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# Structure, Identity, and Solidarity: A Comparative Field Study of Generalized and Direct Exchange

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## Abstract

Here we propose an account of the link between exchange structure and the emergence of solidarity capable of accounting for the conflicting evidence social scientists have found regarding the relationship between social exchange structures and the emergence of intangible, affectively laden group sentiments. We argue that benefits received through exchange foster group identification and solidarity but that this effect is stronger in generalized exchange systems—in which giving and receiving of resources occurs unilaterally among three or more individuals—than direct exchange systems—which feature reciprocal transfers of resources between two people. At low levels of benefit to recipients, generalized and direct exchange systems will produce similarly low levels of group identification. At high levels of benefit, however, generalized exchange will result in relatively higher levels of identification. Higher levels of identification leads individual members in turn to view the group as higher in solidarity. We find support for this mediated moderation model in two survey-based case studies of organizations designed to facilitate these forms of exchange: one of Freecycle, a large-scale, online generalized exchange system, the other of Craigslist, a comparable direct exchange system. The results further suggest that generalized exchange is likely to emerge where a critical mass of exchange benefits creates positive sentiments toward the group, sentiments that help fuel further contributions in the exchange system.

**Keywords:** solidarity, social exchange, group identification, generalized exchange

Many organizations are founded, designed, and managed in ways that are intended to facilitate the exchange of resources (Blau, 1964; Williamson, 1975). Noting this, both organizational scholars and practitioners are interested in

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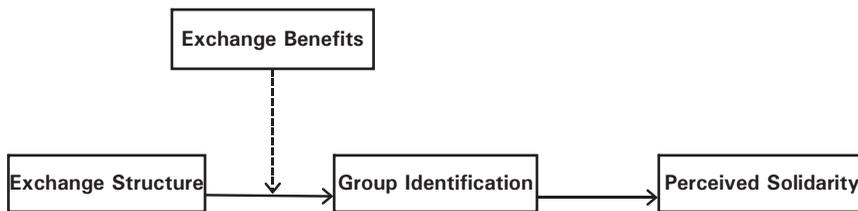
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understanding the dynamics by which forms of exchange can generate tangible rewards while also producing the greatest social harmony. In recent years, this question has drawn renewed interest, although researchers disagree about the answer. Some scholars have asserted that generalized exchange, which is a form of exchange typified by unilateral rather than directly reciprocal resource sharing, generates stronger feelings of solidarity than direct exchange (Molm, Collett, and Schaefer, 2007). Other scholars have argued that direct exchange generates more cohesion (Lawler, Thye, and Yoon, 2008). Here we advance a new explanation of this relationship, one that accounts for prior findings while specifying the intervening processes linking exchange structure and solidarity.

First, we argue that the link between exchange structure and group solidarity operates through an intervening process of group identification. According to social psychologists, individual feelings of identification are strengthened by the perception that group membership is valuable and beneficial to the self (Tajfel, 1972). For individual actors involved in the exchange of resources, the immediate effect of receiving benefits through an exchange system is to identify more with the group, to view themselves in part as valued group members. Once group identification is sparked through the receipt of benefits, it will give rise to more positive views of the group as cohesive and united—perceptions of the group as high in solidarity.

Further, we argue that the link between exchange benefits and the emergence of group identification depends on the exchange structure through which those benefits are received. Benefits received through generalized exchange have a stronger impact on individuals' views of and feelings toward the group than direct exchange in which individuals or dyads are more likely to be seen as the source of benefits. Thus identification and solidarity should be low when generalized and direct exchange systems provide little to no benefit. In relatively productive systems in which exchange benefits are high, however, generalized exchange is likely to create relatively higher levels of identification and solidarity because the group is viewed as the source of benefits more so than in direct exchange systems. In short, the effect of exchange structure on positive group sentiments is moderated by the level of exchange benefits, an explanation that helps account for the contradictory results of past studies of the link between exchange structure and solidarity, which have varied in the levels of benefits generated by the generalized exchange systems studied (Molm, Collett, and Schaefer, 2007; Lawler, Thye, and Yoon, 2008).

Figure 1 summarizes our arguments, depicting both the moderating and mediating processes we theorize. This theoretical account offers a novel perspective on the dynamics by which receiving benefits exchange can give rise to different views of and sentiments toward the group in which the exchanges occur. Receiving benefits through structures of exchange can compel individuals to identify as group members, in turn leading those individuals to hold positive perceptions of the group as cohesive and solidary. Further, this relationship is likely to vary by the level of exchange benefit, with generalized exchange structures fostering greater identity and solidarity than direct exchange structures at high levels of benefit. This argument links phenomena at multiple levels to shed new light on a decades-old problem from research on social exchange. We test this theory in large-scale, survey-based field studies of Freecycle, which features generalized exchange, and Craigslist, which features direct exchange.

**Figure 1. Diagram of theoretical argument.**

## STRUCTURE, IDENTITY, AND SOLIDARITY

### Generalized and Direct Exchange

Generalized exchange refers to the indirect giving and receiving of benefits among three or more people who belong to the same group, organization, or network (Malinowski, 1922; Ekeh, 1974; Yamagishi and Cook, 1993; Bearman, 1997). In generalized exchange, benefits received by B from A are not directly reciprocated through B's giving back to A, as they would be in direct exchange. Rather, benefits are indirectly repaid—by A giving to another actor, C. Though the mechanisms sustaining generalized exchange systems appear enigmatic to many social scientists, everyday examples are common and often spontaneously emerge, including academic journal reviewing, blood donation, "secret Santa" gift giving, academic mentoring, the "Kula ring," flashing bright lights on the highway to warn of a police trap, and so on. Everyday examples of generalized exchange in modern organizations are common and often spontaneously emerge, including online file sharing, open-source software programming, peer-to-peer mentoring, and so on. Moreover, a variety of organizations have emerged whose sole purpose is to facilitate generalized exchange, including Freecycle, Couchsurfer, and Kinded.com.

The two most commonly studied forms of generalized exchange are "chain" and "net" (Ekeh, 1974). Chain generalized exchange follows a circular pattern, in which benefits move in one direction among a group of actors (e.g., Malinowski, 1922). Benefits must be passed along by each party in the system before the original giver can receive reciprocation (see Bearman, 1997). Net generalized exchanges can be reduced to dyadic transactions between an individual and a group. The onus of making a contribution toward the group's objective moves from one individual to the next (e.g., the development of open-source code; Cheshire, 2007).

Here, we study a system of generalized exchange in which person-to-person giving follows no specific pattern, what Takahashi (2000) referred to as a system of "pure" generalized exchange. In each transaction, one individual makes a contribution to another without expectation of direct recompense. Indirect reciprocation may be received, but people offer benefits unilaterally without knowing when, from whom, and in what form such indirect reciprocation may come. Unlike other forms of generalized exchange, contributors can choose their recipients. Compared with many generalized exchange systems studied in the past (e.g., Yamagishi and Cook, 1993), the process of giving and receiving benefits in this system follows a less patterned structure.

Unlike generalized exchange, direct exchange refers to the transfer of resources within a dyad. Researchers have identified two distinct structures of

direct exchange: negotiated and reciprocal. In negotiated exchange, the transfer of resources between actors is simultaneous. In reciprocal exchange, some delay occurs between unilateral transfers of resources between members of a dyad, thereby requiring direct reciprocity. Examples of direct exchanges are more typical than examples of generalized exchange, including purchasing an item, trading goods, turn-taking, and various forms of dyadic favor-trading. Here, we focus on a system of negotiated, direct exchange (rather than reciprocal exchange) wherein the choice of exchange partner is facilitated, the trading of resources is heavily structured, and the obligation to provide payment is explicit.

### The Link between Exchange and Solidarity

Claims about the effects of exchange structure on solidarity are rooted in both classical sociology and structural anthropology. Durkheim (1933) pioneered the social structural explanation of group solidarity, seeking to establish how intangible feelings of group cohesion emerged from the arrangement and type of social relations. According to Durkheim, the interdependence fostered by distinct, individual contributions to the group and its members undergirded "organic solidarity," a form superior to "mechanical" solidarity, based on mere similarity among group members. Later, Mauss (1990) extended this analysis of the structural origins of solidarity to the role of resource transfers, arguing that gift giving fosters enduring relationships by instigating obligations and reciprocity. While some scholars have emphasized how networks of unilateral gift giving can have positive effects on relationships and group dynamics, including building trust and creating positive affect (e.g., Ekeh, 1974), others have emphasized how status inequalities and competition can arise in such contexts (Boas, 1897; Malinowski, 1922; Caplow, 1984; Mauss, 1990; Barclay and Willer, 2007).

Lévi-Strauss (1969) was the first to explicitly argue that generalized exchange creates greater levels of solidarity than does direct exchange, specifically in the context of matrilineal, cross-cousin marriage systems (see also Bearman, 1997). As Lévi-Strauss observed, generalized exchange of marriage partners often involves more actors and longer exchange cycles, thereby producing greater cohesion and integration, but he also noted that generalized exchange involves risk for exchange actors because group members are not owed marriage partners from direct reciprocal obligation. These twin theoretical insights—that generalized exchange is difficult to sustain due to the potential for free-riding but also has the capacity to foster greater solidarity—remain central to theory and research on the subject of generalized exchange decades after their first statement.

Recently scholars have reexamined the effects of different exchange forms on the emergence of solidarity and cohesion using controlled laboratory experiments. For example, Molm, Collett, and Schaefer (2007) reasoned that generalized exchange would create greater solidarity than direct exchange because generalized exchange involves the risk of nonreciprocity, low feelings of conflict, and because the gifts received in generalized exchange convey expressive value. Testing their predictions in a controlled laboratory setting, Molm and her colleagues found that generalized exchange engendered stronger feelings of solidarity than did either of two forms of direct exchange, negotiated and

reciprocal. This result obtained even though rates of exchange were slightly lower in generalized exchange than in either form of direct exchange.

Lawler, Thye, and Yoon (2008) found somewhat different results in testing predictions derived from the affect theory of social exchange (Lawler, 2001). This theory extends past research showing that, under conditions of equal power, the receipt of benefits through negotiated exchange generates positive affective reactions. Because these benefits are jointly produced via negotiation, their source is attributed to the relation or group, engendering a sense of cohesion proportional to the benefit received (e.g., Lawler and Yoon, 1993, 1996, 1998). In exploring the different levels of group cohesion resulting from different exchange structures, Lawler, Thye, and Yoon (2008) predicted that levels of cohesion achieved would be higher for the two forms of direct exchange, negotiated and reciprocal, than for generalized exchange. These predictions are based on the theory's claim that generalized exchange fosters relatively low levels of perceived "jointness" and shared responsibility for the outcomes of exchange, and thus group members who experience positive emotions resulting from the benefits of exchange are less likely to attribute the source of these benefits to the group. Results of a laboratory experiment supported these predictions, showing that generalized exchange created uniquely low levels of cohesion. Importantly, participants in generalized exchange achieved much lower rates of exchange than did those assigned to the other exchange forms, perhaps as a result of the free-rider problem inherent in this system.

What can make sense of these apparently conflicting findings? The different levels of productivity achieved in the generalized exchange systems studied by Molm, Collett, and Schaefer (2007) and Lawler, Thye, and Yoon (2008) may be critical to understanding the different levels of solidarity observed. Molm, Collett, and Schaefer studied relatively productive generalized and direct exchange systems that provided high levels of exchange benefits to participants and found higher levels of solidarity in generalized exchange. By contrast, the generalized exchange systems studied by Lawler, Thye, and Yoon were not as productive and were relatively lower in solidarity than direct exchange. At this point, what is needed is a theory that can (1) explain the relative levels of solidarity produced by direct and generalized exchange systems and (2) account for levels of exchange benefit while specifying the underlying social psychological processes producing these dynamics.

We propose that the effects of exchange benefits on solidarity are both mediated and moderated in critical ways that must be understood in order to make sense of past conflicting findings. First, receiving benefits through a group's exchange structure is likely to foster solidarity by engendering feelings of group identification, a self-perception among group members that their identity is meaningfully linked with the group. Having come to view themselves in group terms, individuals then adopt positive group sentiments, viewing the group as united and cohesive. Further, the effect of exchange benefits on feelings of group identification should be stronger in generalized exchange than in direct exchange. When exchange benefits are low, neither generalized nor direct exchange should produce high identification, a dynamic consistent with Lawler, Thye, and Yoon's observation that low-productivity generalized exchange produces little cohesion. At high levels of benefit, however, generalized exchange should produce higher levels of identification than direct

exchange, consistent with Molm, Collett, and Schaefer's findings. In turn, group identification should foster corresponding levels of solidarity.

### Exchange Structure and Identification

We depart from previous work in arguing that the relationship between exchange structure and solidarity operates through the emergence of group identification. Group identification can be defined as the part of the self-concept that derives from group membership (e.g., Turner, 1982). According to social identity theory, people value membership in groups because it defines their self-concepts in meaningful ways and provides a critical source of self-worth (Tajfel and Turner, 1979). For example, when the object of identification (e.g., a demographic category, an organization, a social club) achieves success, those who identify with that object often "bask in the reflected glory" of its achievement (Cialdini et al., 1976). Past research by Lawler and colleagues shows that the receipt of benefits through social exchange tends to foster affective sentiments toward groups (e.g., Lawler and Yoon, 1998; Lawler, 2001). This is consistent with research from social identity theory showing that people who receive higher levels of social support tend to feel more strongly connected to the group (e.g., Hogg and Abrams, 1990; Tyler and Blader, 2004; De Cremer and Van Dijk, 2002). Building on this idea, we argue that the strength of this link is likely to vary depending on what exchange structure acts as the source of benefits.

The theoretical perspectives offered by Lawler (2001) and by Molm, Collett, and Schaefer (2007) help us link exchange structure and identification. According to Molm, Collett, and Schaefer (2007), an individual who gives resources in generalized exchange must overcome the temptation to free-ride and the risk of nonreciprocity in the system. Overcoming individual self-interest in this way signals that the sender has real, non-instrumental regard for the recipient, what Molm and colleagues referred to as "expressive value." The expressive value that the resulting benefits carry should foster a stronger sense of identification in the participant. An individual's sense of identity is driven by the "knowledge that he belongs to certain groups together with some emotional and value significance to him of this group membership" (Tajfel, 1972: 292). Consistent with this view, the expressive value carried by unilateral resource transfers communicates a regard for the recipient beyond the instrumental value attached to the item itself (Molm, Collett, and Schaefer, 2007). The level of expressive value should be greatest in generalized exchange because the elevated risk of nonreciprocity, and the insufficiency of self-interest to sustain giving in such systems, suggests that the giver is motivated to act in the interest of the recipient rather than in his or her self-interest.

In contrast, directly reciprocal exchanges, and especially negotiated transactions, should carry less expressive value. Given the explicit nature of contractual obligations, it is difficult to create or maintain the impression that one party in a negotiated exchange has high regard for the other. Negotiating over the terms of a contractual obligation clearly conveys a greater concern for self-interest than altruism (e.g., Babcock and Loewenstein, 1997). As a result, participants in direct exchange will be less inclined to identify with the group because they will be less likely to derive the emotional experience of group membership when receiving benefits through direct exchange.

Drawing on Lawler (2001), we suggest that the degree to which the group is seen as the source of benefit from exchange is a critical factor in the development of identification, but generalized exchange should typically facilitate such attributions to the larger group more than direct exchange. Exchange benefits earned through direct, negotiated exchange should be attributed more to one's skill in negotiation or the properties of a single dyadic relationship. As exchanges are completed with multiple members of the system, attributions may begin to move to the larger group, but less so than in generalized exchange, which is an inherently group-driven phenomenon, requiring at minimum three actors to function. Especially in pure generalized exchange, in which giving resources follows no set pattern, the repeated sending of unilateral gifts among various group members should lead participants to attribute the source of benefit to the entire collective (e.g., organization, community), rather than to their own personal effectiveness or the dyadic exchange relation. Whereas receiving benefit from direct exchange will feel like winning profits through exchange with another individual, in generalized exchange, it should feel like receiving gifts from a group.

Because exchange benefits foster group identification, generalized and direct exchange systems with low levels of benefit are likely to generate little identification, but that identification should increase with the level of exchange benefits received. Because benefits earned via generalized exchange are seen as carrying expressive value and their source is readily attributed to the group, the development of identification in such systems should be more closely tied to the amount of such benefits received than in direct exchange. As a result, while receipt of very few benefits through exchange should foster low levels of identification in both forms of exchange, generalized exchange should create higher levels of identification when exchange is relatively beneficial to a participant (e.g., Molm, Collett, and Schaefer, 2007).

**Hypothesis 1:** The receipt of exchange benefits will be positively related to group identification, but this relationship will be stronger in generalized exchange than in direct exchange. As a result, at low levels of benefit, individuals will identify at low levels with groups featuring either generalized or direct exchange, but at high levels of benefit, individuals will identify more strongly with groups featuring generalized exchange.

This argument leads us to expect that exchange benefits will moderate the link between exchange structure and feelings of identification. Further, it helps us reconcile the results of recent experimental studies, one of which found higher levels of solidarity in generalized exchange in which benefits received through both generalized and direct exchange were both relatively high (Molm, Collett, and Schaefer, 2007) and the other of which found that uniquely low levels of cohesion were also possible when generalized exchange offered low levels of benefit (Lawler, Thye, and Yoon, 2008).

### Group Identification and Solidarity

Conceptions of solidarity are diverse in social science, ranging from the highly structural (e.g., Hechter, 1987) to more expressive formulations (e.g., Blumer, 1939). Here, we define solidarity as a positive perception of the group and its

members as structurally interdependent, united, and cohesive. The receipt of benefits from generalized exchange should lead to relatively high levels of group identification, and these feelings of identification in turn should lead to perceptions of the group as high in solidarity. This latter process is likely driven by the experiences of in-group attraction and depersonalization, two consequences of identification that lead group members to perceive their group as both cohesive and in a positive light. First, in-group attraction leads group members to view one another more positively and to give one another the benefit of the doubt—making dispositional attributions for successes and situational attributions for failures (Taylor and Doria, 1981). The experience of in-group attraction can help build rapport among group members and inspire a sense of “shared fate” (Sherif et al., 1954). Self-interested motives are transformed from the personal to the group level—that is, highly identified group members think of the interests of the group as being their own interests and become intrinsically motivated to achieve the group’s goals (De Cremer and Van Vugt, 1999; De Cremer and Van Dijk, 2002).

Second, the experience of depersonalization should further engender feelings of group solidarity. Depersonalization entails a shift in identity from individual to group, or from “I” to “we,” that corresponds with transformations of the self-concept, which is the frame of reference for evaluations of self-worth (Brewer and Gardner, 1996). This transformation in self-representation suggests that highly identified group members will increasingly view their self-worth as intertwined with the well-being of the group and its members as their assimilation into the social group intensifies (Tajfel, 1972: 292). In this sense, the depersonalization generated by group identification may further increase feelings of cohesion, shared fate, and interdependence (see also Lawler and Yoon, 1998). By creating in-group attraction and depersonalization, group identification will serve to promote solidarity in at least two ways: by increasing regard for fellow group members and by promoting a sense of interdependence and shared interests.

**Hypothesis 2:** Feelings of group identification will be positively related to perceptions of group solidarity.

Because we expect group identification to be positively related to perceptions of group solidarity, the interactive effects of exchange structure and exchange benefits should be related to solidarity as they were to identification. Thus, just as we expect a stronger, positive association between exchange benefits received and identification in generalized exchange, we also expect a stronger, positive link between benefits received and solidarity in such exchange systems. Further, we expect this link to operate through group identification.

**Hypothesis 3:** The receipt of exchange benefits will be positively related to perceived group solidarity, but this relationship will be stronger in generalized exchange than in direct exchange. As a result, at low levels of benefit, individuals will perceive low solidarity in groups featuring either generalized or direct exchange, but at high levels of benefit, individuals will perceive greater solidarity in groups featuring generalized exchange.

**Hypothesis 4:** The interactive effects of exchange structure and exchange benefits on perceived group solidarity will be mediated by group identification.

This last hypothesis constitutes a claim of mediated moderation and best captures our full argument. As reflected in figure 1, above, the effect of exchange structure on identification is moderated by the level of exchange benefits in a way specified by hypothesis 1. Then levels of identification give rise to corresponding perceptions of group solidarity. In this way, our argument suggests a novel account of the relationship between social exchange and solidarity, one that both reconciles past findings via the specification of a critical moderator and better explains the underlying process by identifying a new mediator.

### Solidarity and Giving in Generalized Exchange

One of the most persistent puzzles in organizational research on exchange is how contributions to generalized exchange are sustained when individuals in such systems face the temptation to free-ride (Organ, 1990; Flynn, 2005). In particular, many exchange researchers have been puzzled by the successful maintenance of pure generalized exchange systems (Lévi-Strauss, 1969; Takahashi, 2000), in which the individual can clearly profit more by receiving, but not giving, resources. These systems appear similar to public goods and collective action settings, in which giving is unilateral and not directly reciprocated, temptations to free-ride are high, and self-interest is likely insufficient to sustain high rates of exchange (Cheshire, 2007). In this sense, maintaining unilateral contributions in large-scale, pure generalized exchange systems entails a social dilemma and an especially puzzling one.

The tendency for highly productive generalized exchange systems to foster high levels of identification and solidarity may offer one solution to the free-rider problem in generalized exchange. Groups high in solidarity should be better able to elicit costly contributions from their members by increasing individuals' motivation to benefit one another and by reducing concerns that others will free-ride. If someone has given at relatively low levels in the past but receives gifts that lead him or her to feel identification and, in turn, solidarity with the group, he or she should thereafter exhibit higher levels of giving. Likewise, if an individual in generalized exchange has given at high levels but does not receive gifts that lead him or her to feel identification and solidarity at high levels, then he or she should subsequently give at lower levels. Although we cannot fully evaluate this theorized relationship in the present paper, we explore whether an association exists between respondents' perceptions of group solidarity and their likelihood of subsequently giving to the system.

Our paper makes four central contributions to the study of social exchange and solidarity. First, we highlight a novel mediating process that clarifies the link between these core concepts in exchange. Second, we posit a critical moderating variable capable of accounting for contradictory past results. Third, we identify how these dynamics offer a solution to the classic free-rider problem of generalized exchange. Fourth, we extend the scope of application of theories relating exchange structure and solidarity because we argue that these dynamics apply to large-scale exchange systems with high rates of one-shot

interactions, in addition to the repeated interaction of small groups studied in past research.

## METHOD

### Empirical Overview

Previous research on the links between different exchange structures and levels of solidarity has been primarily experimental, with a few studies examining the problem through an ethnographic lens (e.g., Uehara, 1990). To date, there has been no attempt we are aware of to study the phenomenon in a way that captures both the richness of field evidence and the rigor of quantitative data analysis. Further, past research has not yet studied the consequences of different exchange forms in organizational settings. To provide a compelling test of this presumed link between generalized exchange and solidarity and our underlying psychological mechanism, we conducted case studies of two large, online organizations, one facilitating generalized exchange (Freecycle) and the other direct exchange (Craigslist). In our studies, we administered large-scale surveys ( $N = 805$  and  $567$ , respectively) designed to test our hypotheses regarding the relationships linking exchange structure, benefits received, identification, and solidarity. By testing our theoretical claims in organizational field settings of substantial social significance, our study also makes an important empirical contribution to research on the link between exchange structure and solidarity.

### Freecycle: A Generalized Exchange Organization

Freecycle is the name for an organization of web-based communities that facilitate the giving of items among members. Until a recent move to websites, Freecycle was organized through listservs (e-mail-based discussion forums) wherein members post notices of objects they are willing to give away or requests for objects they wish to receive. The objects are diverse, including furniture, children's clothes, computers, office supplies, and even automobiles. Once arrangements are made for a gift to be given, the recipient typically visits the home of the giver to obtain the item. The most distinctive feature of Freecycle is its strict requirement that items be given without reciprocity or compensation; that is, there is no *quid pro quo*.

Founded in 2003, in Tucson, Arizona by Deron Beal, Freecycle was intended to facilitate pairwise giving among local recycling groups and extend their activities through an online community. The initial Freecycle listserv had only one rule: items had to be given away for free. Membership on the list grew at a remarkably fast pace as media attention increased. At the time of the organization's one-year anniversary (May 1, 2004), 100,000 people were members of a Freecycle community, and less than a year later (March 15, 2005), Freecycle added its one millionth member. In 2004, Freecycle spread outside the U.S., first to Germany and later to several other countries. In less than four years, the total number of registered participants climbed to approximately 3.4 million members in over 4,000 Freecycle communities across 83 countries. Freecycle represents the first large-scale, gift-giving system of its kind and a novel organizational form. Its network of online groups is the largest known intentionally constructed system of pure generalized exchange (e.g., Takahashi, 2000). Yet

despite this organization's size, rapid growth, and unique structure, no systematic study of its dynamics has been conducted to date.

### **Craigslist: A Direct Exchange Organization**

Craigslist is the name for an organization of web-based communities that serve many purposes, including the sale and purchase of items among community members. Organized through websites corresponding to geographically defined areas (e.g., Philadelphia, Orange County, Minneapolis/St. Paul), Craigslist is essentially an online classified ad forum. Members post announcements for items wanted or for sale, participate in forums, seek romantic partners, and other activities. Items exchanged via Craigslist are highly diverse, from collectibles to used cars and homes. Once terms are agreed upon, usually via e-mail, the buyer and seller typically arrange a meeting to exchange. Note that not all direct exchanges on Craigslist involve money; some sections of Craigslist allow for trades of goods or posting of free items, though traffic on these sections is typically much lower than in the direct exchange sections.<sup>1</sup>

Craigslist was created in San Francisco, California by Craig Newmark, an Internet entrepreneur, in 1995. Intended for use by tech sector employees in the area, Craigslist began as a location where people could post primarily announcements of social engagements. Soon the list became used for a variety of purposes and a website was created to facilitate the increasing traffic and membership. Craigslist incorporated in 1999 and spread to nine major U.S. cities in 2000, four more in 2001 and 2002, and thirteen more in 2003. By 2008, Craigslist sites had been created for 500 communities in 50 countries. Craigslist derives revenue only from job ads, which members post at a cost. Craigslist websites are among the most heavily trafficked sites in both the U.S. and the world, reportedly receiving more than 12 billion page views a month and hosting 30 million classified ads a month.

### **Comparability of Research Sites**

We conducted survey-based case studies on these two organizations because they share many of the same characteristics, while featuring fundamentally different exchange structures. As mentioned above, both are open-access, Internet-based organizations that facilitate exchange in geographically defined subcommunities. For both sites, exchanges are loosely regulated by a few moderators who enforce some basic rules, primarily that all activity must be legal and safe. Both organizations are relatively new and quickly growing. Further, in studying these two organizations, we used recruitment procedures that were designed to be as close to identical as possible. The critical difference is that exchanges in Craigslist are almost entirely negotiated and direct, while this form of exchange is disallowed in Freecycle (members can give only unilaterally).

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<sup>1</sup> The presence of a section for giving away free items means that a pure generalized exchange system exists within most Craigslist websites. Despite this, Craigslist websites are overwhelmingly used for direct exchanges. Further, the presence of a small generalized exchange system in Craigslist, if anything, makes our test a more conservative one by diluting the contrast between generalized and direct exchange slightly.

Still, as is inevitable with case studies, differences beyond this variable of interest exist. Use of Craigslist is conducted through websites while, during the period studied, Freecycle functioned via e-mail listservs. Also, Craigslist involves a much higher number of users and volume of exchanges than Freecycle. Clearly, then, this comparison does not allow the extremely high levels of control created in laboratory studies (e.g., Molm, Collett, and Schaeffer, 2007; Lawler, Thye, and Yoon, 2008). We argue, however, that each organization is the other's most defensible comparison case. To address remaining differences between the members of each site, independent of those created by the different exchange structures, we employed extensive statistical controls, detailed below. An additional motivation for studying these two particular organizations lies in their comparable claims to significance as large-scale, social exchange systems. Both are the largest known organizations for promoting exchange of their respective type in the world, and perhaps in history.

### Recruitment

We conducted two large-scale surveys of the attitudes and reported behaviors of participants in Freecycle and Craigslist. We requested permission from Freecycle's leadership team (the "mod squad") to survey the members of several Freecycle communities. We were granted access to 118 U.S. communities, from which we selected 18 to survey. In identifying these 18 communities, we attempted to strike a balance between large, medium, and small group sizes, older and younger organizational ages, rural and urban areas, and geographic locations (see Appendix A for a list of these communities). All members of the 18 communities were sent an e-mail through their Freecycle list (sent by the moderator of the list) inviting them to participate in the study and including a link to an online survey. Survey data were collected over a six-day period in which 834 Freecycle members participated.

To encourage Freecycle members to participate in our study, we offered a pair of incentives from which they could choose their preferred reward. Participants were given a choice: they could complete the survey and (1) be entered into a lottery drawing for a free 30 GB video iPod or (2) help their Freecycle listserv obtain a banner that could be used to raise awareness of Freecycle at local events, a reward suggested by moderators. Respondents were informed that a banner would be sent to their group if at least 15 people from their Freecycle community chose to "contribute" their participation toward earning a banner for their group. In the end, 5 of 18 communities received banners, which were delivered to the groups' moderators.

The mixed-incentive system was intended to solicit a representative array of Freecycle members to participate in our study to minimize response bias. Those who are more generous or group-oriented might find the banner incentive more appealing, whereas others might prefer the chance to win an iPod. As it turned out, 59.7 percent of our sample opted for the iPod drawing, and 37.9 percent chose the community banner option (the remaining respondents were moderators, who were not eligible to receive a prize), which seemed to provide a reasonable balance.

In gathering the Craigslist user sample, we were not able to recruit survey respondents directly from Craigslist due to an explicit ban on such solicitations. Thus, Craigslist users were recruited from a web subject pool gathered by a

large, private, Western university. The survey respondent pool consisted of over 10,000 enrolled adult members distributed across the U.S. A recruitment e-mail message targeting Craigslist users was sent out to the entire pool announcing the opportunity to participate in the study and including a link to an online survey. Survey data were collected over a 15-day period in which 578 Craigslist users participated. The recruitment messages were identical except for a few necessary wording changes.

For the Craigslist sample, we used a mixed-incentive system that was designed to be as similar as possible to that used in the Freecycle sample. Participants were given the choice of completing the survey and (1) being entered into a lottery drawing for a free 30 GB video iPod or (2) making a small donation to the Craigslist Foundation, a charitable group operated by Craigslist that promoted the work of nonprofit organizations. We structured this latter charitable giving opportunity in such a way that it mirrored the community banner option in the Freecycle survey. Whereas each banner cost \$150 and was contributed to the community if at least 15 members picked the option, we made a \$150 donation to the Craigslist Foundation for every 15 Craigslist users that picked this payment option. In all, we made a \$1200 donation to the Craigslist Foundation. Seventy-nine percent of the sample opted for the iPod drawing, and 21 percent chose the charitable giving option. We used the same incentive system for Freecycle and Craigslist respondents both to minimize response bias in each case study and to control for response biases that might nonetheless emerge.

Of the people who completed our survey, 29 Freecycle and 11 Craigslist respondents were dropped from our analyses for one (or more) of the following reasons: (1) skipping 20 percent or more of the questions, (2) spending an extremely short time on the survey (less than 5 minutes), and/or (3) providing free response data on the rate and value of their exchange history that was more than 3 standard deviations from the mean. Removal of these cases left 805 Freecycle respondents and 567 Craigslist respondents for analysis.

## MEASURES

The two surveys were largely identical, with similar measures and presentation of scales. Both included a number of questions regarding each respondent's demographic characteristics. We also assessed respondents' exchange activity and feelings of group identification and solidarity. A description of each of these measures follows.

*Exchange activity.* We asked each Freecycle member a number of questions about their exchange activity, from which we were able to create measures of the total number of items Freecycle members had given and received. To account for how much opportunity they had to amass these figures, we asked respondents to report the length of time they had been on their Freecycle lists.

We asked equivalent direct exchange activity questions in the Craigslist survey. Specifically, we asked respondents to indicate how many items they had attempted to sell, actually sold, attempted to buy, and actually bought through Craigslist. We also asked Craigslist users to indicate the length of time they had been using their local Craigslist. Because our theoretical focus concerns how the receipt of benefits through exchange shapes group identification and

solidarity in direct versus generalized exchange systems, we used respondents' answers to these questions to create a single measure of *Exchange benefits*. This measure was a count of the number of exchanges the respondent participated in that brought material benefits to him or her. For Freecycle respondents, this was respondents' total items received. For Craigslist, this was respondents' total items bought and sold, given that benefits are received in both cases.

*Group identification.* To assess respondents' level of identification with their exchange community, we included the "Importance to identity" subscale of Luhtanen and Crocker's (1992) standard measure of group identification. This measure has been used to assess identification with a variety of groups, from work settings (McFarland and Buehler, 1995) to racial categories (Crocker et al., 1994) and nationalities (Sato and Cameron, 1999). These items include the following: "In general, belonging to my Freecycle (Craigslist) group is an important part of my self-image," "Overall, my Freecycle (Craigslist) group membership has very little to do with how I feel about myself" (reverse-coded), "The Freecycle (Craigslist) group I belong to is an important reflection of who I am," and "The Freecycle (Craigslist) group I belong to is unimportant to my sense of what kind of a person I am" (reverse-coded). For each item, the participants' ratings ranged from (1) "Strongly disagree" to (7) "Strongly agree." We averaged responses to these items to create an overall score for each individual's level of identification with his or her Freecycle or Craigslist group. The reliability for the scale was .80.

*Perceived solidarity.* To assess respondents' perceptions of the solidarity of their Freecycle or Craigslist group, we asked several questions: "How much solidarity do you think your Freecycle (Craigslist) group has?" "How much do you think the members of your Freecycle group work well together?" and "How much does your Freecycle group feel like a community?" Participants' responses ranged from (1) "Not at all" to (7) "A great deal." We also included three measures borrowed from prior research on cohesion (e.g., Lawler and Yoon, 1993; Lawler, Thye, and Yoon, 2008). Respondents were asked to indicate on 7-point scales the extent to which they felt their group was "divisive/cohesive," "fragile/solid," and "distant/close." We averaged responses to these items to create an overall score for each individual's perceptions of solidarity in his or her Freecycle or Craigslist group. The reliability for this 6-item scale was .89. Consistent with our theoretical constructs, our measure of group identification focused on the degree to which respondents perceived themselves in terms of their group membership, whereas the group solidarity measure tapped their perceptions of a group-level characteristic.<sup>2</sup> We decided to measure identification and perceived solidarity with respect to the group

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<sup>2</sup> Given that the measures of solidarity and group identification used to test our hypotheses were collected in the same questionnaire, it was important to address the problem of multicollinearity that may result from common method bias. To be certain that our measures of solidarity and group identification represent distinct variables, we conducted a principal component factor analysis (with Varimax rotation) of the items drawn from both scales. Using an Eigenvalue cutoff of 1 and a scree test, the items used in each sample clearly load onto two separate factors that correspond directly to solidarity and group identification. More importantly, in each sample, the solidarity items load highly onto the first factor, with the lowest value being .72 and the highest loading on the second factor being .20. The identification items load highly on the second factor, with the lowest value being .63 and the highest loading on the first factor being less than .46.

rather than specific others for both theoretical and practical reasons. Our theory concerns the processes through which the receipt of exchange benefits shapes group members' perceptions of themselves with respect to their group and, in turn, perceptions of the group's qualities. Further, we thought it would be difficult to accurately measure affective sentiments toward numerous exchange partners in such large-scale exchange communities.

**Control variables.** Our main concern is to demonstrate that generalized exchange, as opposed to direct exchange, engenders group identification and, in turn, feelings of group solidarity. It is important, however, to consider and control for a variety of other mechanisms that may be related to these variables. Thus, in addition to basic demographic data, we assessed several individual difference variables that might (a) vary between the Freecycle and Craigslist samples and (b) be related to our primary dependent variables. Not controlling for these variables could allow for spurious correlations between exchange structure and group sentiments that might superficially appear to support our argument.

*Prosocial value orientation.* A critical control variable in our analyses is respondents' prosocial orientation. It is possible that participants in generalized exchange systems have more positive group sentiments than participants in direct exchange systems, not because of the theoretical process we have laid out but because they have a more prosocial orientation in general. To measure respondents' dispositional prosociality, we used the "triple dominance" measure of social value orientation (Van Lange, 1999). Social value orientations are stable preferences for distributions of valued resources between oneself and others (Messick and McClintock, 1968; Liebrand, 1986). Past research has shown that measures of social value orientation—in particular, this measure—are predictive of behavior in a variety of domains (e.g., Liebrand, 1986; Parks and Rumble, 2001; De Cremer and Van Lange, 2001; Perugini and Gallucci, 2001; Simpson and Willer, 2008). The triple dominance measure repeatedly asks respondents to indicate which of three distributions of resources between themselves and a hypothetical other they most prefer. In nine scenarios, these distributions correspond to individualism (maximize own payoffs), competitiveness (maximize difference between self and other), and prosociality (maximize total payoff to self and other). The prosociality option is generally regarded as a strong indicator of dispositional generosity (Van Lange, 1999). We measured social value orientation as the number of times respondents chose the prosocial option (cf. De Cremer and Van Lange, 2001). As an additional measure of respondents' prosociality, we also controlled for whether or not study participants opted for the *Group reward* (community banner in the case of Freecycle, foundation donation in the case of Craigslist) versus the individual reward (iPod drawing) as compensation for completing our survey.

*Environmental concern.* As an organization, Freecycle has consistently espoused environmental concern as a reason for its existence. Freecycle serves environmental ends by reducing the volume of trash sent to landfills, as well as the pollution that would be created by producing new objects in lieu of recycling used ones. It could be that environmentally concerned individuals are somehow uniquely oriented toward group identification and perceptions of solidarity (i.e., an observed difference in these sentiments between the

communities might result from Freecycle's greater recruitment of these sorts of people). To assess environmental concern, we asked respondents to answer the question, "How concerned would you say you are about protecting the environment," using a 7-point scale ranging from (1) "Not at all concerned" to (7) "Extremely concerned."

*Political conservatism and religiosity.* It may be that political ideology shapes or is related to an individual's predisposition for group identification and/or perceptions of solidarity. For example, evidence suggests that political conservatives may place greater value on in-group loyalty than liberals (Haidt and Graham, 2007). To assess political ideology, we asked respondents to report their political opinions on a 7-point scale ranging from (1) "Extremely liberal" to (7) "Extremely conservative." In addition, there is good reason to think that more religious people may be more oriented toward feelings of group identification and solidarity (e.g., Durkheim, 1965). To assess religiosity, we asked respondents to report how religious they were on a 7-point scale ranging from (1) "Not religious at all" to (7) "Extremely religious."

### Subsequent Behavioral Data Collection

After surveying the Freecycle communities in our sample, we contacted the moderators to request permission to monitor the listserv for each surveyed community. We were permitted to monitor 16 of the 18 listservs. Freecycle members were not notified that we were monitoring listserv activity. For one month following the initial survey period, we tracked the behavior of our respondents by subscribing to the "Digest" on each list. Digests include a compilation of all messages generated by the community members during a specified time period. The frequency of digests varied across groups from two digests a day to two digests a week. Each message in the digest included the author's e-mail address, which allowed us to link each participant's survey responses to these behavioral data. From the digests we were able to construct a measure of how many times our survey respondents offered an item through their Freecycle listserv in the month following our survey. In contrast to Freecycle listservs, Craigslist provides complete anonymity to users and creates a separate and unique e-mail address each time they make a posting. Therefore, it was impossible to collect corresponding data for Craigslist.

## RESULTS

### Descriptive Statistics

Table 1 provides basic demographic data for both the Craigslist and Freecycle samples. The Freecycle sample was more female, white, and older—but less educated and lower paid—than the Craigslist sample. The table also gives descriptive statistics for the exchange benefits composite variable, as well as the measures on which it was based. Finally, the table also gives descriptive data for additional control variables used in our analysis. Freecycle respondents were more prosocial, environmentally concerned, and religious than Craigslist respondents.

Freecycle respondents reported giving away more items via their Freecycle listserv than they reported receiving, while no comparable asymmetry was found for selling and buying behavior among Craigslist respondents. This is

**Table 1. Demographic and Exchange Activity Statistics for Freecycle and Craigslist Samples\***

Variable	Freecycle (N = 608)	Craigslist (N = 526)
Gender (female/male)	84.5%/15.5%	69.2%/30.8%
Age	40.2 (11.8)	33.5 (11.1)
<i>Race/ethnicity</i>		
Caucasian	93.6%	75.9%
African American	2.3%	2.9%
Hispanic	3.3%	3.6%
Asian	0.8%	17.7%
Income	\$50,072 (29,871)	\$64,306 (49,416)
<i>Education</i>		
High school	35.5%	29.5%
Associate	19.2%	15.6%
Bachelor	26.5%	38.6%
Professional	3.1%	16.3%
<i>Exchange activity</i>		
No. of items given/sold	21.01 (64.22)	5.97 (14.49)
No. of items received/bought	6.65 (10.99)	4.73 (14.31)
Value of items given/sold	\$384.09 (781.52)	\$438.26 (1427.07)
Value of items received/bought	\$228.21 (778.74)	\$452.59 (1557.61)
No. of items offered, not given/sold	1.60 (8.22)	2.69 (6.79)
Exchange benefits (min., max.)	6.65 (10.99) (0, 85)	10.70 (26.79) (0, 421)
<i>Control variables</i>		
Prosocial value orientation	7.35 (3.06)	5.11 (3.95)
Environmental concern	5.88 (1.17)	5.19 (1.46)
Conservatism	3.70 (1.50)	3.69 (1.41)
Religiosity	4.14 (1.89)	3.33 (1.95)
Chose group reward	38.8%	21.1%

\* Standard deviations for means are given in parentheses.

somewhat surprising because total giving and total receiving should be equal on average. The most obvious interpretation is response bias: those who give more on their Freecycle list were more likely to reply to our survey. Another possible explanation is that responses to these questions reflect a self-serving bias (e.g., the “holier than thou” effect, discussed by Epley and Dunning, 2000), which would predict that people will inflate their self-reported generosity. It might also be that those who take the most from Freecycle are more transient members: joining to take some things and quickly leaving. This would mean that at any point in time a cross-sectional analysis would show the average Freecycle member as giving more than he or she received. Supportive of this interpretation was a significant correlation we found between months since joining Freecycle and the difference between items given and received ( $r = .22, p < .001$ ). The longer respondents had participated in Freecycle, the more likely they were to report giving in excess of taking from the system. We found no significant correlation among Craigslist respondents between reported time since first using Craigslist and the reported difference between items bought and sold ( $r < .01, p > .90$ ).<sup>3</sup>

<sup>3</sup> We also asked a series of questions about why respondents had joined Freecycle and found that the more people reported joining primarily to get objects, the shorter their tenure on their Freecycle list.

### Exchange Structure, Benefits, and Solidarity

We argued that past results for the relationship between exchange structure and solidarity can be understood in terms of a mediated moderation model in which levels of benefit moderate the relationship and group identification mediates it. We anticipated that the greater tendency to view exchange benefits as resulting from the group in generalized exchange would lead to a stronger tendency for benefits to generate group identification and solidarity in Freecycle than in Craigslist. At low levels of benefit, direct and generalized exchange will generate comparably low levels of identification and solidarity, but at high levels of benefit, generalized exchange should foster greater identification and solidarity than direct exchange.

Here we first establish our claim about the link between exchange structure and solidarity before investigating the mediating role of group identification. In evaluating this hypothesis, it is possible that various characteristics of respondents and their experiences in Freecycle or Craigslist could have an impact on levels of positive group sentiments, confounding our analysis. For example, it could be that more prosocial people are more likely to participate in Freecycle and, in turn, are more likely to express pro-group sentiments. Alternatively, it could be that the differences in the frequency of exchange activity or duration of time spent by respondents in the two organizations could be an important confound. To address these possibilities, we conducted multivariate analyses, controlling for respondents' duration in their community, basic demographics, and other individual difference variables that could drive the observed effects. All variables were centered around their means prior to analysis.

Table 2 gives results of models testing the effects of exchange activity in Freecycle and Craigslist. Model 1 gives results for the relationships between measures of exchange activity in Freecycle and respondents' reported levels of solidarity. Among the control variables, only environmental concern is significantly related to solidarity in Freecycle. More relevant to our predictions are results for the relationship between items given and received in Freecycle and perceived solidarity. Here we find that the more items respondents reported having received, the higher levels of solidarity they reported. We found no significant relationship between the number of items participants gave to their community and reported levels of solidarity. These findings are consistent with our reasoning that the receipt of benefit in generalized exchange is strongly related to resulting levels of solidarity.

Model 2 explores the relationship between exchange activity in Craigslist and perceived solidarity. Results for this model indicate that Asian respondents reported greater solidarity but that no other control variables were significantly associated with solidarity. In addition, neither reported buying nor selling activity on Craigslist was significantly associated with perceived solidarity, though both coefficients were positive.

To conduct a more complete test of our claim that the relationship between exchange benefits received and reported solidarity is stronger in generalized exchange than in direct exchange, we next analyzed the effects of exchange structure and benefits on solidarity in a single model conducted on the entire, merged dataset. Table 3, model 1 gives results for that model, including terms for generalized exchange structure, exchange benefits, and the interaction of these two factors. Among the various control variables, more prosocial and

**Table 2. OLS Analysis of Relationship between Exchange Activity and Group Identification in Freecycle and Craigslist\***

Independent variable	Model 1 (solidarity, Freecycle)	Model 2 (solidarity, Craigslist)	Model 3 (identification, Freecycle)	Model 4 (identification, Craigslist)
Female	.195 (.122)	.080 (.111)	-.100 (.163)	.198 (.137)
Age	.001 (.004)	-.005 (.005)	.001 (.005)	.002 (.006)
Black	.303 (.290)	.123 (.287)	.433 (.388)	-.096 (.354)
Latino	.385 (.246)	.154 (.252)	.834* (.328)	-.291 (.311)
Asian	-.498 (.489)	.233 (.132)	1.470* (.653)	.700*** (.163)
Months since joining	-.009 (.004)	.002 (.002)	-.008 (.005)	.000 (.002)
Prosocial value orientation	.020 (.015)	.027* (.012)	.012 (.020)	.012 (.015)
Group reward	.084 (.090)	.064 (.117)	.182 (.120)	.014 (.144)
Conservatism	.026 (.035)	-.018 (.038)	-.046 (.046)	-.022 (.047)
Religiosity	.029 (.025)	.049 (.027)	-.010 (.034)	.027 (.033)
Environmental concern	.153*** (.041)	.075* (.034)	.188*** (.055)	.024 (.042)
No. of items given	.000 (.001)		-.001 (.001)	
No. of items received	.021*** (.005)		.028*** (.006)	
No. of items sold		.008 (.005)		.008 (.006)
No. of items bought		.004 (.005)		.010 (.006)
Constant	-.105 (.084)	-.124 (.069)	.113 (.113)	-.158 (.085)
R <sup>2</sup>	.085	.069	.081	.072
ΔR <sup>2</sup>	.039	.020	.030	.029
F	4.21***	2.93***	4.03***	3.07***
N	605	526	605	526

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

\* Unstandardized coefficients, with standard errors in parentheses. Coefficients for value of exchanges given in thousands of dollars.  $\Delta R^2$  statistics are relative to model with control variables and no terms for exchange activity.

environmentally concerned respondents indicated greater levels of solidarity. We found a significant main effect of generalized exchange structure, indicating that, at the mean level of benefits, Freecycle respondents reported higher levels of solidarity. We also found a significant main effect of level of exchange benefits, indicating that the relationship between exchange benefits and solidarity is positive for Craigslist respondents. Most relevant to our hypothesis is the interaction of generalized exchange structure and exchange benefits. This term is positive and significant, indicating that the effect of exchange benefits

**Table 3. OLS Analysis of Effects of Exchange Structure and Benefits on Group Identification and Solidarity in Freecycle and Craigslist (N = 1135)\***

Independent variable	Model 1 (solidarity)	Model 2 (identification)	Model 3 (solidarity)	Model 4 (solidarity)
Female	.136 (.080)	.076 (.104)	.126 (.074)	.114 (.074)
Age	-.002 (.003)	.002 (.004)	-.003 (.003)	-.003 (.003)
Black	.243 (.203)	.162 (.263)	.189 (.188)	.197 (.188)
Latino	.248 (.175)	.270 (.227)	.164 (.163)	.168 (.163)
Asian	.235 (.123)	.757*** (.160)	.018 (.116)	.015 (.116)
Months since joining	.001 (.002)	-.002 (.002)	.001 (.001)	.001 (.001)
Prosocial value orientation	.025** (.009)	.010 (.012)	.022* (.009)	.022* (.009)
Group reward	.081 (.071)	.130 (.092)	.037 (.066)	.045 (.066)
Conservatism	.008 (.025)	-.047 (.033)	.022 (.024)	.021 (.024)
Religiosity	.035 (.018)	.012 (.024)	.033 (.017)	.033 (.017)
Environmental concern	.098*** (.026)	.089*** (.034)	.070 (.024)	.072** (.024)
Generalized exchange structure	.321*** (.086)	.425*** (.111)	.237** (.079)	.196* (.080)
Exchange benefits	.012*** (.002)	.015*** (.003)	.005** (.002)	.009*** (.002)
Generalized exchange × Exchange benefits	.012** (.004)	.012* (.006)		.008 (.004)
Group identification			.294*** (.021)	.291*** (.021)
Identification × Benefits				-.001 (.001)
Constant	.012 (.032)	.012 (.041)	-.321 (.140)	.023 (.030)
R <sup>2</sup>	.093	.081	.219	.223
F	8.18***	7.01***	22.45***	20.00***

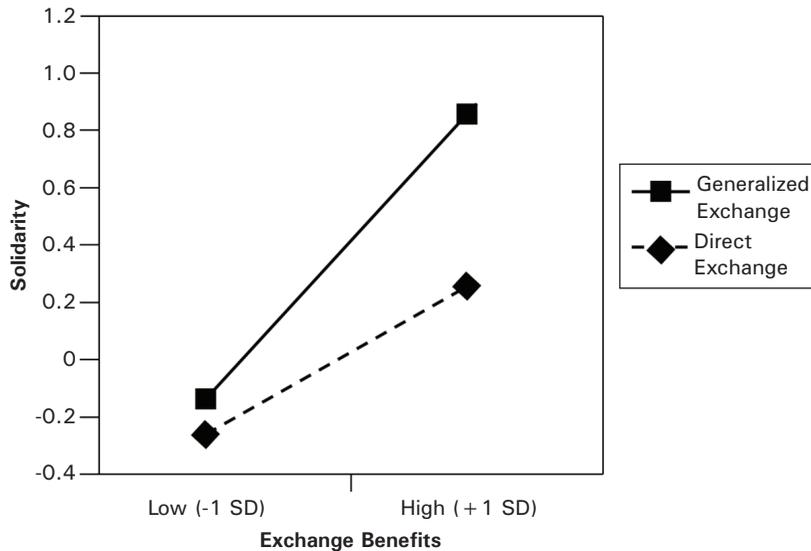
\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

\* Unstandardized coefficients, with standard errors in parentheses.

on solidarity is greater in Freecycle than in Craigslist. These findings support hypothesis 3, which claims that solidarity increases with the extent of exchange benefits received and that this relationship is stronger in generalized exchange than direct exchange.

We next conducted a simple slopes analysis to test whether the form of this interaction is as predicted. Looking at respondents one standard deviation above and one standard deviation below the mean for exchange benefits revealed that at low levels of benefit, there was no significant effect of exchange structure on solidarity ( $B = .077$ ,  $p = .514$ ), whereas at high levels of

**Figure 2. Graph of the effect of exchange benefits on reported solidarity in the direct exchange system Craigslist and generalized exchange system Freecycle.**



benefit, generalized exchange participants reported significantly higher solidarity than did direct exchange participants ( $B = .565, p < .001$ ). Figure 2 depicts the interaction between exchange benefits and exchange structure on respondents' perceived solidarity. These findings are consistent with the interaction predicted in hypothesis 3.

### Exchange Structure, Benefits, and Identification

We next tested our claims about the interactive effects of exchange structure and benefits on group identification. As an initial exploration, we fit separate models testing the effects of exchange activity on group identification in Freecycle and Craigslist. Model 3 in table 2 gives results for Freecycle. Here we see that, among the control variables, Latino, Asian, and environmentally concerned respondents tended to identify at higher levels with their Freecycle community. More relevant to our theory, the number of items received was positively related to group identification in Freecycle. We found no significant relationship, however, between the number of items given and Freecycle respondents' reported group identification. These findings are consistent with our claim that the receipt of benefits is strongly related to group identification in Freecycle. Model 4 tests for effects among Craigslist respondents. Similar to the analyses of reported solidarity above, we find that Asian respondents reported greater group identification in Craigslist. Neither number of items bought nor sold was significantly related to group identification.

To more completely assess our claim in hypothesis 1 that the relationship between exchange benefits and group identification is stronger in generalized than in direct exchange, we merged these datasets to analyze the possible interaction effects of exchange structure and benefits in a single model. Model 2 in

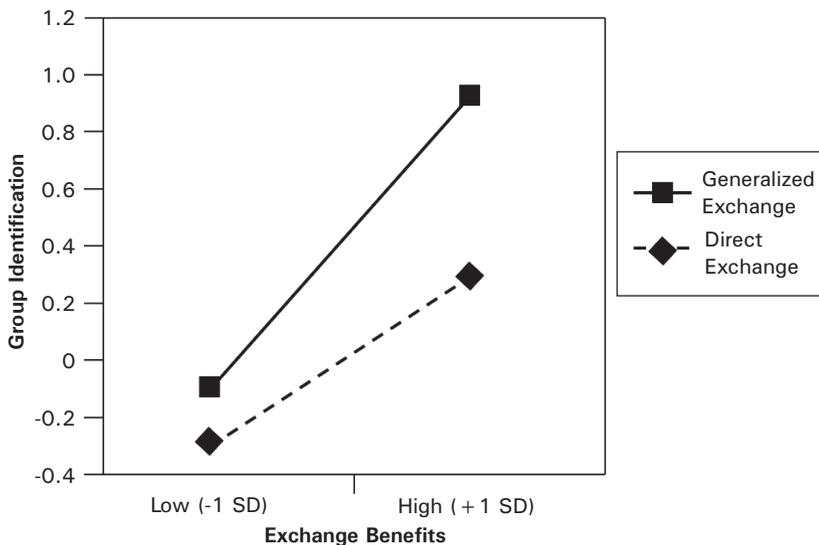
table 3 presents the results of that test. Among the control variables, Asian and more environmentally concerned respondents indicated greater levels of solidarity. As in the above analyses for solidarity, we again found significant main effects of exchange structure and exchange benefits. The main effect of exchange structure indicates that, at the mean level of exchange benefits, Freecycle respondents identify more strongly with their exchange community than Craigslist respondents. The main effect of exchange benefits shows that the relationship between exchange benefits and identification is positive for Craigslist respondents. We also found a positive and significant interaction of generalized exchange structure and level of exchange benefit. This effect indicates that the positive relationship between exchange benefits and group identification was stronger in the generalized exchange system of Freecycle than the direct exchange system of Craigslist. Together, the results of this model support hypothesis 1.

To further evaluate whether the form of that interaction is consistent with our prediction, we conducted a simple slopes analysis. Analysis of respondents one standard deviation above and one standard deviation below the mean for exchange benefits showed that at low levels of benefit, there was no significant effect of exchange structure on identification ( $B = .185, p = .229$ ). At high levels of benefit, however, generalized exchange participants reported significantly higher solidarity than direct exchange participants ( $B = .665, p < .001$ ). Figure 3 shows the interaction between exchange benefits and exchange structure on respondents' group identification. These findings are consistent with the interaction predicted in hypothesis 1.

### The Mediating Role of Group Identification

Next we assessed our predictions about the mediating role of group identification. First, we sought to establish that group identification is positively related

**Figure 3. Graph of the effect of exchange benefits on reported group identification in the direct exchange system Craigslist and generalized exchange system Freecycle.**

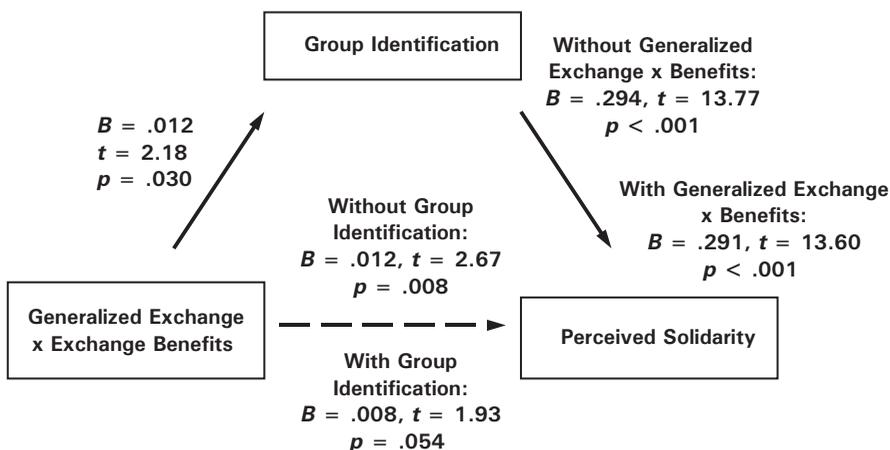


to solidarity among both Freecycle and Craigslist respondents (hypothesis 2). Model 3 of table 2 gives results of a model analyzing the effects of group identification and various control variables on solidarity among both Freecycle and Craigslist respondents. Among the control variables, more prosocial respondents and respondents who opted for the group reward indicated greater levels of solidarity. We also found a strong, positive relationship between group identification and solidarity, supporting hypothesis 2.

We next evaluated our prediction that group identification would mediate the interactive effects of exchange structure and exchange benefits on solidarity. Model 4 gives results of a model testing the effects of group identification and the interaction of level of exchange benefit and exchange structure on solidarity. Because our argument is one of mediated moderation, we follow Muller, Judd, and Yzerbyt (2005) in also including a term for the interaction of the moderator (exchange benefits) and mediator (group identification). Results of this model indicate that the inclusion of a term for group identification results in the interactive effect of exchange structure and exchange benefits no longer being significant, consistent with our claim that this term operates through group identification in its effect on solidarity (hypothesis 4). The interaction of exchange benefits and group identification was not significant.

Full results for our mediation analysis are given in figure 4. Consistent with the above analyses, this figure shows that the interaction of generalized exchange structure and exchange benefits was positively related to both group identification and solidarity. Further, group identification was positively related to solidarity. Finally, as above, in analyses including group identification and the interaction term for exchange structure and exchange benefits, only group identification was significantly related to perceived solidarity. A Sobel test confirmed that group identification mediated the interactive

**Figure 4. Results of mediation analysis of effects of the interaction of generalized (as opposed to direct) exchange structure and exchange benefits on reported solidarity, with group identification as the hypothesized mediator.\***



\* A dotted arrow indicates that a relationship is statistically nonsignificant ( $p > .05$ ) in the full model. Age, gender, race/ethnicity, months since joining exchange community, prosocial value orientation, conservatism, religiosity, whether or not the respondent opted for the group reward, environmental concern, exchange benefits, and generalized exchange structure were control variables in all analyses.

effects of exchange structure and exchange benefits on feelings of solidarity ( $z = 2.15$ ;  $p = .03$ ).

Taken together, results of these analyses support our claim of mediated moderation. First we found that the effect of exchange structure on solidarity was moderated by the level of exchange benefits. We also found that the effect of exchange structure on identification was moderated by the level of exchange benefits. Further, we found that group identification was, in turn, positively related to solidarity. Finally, we found that the stronger impact of exchange benefits on solidarity in generalized exchange operated through higher levels of group identification.

### Solidarity and Giving Behavior

A central puzzle in research on generalized exchange is what motivates giving in such systems, given the temptation to free-ride on the contributions of others. Above, we speculated that one answer may lie in the tendency for the receipt of exchange benefits in generalized exchange to foster high levels of group identification and solidarity, which may motivate group members to give in the system. Because our data are largely cross-sectional, we have a limited ability to test this feedback process directly. Nevertheless, we were able to test whether respondents' perceptions of solidarity are associated with the likelihood of their giving items through Freecycle in a later time period. Because only a small number of respondents (8.7 percent) offered more than one item in the month following our survey, we collapsed this variable into a simple, dichotomous measure of whether respondents offered an item or not.<sup>4</sup> To test the association between reported solidarity and subsequent giving behavior, we calculated binary logistic regression models of whether respondents offered at least one item on Freecycle in the month following the survey. We added a control variable, *Total previous offers*, indicating how many times the respondent reported offering a gift via Freecycle before the period of direct observation, to control for respondents' established rate of giving before the period of direct observation.<sup>5</sup> We also controlled for participants' reported group identification. Table 4, model 1 reports relative odds ratios for control variables before feelings of solidarity are added to the model. Here only group identification was significantly related to observed attempts to offer an item on Freecycle, with the odds of offering an item increasing with reported identification.<sup>6</sup>

Model 2 introduces our measure of reported solidarity. Individuals reporting greater feelings of solidarity with their Freecycle community were more likely to offer an item at some point during the following month. Specifically, a one-unit increase in our 7-point scale of solidarity corresponded to a 24.9 percent increase in the odds that an individual offered an item through Freecycle in the month after our survey. Notably, while reported solidarity was significantly associated with offering an item, control variables like dispositional generosity

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<sup>4</sup> In all, 19.8 percent of survey respondents offered at least one object through Freecycle in the month following the survey, while 80.2 percent of respondents did not.

<sup>5</sup> We also ran another version of this model controlling for a dichotomous measure of whether respondents reported having offered an item or not, and results were substantively identical.

<sup>6</sup> An alternate model specification that controlled for items given per month since joining Freecycle gave substantively identical results.

**Table 4. Binary Logistic Regression Models of Observed Gift Offering on Freecycle (N = 563)\***

Independent variable	Model 1 (offered/not)	Model 2 (offered/not)
Female	1.627	1.519
Age	.986	.987
Black	.236	.233
Latino	1.336	1.317
Asian	.899	1.136
Months since joining	.983	.984
Total items exchanged	1.002	1.001
Total previous offers	.999	1.000
Prosocial value orientation	.986	.984
Group reward	.877	.865
Conservatism	1.000	.989
Religiosity	1.091	1.084
Environmental concern	.976	.953
Identification	1.172**	1.092
Solidarity		1.249**
Constant	.235****	.226****
Pseudo R <sup>2</sup>	.051	.061
Log-likelihood	-279.77	-277.75
Chi-square vs. null	18.75	22.61*
Chi-square vs. model 1		3.86**

\* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ ; \*\*\*\* $p < .001$ .

\* Relative odds ratios converted from coefficients.

were not. These findings are consistent with the theorized role of solidarity in maintaining giving behavior in generalized exchange. In addition, inclusion of the term for solidarity reduced the effect of group identification to nonsignificance, consistent with our theorized causal sequence in which solidarity is the more proximate cause of giving behavior.

## DISCUSSION

Past research has offered conflicting evidence and theoretical perspectives on the relationship between a group's exchange structure and the emergence of solidarity among its members. Here we sought to develop and test a theory capable of accounting for these divergent findings. Given the substantial temptation to free-ride in generalized exchange, we reasoned that the receipt of gifts in such systems carries with it greater expressive value than that generated by participation in direct, negotiated exchanges (see Molm, Collett, and Schaefer, 2007). Further, the receipt of exchange benefits in generalized exchange will be more readily attributed to the group, rather than to one's skill in negotiation or the properties of a single dyad, as in direct exchange (see Lawler, 2001). So while the receipt of exchange benefits in either system will build solidarity, this relationship would be stronger in generalized exchange. As a result, while there will typically be comparably low levels of solidarity in both generalized and direct exchange, at high levels of benefit, generalized exchange should generate higher levels of solidarity.

We further argued that the relationship between the receipt of exchange benefits and emergent levels of solidarity is partly driven by group

identification, as members come to perceive themselves through the lens of group membership. This self-perception in group terms will give rise to solidarity as the focal individual increasingly views him- or herself as a part of a valued, cohesive community. Thus the effect of exchange structure is both moderated by the level of exchange benefits and mediated by group identification. In this way, the structure of exchange through which benefits flow has a critical impact on the tendency of those benefits to shape views of oneself as a group member and, in turn, positive views of the group as cohesive and united. Finally, the solidarity resulting from these processes should be associated with subsequent giving, thereby helping to sustain productivity in generalized exchange systems.

Results of two organizational case studies provided support for our theoretical reasoning. First, we found a stronger relationship between exchange benefits and solidarity among participants in Freecycle, an organization that facilitates generalized exchange, than in Craigslist, a comparable system of direct exchange. Second, we found a stronger relationship between exchange benefits and group identification in Freecycle than in Craigslist. Third, the character of both interactions was consistent with our predictions, with no significant difference in solidarity or identification at low levels of exchange benefits, but significantly higher levels of these sentiments in Freecycle when exchange benefits were high. Fourth, we found that group identification was significantly related to solidarity and that the interactive effects of exchange structure and benefits shaped levels of solidarity through group identification. When accounting for the simultaneous influence of the interaction of exchange structure and benefits as well as the effect of identification in predicting solidarity, the predictive power of identification remained robust, while the predictive power of the interaction of exchange structure and benefits was significantly diminished. This suggests that exchange benefits in Freecycle had a stronger impact on group members' sense of solidarity in their community *because* these benefits led them to identify more intensely with their Freecycle community.

Finally, by collecting direct observation data following our survey, we were able to explore whether greater levels of perceived solidarity might be associated with future patterns of exchange, shedding light specifically on the recursive dynamics of generalized exchange. Freecycle participants reporting a stronger perception of solidarity were more likely to make unilateral contributions in their Freecycle community in the month following our survey. Although not conclusive, these findings are consistent with the theorized role of solidarity in fueling participation in generalized exchange systems.

Our theoretical arguments and the findings supporting them offer several contributions to the literature on exchange structure and group sentiments. First, we advance a moderation argument that clarifies why past results in this area are conflicting. Here, we theorized and found support for the notion that exchange structure interacts with the level of exchange benefits in its effect on solidarity. Given that past research primarily looked at the main effect of exchange structure, while testing those effects in settings in which levels of exchange benefits were not always held constant, identifying and

testing the moderating role of the exchange benefits greatly clarifies the nature of the link between structure and solidarity. In addition, we identified and directly tested a social psychological process linking exchange and solidarity—group identification—that clarifies both how and why the structure of exchange could shape individuals' perceptions of the group. In this way, our theory links phenomena at several levels of analysis, explaining how the receipt of benefits through different exchange structures has an impact on affectively laden group sentiments via perceptions of the self with respect to the group.

A final contribution of this research is to extend theory and research on the effects of exchange structure from small, laboratory groups featuring repeated exchanges to large-scale, often one-shot exchange systems in the field. Our data offer strong external validity by systematically examining multiple forms of exchange in real-world settings. We tested our ideas by studying two unique organizations that closely follow the principles of generalized and direct negotiated exchange. Users of Freecycle make unilateral contributions to other individual users but cannot make requests for payment or ask for any other form of reciprocation. In contrast, Craigslist users exchange resources with one another by engaging in direct transactions, the terms of which are explicitly shared and mutually agreed upon. Drawn from naturally occurring field settings, the present findings strengthen and build on previous studies of exchange dynamics conducted in carefully controlled laboratory settings.

Our theory and findings also suggest a new account of when generalized exchange structures are likely to emerge. We argued that receiving benefits in generalized exchange exerts a particularly strong influence on pro-group sentiments that motivates group members to give to the system. These contributions should in turn lead to exchange benefits for others, inspiring them to identify at higher levels with the group, perceive higher levels of solidarity, contribute themselves, and so on. Thus if a critical mass of contributions can be harnessed, it may spark a sort of "virtuous cycle" that leads groups featuring generalized exchange to achieve productivity and maintain group members' giving. At the same time, generalized exchange systems that are unable to overcome this "start-up" problem are likely to crumble, as their low productivity will fail to produce pro-group sentiments that are uniquely critical to the maintenance of giving in such systems. This stands in stark contrast to direct exchange systems, which should not require solidarity to function. Such systems can survive on self-interest—and perhaps emergent dyadic cohesion (e.g., Lawler and Yoon 1993, 1996, 1998)—alone.

### Limitations of the Current Research

Although our results offer support for our hypotheses, some alternative explanations may merit further study. Most significantly, the data we gathered to test our ideas were largely cross-sectional, and such data are not ideally suited for evaluating causal claims. For example, we argued that identity mediates the effect of exchange structure on solidarity, but it is possible that solidarity mediates the effect of structure on identification. Although we gave results of a mediation analysis supporting our claims, identification and solidarity were measured using the same survey rather than longitudinally, which means that the

reverse link remains possible.<sup>7</sup> Despite the limitations inherent in any correlational analysis, we believe that our case studies represent a valuable contribution to a theoretical debate that has primarily been informed by laboratory experiments (and occasionally by ethnography). Whereas prior experiments were well designed to evaluate causal claims, our case studies offer findings high in external validity.

Another potential critique is whether self-selection can account for the differences we observed between Freecycle and Craigslist. That is, different people join the two organizations, with those who join Freecycle perhaps being more predisposed toward positive group sentiments like identification and solidarity. We have attempted to address this possibility by controlling for respondent-level factors that could vary between the two research sites and be related to group sentiments (e.g., religiosity, environmental concern, political ideology, and prosociality), and our results held in these analyses. Further, we found that the emergence of identification and solidarity depended on the level of exchange benefits received, not mere membership. Conversely, some might argue that local Craigslist communities are simply unable to achieve meaningful levels of solidarity. We believe that Craigslist is an appropriate organization for study, however, for several reasons. Reported levels of group identification and solidarity in Craigslist were not that low: both were less than one point on a 7-point Likert scale below those reported by Freecycle users, and we found no significant difference in levels of identification or solidarity in our multivariate analyses until we took into account exchange benefits. More importantly, we chose Craigslist for study because it was the organization most comparable to Freecycle. Although the comparison examined here is certainly not as controlled as those studied in past experiments, a contribution of our research is to extend past laboratory experimental findings to organizational field settings.

A related critique of the present research is that Freecycle shares a clearer unified culture, mission, and set of common goals than Craigslist, and Freecycle communities may be predisposed to foster high levels of positive group sentiments as a result. According to Lawler, Thye, and Yoon (2008), the prior existence of a shared group identity could lead generalized exchange systems to achieve high levels of solidarity. Applied to our study, their reasoning suggests that Freecycle respondents may have reported higher identification and solidarity at higher levels of benefit because participants in Freecycle begin their participation with a stronger sense of group identification than participants in Craigslist, and that greater initial identification overwhelms direct exchange's normal, structural tendency to create greater solidarity.

We agree that initial levels of identification produced by Freecycle's emphasis on recycling and environmental concern could be higher in Freecycle at the point at which group members join. We have thus made an effort in the current study to statistically control for the effects of environmental concern on group identification and solidarity in Freecycle. Further, we do not argue here that solidarity will always be higher in generalized exchange, only in systems that provide higher levels of exchange benefit. Consequently, we think the present

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<sup>7</sup> Though we have focused here on testing one model of the relationships linking exchange activity, group identification, and solidarity, a variety of other causal relationships between these variables are possible, even plausible (e.g., people likely give more to groups they identify with, identify more with high-solidarity groups, etc.).

results support our claim that the levels of pro-group sentiments we observed are the product of the repeated receipt of gifts, as opposed to other factors.<sup>8</sup> That said, we agree with Lawler and colleagues that factors like a shared mission or identity likely play an important role in achieving a critical mass of contributions sufficient to overcome start-up problems and achieve the virtuous cycle we theorize may be key to maintaining giving in generalized exchange.

Another possible criticism of the present research is that Freecycle is not a true generalized exchange organization—that those who give items through Freecycle are simply disposing of unwanted trash, rather than giving gifts of value—but we think that the balance of evidence strongly supports viewing Freecycle as a generalized exchange organization. If this alternative account were true, then Freecycle users should be classifiable into two subsets: those who give away unwanted trash and those who receive these “gifts.” This account would therefore predict a negative correlation between items given and received via Freecycle. Instead, we found a strong, positive correlation ( $r = .57$ ). This correlation was approximately the same as the correlation between total items bought and sold by Craigslist users ( $r = .55$ ). Thus it would be more accurate to say that Freecycle participants, like Craigslist participants, vary in their level of overall activity, with the more active ones both giving and receiving more than less active ones.

Several features of our study could be viewed as making it either easier or harder for us to find support for our predictions. For example, a “norm of generalized reciprocity” exists in Freecycle, encouraging individual giving to the system. The presence of this norm suggests that our test is a relatively conservative one. Such a norm would likely promote giving (Lawler, Thye, and Yoon, 2008) but should also serve to reduce the symbolic value of giving, thereby reducing the extent to which the receipt of gifts is likely to spark positive group sentiments. In addition, it is possible that giving in Freecycle involves low opportunity costs in that many people may use Freecycle to give away items they no longer need (e.g., baby clothes). This would also undermine the apparent symbolic value of giving. In short, in other generalized exchange systems in which giving is not normatively encouraged and involves clearly high costs to givers, we might have observed stronger effects.

That said, we chose to test our theory in the context of two large-scale, largely one-shot exchange systems. Though these settings are socially significant and offer an important extension of the scope of theories in this domain, it is possible that one-shot interactions with different exchange actors make the emergence of solidarity particularly unlikely in direct exchange systems; that is, it may be that the emergence of positive group sentiments in direct exchange systems is for some reason uniquely dependent on the development of cohesive dyadic relationships with one or more actors within them, more so than in generalized exchange systems. Past research offers evidence against this concern, however, specifically Molm, Collett, and Schaefer’s (2007) finding that at high levels of productivity, generalized exchange systems featuring repeated interaction generated higher levels of solidarity than comparable direct exchange systems. Though we think that

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<sup>8</sup> Although Freecycle does have a central mission of reducing trash sent to landfills, the organization’s level of promotion of generalized exchange activity is comparable to Craigslist’s encouragement of direct exchange, as both organizations suggest that their system should be used for their respective forms of exchange.

future research should pursue novel tests of our claims in settings that differ with respect to these various considerations, we believe that in the present research these factors tend to balance out and that the test of our claims was a fair one.

### Practical Implications

The findings from our research have clear implications for managers of organizations. Many firm leaders hope to increase cooperation in the firm by facilitating the unilateral exchange of resources among their employees—in essence, to promote a system of generalized exchange (see Flynn, 2005). To this end, they may be wise to focus on engendering an orientation toward conferrals of help and support, one that encourages employees to give freely, rather than with an expectation of direct reciprocation. Further, when leaders communicate to employees about exchange dynamics, they may be better off emphasizing the receipt of benefits in exchange (“we all benefit from sharing resources”) rather than the giving of benefits (“we should do more to help our colleagues”), if their goal is to encourage the development of positive group sentiments and further contributions to generalized exchange.

### Theoretical Implications

Why is the receipt of benefits through direct exchange weakly related to the emergence of affectively laden group sentiments in our research? Though exchange benefits fostered identification and solidarity in direct exchange, they did so to a lesser extent than in generalized exchange. One reason is that reciprocal exchanges, and especially negotiated transactions, seem to emphasize self-interest rather than altruism. It is hard to create or maintain the impression that one party cares about the other when haggling over the terms of a contractual obligation. Rather, for exchange to produce high levels of affective regard and “groupness,” it is helpful to construct a “veil of altruism”: to wit, exchanges should never be explicitly negotiated, and return “payments” should be apparently non-instrumental (i.e., not reciprocal actions). For example, people avoid material payments to friends, create polite time delays before reciprocating, and generally present reciprocal gestures in the guise of spontaneous gift giving.

Organizations that facilitate generalized exchange readily produce a kind of veil of altruism around the movement of resources. Pure generalized exchange systems in particular are based on untracked unilateral gift giving. Such systems are considered unusual and difficult to maintain because the material incentive for free-riding looms large. For this reason, giving in systems of generalized exchange is readily perceived as altruistic and unlikely to be confused with self-interest. Perhaps ironically, it is precisely because of the high temptation to free-ride in generalized exchange that giving is so favorable to positive feelings for the group (and as shown earlier, this solidarity in turn helps to solve the free-rider problem). In this way, the receipt of benefits through generalized exchange is uniquely suited to the development of identification and solidarity, though there are other reasons why this might be so (see Molm, Collett, and Schaefer, 2007). Of course, the apparent altruism motivating gifts in pure generalized exchange systems like Freecycle can also hinder the development of identification because failing to receive benefits in such systems also carries

with it an expressive message. Thus not receiving valued gifts in such systems can also lead generalized exchange to engender low levels of identification (see also Lawler, Thye, and Yoon, 2008).

Our findings support a central process proposed by the affect theory of exchange (Lawler, 2001) and documented in research by Lawler and colleagues (Lawler and Yoon, 1996, 1998; Lawler, Thye, and Yoon, 2000). Their theory proposes that benefits received from exchange lead to positive feelings that are attributed to social units and catalyze feelings of "groupness" and cohesion. We found evidence that the more gifts individuals received in generalized exchange, the greater their identification with the larger group. We also found that the emergence of group identification was a critical step in the development of feelings of solidarity. We depart from Lawler and colleagues' claim that the inseparability of individual contributions to direct exchange prompts the attribution of benefit to the group, arguing instead that group-level attributions are better facilitated in generalized exchange due to the necessity for multiple actors to act in a complementary fashion in such systems. Though we advanced and found evidence for a different relationship between exchange structure and the attributional process than the one proposed by Lawler and his colleagues, our findings nonetheless support this central aspect of their theory.

Researchers in organizational behavior have relied heavily on social exchange theory to understand the antecedents and consequences of exchange, but few attempts have been made to distinguish between multiple exchange forms. Is participation in certain forms of exchange more tightly linked with levels of cohesion and feelings of solidarity than participation in other forms? In the present research, we relied on a unique pair of organizations to test a new theory of the relationship between exchange structure and solidarity. The effects of exchange structure on identification and solidarity depended greatly on the level of benefit group members enjoyed. Further, we found evidence that the solidarity created by generalized exchange had real downstream consequences, leading to greater giving behavior in the future. While direct exchange systems need only rely on material self-interest for perpetuation, systems of generalized exchange may be fueled by the pro-group sentiments they create.

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**APPENDIX A: Locations, Dates Founded, and Group Size (as of 5/1/07) of Freecycle Communities Surveyed**

Community name	Date founded	Group size
Albany–Corvallis, OR	5/18/2004	2112
Chicago, IL	9/17/2003	10777
Cleburne, TX	8/28/2005	427
Dallas Fort Worth, TX	8/23/2005	6633
Danvers, MA	5/31/2005	359
Decatur, IL	8/17/2004	1299
Edgar County, IL	10/26/2005	118
Fort Riley, KS	6/29/2005	1046
Jefferson, MO	6/6/2004	1018
Missoula, MT	1/11/2005	976
Norfolk, VA	12/19/2003	3309
Oklahoma City, OK	12/18/2003	6917
Sahuarita, AZ	11/5/2003	6614
Southern Maine, ME	5/27/2004	3120
Tipp City, OH	6/28/2006	357
Topsham, ME	4/27/2004	1292
TriCity, OK	8/7/2005	316
Wheeling, IL	6/5/2004	802

**APPENDIX B: Correlation Matrix for Variables Used in Analysis\***

Variable	1	2	3	4	5	6	7	8	9
1. Female									
2. Age	.173***								
3. Black	.048	-.039							
4. Latino	-.002	-.072*							
5. Asian	-.231***	-.278***							
6. White	.163***	.276***							
7. Months since joining	-.146***	-.124***	.067*	.040	.186***	-.198***			
8. Prosocial value orientation	.118***	.147***	-.031	-.041	-.155***	.158***	-.215***		
9. Group reward	.081**	.062*	-.023	-.010	-.089**	.086**	-.117***	.149***	
10. Conservatism	.001	.048	-.046	-.026	-.042	.067*	-.070	-.017	-.082**
11. Religiosity	.184***	.163***	.050	.017	-.137***	.077**	-.180***	.092**	.007
12. Environmental concern	.100**	.181***	.023	.011	-.081**	.048	-.091**	.163***	.136***
13. No. of items given	.077	.019	-.019	-.028	-.024	.040	.191***	.005	-.001
14. No. of items received	.112**	.017	-.001	-.032	-.039	.038	.267***	-.052	-.039
15. No. of items sold	-.044	-.005	.004	-.041	-.060	.070	.200***	-.021	.110*
16. No. of items bought	-.025	-.020	.068	-.006	-.012	-.014	.221***	-.001	.075
17. Exchange benefits	-.015	-.032	.027	-.024	-.006	.005	.248***	-.052	.023
18. Identification	.043	.038	.012	.018	.072*	-.072*	-.067	.070*	.082**
19. Solidarity	.097**	.042	.038	.031	-.023	-.015	-.061	.133***	.082**

Variable	10	11	12	13	14	15	16	17	18
11. Religiosity	.388***								
12. Environmental concern	-.316***	-.006							
13. No. of items given	.063	.053	.047						
14. No. of items received	.054	.069	-.038	.494***					
15. No. of items sold	-.015	-.055	.061						
16. No. of items bought	.006	.013	.066			.731***			
17. Exchange benefits	.013	-.016	.010	.494***		.931***	.929***		
18. Identification	-.073*	.024	.142***	.040	.146***	.148**	.149**	.127***	
19. Solidarity	-.011	.100**	.164***	.079	.179***	.164***	.153***	.133***	.420***

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

\* Results for items given/received are for Freecycle alone; results for items sold/bought are for Craigslist alone.

**Authors' Biographies**

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