to get help from a fourth person as a reward for helping me, this fourth person is more likely to get help from a fifth, and so on. Either paying it forward or rewarding reputation could sustain a system of generalized reciprocity. Surprisingly, these two mechanisms have never been included in the same model and analysis.

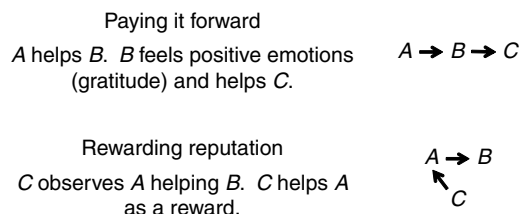
Organizational scholars know that generalized reciprocity occurs in small, medium, and large organizations (e.g., Constant et al. 1996, Hargadon and Sutton 1997) and between organizations (e.g., Das and Teng 2002), but we lack an in-depth understanding of the mechanisms that

produce it. Most organizational studies use generalized reciprocity as a label to describe exchange patterns or simply cite norms of generalized reciprocity to explain empirical patterns. Similarly, practitioners advise managers to build social capital for strong organizations and superior performance, but offer little guidance on specific management practices that implement mechanisms of generalized reciprocity (e.g., Cohen and Prusak 2001, Cross and Parker 2004, Wenger et al. 2002). We draw on different and often separate literatures on prosocial behavior, organizational citizenship behavior (OCB), evolutionary biology, social psychology, sociology, and experimental economics to develop hypotheses and test them in an empirical organizational setting. Following Weick's (1992) advice about theorizing, we analyze a particular empirical case in order to generalize to other settings (see Eisenhardt 1989). Our goal is to advance theorizing about generalized reciprocity by (1) developing a causal model with multiple mechanisms, (2) providing a critical test of hypotheses about key mechanisms that sustain generalized reciprocity, and (3) developing propositions about generalized reciprocity in organizations. We also contribute to management practice by linking mechanisms of generalized reciprocity to specific practices. We hope this study will stimulate new research and advance the theoretical and empirical understanding of generalized reciprocity in organizations.

Generalized Reciprocity

Generalized reciprocity is a form of prosocial behavior. Prosocial behavior is a broad class of costly actions performed to benefit others. This voluminous literature can be organized by level of analysis: the micro level focuses on why prosocial behavior emerged and evolved in the human species, the meso level considers helper–recipient dyads, and the macro level examines prosocial behavior that occurs in groups or organizations, such as volunteering (Penner et al. 2005). Direct reciprocity takes place at the meso level of prosocial behavior (*A* helps *B*, *B* helps *A*). Generalized reciprocity, however, takes place at the macro level because it requires at least a triad of actors (*A*, *B*, *C*). It occurs in two ways (see Figure 1). One way involves reputation: it occurs when *C* helps *A* because *A* helped *B*. If *A* does not help *B*, *C* will not help *A*. The other way is the pay-it-forward pattern: *A* helps *B*, which motivates *B* to help *C*. If *A* does not help *B*, then *B* does not help *C*. Note that generalized reciprocity has not occurred if *A* helps *B* but *C* does not help *A* or if *A* helps *B* but *B* does not pay it forward to *C*. Dyadic helping has taken place, but not generalized reciprocity. The triadic nature of generalized reciprocity has implications for identifying prior work that is relevant to our study. For example, the literature on prosocial behavior has a lot to say about helper–recipient dyads but not triads; similarly, reciprocity is a foundational concept

Figure 1 Illustration of Two Mechanisms of Generalized Reciprocity: Paying It Forward and Rewarding Reputation



Note. Adapted from Nowak and Sigmund (2005).

in organizational behavior and social exchange theory, but it almost always means direct reciprocity. Only studies that examine triads and third-party effects are relevant for understanding the mechanisms of generalized reciprocity.¹

In an organizational setting, generalized reciprocity is a type of OCB that involves at least three employees, as depicted in Figure 1. Paying it forward occurs when one employee helps a second employee, which motivates the second employee to help a third. Reputation-based reciprocity occurs when employees monitor one another's helping behavior and allocate rewards (helping employees who have helped others) or punishments (refusing to help unhelpful employees). Originally, OCBs were defined as discretionary, extra-role behaviors that benefit the organization but were not formally monitored or rewarded by the organization (Organ 1988). This definition evolved to include extra-role behaviors that are monitored and rewarded by the organization (e.g., Podsakoff et al. 2000, 2010). Hence, supervisors may view paying it forward and rewarding reputation as extra-role behaviors but nonetheless factor them into formal appraisals. In organizations, generalized reciprocity may not be as clearly discretionary as in the case of, say, aiding a stranded motorist (Baker 2012) or donating your kidney to a stranger because another stranger gave a kidney to your spouse or child (Roth et al. 2004). The distinction between extra- and in-role can be ambiguous. For example, employees vary in their perceptions of OCB as in- or extra-role behaviors (Morrison 1994), and “the demarcation between in-role and extra-role behaviors is further blurred by . . . organizational interventions” that alter how employees conceive of their work responsibilities (Coyle-Shapiro et al. 2004, p. 100). Overall, empirical evidence and criticisms led Organ (1997, p. 85) to revise his original definition: “It no longer seems fruitful to regard OCB as ‘extra-role,’ ‘beyond the job,’ or ‘unrewarded by the formal system.’” But a key distinction remains: OCB is not an enforceable job requirement with guaranteed rewards.

In organizations, people help others for multiple reasons, and we designed our procedures accordingly. For example, we used a formal participation quota, similar to the use of incentives to motivate sharing knowledge and helping others in organizations (e.g., Gray and Ranta 2010). Our

incentive makes helping others an enforceable requirement with guaranteed rewards. Note, however, that the incentive motivates *helping in general* but does not specify *whom to help*. Choice of whom to help is *discretionary*. Different strategies are possible. You could meet the quota by helping the same person multiple times, building a strong tie. You could help only those who helped you (direct reciprocity). You could reward reputation, helping those who helped others and refusing to help those who did not. You could pay forward help received. You could select recipients haphazardly. Once you met the quota, you could stop altogether or continue voluntarily. Our statistical analysis enables us to identify and evaluate the effects of paying it forward and rewarding reputation, controlling for the participation quota and many other factors.

We focus on mechanisms that *sustain* generalized reciprocity. We do not address the *emergence* of generalized reciprocity (the micro level of prosocial behavior) or its *outcomes*, such as social solidarity (e.g., Molm et al. 2007). In contrast, evolutionary biologists investigate the origins of generalized reciprocity, focusing on *ultimate causation*—the ultimate reason why generalized reciprocity emerged and evolved in the human species (e.g., Alexander 1987; Nowak and Sigmund 1998a, 1998b, 2005). Although there might be a single ultimate cause of generalized reciprocity, organizational studies search for *proximate* causes of phenomena—in our case, the mechanisms that sustain generalized reciprocity. A single explanation (e.g., ultimate cause) has the advantage of parsimony, but Blalock (1994, p. 129) argued that “a strong case can be made that if one wants theories that are simultaneously general in scope but also realistic in terms of their ability to explain variance, then parsimony will probably have to be sacrificed.” Since we want to develop a model that is both general in scope and able to explain variation in empirical behavior, we argue that multiple mechanisms (proximate causes) are necessary to explain how generalized reciprocity is sustained in organizations.

Paying It Forward

Paying it forward involves at least three actors (see Figure 1). For example, using survey data from diverse organizations, Deckop et al. (2003) found that an employee who received help from a coworker was more likely to pay it forward and give help to another employee. Economic experiments have documented paying it forward. Greiner and Levati (2005) arranged anonymous participants in three- or six-actor rings (cycles) and restricted monetary donations to one direction. Participants paid forward in proportion to what they received (see Dufwenberg et al. 2001). Güth et al. (2001) found that more money was donated and more money reciprocated when exchange was direct (*A* gives to *B*, *B* gives to *A*) than indirect (*A* gives to *B* who gives to *C*). Using computer simulations,

evolutionary theorists Nowak and Roch (2007) argued that paying it forward can promote cooperation if it is linked to direct or spatial reciprocity, but cooperation cannot evolve from this mechanism alone.

Why would a person pay it forward? The principle of direct reciprocity says that you should pay back a favor (e.g., Blau 1963, Greenberg 1980), not pay it forward by helping someone who did not help you. The classic definition of generalized reciprocity cites *obligation* as the reason for paying it forward: “An individual feels obligated to reciprocate another’s action, not by directly rewarding his benefactor, but by benefiting another actor implicated in a social exchange situation with his benefactor and himself” (Ekeh 1974, p. 48). However, the positive emotion of gratitude rather than obligation may explain paying it forward (McCullough et al. 2008). For example, Bartlett and DeSteno (2006) found that grateful recipients of help were more likely to respond to a third-party stranger’s request for help. DeSteno et al. (2010) found that grateful recipients of help gave more money to third-party strangers. Emotions are short-lived, however, so a grateful recipient must be “quickly confronted by another individual requesting exchange or assistance” (DeSteno et al. 2010, p. 293). However, Grant and Gino (2010) found that receiving an expression of gratitude for help given increased prosocial behavior over time: a person who had been thanked was more likely to respond to a request for help made a day later by a third party than one who had not received an expression of gratitude.

Moods are longer-term affective states that influence prosocial behavior. Regularly “counting one’s blessings” elevates and maintains positive mood over time (Sheldon and Lyubomirsky 2006) and promotes prosocial behavior. For example, people who kept a daily gratitude journal for two weeks were more likely to offer emotional support and give help to others compared with participants who recorded their hassles (Emmons and McCullough 2003). Positive mood increases prosocial behavior by lowering the perceived costs of helping and creating a more favorable view of others (e.g., Isen et al. 1976, Carlson et al. 1988). Similarly, according to the broaden-and-build theory (e.g., Fredrickson 2001), regular experiences of positive emotions over time broadens attention and cognition, builds enduring psychological resources, and promotes prosocial behavior over time (e.g., Fredrickson and Cohn 2008). Thus, we expect to observe paying it forward based on receiving help in the short term and long term.

HYPOTHESIS 1 (H1). *The more help a member of an organization has received from others in the short term or long term, the more likely the person will respond to a request for help made by another member (ceteris paribus).*

Rewarding Reputation

In a landmark treatise on the biology of moral systems, Alexander (1987) proposed that *reputation* gave rise to generalized reciprocity in the human species. Reputation is a person's history of actions toward others—specifically, how helpful the person has been to others in the same social system. Evolutionary theorists Nowak and Sigmund (1998a, b) called reputation a person's "image." Their view of image is analogous to the concept of "professional image" in organizations—how one's "competence and character" are viewed by others (Roberts 2005, p. 687)—but it focuses on character. Their view is also similar to the concept of "personal reputation" in organizations—"the extent to which individuals are perceived by others, over time, as performing their jobs competently and being helpful towards others in the workplace" (Zinko et al. 2012, p. 157)—but it focuses on helpfulness. Using computer simulations, Nowak and Sigmund (1998a, b) demonstrated that the strategy of rewarding reputation produces an evolutionarily stable system of generalized reciprocity. Economic experiments support the argument that rewarding reputation yields generalized reciprocity (e.g., Seinen and Schram 2006, Wedekind and Milinski 2000).

Rewarding reputation has not been tested empirically outside the laboratory, but practices in organizations such as international design firm IDEO are consistent with the strategy. IDEO designers with reputations for helpfulness are more likely to get help themselves compared with those who have not been helpful. Indeed, a designer's reputation is based on the quality of his or her product designs and "at least as much on using his or her skill to help others" (Hargadon and Sutton 1997, pp. 742–743). In situations where reputations for helpfulness are rewarded, people are motivated to help others so that they themselves will be helped in the future. They build reputations strategically with future self-benefit in mind. They are "good actors"—those who engage in OCB for reasons of impression management (Bolino 1999).

Despite evidence that rewarding reputation produces a system of generalized reciprocity, the theory has been criticized because refusing to help someone with a poor reputation harms one's own reputation and reduces the chances of getting help in the future. An alternative is a "standing strategy." A person loses good standing if he or she fails to help another person in good standing. But a person in good standing does not lose standing when refusing to help a person in bad standing. Mathematical models show that a standing strategy is superior to the strategy of rewarding reputation, but when tested in experiments, participants behaved in ways consistent with rewarding reputation and not consistent with a standing strategy (Milinski et al. 2001). A standing strategy is too cognitively demanding because it requires a potential helper to keep track of multiple orders of information (Milinski et al. 2001). Rewarding reputation, by contrast,

places fewer cognitive demands on a potential helper, who only needs to know the reputation of a potential receiver, not the reasons for the reputation.

Experiments on rewarding reputation (e.g., Wedekind and Milinski 2000, Seinen and Schram 2006) demonstrate short-term reputational effects (i.e., during the experimental session). However, personal reputations in organizations are built over time: "Reputations are formed through the consistent demonstration of distinctive and salient behaviours on repeated occasions, or over time" (Zinko et al. 2012, p. 157). And personal reputations have consequences over time, with good reputations resulting in more autonomy, power, and career success (Hargadon and Sutton 1997, Zinko et al. 2012). Hence, we expect to observe that short-term and long-term personal reputations are rewarded.

HYPOTHESIS 2 (H2). *The more a member of an organization has helped others in the short term or long term, the more likely it is that other members will respond to a request for help the person makes (ceteris paribus).*

Paying It Forward vs. Rewarding Reputation

Either paying it forward or rewarding reputation could sustain generalized reciprocity in an organization. Is one the main driver? Do both operate at the same time? These are key theoretical questions because these mechanisms are fundamentally different grammars of organizing (Weick 1979). Paying it forward means that helping others is driven by positive affect. Rewarding reputation, however, means that helping others is driven by strategic action and intentional reputation building. These two mechanisms have never been included in the same model and analysis. Prior work offers only a few clues to form a hypothesis. But these clues are consistent, suggesting that rewarding reputation should be more important. Reputation is the main focus of evolutionary theories (e.g., Alexander 1987), modeling (e.g., Nowak and Sigmund 1998a, b, 2005), and economic experiments (e.g., Milinski et al. 2001, Seinen and Schram 2006). Only one study includes both mechanisms (Boyd and Richerson 1989), but these are modeled separately. To the extent that paying it forward has been studied, the consensus seems to be that it is a weak force. For example, Nowak and Roch (2007, p. 605) call paying it forward a "misdirected act of gratitude" because a grateful recipient of help should return the favor to the benefactor. Similarly, DeSteno et al. (2010, pp. 292–293) called the effect of gratitude on paying it forward "incidental." Boyd and Richerson (1989) concluded that the practice of paying it forward can survive only in very small groups (much smaller than the ones we study). Therefore, we expect that rewarding reputation will be more important than paying it forward.

HYPOTHESIS 3 (H3). *Rewarding reputation has stronger and more lasting effects than paying it forward as a mechanism that sustains generalized reciprocity in an organization (ceteris paribus).*

Setting, Procedures, Data, Measures, and Methods

We conducted our study with working adults who were enrolled in a part-time evening MBA program at a large university in the United States, similar to the samples used in other organization studies (e.g., Bendersky and Shah 2012, Krackhardt and Stern 1988). Our data come from 125 participants in two concurrent sections, 60 and 65 individuals, respectively, of a required semester-long course on organizational behavior. For several reasons, working professionals enrolled in a part-time evening MBA course are well suited for our research question of what sustains generalized reciprocity in organizations. First, an evening MBA section is a formally organized group inside a complex formal organization (the business school and university). In general, organizational groups are diverse, varying across such dimensions as skill differentiation, authority differentiation, and temporal stability (Hollenbeck et al. 2012). For example, “short-term advice groups” are low on all three dimensions; “hierarchical decision-making teams” are high on all three (Hollenbeck et al. 2012). An MBA section is low on skill and authority differentiation but higher than a short-term advice group on the temporal dimension. These features are desirable for research because the relative lack of a differentiated role structure and status or power differences minimizes such confounding effects on helping behavior, and the group lasts long enough to capture data over time. In general, an MBA section is analogous to a “working group,” in which “members interact primarily to share information, best practices, or perspectives and to make decisions to help each individual perform within his or her area of responsibility” (Katzenbach and Smith 1993, p. 91) or a “community of practice”—a group of people who “share a concern, a set of problems, or a passion about a topic” and who interact on a regular basis (Wenger et al. 2002, p. 4).

Second, MBA courses begin as newly formed groups. Most participants did not know each other before taking the course, which minimized the confounding effect of preexisting ties. Evening MBA programs are known to be atomized; students have few preexisting relationships, especially compared with students in full-time MBA programs. Triadic network analysis of our data using SIENA did not show evidence of subgroup formation, which indicates that any preexisting ties did not systematically bias the results.

Third, tasks and consequences are real, measurable, and meaningful. The assignment that generated our data required individuals to cooperate with one another to achieve a real outcome that impacted their grades and how much tuition employers reimbursed (tied to course grades). Unlike a game or simulation (e.g., Krackhardt and Stern 1988), the assignment was an integral part of the course and presented to participants as a managerial intervention. Individual behavior was objectively monitored

and measured with an online system (described below). Participation was a course requirement, which is the norm for research in psychology and organizational behavior. Required participation increases the generalizability of our findings because organizations often use incentives to motivate behavior, including cooperating with and helping others. For example, at energy company ConocoPhillips, evidence of contributions to knowledge sharing and helping others is specifically linked to variable compensation (Gray and Ranta 2010). The formal course requirement incentivized helping in general, but, as noted above, the choice of whom to help was discretionary. Participants did not have to reward reputation or pay it forward either before or after meeting the quota.

Fourth, the composition of this part-time MBA population contributes to the generalizability of our findings. The average age of these working adults is 29 years. They have an average of 6.25 years of work experience after college in professional, technical, and managerial occupations. About 80% are male. This population is diverse, with 68% reporting their race as white, 26% Asian, 5% Hispanic, and 1% black. Thus, this population is similar to the composition of work organizations that are educated, experienced, male dominated, diverse, and in early to middle adulthood.

Fifth, the two groups were about the same size, were formed at the same time, and ended at the same time, enabling us to pool their data and enlarge the sample. This is often difficult or impossible to accomplish in other organizational settings because groups typically do not start at the same time and run for the same duration.

Procedures

Members of each section participated in an online system for three months. The online system was a custom-made website where participants could post requests for help and/or respond to requests made by others. Generalized reciprocity could occur without explicit requests for help, but we focus on them because helping behavior in organizations is often initiated by overt requests. For example, IDEO product designers are “expected to ask for help” when they need it (Hargadon and Sutton 1997, p. 740). Similarly, government auditors explicitly asked for help from colleagues (Blau 1963, pp. 127–131), employees at Tandem Computers explicitly asked for information and advice via the company’s intranet (Constant et al. 1996), and employees of a global firm initiated contacts and asked for help (Levine and Prietula 2012).

Each section had its own password-protected private site. Interactions between sections were not possible. Each participant set up a basic profile (e.g., name, title, place of employment) and simple preferences. These profiles were easily viewed by any member of the same section. After setting up a profile, a participant could then post a request. The entry for each request included the name of the requester, date, time, subject, and free-form text

with request details. All requests could be viewed as a list that could be sorted by name of requester, date, time, type, or subject. The first few lines of free-form text were visible, which could be expanded with a single click. The environment in which exchanges took place was transparent, as all actions could be seen by all participants in the same section.

At any time, a participant could respond to a request with a single click, which would bring up a free-form text box for entering response details. Each response was linked to a specific request and included the responder's name, the date and time of response, and content. A list of responses could be viewed by selecting an item on the main menu. This list could be sorted by name of responder, the date and time of response, and the first sentence of text. A participant would click on a specific response to read its details. Each request could receive multiple responses. A continuously updated ranking of participants was available via the home page, which showed each participant and his or her count of responses to others' requests. This count was a person's personal reputation.

We imposed an incentive in the form of a participation quota. Of a person's final course grade, 10% was based on meeting the quota: making 5 requests and 15 responses to others' requests by the end of the semester. We selected 10% to avoid being onerous, while still providing a real incentive. Ten points is the difference between two letter grades, which impacts the amount of tuition employers reimburse. Participants were informed that the online system would be closed at the end of the semester. By that time, those who had made at least 5 requests and 15 responses would have earned the 10 points; those who did not meet the quota would have earned a prorated number of points. Participants were informed that those who exceeded the quota would *not* receive additional credit. This course was graded according to an official grade distribution. All assignments were individual. The course did not have team projects, which mitigated the possibility of within-group reciprocity based on working together on a team assignment.

Data and Measures

Participation in the online system created behavioral data: a time-stamped record of acts of making requests and responding to requests. Most of our measures are derived from these behavioral data. These data are more accurate than self-reported data because they are not subject to recall errors that are likely to occur because of the high volume of transactions and study duration. Behavioral data avoid a self-serving bias (e.g., intentionally or unintentionally presenting a generous reputation by overreporting the number of responses one made) or social desirability (e.g., reporting gratitude because it is socially desirable to do so).

Dependent Variable. The unit of observation is the opportunity to respond to a request. Each participant is a potential responder to every request made in the participant's group. The dependent variable is participant i 's decision to respond or not respond to participant j 's request, where 1 = response and 0 = no response.

Independent Variables. *Responses received* is a count of the number of responses that a participant has received from all others at the point in time when another participant posts a new request. We measured responses received in four time windows. A time window is relative to the point in time when a new request is posted in the online system. "Recent responses received" is a count of responses the participant received in the seven days prior to the new request under consideration. "Intermediate responses received" is a count of the responses received 8–14 days and 15–30 days prior to the new request. "Past responses received" is a count of responses the participant received more than 30 days prior to the new request. *Reputation* is a count of the number of times a participant responded to requests made by others. Similar to the measures of responses received, we measure reputations in four time windows: 0–7 days, 8–14 days, 15–30 days, and 31+ days.

Control Variables. We include variables to control for alternative explanations and other factors that might influence the results. These variables also provide validity checks on the model. For example, direct reciprocity should occur in a real social setting such as ours because owing someone creates an uncomfortable feeling of indebtedness that should motivate paying back a benefactor (e.g., Blau 1963, Greenberg 1980). We control for direct reciprocity because a response to a request could be direct or indirect reciprocity. We include a dichotomous measure of indebtedness, where $owes\ requester = 1$ if participant i owes requester j at the time j makes a request and 0 if participant i does not owe the requester at that time. Participant i owes requester j if the total of j 's responses to i 's requests is greater than the total of i 's responses to j 's requests at the time of j 's request. Another indication of validity is behavior after meeting the participation quota. We specified a participation quota of 15 responses, which could be met at any time during the semester. Once met, we expect a decrease in the likelihood of a response. *Quota met* is a dichotomous variable, where 1 = the participant has met the quota for responses at the point in time when another participant posts a new request and 0 = the participant has not met the quota at that time.

Gender might influence the likelihood of responding to a request. Gender differences have been the subject of considerable debate and study (e.g., Croson and Gneezy 2009, Eckel and Grossman 2008, Eckel et al. 2008), but the evidence of behavioral differences between men and women has been inconsistent. In their review of economic

experiments, Eckel and Grossman (2008) did not find consistent evidence of behavioral differences, but they observed a pattern: in experiments where participants are exposed to risk of financial loss, exploitation, or the judgment of others, there are no systematic differences between the behaviors of men and women; in experiments where participants are not exposed to such risks, women behave in ways that are “less individually-oriented and more socially-oriented” (p. 518). Given that participants are exposed to these risks in the study, we do not expect gender differences in the likelihood of responding to a request. We include gender as a control variable, where *female responder* = 1 if potential responder is female and 0 = male. Homophily is a well-documented mechanism of network tie formation (e.g., McPherson et al. 2001) that might influence responding to a request. *Gender homophily* = 1 if the requester and potential respondent have the same gender and 0 otherwise. *Ethnic homophily* = 1 if requester and potential responder have the same ethnicity and 0 otherwise. *Program homophily* = 1 if the requester and potential responder are in the same program and 0 otherwise. (Most participants were in the evening MBA program, but some were from other programs.)

We include dummy variables for different types of requests because requests may vary by the cost, risk, and difficulty of responding. If so, then different types could influence the likelihood of a response. For example, some requests might ask for something that is rare or difficult to obtain. Responding to some types might take more time or effort than other types, and helping others can reduce the time and energy available for one’s own tasks (e.g., Bergeron 2007, Mueller and Kamdar 2011). Using an inductive process, we identified five types of requests. Two independent coders coded each request by type. *Advice* is an opinion about what should or could be done regarding a particular issue, problem, or situation. For example, one participant made this advice request: “Recently the sump pump in my house failed and the partially finished basement got wet. The carpet got soaked, but I managed to dry everything using fans and a dehumidifier. Since the carpet is now stained, I need advice on what to do next.” *Information* is knowledge, facts, or data about something or someone. For example, one participant asked, “At work we are redesigning our incentive plan. Does anyone have information regarding incentive plans?” *Online action* is a behavior or activity that takes place via e-mail or through the Web (e.g., “Would you take this online survey of consumer decision making? We are finalizing the survey at work, and I’m testing usability”). *Off-line action* is a behavior or activity that takes place face-to-face (e.g., “Hi all, I am preparing for CFA L1 in June. If someone is interested in joint study and/or discussion, review for the exam let me know”). Finally, a *referral* is a request to be connected to someone outside the group (e.g., “I would like an opportunity to meet with a Target store manager or local area director for one hour to discuss Target’s

strategies for growth, what has worked, what has not, etc.”).

We observed that specific requests seemed more difficult to respond to than general requests, that leisure requests were easier to respond to than nonleisure requests, and that including a salutation such as “Hi,” “Hi friends,” “Folks,” or “Dear” seemed to increase the likelihood of a response. Therefore, the two coders coded each request by specificity, leisure, and salutation. We collapsed specificity into two categories, where *specificity of request* = 1 if the request is among the 100 most general requests and 0 otherwise. An example of a general request is, “Does anyone have recommendations on places to go for a long-weekend ski trip? I’m looking for a place that combines great skiing, cool town, and reasonable price,” whereas an example of a specific request is, “I am going to Telluride, CO skiing and am looking for discounted lift tickets. I’ve tried searching online and haven’t come up with anything. I’m looking for two 4-day passes. Can you help?” *Leisure requests* is a dummy variable, where 1 = request is leisure related and 0 otherwise. *Salutation* is a dummy variable, where 1 = a requester included a salutation and 0 otherwise.² *Group* is a dummy variable, where 1 = the section with 65 participants and 0 = the section with 60 participants.

We tried many specifications for temporal effects, concluding that a simple approach worked best and allowed us to control for time effects. These controls account for differences in the likelihood of a response as a result of variation in the timing of requests. Specifically, we use seven dummy variables for *days of the week*, with Sunday as the omitted category. We use 13 dummy variables for *weeks* in the three-month duration of the study, with the last week as the omitted category. As robustness tests, we analyzed the possible effects of additional temporal measures (results available on request). For example, we included dummy variables for hour of the day, but most of these hourly controls were not statistically significant; these controls did not materially influence the main results. We included a variable for the duration of time between a new request and the previous request. This variable was not statistically significant.

Method

Our analysis considers the factors that influence the likelihood of a participant making a response to a request. In a sense, this is a network study of tie formation, where we estimate the probability that a tie forms between two participants when one responds to a request made by the other. Each time a new request is made in a group of size N , there are $N - 1$ potential responders to the request. Participants in the two groups made a combined total of 726 requests, which translates into 44,394 decisions made during the three-month period. Of these 44,394 decisions, about 5% resulted in responses. The nature of these data presents two potential problems for analysis. First, because

each participant can potentially respond to every request made in a group, each participant enters the data many times. Repeat occurrences create a potential problem because cases are not independent; not accounting for nonindependence could lead to systematic underestimation of the standard errors in the model. Second, a response to a request is a “rare” event. Logistic regression produces biased coefficients when the number of positive outcomes (ones) is far fewer than the number of negative outcomes (zeros) in the data—that is, when positive outcomes are rare events (King and Zeng 2001).

These potential problems can be addressed by adopting three strategies used in other organization studies with similarly structured data (e.g., Jensen 2003, Sorenson and Stuart 2001). (1) The nonindependence of cases associated with repeat occurrences is substantially reduced by using combined samples. This strategy recognizes that “realized ties” provide most of the information for estimating the mechanisms that influence the likelihood of a tie (Cosslett 1981, Imbens 1992, Lancaster and Imbens 1996, King and Zeng 2001). In our data, a “realized tie” occurs when one participant responds to another’s request. A recommended strategy for reducing potential problems of nonindependence (King and Zeng 2001) is to combine all realized ties and a 20% random sample of unrealized ties.³ (2) We use a variation of logistic regression explicitly designed by King and Zeng (2001) to analyze rare events and combined samples. It corrects for the underestimation of rare events and yields correct parameter and error estimates. Specifically, we used the Relogit procedure (Tomz et al. 2003) in Stata. Relogit does not generate fit statistics because maximum likelihood or a pseudo- R^2 are not meaningful for rare-events models (King and Zeng 2001, Tomz et al. 2003). (3) We calculate Huber–White robust standard errors because participants in the reduced data set still enter the data more than once. We compared the results of calculating Huber–White standard errors by clustering three different ways: by requester, by responder, and by dyad. The results are very similar, with no material difference from the results reported here.

Findings

Descriptive statistics and correlations are provided in Table 1. Table 2 presents logit coefficients and Huber–White robust standard errors for rare-events logistic models. Following the strategy described above, our models include the reduced sample (all realized ties and a 20% random sample of unrealized ties). Table 2 presents a base model (controls-only) and a model with all variables for both the reduced sample and full sample. Comparisons of models show that the results are robust and stable.

In two different groups, 125 participants made a total of 726 requests for help and 2,474 decisions to respond to requests during a three-month period. The average number

Table 1 Descriptive Statistics and Correlation Matrix

Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1 Response (DV)	0.056	0.230	0	1																			
2 Advice	0.478	0.500	0	1	0.032																		
3 Information	0.193	0.394	0	1	0.054	0.144																	
4 Referral	0.229	0.420	0	1	0.152	0.051	0.051																
5 Off-line action	0.101	0.301	0	1	0.015	0.056	0.051	0.051															
6 Online action	0.021	0.142	0	1	0.015	0.056	0.051	0.051	0.051														
7 Leisure request	0.208	0.406	0	1	0.032	0.144	0.051	0.051	0.051	0.051													
8 Specificity	0.099	0.299	0	1	0.054	0.152	0.058	0.105	0.031	0.052	0.139												
9 Salutation	0.199	0.399	0	1	0.015	0.056	0.004	0.008	0.099	0.025	0.077	0.071											
10 Own requester	0.122	0.328	0	1	0.021	0.023	0.004	0.022	0.013	0.000	0.007	0.001	0.001										
11 Quota met	0.322	0.467	0	1	−0.056	0.007	0.026	0.003	−0.041	0.005	−0.029	0.046	0.086	0.173									
12 Responses received 0–7 days	2.320	3.623	0	40	0.010	0.016	−0.003	−0.008	−0.012	0.000	0.002	0.000	−0.016	0.207	0.118								
13 Responses received 8–14 days	0.843	2.439	0	24	0.023	0.015	−0.010	−0.003	−0.007	0.008	0.006	−0.003	−0.012	0.105	0.135	0.157							
14 Responses received 15–30 days	1.774	3.745	0	47	0.013	0.009	0.004	−0.001	−0.018	0.007	0.007	−0.027	0.014	−0.023	0.193	0.283	0.115	0.068					
15 Responses received 31+ days	4.800	8.346	0	60	−0.005	0.025	0.023	−0.024	−0.039	−0.008	−0.023	0.054	−0.065	0.216	0.510	−0.015	−0.041	0.137					
16 Reputation 0–7 days	2.869	3.215	0	20	0.024	−0.043	−0.045	0.065	0.040	0.010	0.048	0.010	0.016	0.060	0.030	0.006	0.042	0.016	0.024				
17 Reputation 8–14 days	1.833	2.625	0	19	0.005	−0.002	0.014	−0.021	0.015	0.024	0.031	0.023	−0.001	0.075	0.080	0.039	0.010	0.046	0.042	−0.073			
18 Reputation 15–30 days	2.571	3.224	0	21	−0.002	0.070	−0.010	−0.048	−0.037	−0.011	−0.037	−0.021	0.055	0.106	0.087	0.054	−0.042	0.102	0.065	−0.181	0.047		
19 Reputation 31+ days	4.443	5.491	0	34	−0.035	0.077	0.024	−0.095	−0.026	−0.001	−0.077	0.025	−0.007	0.144	0.276	0.037	−0.057	0.054	0.258	−0.135	−0.012	0.194	

Notes. Included are all variables for paying it forward and reputation (12–19) and key control variables: quota met, types of requests, request characteristics, and direct reciprocity (own requester). Request characteristics 2–6 are a set of classification dummy variables; correlations are left blank because they are independent by design. Because of excessive length, the complete matrix is not shown but is available on request. The variables not shown here are time, demographics, and homophily. DV, dependent variable.

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Table 2 Parameter Estimates (Logit Coefficients) and Huber–White Robust Standard Errors from Rare-Events Logistic Regression of Likelihood of a Response to a Request by Responses Received (Paying It Forward), Reputation, and Other Factors

Variable	Model 1: Controls only with full sample	Model 2: Controls only with reduced sample	Model 3: All variables with full sample	Model 4: All variables with reduced sample
<i>Information</i>	−0.392*** (0.061)	−0.436*** (0.067)	−0.398*** (0.062)	−0.447*** (0.068)
<i>Referral</i>	−0.557*** (0.064)	−0.566*** (0.070)	−0.589*** (0.065)	−0.598*** (0.071)
<i>Off-line action</i>	−0.553*** (0.090)	−0.578*** (0.097)	−0.576*** (0.090)	−0.613*** (0.097)
<i>Online action</i>	1.762*** (0.116)	1.698*** (0.140)	1.771*** (0.116)	1.689*** (0.140)
<i>Leisure request</i>	0.245*** (0.050)	0.216*** (0.058)	0.218*** (0.051)	0.191** (0.058)
<i>Specificity</i>	0.467*** (0.062)	0.467*** (0.073)	0.457*** (0.061)	0.441*** (0.073)
<i>Salutation</i>	0.188*** (0.053)	0.173** (0.061)	0.193*** (0.054)	0.191** (0.062)
<i>Owe requester</i>	0.397*** (0.061)	0.502*** (0.070)	0.202** (0.067)	0.313*** (0.076)
<i>Quota met</i>	−0.575*** (0.069)	−0.561*** (0.072)	−0.805*** (0.073)	−0.801*** (0.080)
<i>Group</i>	0.113** (0.044)	0.102* (0.050)	0.112* (0.045)	0.083 (0.051)
<i>Monday</i>	0.162* (0.080)	0.074 (0.089)	0.143† (0.080)	0.045 (0.090)
<i>Tuesday</i>	0.326*** (0.077)	0.190* (0.087)	0.325*** (0.077)	0.167 (0.087)
<i>Wednesday</i>	−0.038 (0.080)	−0.102 (0.089)	−0.066 (0.080)	−0.133 (0.090)
<i>Thursday</i>	−0.079 (0.082)	−0.174† (0.091)	−0.082 (0.082)	−0.186* (0.091)
<i>Friday</i>	0.048 (0.081)	−0.012 (0.090)	0.024 (0.081)	−0.050 (0.091)
<i>Saturday</i>	0.339*** (0.092)	0.300** (0.104)	0.309** (0.092)	0.261* (0.105)
<i>Week 1</i>	0.330 (0.179)	0.452* (0.194)	0.489* (0.178)	0.642** (0.195)
<i>Week 2</i>	0.201 (0.174)	0.235 (0.188)	0.268 (0.174)	0.326 (0.189)
<i>Week 3</i>	0.034 (0.179)	0.128 (0.195)	0.012 (0.180)	0.126 (0.197)
<i>Week 4</i>	0.231 (0.179)	0.302 (0.193)	0.195 (0.179)	0.260 (0.195)
<i>Week 5</i>	−0.175 (0.204)	−0.006 (0.225)	−0.195 (0.205)	0.009 (0.227)
<i>Week 6</i>	0.003 (0.194)	0.072 (0.211)	0.015 (0.196)	0.083 (0.214)
<i>Week 7</i>	0.454* (0.183)	0.596* (0.201)	0.555** (0.184)	0.724*** (0.203)
<i>Week 8</i>	−0.004 (0.186)	0.173 (0.204)	0.101 (0.187)	0.310 (0.207)
<i>Week 9</i>	0.173 (0.171)	0.295 (0.187)	0.259 (0.173)	0.400* (0.191)
<i>Week 10</i>	0.111† (0.169)	0.234 (0.186)	0.120 (0.171)	0.284 (0.189)

Table 2 (cont'd)

Variable	Model 1: Controls only with full sample	Model 2: Controls only with reduced sample	Model 3: All variables with full sample	Model 4: All variables with reduced sample
<i>Week 11</i>	0.084 (0.170)	0.131 (0.188)	0.079 (0.173)	0.142 (0.193)
<i>Week 12</i>	−0.039 (0.176)	0.017 (0.193)	−0.041 (0.177)	0.045 (0.195)
<i>Female responder</i>	0.160** (0.051)	0.233*** (0.059)	0.134** (0.052)	0.191** (0.060)
<i>Female requester</i>	0.179** (0.053)	0.205** (0.061)	0.177** (0.053)	0.193** (0.061)
<i>Gender homophily</i>	0.006 (0.051)	0.039 (0.059)	0.019 (0.051)	0.048 (0.059)
<i>Ethnic homophily</i>	−0.019 (0.045)	−0.022 (0.050)	0.032 (0.045)	0.030 (0.051)
<i>Program homophily</i>	0.017 (0.066)	0.023 (0.076)	0.000 (0.067)	0.003 (0.076)
<i>Responses received 0–7 days</i>			0.010† (0.006)	0.010 (0.007)
<i>Responses received 8–14 days</i>			0.047*** (0.007)	0.042*** (0.009)
<i>Responses received 15–30 days</i>			0.032*** (0.005)	0.037*** (0.007)
<i>Responses received 31+ days</i>			0.021*** (0.003)	0.019*** (0.003)
<i>Reputation 0–7 days</i>			0.032*** (0.007)	0.032*** (0.008)
<i>Reputation 8–14 days</i>			0.012 (0.009)	0.018 (0.009)
<i>Reputation 15–30 days</i>			0.014* (0.007)	0.016* (0.008)
<i>Reputation 31+ days</i>			−0.021*** (0.005)	−0.021*** (0.006)
<i>Constant</i>	−3.096*** (0.178)	−1.545*** (0.196)	−3.310*** (0.181)	−1.760*** (0.202)
Observations	44,329	10,845	44,329	10,845

Notes. Omitted categories are advice, Sunday, and Week 13. Fit statistics are not reported because maximum likelihood or a pseudo- R^2 are not meaningful for rare-events models (King and Zeng 2001, Tomz et al. 2003). Robust standard errors are given in parentheses.

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (two-tailed tests).

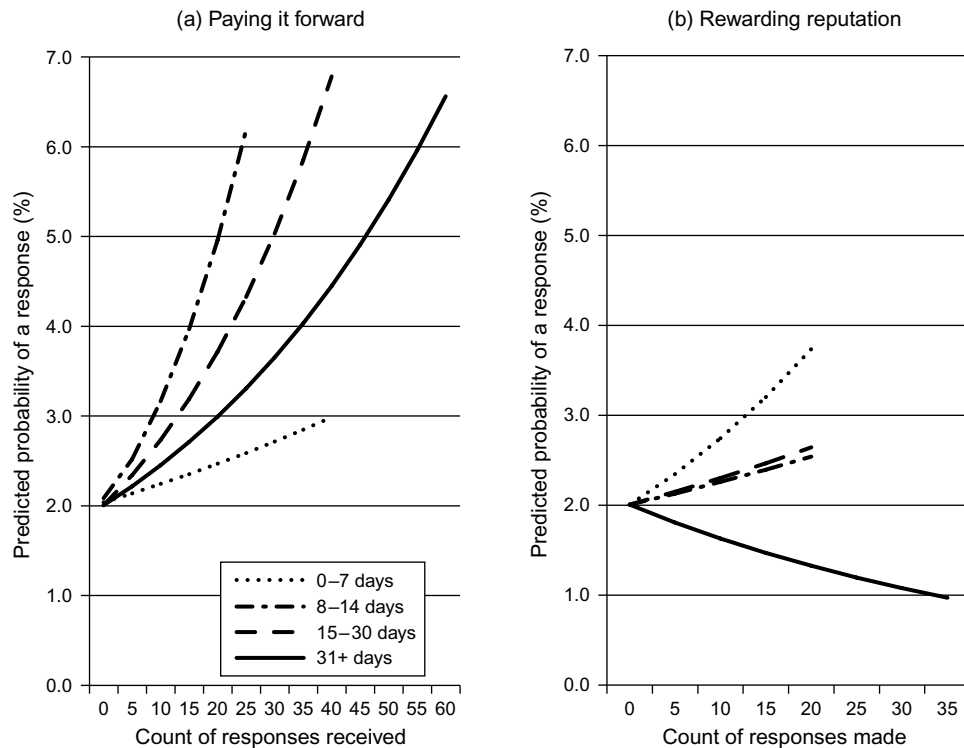
of requests per participant was 5.69, ranging from 1 to 12. The observed number of requests is 16% higher than would be expected if all participants had met the quota and stopped. The average number of responses is 19.34, ranging from 1 to 55. The observed number of responses is 32% higher than would be expected if all participants met the quota and stopped. Of the 125 participants, 85.6% continued to use the online system after they met the quota, 8 reached the quota and stopped, and 10 failed to reach the quota.

As shown in Table 2, the coefficient for responses received in the 0–7-day window is positive and marginally significant. In each of the other time windows (8–14 days, 15–30 days, and 31+ days), the coefficient is statistically significant and positive. The more responses received at just about any time, the higher the probability that a participant will respond to a new request, controlling for the quota, direct reciprocity, type of request,

demographics, homophily, and time. These results support H1. The magnitude of these effects, however, is not the same. Testing for differences between coefficients shows that the coefficient for responses received in the 0–7-day window is significantly smaller than the coefficients for the number of responses received in the two intermediate time windows, 8–14 days and 15–30 days ($p < 0.01$); it is not statistically different from the coefficient for responses received in the oldest window (31+ days). The biggest effect occurs in the 8–14-day window. The coefficient for this window is significantly larger than the coefficients for responses received in the 0–7-day and 31+-day windows ($p < 0.01$), but not from the coefficient for responses received in the 15–30-day window.

The coefficient for a participant's reputation in the 0–7-day window is significant and positive: the more responses a requester made (reputation) in the seven days prior to his or her request, the more likely others would

Figure 2 Predicted Probabilities of a Response to a Request: (a) Paying It Forward vs. (b) Rewarding Reputation, in Four Time Windows, Controlling for Other Factors



Notes. Predicted probabilities are calculated using the coefficients in Model 3 in Table 2 and descriptive statistics in Table 1. The horizontal axis in panel (a) represents a count of the number of responses a responder received, in four time windows, relative to the point in time when a request is made. The horizontal axis in panel (b) represents the requester's reputation (number of responses requester made), in four time windows, relative to the point in time when a request is made. Results displayed for each window range between the observed minimums and observed maximums. See text for details.

respond to the request, controlling for the quota, direct reciprocity, type of request, demographics, homophily, and time (see Table 2). The coefficient for reputations in the 8–14-day time window is positive but not statistically significant, whereas the coefficient for the 15–30-day window is significant and positive. The coefficient for reputation in the oldest time window is significant but negative: the higher the reputation in the 31+–day window, the less likely a requester will get help, holding constant other factors. Overall, these results support H2 for recent reputation and somewhat for intermediate reputation.

To test our hypothesis that rewarding reputation is stronger than paying it forward (H3), we compared the coefficients for reputations and responses received in each time window. The coefficient for reputations (0–7 days) is significantly larger than the coefficient for responses received in the same window ($p < 0.01$). However, the coefficient for responses received in each intermediate window (8–14 days and 15–30 days) is significantly larger than the corresponding coefficient for reputations. The coefficient for reputations in the 31+–day window is negative; the absolute size of the effect is not statistically different from the effect of responses received in the same window. The strongest effect for reputations (0–7 days)

is not statistically different from the strongest effect for responses received (8–14 days).

A visual comparison of the effects of these two mechanisms illustrates their differences. Using the equation in Table 2 and descriptive statistics in Table 1, we calculated and graphed the predicted probability of a response.⁴ Figure 2 displays predicted probabilities for responses received in each time window, and predicted probabilities for reputation in each time window, controlling for other factors. The length of each line corresponds to the observed range in each window. As shown, the mechanism of paying it forward has stronger and more lasting effects than the mechanism of rewarding reputation.

Several control variables permit a validity check of our model. As expected, participants who met the quota for responses were significantly less likely to respond to additional requests compared with participants who were under quota, controlling for other factors. Also as expected, we observed direct reciprocity: a participant was more likely to respond to a request if he or she owed the requester, holding other factors constant. However, only 15% of decisions to respond were instances of direct reciprocity, meaning that *A* owed *B* at the time *A* decided to respond to a request made by *B*. A female participant was

more likely than a male participant to respond to a request, suggesting that women did not perceive a substantial risk of financial loss, exploitation, or the judgment of others and therefore were “less individually-oriented and more socially-oriented” (Eckel and Grossman 2008, p. 518). A female requester is more likely than a male requester to get a response, holding other factors constant. None of the three forms of homophily is significantly related to the chances of a response. Homophily is common but does not occur in all settings. Finally, participants appear to consider costs, risks, and difficulty when they make decisions, consistent with Bergeron (2007) and Mueller and Kamdar (2011). Requests for information, referrals, or off-line actions were less likely to get a response compared with a request for advice, whereas a request for an online action was significantly more likely to get a response. Overall, the effects of the control variables support the validity of our model and analysis.

Discussion

What sustains generalized reciprocity in an organizational setting? Generalized reciprocity is an essential component of organizational social capital (e.g., Adler and Kwon 2002, Baker and Dutton 2007, Cross and Parker 2004, Levine and Prietula 2012), but its underlying theoretical mechanisms and dynamics are not well understood. We developed a causal model of the multiple mechanisms that may sustain generalized reciprocity in organizations and conducted the first critical test of two key mechanisms: paying it forward and rewarding reputation. Either mechanism could sustain a system of generalized reciprocity; either one could produce ongoing social networks of interlocked cooperative behaviors that benefit individuals and the organization. But they are fundamentally different grammars of organizing (Weick 1979) with different logics, patterns of interaction, motivations, and (as discussed below) management implications. Paying it forward is a type of OCB that dictates “help others if you have been helped.” Paying forward help received is not contingent on observation by third parties and does not involve consideration of future self-benefit. Rather, it may be motivated by the affective state of the person who pays help forward (e.g., DeSteno et al. 2010). In contrast, rewarding reputation is a type of OCB that dictates “help those who have helped others.” It implies that people help one another when they are observed by third parties. Third parties are disciplinarians, rewarding reputations for helpfulness and punishing reputations for unhelpfulness. What looks like prosocial citizenship behavior (helping others at a cost to self) may be motivated by the anticipation of future self-benefit.

Paying it forward and rewarding reputation could be competing or complimentary mechanisms. One could “crowd out” the other, but both could operate in the same organization. Indeed, the same person could apply both

principles, rewarding those with reputations for helpfulness *and* paying forward help received. It is convenient to classify people into “egoists” or “altruists” (e.g., Simpson and Willer 2008), but in organizations most people have mixed motives that influence generalized reciprocity (Baker 2012). Correspondingly, we find evidence of both mechanisms.

The mechanism of paying it forward operates in our organizational setting. Consistent with experiments on paying it forward (e.g., Greiner and Levati 2005) and third-party effects of gratitude (e.g., DeSteno et al. 2010), we found that the more help a person received, the likelier the person would be to respond to a new request made by someone else, controlling for formal incentives, recipient’s reputation, direct reciprocity, type of request, demographics, homophily, time, and other factors. Participants paid forward help received *at any time*. Help received in the short, intermediate, and long terms motivated prosocial behavior. These patterns suggest that participants pay it forward by using a simple rule: “What has the group done for me?” Paying forward help received at any time is consistent with the argument that both positive emotions and positive mood motivate prosocial behavior (e.g., Bartlett and DeSteno 2006, Carlson et al. 1988, DeSteno et al. 2010, Isen et al. 1976, Sheldon and Lyubomirsky 2006). Gratitude stimulates paying it forward when “quickly confronted” by another person who requests help (DeSteno et al. 2010, p. 293), and positive mood borne from reflecting on benefits received over time (regularly “counting one’s blessings”) promotes prosocial behavior over time (Emmons and McCullough 2003, Fredrickson 2001, Fredrickson and Cohen 2008, Sheldon and Lyubomirsky 2006). The practice of paying it forward may be (relatively) independent of organization size. Unlike a reputational mechanism, which gets exponentially more complicated as size increases, keeping track of help received should not become more complicated in large groups. Overall, these findings suggest our first proposition, noting that the second phrase generalizes beyond our data.

PROPOSITION 1. *The practice of paying it forward based on help received at any time sustains generalized reciprocity in organizations, regardless of organization size.*

The mechanism of rewarding reputation also operates in our organizational setting. Consistent with qualitative studies of organizations (e.g., Hargadon and Sutton 1997), economic experiments (e.g., Seinen and Schram 2006, Wedekind and Milinski 2000), evolutionary theory (e.g., Alexander 1987), and computer simulations (e.g., Nowak and Sigmund 1998a, b), participants took personal reputation into account when they decided whether to help someone, controlling for formal incentives, responses received, direct reciprocity, type of request, demographics,

homophily, time, and other factors. However, rewarding reputation was limited mainly to *recent* reputation. Reputation effects decayed thereafter and actually turned negative for past reputation. We did not expect this negative effect, but a plausible explanation is that a “good citizen” or “good soldier” (Bolino 1999) is considered to be someone who regularly helps others. An old reputation for helpfulness is viewed negatively, holding constant recent and intermediate reputations (and other factors).

Overall, these patterns suggest that participants reward reputation mainly by using a simple rule: “What have you done for us lately?” They may do so because keeping track of reputation is cognitively demanding in large groups. As discussed above, rewarding reputation is not mathematically superior to a standing strategy, but participants rely on it because a standing strategy demands “too much working memory capacity” (Milinski et al. 2001, p. 2495). However, rewarding reputation itself can be difficult. Consider the cognitive demands implied by Alexander’s (1987, p. 85) argument that generalized reciprocity based on reputation requires that “everyone in a social group [is] continually being assessed and reassessed by interactants, past and potential, on the basis of their interactions with others.” In groups as large as ours, such monitoring may be too taxing, because it requires everyone to keep track of what everyone else does, over time, and compare their rates of helping. Instead, participants rely on recent reputation as a cognitive shortcut when deciding whom to help. In larger organizations, making decisions based on intermediate or past reputation would be even more difficult, and participants would be even more likely to rely on recent reputation. Overall, the findings about reputation suggest our second proposition, noting that the second statement generalizes beyond our data.

PROPOSITION 2. *Rewarding recent reputations for helping sustains generalized reciprocity in organizations. As organization size increases, members increasingly rely on the cognitive shortcut of recent reputation.*

Contrary to expectations, paying it forward was more important than rewarding reputation. This is especially noteworthy, given that paying it forward is expected to survive only in groups much smaller than ours (Boyd and Richerson 1989). Participants may pay forward help received because it is cognitively undemanding to do so. The sole requirement is that a participant be aware of his or her own experience, which is simpler and more salient than observing others and keeping track of what they do. At a deeper level, the observed importance of paying it forward gives weight to what McCullough et al. (2008, p. 283) observed was a speculative “evolutionary hypothesis that gratitude evolved to stimulate not only direct reciprocal altruism” [i.e., direct reciprocity], but it also evolved to stimulate the practice of paying it forward. As McCullough et al. noted, Nowak and Roch (2007) concluded from computer simulations that gratuitous

acts of paying it forward can enhance fitness. If so, said McCullough et al. (2008, p. 284), “then Bartlett and DeSteno’s (2006) finding that gratitude increases people’s willingness to help third parties may not be the ‘incidental effect’ that Bartlett and DeSteno (2006) presumed, but rather, an intrinsic part of gratitude’s adaptive design.” In other words, gratitude may be “an adaptation for altruism” (McCullough et al. 2008). In their directions for future research, McCullough et al. (2008, p. 284) said that the Nowak–Roch model “needs fuller attention.” We do that here by developing a causal model that includes the mechanism of paying it forward and testing empirically the operation of this mechanism in the presence of the reputational mechanism and other factors. Overall, the evidence leads to our third proposition.

PROPOSITION 3. *Generalized reciprocity in organizations is sustained more by the mechanism of paying forward help received than by the mechanism of rewarding personal reputations for helpfulness.*

Paying it forward is more important than rewarding reputation, but they are complimentary mechanisms—something that can be seen only when both mechanisms are in the same model. When people began participating, they started to build personal reputations, even if they were not strategic about it. Those with reputations for recent generosity were more likely to get help. When people are rewarded for generosity, they increase their helping behavior; when they are rewarded for *recent* generosity, they are more likely to participate on a regular and current basis. As participants increase their helping behavior, their reputations improve, and they get even more help. Similarly, as group members developed a history of helping one another, more and more of them had reasons to feel grateful and to reflect on benefits received, paying it forward as a result. Paying it forward improves reputations and increases the probability that participants will get responses to their own requests; when they get more help, they pay it forward even more, improving their reputations again. Over time, rewarding reputation and paying help forward may have created a virtuous cycle of cooperation. The fact that almost 9 of 10 participants continued to use the system after reaching the quota suggests that a “tipping point” may have been reached. If it had not, then a vicious cycle might have ensued, and cooperation would have plummeted.

Our study makes several contributions. We contribute to theory and research on prosocial behavior at the macro level of groups and organizations (Penner et al. 2005) by introducing and developing the concepts of paying it forward and rewarding reputation as triads of actors who give and get help. Research on prosocial behavior has favored the meso level of helper–recipient dyads. But triads, not dyads, are the building blocks of social networks (Wasserman and Faust 1994). We argue that triadic interactions over time, driven by positive affect

and reputational concerns, sustain prosocial behavior in organizational groups. Similarly, we contribute to work on OCB by introducing and developing an explicit focus on triads. Helping others is a widely recognized type of OCB (Podsakoff et al. 2000), but it almost always refers to helper–recipient dyads (cf. Deckop et al. 2003). Generalized reciprocity, in contrast, requires at least three organizational members and involves two different mechanisms of organizing (paying it forward and rewarding reputation).

Our study contributes to social exchange theory by offering an additional solution to the “collective action problem unique to work on social exchange”—the conflict between group and self-interest (Cook and Rice 2003, p. 69). Extant studies of this problem all point to the importance of monitoring, reputation, and accountability (Cook and Rice 2003). In other words, rewarding reputation is the solution to the collective action problem. However, we found that paying it forward is a stronger and more lasting mechanism. Hence, the practice of paying it forward based on positive affect may be another way to address the collective action problem. We observed both mechanisms in our setting, so perhaps they work in tandem to resolve the conflict of group and self-interest.

We contribute to the growing field of positive organizational scholarship (POS). POS is a large tent covering micro, meso, and macro approaches to the study of “processes, dynamics, perspectives, and outcomes considered to be positive” (Cameron and Spreitzer 2012, p. 2). However, most work is at the micro and meso levels, which prompted Spreitzer and Cameron (2012, p. 1040) to issue a call for more research and theorizing on the “O” in POS, where “O” focuses on behaviors that are central to organizing processes and dynamics (Heath and Sitkin 2001, Weick 1979). Our study provides new insights into the dynamics of “give and take” (Grant 2013), showing that the “positive” mechanism of paying it forward is more important than the mechanism of rewarding reputation and the self-interested strategic action it entails. Generalized reciprocity has been identified as a component of “positive social capital” in organizations (Baker and Dutton 2007), and we show how positive processes may help to sustain it.

Finally, our study may have something to offer to evolutionary biologists. Evolutionary biologists are concerned with ultimate causation—the micro level of prosocial behavior (Penner et al. 2005). Our study focuses on proximate causes. Nonetheless, “[p]roximate and ultimate viewpoints do inform each other” (de Waal 2008, p. 280). For example, we expected to observe the mechanism of rewarding reputation as a proximate cause partly due to theory and simulations that identified reputation as a likely ultimate cause of cooperation (e.g., Alexander 1987; Nowak and Sigmund 1998a, b). The importance of paying it forward suggests that positive affect may be worth reconsidering as an ultimate cause. If gratitude is an

adaptation for altruism (McCullough et al. 2008), perhaps positive affect and reputation coevolved and together account for the emergence of cooperation.

Management Implications

Generalized reciprocity can be facilitated by implementing practices, procedures, and systems that activate the mechanisms in our model. Informal practices, such as IDEO’s “brainstorming” and “Monday morning” meetings (Hargadon and Sutton 1997), encourage reciprocity by making visible and enforcing norms of asking for help, giving help, and reciprocating help. Such meetings should be frequent and regular because people rely on recent reputation. OCB is discretionary, but supervisors can factor it into performance evaluations (e.g., Podsakoff et al. 2000). Supervisors can use symbolic or financial rewards to recognize employees who help helpful others.

Gratitude is a “benefit detector” (McCullough et al. 2008, p. 281). Gratitude can be heightened by practices that make generous acts more salient and known by more others. For example, Southwest Airlines gives “agent of the month awards” to recognize those who help others succeed (Gittell 2003). Zingerman’s, a world-renowned family of food-related businesses, has created a “culture of positive appreciation” in which acts of generosity and expressions of gratitude are recognized and communicated to others, such as publication in the staff newsletter (Weinzweig 2010, pp. 202–217). Every meeting ends with a round of verbal appreciations for those in the meeting or elsewhere in Zingerman’s. Google uses a peer-to-peer bonus system that empowers employees to express gratitude and reward helpful behavior with token payments. This system includes a pay-it-forward component: a recipient of a peer-to-peer bonus is given additional funds that may only be paid forward to recognize a third employee.

Collaboration technologies facilitate generalized reciprocity in organizations (Baker and Dutton 2007, Constant et al. 1996). Large companies overcome the barriers of distance, time, and organizational silos with online communities (Levine and Prietula 2012, McDermott and Archibald 2010). At ConocoPhillips, more than 13,000 colleagues belong to at least one knowledge-sharing community in which they post and respond to requests for help around business problems (Gray and Ranta 2010). Since 2004, over \$100 million in cost savings and additional value have been realized. To facilitate referrals, ConocoPhillips’ community managers cultivate the norm of forwarding requests to knowledgeable colleagues. Like other organizational interventions that blur the lines between in-role and extra-role behavior (Coyle-Shapiro et al. 2004), ConocoPhillips links knowledge sharing and variable compensation, but employees also voluntarily use the system.

Limitations and Future Research

Our model captures key mechanisms theorized to sustain generalized reciprocity, along with control variables for

other factors that might influence helping others. We did not measure individual differences beyond demographic and program variables, though a small but growing stream of research focuses on how *other orientations*—“the dispositional tendency to be concerned with and helpful to other persons” (Meglino and Korsgaard 2004, p. 948)—influences cooperation. Korsgaard et al. (2010) showed that other orientations influence *direct* reciprocity. Other orientations may influence generalized reciprocity as well. Our participants varied their behavior in ways that were consistent with paying it forward and rewarding reputation, but future research might find that individual differences moderate the effects these mechanisms.

We chose an organizational context in which the potentially confounding effects of differences in status and power were minimal. Future research should examine generalized reciprocity in organizations characterized by high-skill differentiation, high-authority differentiation, and temporal stability (Hollenbeck et al. 2012). We noted that, in organizations, generalized reciprocity may not be as clearly discretionary as in the case of aiding a stranded motorist or donating a kidney to a stranger. Making explicit requests for help is common in organizations but may be less so in other social settings. In organizations, the distinction between extra-role and in-role can be ambiguous, and employees vary in their perceptions of OCB as in-role or extra-role behaviors (e.g., Coyle-Shapiro et al. 2004, Morrison 1994). Our findings may be generalized to other organizations, but future research would determine the extent to which they can be generalized in nonorganizational settings.

We argued that positive affect—positive emotions and mood—motivated recipients of help to pay it forward and help third parties, consistent with prior work on positive emotions, mood, and prosocial behavior (e.g., Bartlett and DeSteno 2006, DeSteno et al. 2010, Fredrickson and Cohen 2008, McCollough et al. 2008, Sheldon and Lyubomirsky 2006). However, we used a behavioral measure (responses received) as a proxy and did not directly measure positive affect. Various methods exist for collecting self-reported and non-self-reported data on emotions and mood, but none is practical or feasible given the sheer volume of measurements that would be required in our study. Thus, an area of future research is to devise ways to reliably and validly measure positive affect in large-scale longitudinal studies.

Preexisting ties, which in our organizational context might be formed by taking courses together, having the same employer, or belonging to the same extracurricular clubs, could influence patterns of helping. As noted before, however, preexisting ties are not common in part-time evening MBA programs, which are known for their atomized student populations. Indeed, network analysis of our data using SIENA did not show evidence of subgroups, indicating that any preexisting ties did not systematically bias the results. Nonetheless, future

research could collect network data at the beginning and end of a longitudinal study to evaluate and control for potential confounding effects.

As in other organizational contexts, we used a formal incentive: a participation quota. This quota motivated helping in general, but the choice of whom to help was discretionary. Participation after meeting the quota was voluntary and almost 9 of 10 elected to continue. The effect of formal incentives on generalized reciprocity is a fruitful area of future research, with designs ranging from no formal incentives at all through various combinations and types of incentives. Future research could determine how different incentives influence generalized reciprocity in organizations.

Conclusion

Reciprocity is a universal principle, a part of all moral codes, central to the concept of social exchange, and essential for organizational social capital. We examined generalized reciprocity in an organizational context, drawing on diverse literatures in the social, organizational, and biological sciences to develop hypotheses about the multiple mechanisms that sustain generalized reciprocity. By doing so, we conducted the first critical test of two key mechanisms: paying it forward and rewarding reputation. Paying it forward is a type of OCB that occurs when members of an organization help third parties because they themselves were helped. Positive affect drives the practice of paying it forward. Rewarding reputation is another type of OCB that occurs when peers in an organization monitor one another's helping behavior and reward reputations for helpfulness and punish reputations for unhelpfulness. This reputation-based form of generalized reciprocity is driven by self-interest and strategic action.

We tested hypotheses with reliable and accurate large-scale behavioral data collected from two organizational groups over a three-month period. We found that generalized reciprocity was sustained by the practice of paying it forward *and* by peer-monitored, peer-rewarded reputation, controlling for formal incentives, direct reciprocity, type of request, demographics, homophily, time, and other factors. Contrary to expectations, we found that the mechanism of paying it forward had stronger and more lasting effects than the mechanism of rewarding reputation. Participants paid forward help received at any time, recently or in the past. Paying help forward is cognitively undemanding; all it requires is that each person be aware of and keep track of his or her own experience. In contrast, rewarding reputation is cognitively demanding, especially in groups as large as ours, because it requires everyone to observe everyone else, keep track of what everyone does, and compare rates of helping. Therefore, participants relied mainly on recent reputation as a cognitive shortcut. At a deeper level, the observed importance of paying it forward supports the speculation that gratitude may be

“an adaptation for altruism” (McCullough et al. 2008). Paying it forward may be an additional solution to the collective action problem caused by the conflict between group-interest and self-interest (Cook and Rice 2003).

Following Weick’s (1992) advice about theorizing, we analyzed a particular empirical case to generalize to other settings. We used the empirical findings to develop three propositions about the mechanisms that sustain generalized reciprocity in organizations. These propositions provide a road map for the study of generalized reciprocity in other organizations. Our model can be used to guide future research that will further the theoretical and empirical understanding of generalized reciprocity in organizations. This research would refine and elaborate our model, and it would uncover other mechanisms that may be alternative, additional, or complimentary explanations of generalized reciprocity. Finally, we linked our results to specific management practices that can strengthen organizational social capital by elevating the practice of generalized reciprocity.

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Endnotes

¹Evolutionary biologists have theorized about generalized reciprocity and we draw on their work here. Note, however, that biologists use different terms. Generalized reciprocity is known as “indirect reciprocity” (e.g., Alexander 1987). Paying it forward is called “upstream reciprocity” (Nowak and Roch 2007) or “upstream tit-for-tat” (Boyd and Richerson 1989). Rewarding reputation is called “downstream reciprocity” (Nowak and Sigmund 2005) or “downstream tit-for-tat” (Boyd and Richerson 1989).

²The controls for type, specificity, leisure, and salutation have statistically significant effects on the likelihood of a response (see Table 2). These controls also provide validity checks on our model. However, our main results for paying it forward and rewarding reputation are not dependent on the controls. We ran a model without the controls and found that it gave substantively identical results to those reported here.

³As an additional way of addressing concerns about potential nonindependence, we conducted a sensitivity analysis by drawing 100 samples (all realized ties plus a 20% random sample of unrealized ties) and rerunning the analysis on each combined sample. The results from this analysis give us confidence in the results we report here. We also used the 100 combined samples

to compare parameters (coefficients) for the time windows that we report here. We found that statistically significant differences between 8–14-day and 15–30-day windows for responses received occurred somewhat less often in the reduced sample runs compared with results from the full sample; otherwise, the results were similar. This difference has no substantive effect on the interpretation of the results. When comparing coefficients, we report full sample comparisons and can provide our sensitivity analyses of the reduced sample comparisons upon request.

⁴The coefficients in Table 2 are log odds ratios, which can be expressed as odds ratios or probabilities. To assess the magnitude of the effect of recent responses received, we first calculated the predicted probability of a response when the count of responses received in the 0–7-day window was zero, with the other variables set as follows: the participation quota has been met, the potential responder does not owe the requester, the request was for advice (the most common request), it was made in the middle of the week, the request was made in the middle of the three months (Week 6), the requester and potential responder were both male, and the only type of homophily that occurred was gender. The other three variables for responses received are set to their means; all four variables for reputation are set to their means. Next, to calculate the predicted probability of a response when the count of responses received was greater than zero, we made the same calculation but set responses received to five. We repeated this second calculation for responses received by increments of five until we reached the maximum observed count of responses received for the time window. For ease of interpretation, all predicted probabilities are based on Model 3 in Table 2.

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