

A Market in Your Social Network: The Effects of Extrinsic Rewards on Friendsourcing and Relationships

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ABSTRACT

Friendsourcing consists of broadcasting questions and help requests to friends on social networking sites. Despite its potential value, friendsourcing requests often fall on deaf ears. One way to improve response rates and motivate friends to undertake more effortful tasks may be to offer extrinsic rewards, such as money or a gift, for responding to friendsourcing requests. However, past research suggests that these extrinsic rewards can have unintended consequences, including undermining intrinsic motivations and undercutting the relationship between people. To explore the effects of extrinsic reward on friends' response rate and perceived relationship, we conducted an experiment on a new friendsourcing platform - Mobilyzr. Results indicate that large extrinsic rewards increase friends' response rates without reducing the relationship strength between friends. Additionally, the extrinsic rewards allow requesters to explain away the failure of friendsourcing requests and thus preserve their perceptions of relationship ties with friends.

Author Keywords

Friendsourcing, Extrinsic Rewards, Monetary Rewards, Non-monetary Rewards, Social Network, Relationship.

ACM Classification Keywords

H.5.3 [Information Interfaces and Presentation]: Group and Organization Interfaces – Collaborative computing, Computer-supported cooperative work, Web-based interaction.

INTRODUCTION

Friendsourcing is the act of soliciting answers and help from friends on online social networking services, such as Facebook and Twitter [4,34,35,39]. Prior research suggests that over 50% of social network users report that they asked

questions of their friends on online social network sites [35]. Noticing this relatively untapped potential, researchers have attempted to build systems that, for example, use friendsourcing to help personalize user experiences [4] or help blind communities get answers to questions about the world around them captured by cameras [8].

Despite its potential value for sharing resources and expertise, friendsourcing requests often fall on deaf ears. For example, Paul et al. found that only 18.7% of questions identified in a random sample of 1.2 million tweets received even one response [36]—far lower than the 84% response rate found on community Q&A sites, such as Yahoo Answers and Google Answers [19]. Additionally, while friendsourcing requests may appeal to requesters because help comes from a trusted source, often for free, these requests can impose significant costs to the requester's social capital [39]. The combination of low response rates and potential costs to social capital creates a situation where requesters primarily make small requests of their friends—for example, questions that require one-sentence answers, rather than tasks that may require more time and commitment (e.g., critiquing or proofreading a resume).

Offering explicit rewards, such as money or gifts, may be one way to improve response rates for friendsourcing requests, motivate friends to undertake more difficult tasks, and mitigate the social capital costs requesters may incur. According to a classic economic view, adding such incentives should increase the amount of work that requesters can extract from their social networks.

However, introducing extrinsic rewards into a social network could have unintended consequences. One possibility is that introducing extrinsic rewards might overshadow the expected value of friends' good deeds and change how the participants interpret a request (e.g., as a favor or a job). Extrinsic rewards may undermine the natural social motives driving friend-sourcing activity and change the perceived relationship between people [20, 41,45,46].

To better understand the effects of offering extrinsic rewards on friendsourcing, this paper seeks to answer two research questions: Does adding extrinsic rewards to a friendsourcing request (i) increase or decrease response rates to friendsourcing requests?; and (ii) change requesters' perceived relationship strength with responding friends?

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To answer these questions, we ran a randomized controlled experiment on Mobilyzr, a friendsourcing platform we built on top of Facebook that allows explicit rewards to be attached to friendsourcing requests. We recruited participants to request help from friends in their Facebook network. Some were in a control condition that made no mention of payments or rewards. Others were in a monetary payment condition, where they offered friends a small or large cash payment for performing a task. Finally, others were in a non-monetary reward condition, where they offered friends either a small or large amount of candy, an ambiguous reward that could be interpreted either as a payment or as a gift.

The results of this experiment suggest that providing extrinsic rewards have largely positive effects on friendsourcing. First, both large monetary and large non-monetary rewards substantially increased response rates. Second, extrinsic rewards did not seem to harm requester's perceived relationship strength with their friends. Requesters liked their friends more when they responded, no matter whether they received rewards or not. In addition, the extrinsic rewards allowed requesters to rationalize in a non-threatening way why some friends did not help them: they attributed the failure to help to an inadequate reward not a poor relationship.

These results provide new theoretical insights into the strategies friends can use in an online context to solicit help, and practical implications for the design of new friendsourcing systems.

Effects of extrinsic rewards on giving help

Our first research question investigates the impact of extrinsic rewards on the likelihood a receiver will respond to a friendsourcing request.

Other than pure altruism and communal relationship reasons [11], people often respond to a friendsourcing request because of an implicit promise of reciprocity [18,43]: that the requester will return a favor in future. Although scholars studying social exchange have noted a norm of reciprocity, the promise to return a favor is an uncertain one. As Blau note, "while there is a general expectation of some future return, its exact nature is definitely not stipulated in advance" (p. 93) [5].

According to a rational economic view, people should prefer certain and immediate rewards to uncertain rewards in the future [e.g., 33], therefore they should be more willing to fulfill a request from a friend for a service if it is coupled with an explicit promise of payment than one for which no payment is explicitly promised.

However, the effects of incentives on friends' responses can be complicated (in the following paper, we will use the term *incentives* and *rewards* interchangeably to refer to payment, in monetary or non-monetary forms, in exchange for services). Friends, by definition, like each other, enjoy being with each other, and will help each other when

needed. It is possible that the presence of extrinsic rewards might affect the intrinsic motivation that drives friendsourcing.

For over forty years, social scientists have been examining the effects of extrinsic rewards on intrinsic motivations, such as altruism, reciprocity, and intrinsic pleasure in helping others. In his seminal 1970 book, *The Gift Relationship*, Richard Titmuss claimed that monetary compensation for donating blood degraded the meaning of good deeds and reduce the supply of blood donors [41]. This hypothesis that monetary compensation undermines intrinsic motivation is often referred to as "crowding-out".

The "crowding-out" hypothesis received mixed support from follow-up studies [7, 17,24,25, 32]. For example, Frey and Oberholzer-Gee [17] conducted a survey about the location of a nuclear waste repository facility, showing that individuals were less willing to accept the facility in their community if they were offered monetary compensation, suggesting the introduction of these payments reduced the intrinsic motivation to behave altruistically or perform one's civic duty. In a more recent experiment, Mellstrom and Johannesson [32] showed that the supply of blood donors from women donors decreased by almost half when a monetary payment is introduced. However, other research challenges this finding. Observational studies controlling for confounding factors have examined the influence of 14 distinct rewards ranging from small coupons to a paid day off work. All seem to increase blood donations [24,25]. For example, items such as T-shirts and coupons led to 16% more donations at American Red Cross blood drives [24], and a 1-day paid leave was associated with 40% extra annual donations in Italy [25].

One way to resolve the conflicting empirical results is that there are multiple mechanisms underlying the influence of extrinsic rewards on intrinsic motivations, with predicted effects in different directions and magnitude. Contextual factors in different study settings, such as how the decision situation is framed to suggest the appropriate behavior and who implemented the incentives, might determine to what extent which mechanisms are triggered [7]. In the following sections, we will discuss the two primary mechanisms underlying the effects of extrinsic rewards. Then we will make predictions about how extrinsic rewards may affect response rate in the context of friendsourcing, based on these two mechanisms.

Hyp 1: Extrinsic rewards trigger market-like frames

Human behavior is acutely sensitive to the nature of the decision situation [38,42], which psychologists and behavioral economists referred to as "situation-dependent" preference [7].

Rewards provide situational cues [7, 21]. Particularly, Heyman and Ariely [21] proposed a "two market" theory. According to this theory, when no extrinsic reward is involved, people perceive their personal relationships

existing in a “social-market”. In contrast, the presence of monetary rewards invokes “money-market” frames and norms. Non-monetary rewards, like gifts, are ambiguous and can also invoke “social-market” frames and norms [21]. The foundation of this “two market” theory is Fiske’s relational theory [1, 16]. Fiske posits four basic types of social relationships, communal sharing (CS), authority ranking (AR), equality matching (EM), and market pricing (MP). Based on Fiske’s model, Heyman and Ariely [21] divided the exchange relationships into two general categories, one based on economic exchanges and one based on social exchanges.

According to the two market theory [21], friends’ response to friendsourcing requests should follow the market rules for economic exchanges in the presence of promises of cash payments, with the response rate sensitive to the size of the reward they are offered: they should be more willing to help a friend when offered large cash payment than a smaller one.

H1a. *If monetary rewards are attached to requests, friends’ response rate increases as the reward size increases.*

In contrast their response to friendsourcing requests when no payments are offered or in the presence of non-cash payments, interpreted as gifts, should follow social market rules based on social relationship norms [21]. Their responses should be the same whether they are offered no reward, a small non-cash gift or a large non-cash one.

H1b. *If non-monetary rewards are attached to requests, friends’ response rate remains the same level as the control condition (no rewards attached). The response rate is insensitive to the size of the non-monetary reward.*

The two market theory also predicts that friends will sometimes help less when offered a small cash payment than when offered no payment at all. The cash payment evokes the norms of economic transactions, and friends may perceive the payment isn’t sufficient compensation for their effort. In contrast, the failure to mention payment allows friends to help based on their altruism or social relationship with the requester.

H1c. *The response rate in the no reward condition can be higher than the response rate in the small monetary reward condition.*

Hyp 2: Extrinsic rewards overshadow friends’ good deeds

Another mechanism underlying the effects of extrinsic rewards is that the presence of extrinsic rewards might spoil the reputational value of good deeds, creating ambiguity about whether people performed the good deed for reward rather than for altruistic purpose [1]. Thus rewards may crowd out the reputational motivation to do good deeds. Note that the reputational motivation includes both maintaining positive “social image” that others have of the actor and a positive “self-image” the actor has of him or

herself. This explains why crowding out can be observed in both public and private settings.

According to this reasoning, it is possible that extrinsic rewards, whether monetary or non-monetary, would overshadow the expected value of friends’ good deeds and discourage their responses.

H2. *Extrinsic rewards, whether monetary or non-monetary, can degrade the meaning of helping behavior between friends, cause doubts about the motives of performing the tasks, and thus discourage friends’ responses.*

Effects of rewards on relationship quality

Our second research question investigates how extrinsic incentives might impact the relationship between the requesters and their friends.

Hyp 3: Rewards harm relationships

Some researchers suggest a “Hostile World” view [46], which claims that economic markets damage intimate relationship such as love and friendship. For example, scholars argue that friendship is a social tie that is not supposed to be marketed [20]. Any intersection between money and intimacy is “corrupting” and “pernicious” [20,46]. According to this view, introducing payments can change how the participants interpret a request and even the nature of the relationship. To take an extreme case, monetary payment can cross the line between love and prostitution. Non-monetary rewards are less likely to introduce such risk because people can interpret them as gifts and invoke social schema rather than transactional schema [21]. Based on this perspective, providing extrinsic rewards when seeking help from friends will have detrimental effects on the friendship between people.

H3a. *Attaching extrinsic rewards to requests will harm the social relationships between the requesters and friends.*

H3b. *The negative effects of extrinsic rewards are stronger with monetary than non-monetary rewards.*

Hyp 4: Rewards strengthen relationships

Other scholars hold a different view regarding the effects of reward-attached transactions on human relationships. Researchers studying low-income single mothers and their relationships with an absent father, live-in boyfriend and customers of prostitution suggested that it is not payment per se that determines the nature and quality of the social relationship. Instead, it is the nature of the relationship that determines how people interpret payment and transactions [6].

Furthermore, emerging evidence indicates that exchanges with extrinsic rewards involved have the potential to foster interpersonal harmony and strengthen relationships [2, 13,31]. For example, Al-Ubaydli et al. showed that, in trust games, priming people with markets and trade increased people’s perceptions that other anonymous agents will act in a trustworthy manner, which in turn increased people’s trusting behavior [2]. Dun et al showed that spending

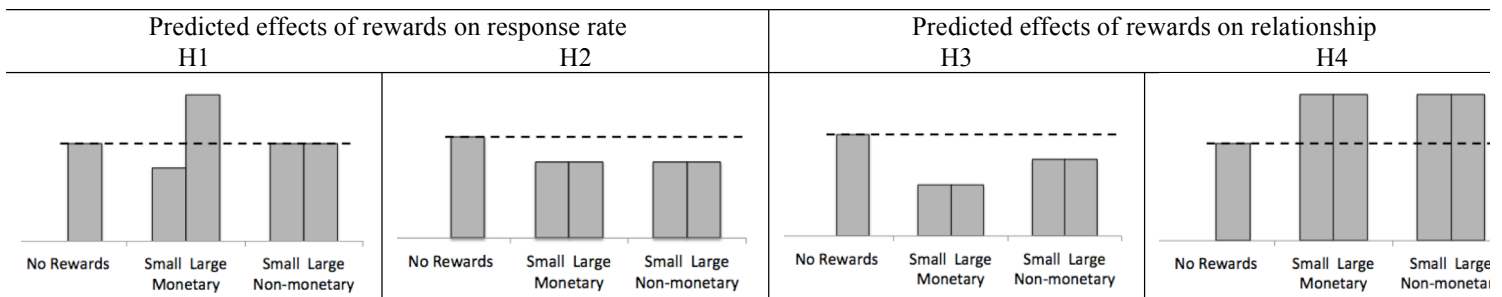


Table 1. Graphical summary of the predicted level of response rate and relationship in different reward conditions (control, small/large monetary, and small/large non-monetary).

money on others can boost a socially desirable outcome of happiness [13]. According to social exchange theories, “distributive justice” (when exchange partners perceive themselves as receiving their fair share) leads to positive emotions and strengthens the relationship between them [12,26,27,28]. Compensating friends with extrinsic rewards for their work can avoid exploitative use of a social network, achieving distributive justice, and thus might strengthen relationships.

Based on this perspective, attaching rewards will not harm relationships, but might benefit the relationships between people.

H4. *Attaching extrinsic rewards to requests might strengthen the relationship between the requesters and their friends.*

Social science theories provide different predictions (H1 versus H2, H3 versus H4) about the effects of rewards on friendsourcing performance and relationships. See Table 1 for a summary of the hypotheses. In the following sections, we conduct experiments to examine which perspectives are supported.

METHOD

Study platform

To answer our research questions and test our hypotheses, we ran a randomized between-subjects experiment on Mobilyzr, a friendsourcing platform we built on top of the Facebook social graph. Mobilyzr allows users to create friendsourcing requests sent to some or all members of their Facebook network, attach explicit rewards to those requests, and share those requests on Facebook. Requesters can offer either monetary (e.g., \$1 or \$5) or non-monetary rewards (such as a small bag or large bag of candy) to friends who satisfactorily respond to their request.

Participants

We recruited 60 participants to the experiment—22 in the monetary condition, 18 in the non-monetary condition and 20 in control conditions. They were required to post two tasks requests to friends to help them on two tasks, one assigned by experimental instructions and the other freely created by the participant. Because of technical problems 15 participants posted only a single task, leading to 105 tasks in the experiment. .

For each task, requesters were required to tag six friends to specifically ask help from. Overall, participants tagged 630 friends to respond their task posts.

Experiment Design

Participants were randomly assigned between subjects into one of three reward conditions (no reward control, monetary reward and non-monetary reward). Their requests to friends included no promise of a reward, a promise of a financial reward or the promise of a non-monetary reward, respectively. Requesters in the financial and non-financial reward conditions were randomly assigned (within participant) whether to offer a small or large reward on each of their tasks. The small and large monetary rewards were a



Table 2. Three between-subject experiment conditions. In Condition 1 and 2, whether the reward is large or small is randomly assigned within-subjects. *The value of small bag of M&M is \$1.00. ** The value of large bag of M&M is \$5.00.

\$1 or \$5 Amazon gift card. The small and large non-monetary rewards were a small (\$1) or large (\$5) bag of M&M candies. Table 2 shows the logo and rewards as used in the five experimental conditions.

Among the 105 tasks that participants posted, 17 were randomly assigned to include small monetary rewards, 23 included large monetary rewards, 11 included small non-monetary rewards, 19 included large non-monetary rewards and 35 were in the control condition without any rewards.

Procedure

Our experiment consisted of two lab sessions. In the first session, participants were introduced to the purpose of the study and the study procedures. Participants were required to post two requests for their friends to perform – a pre-set request and a self-defined request. The preset tasks were a survey task, which asked friends to complete a short survey, or a *document revision task*, which asked friends to download and revise a document. An experimenter helped participants brainstorm possible self-defined requests. Participants were also provided with a list of template requests to help with the brainstorming. The pre-set task was aimed at controlling for differences in task selection between participants (e.g., participants in the reward conditions might have chosen different types of tasks), while the self-defined task was aimed at probing environmental validity (e.g., what kinds of tasks would participants self-generate).

Participants then created an account on Mobilyzr, which randomly assigned them into one of the three reward-type conditions. Participants had to sign up through Facebook, and in so doing allowed Mobilyzr to retrieve their Facebook public profile, email address as well as list of friends who also use Mobilyzr.

Next, participants were shown how to use Mobilyzr—navigating through the user interface, creating a task request (in the experiment, once a task is created, rewards will be automatically allocated to the requests by the Mobilyzr system), sharing their requests on Facebook, and collecting and reviewing responses to their requests.

Once participants were comfortable using Mobilyzr, they were instructed to post and share on Facebook their first, pre-set request.

To more easily measure how perceived relationship strength with *specific* friends changes after the posting a friendsourcing request and receiving their responses, participants were asked to tag six friends on the Facebook post advertising each of their friendsourcing requests. Immediately after posting each task requests, participants completed a survey asking them to rate the strength of their relationship with the six friends they tagged in the posts. Specifically, participants were asked to answer the following questions on a scale from 1-100: (1) How strong is your relationship with this person?; (2) How much do you care about this person?; and, (3) How comfortable

would you feel loaning this person \$100? We designed these questions based on prior work on the operationalization of friendship ties [14,29].

Three days after the initial lab session, participants were required to repeat the process for their second, self-defined, task. In other words, they had to create the request on Mobilyzr, share the task on Facebook and again tag six friends, and then fill out the relationship strength survey for each of those six friends. To ensure participants followed-through, we sent out a reminder e-mail.

Participants returned to the lab one week later to complete a second lab session. In this session, participants fill out survey questions regarding whether their friends responded to their task requests and rated their relationships with their friends again. In order to get a better sense of their experience using Mobilyzr, we conducted an audio-recorded interview with the participants about their experience. During the interview, participants opened their Facebook accounts and showed the experimenter their task request and the communication they and their friends attached to the requests. After the last lab session, participants were debriefed.

For participants who are local, they were invited to come to the lab to complete the two sessions. Participants could also choose to participate in the study online. These online participants need to send the signed consent form before starting the study procedures. The procedures for online participants are the same as the on-site lab procedures, except that lab sessions were conducted through emails and online video/text-based chat.

Friends' view

Requesters' friends would see task posts like Figure 1 in their newsfeed. Additionally, those who are tagged for a task request received notifications that they were tagged in



Figure 1. Mobilyzr task requests on Facebook

their friends' posts. Participants' friends see the Facebook post, click the post, direct to the Mobilyzr site and work on the task. The responders might post related comments directly under the task request post on Facebook. We did not have access to the communication occurring on Facebook directly. But we required the requester to show us (and make screenshots of) the communications on Facebook during the interview in the second lab session when they were talking about their experience of using Mobilyzr. After completing the task, responders in the reward conditions received an email containing the rewards (i.e., either Amazon ordinary gift cards or Amazon gift cards for the candies).

Measurement

To test which of hypotheses 1 and 2 was supported, we kept track of the number of responses participants received to their posted requests. To test which of hypotheses 3 and 4 was supported, we had participants answer pre and post experiment surveys measuring their perceived relationship strength with friends whom they would solicit to help complete their requests.

For each friend the participant tagged in the task posts, we calculated the following four measurements.

- **Responses from tagged friends.** We measured whether this friend responded by completing the task requests either via Mobilyzr or outside Mobilyzr.
- **Responses from untagged friends.** We also calculated the number of friends who were not tagged but responded to the task requests.
- **Relationship change.** We designed three questions based on prior literature to measure relationship strength [14,29]: "How strong is your relationship with this person?", "How much do you care about this person?" and "How comfortable would you feel loaning this person \$100 or more". Participants answered these relationship strength questions before and after posting the task. The internal consistency (Cronbach's alpha) of the three question items is 0.87 (pre-posting) and 0.89 (post-posting). Therefore, we constructed our relationship scale as the ratings averaged over the three questions. In the analysis, we used relationship change as our outcome variable, which was the difference between the pre- and post- relationship ratings. The test-retesting reliability is substantial, $r = 0.76, p < 0.01$.

RESULTS

1. Rewards and giving help

The first analysis tests the effects of extrinsic rewards on the frequency of responses to friendsourcing requests. Recall that prior work suggests different hypotheses—the market hypothesis (H1) suggests that larger monetary rewards should encourage more responses, while the social, "overshadow" hypothesis (H2) suggests that explicit rewards will overshadow the expected value of friends' good deeds and discourage their responses.

Figure 2 shows the response rate of the tagged friends in different conditions. The results show that extrinsic rewards did not decrease the response rate in any condition and larger rewards increased it. Both the large monetary (\$5) and large non-monetary (large bag of M&M) rewards increased the responses from their tagged friends by 55% and 70% compared to those in the control condition.

To test whether these differences were significant, we modeled whether or not a tagged friend responded to a friendsourcing request with a random effects logit model, with tagged friends of nested within requester. The regression in Table 3 shows that the differences between the two large reward conditions and control conditions are statistically significant, while the difference between small reward conditions and control conditions are not significant.

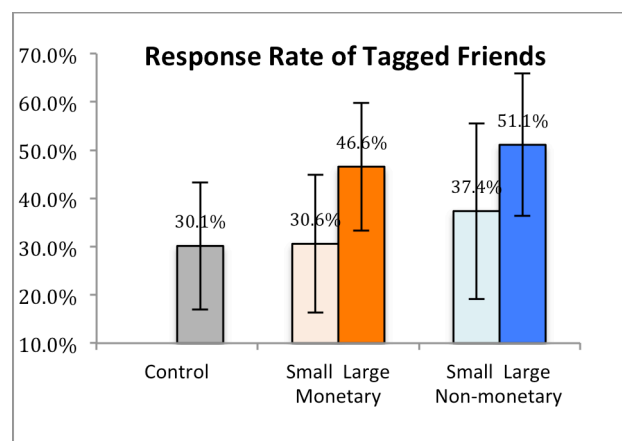


Figure 2. The response rate of 630 tagged friends in different conditions (error bars show the 95% confidence interval)

Contrast	Coef. (Std. Err)
Constant	-0.951 (0.33) **
Small Monetary v.s. Control	-0.011 (0.49)
Large Monetary v.s. Control	0.799 (0.47) *
Small Non-monetary v.s. Control	0.332 (0.56)
Large Non-monetary v.s. Control	0.982 (0.49) **

* $p < 0.1$; ** $p < 0.05$

Table 3. Random effects logit model with requests nested within requester, predicting whether a tagged friend would respond the task request from the requester.

Contrast	Coef. (Std. Err)
Constant	-0.983 (0.40) **
Reward Size (large v.s. small)	0.826 (0.40)**
Reward Type (monetary v.s non-mon)	0.338 (0.63)
Reward Size X Reward Type	-0.159 (0.62)

* $p < 0.1$; ** $p < 0.05$

Table 4. Among the reward conditions, random effects logit model predicting whether a tagged friend responded to a task request.

The regression in Table 4 shows that the reward size has a significant effect but the reward type has no significant effects on tagged friends' response rate.

Our results in general support H1—the market perspective—and provide no support for H2—the overshadow perspective. At least in the context of the crowdsourcing survey and document revision tasks, offering extrinsic rewards did not decrease users' response rates. Furthermore, the response patterns are consistent with a market view: larger rewards led to more responses.

Interestingly, and inconsistent with H1b, we found that non-monetary rewards followed the same market pattern as monetary rewards, in which larger rewards led to more responses. One explanation is that although we constructed non-monetary rewards without mentioning their financial values (see Experiment 3 in [21]), it is possible that they also triggered market schemas rather than social schemas among responders, who could have estimated their monetary value (especially since we showed the weight of the M&M candy rewards in the description). We will return to this argument in more detail in the Discussion section.

Although participants were required to explicitly tag only six friends on each task post, other untagged friends were also allowed to respond and complete the tasks. Figure 3 shows the number of responses from non-tagged friends in different conditions (note that for un-tagged friends we analyze the number of respondents instead of the percentage as there is no limit on how many could friends respond). While the pattern of results is similar to the tagged friends -- larger monetary and larger non-monetary conditions had more responses -- these differences were not statistically significant.

“Just for you”: Self-presentation to justify the motives

Overall, the results are consistent with the economic market perspective and inconsistent with the social crowding-out perspective. We examined the communication requesters and their friends exchanged on their Facebook pages to better understand this phenomenon.

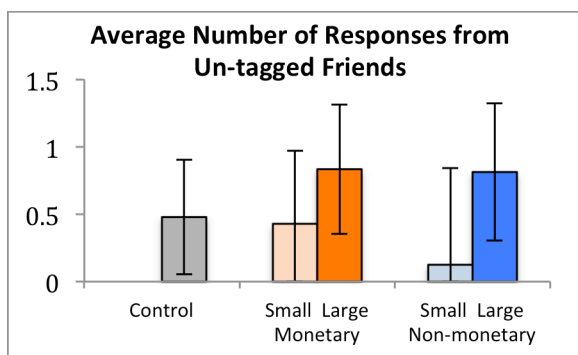


Figure 3. The average number of responses from non-tagged friends in different conditions (error bars represent the 95% confidence interval)

The results suggest that requesters' friends often proactively justified their motives to “protect” their social images when extrinsic rewards are present. They used two different strategies to persuade their friends that the help they offered was not done for the rewards: direct and indirect attribution.

Direct attribution. Requesters' friends sometimes directly claimed that they were doing the task for the requesters and not for the rewards. For example, one requester (P1) posted a task to collect survey responses. Responders would get \$5 for completing the survey. One of P1's tagged friends (R1) asked what this post was about. P1 commented back by saying that “hey it gives you money my dear. XD”. R1 replied “*Lol (P1's name). Fine, just for you (smiley face)*”, highlighting her personal rather than her financial motive.

Indirect attribution. Another strategy people used was to claim their efforts exceeded the value of the reward, indirectly declaring that they were doing the task for the requesters rather than the (claimed insufficient) rewards. For example, P2 posted a task asking her friends to help revise her resume. Her friend R2 left comments indicating an interest in helping. P2 then left a comment saying that “*Thx! You will get the money after you upload the revised document.*” R2 then replied “*seriously? 1 dollar can even hardly compensate my apt rent for the (time I spent on the) revision work. just treat me well*”. In another example, P3 posted a \$5 proofreading task. During the interview, P3 mentioned in a face-to-face conversation his friend R3 emphasized that he spent time much more than \$5 worth of time doing the proofreading task.

Friends also used irony to show that they weren't motivated by the money. For example, participant P4's friend joked after completing the requester's task: “*I better get my fucking m&ms*”.

Thus although friends' behavior as measured by increased response rates indicates they were motivated by the extrinsic rewards, their communication strategies suggested they did not want their friends to view them as being motivated by those rewards. The communication between friends appeared to allow them to justify their motives so that they could accept the reward while retaining their positive social images.

2. Rewards and relationship

Although extrinsic rewards appeared to increase the rate of friends' responding, one concern is whether this increase could come at a cost to friends' social relationships.

We investigate how making a crowdsourcing request affects the perceived relationship between requesters and the friends they tagged. Figure 4 shows the pre-post change of self-rated relationship ratings (post-ratings minus pre-ratings) between requesters and tagged friends in different conditions. The results show overall support for H4: requesters' perceived relationship strength with friends was higher in the extrinsic incentive conditions compared to the

control condition. Table 5 shows the results of the random effects linear regression model comparing the five conditions, which demonstrates that small monetary rewards increased relationship ratings by 5.55 in a 100 scale ($p < 0.05$), large monetary reward increased the relationship rating by 5.29 in a 100 scale (Coff. = 5.29, $p < 0.05$), small non-monetary reward increased the relationship rating by 2.14 but not significantly ($p = 0.43$) and large non-monetary condition significantly increased the relationship by 4.83 (Coff. = 4.83, $p < 0.05$).

To investigate the way that extrinsic rewards increased requesters' relationship ratings compared to control conditions, we looked more closely at the data by dividing the observations into cases where friends responded to the requester and those where they did not (see Figure 6). The results suggest that external incentives didn't necessarily strengthen the relationship, but rather it *preserved* from the threat that occurs when friends fail to help as request.

As shown in Figure 6, when a friend did not respond to a request, the requester felt a decrease in relationship strength with that friend. However, extrinsic rewards mitigated the negative consequence of not receiving responses from friends. The negative effects of not receiving a response

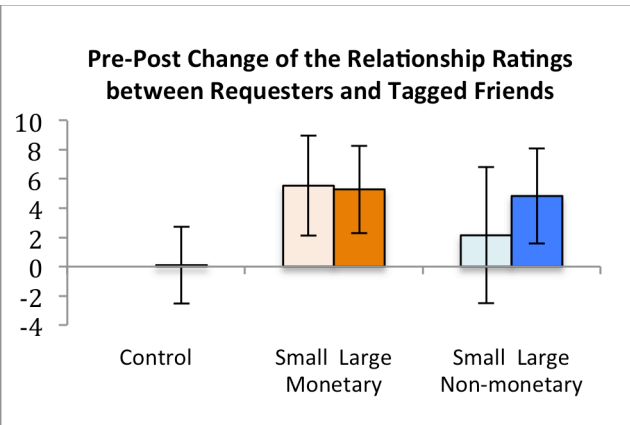


Figure 4. The pre-post change of the relationship ratings between requesters and tagged friends in different conditions (Average value in control condition as baseline).

Contrast	Coef. (Std. Err)
Constant (Control)	-4.66 (1.34) **
Small Monetary versus Control	5.55 (2.20) **
Large Monetary versus Control	5.29 (2.03) **
Small Non-monetary versus Control	2.14 (2.72)
Large Non-monetary versus Control	4.83 (2.13) **

* $p < 0.1$; ** $p < 0.05$

Table 5. Random effects linear regression model with each requester as a group predicting the pre-post change of the relationship ratings between the requesters and their friends.

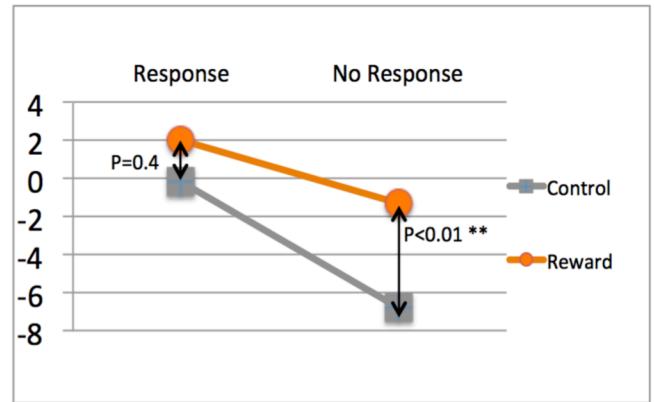


Figure 6. Pre-post relationship change between the requesters and their tagged friends in different conditions, differentiating whether their friends responded or not.

were much stronger in the control condition compared to the reward conditions, with mean relationship ratings towards non-responding friends significantly lower in the control versus reward conditions ($t(177) = -2.76, p < 0.01$).

In conditions when a friend responded to a request, the requesters' relationship with that friend did not change significantly. This was true whether or not the friend was compensated with an extrinsic reward. The difference in means of relationship ratings towards responding friends between the reward conditions and control condition are not statistically significant ($t(177) = -0.84, p = 0.40$). These results provide no evidence supporting a hypothesis that the extrinsic rewards harm the relational benefit requesters receive when a friend offers to help. That is, there is no evidence that requesters attributed friends' help as a response to the extrinsic rewards; instead, getting help from a friend built tie strength whether or not the friend was receiving a payment. Because rewards, especially large rewards, significantly increased the response rate, this in turn helps explain why there was an increase in the relationship ratings in the reward conditions.

One limitation of this analysis is that friends' responses were contingent on the reward conditions. Because of this contingency, we could not test the statistical interaction between offering rewards and receiving responses on relationship strength. In future research, we could solve this problem by directly manipulating whether friends provide help, perhaps through "deception" study by randomly assigning responses to requesters in reward and control conditions.

My friends probably think M&M's are dumb: Rewards externalize the failure of help-seeking

While these quantitative results indicate that extrinsic rewards helped to *preserve people's relationships* when friends did not respond to task requests, they do not illuminate the mechanism involved. One possible explanation is that when friends failed to help, requesters

could attribute this to the ineffectiveness of the rewards instead of the relationship. The exit interview provides evidence to support this interpretation. Here, we asked participants to speculate why some of their friends failed to respond to their requests. Participants gave us various reasons, such as “my friends are busy”, “it is close to the end of the semester” or “they probably think this is a spam”. Among the 14 participants in reward conditions who were willing to talk to us about this issue, six of them mentioned that their friends did not respond because the rewards were not attractive enough.

“None of them seriously want the candies. They probably just (think) this is dumb.” – P4

“A lot of my friends are lazy.” “Even if they are given out free food on campus, they have to leave their beds, they probably wouldn’t get out”. – P5

“They like the big dollars. They don’t play around with the little dollar” – P6

Thus, external rewards allow requesters to externalize the non-responsiveness of their friends. Indeed, when rewards are present, people can potentially separate the transaction and relational aspects of the friendsourcing. When friendsourcing fails (i.e., friends do not respond), people can attribute the failure to the insufficiency of the rewards (as they could in any market economy) and not to the relationship with their friends. In so doing, the external rewards act to protect the relationship between requesters and their unhelpful friends.

However, in the absence of external rewards, requesters were more likely to directly attribute the failure to their relationships with their non-responding friends. The following excerpt from a participant in the control condition who did not receive any response from his friends illustrates this point:

“I was surprised that there is no replies. (Why did you feel surprised?) Because I thought they might feel a little bit better about me. Those people they kinda of let me down by not sending me a reply. I got nothing. I am hurt by it... Not to the point that I will stop eating or commit suicide. Nothing like that extreme. Just from a personal level, I know these persons. We have been together for years. I am shocked that I got no replies from these people I chose for these Mobilyzr tasks.”

From the excerpt above, we can see that this requester felt that his friends let him down; moreover, he directly attributed this to relationship with his friends that was weaker than he initially believed it to be.

To more broadly assess participants’ emotional response to their friends’ non-responsiveness, we had two research assistants who are blind to experimental condition code the emotional valence of participants’ explanations for their friends did not respond. They agreed in their judgments ($Kappa = 0.89$). We found that that 50% of participants (4 of

8) in the control condition (in which no external reward was offered) expressed negative emotions in their explanations (such as feeling sad and hurt), while the remaining 50% participants expressed primarily neutral emotions (such as being indifferent or surprised). In contrast, only 15% (4/26) of participants in the reward conditions expressed negative emotions while 85% (22/26) neutral emotions about their friends not responding their task requests.

In sum, offering external rewards on friendsourcing requests has two effects. First, offering rewards indirectly increased requesters’ perceived relationship strength with their responding friends by increasing the response rate to their requests. Second, offering rewards also allowed requesters to explain away the non-responsiveness of some friends as being a fault of the rewards and not the relationship. In so doing, these external rewards mitigated the potential social damage between requesters and their non-responding friends.

Other findings

The effect of rewards on future friendsourcing tendency and obligation to repay friends

We also asked participants two additional questions for each friend they tagged in their friendsourcing requests. The first question was designed to assess whether participants felt they had used up social capital by asking whether they would be willing to ask for help from the same friends in future tasks: “Will you tag this person in a future Mobilyzr task?”. The second question was designed to measure if participants felt an obligation to pay their friends back: “If you friend creates a similar Mobilyzr task, will you complete the task for him/her?”

One might expect that offering friends an external reward may reduce the perceived social cost of friendsourcing, and thus should make requesters feel more comfortable in friendsourcing future tasks as well as reduce any obligations they may feel to reciprocate the favor. If this is the case, participants in the reward conditions should report be more willing to tag these same friends in a future Mobilyzr task and express a lower feeling of obligation to repay their friends.

Table 5 shows our results. These expectations were not supported by the data. We found no significant effect of external rewards on requesters’ willingness to tag their friends in future tasks or their perceived obligations to reciprocate the favor. One possible reason for this finding is that in the experiment research assistants pay participants’ friends for their effort. As a result, requesters may not have felt that they personally compensated their friends for their efforts, and, as a result, didn’t think that the social capital is less “used” or they are less obligated to repay their friends.

The data, however, show that participants were more willing to tag friends in future requesting tasks if those friends responded to their previous requests (Model 1 in Table 4). This result is consistent with the common practice

	Model 1: Future friendsourcing tendency Coeff (S.E.)	Model 2: Obligations to repay friends Coeff (S.E.)
Reward (1) vs. No reward (0)	0.36 (3.2)	2.76 (2.73)
Respond (1) vs. Not Respond (0)	24.7 (3.1) **	11.2 (2.7) **

Table 5. Regression predicting the future friendsourcing tendency and obligations to repay friends.

in charity appeals and marketing campaign, to target future requests to people who contributed or bought in the past. It is also consistent with prior analyzes modeling the costs of friendsourcing [39], that also found that more previous friendsourcing activities predicts higher tendency to friendsourcing in future. The data also show that, people also felt more of an obligation to repay friends who actually responded to their requests (Model 2 in Table 4).

Discussion

Through a randomized, controlled experiment, we examined people's responses and reactions to friendsourcing requests that offer external rewards. In so doing, we have provided concrete evidence of the value of a friendsourcing market overlaid on social network site. Our results suggest that external rewards increase response rates without undermining relationships among friends. In addition, the presence of external rewards allows requesters to explain away the non-responsiveness of their friends and, in turn, helps requesters preserve their perceived relationship strength with their non-responding friends.

In contrast to similar experiments by Heyman & Ariely [21], this experiment did not find differences in response rates between monetary and non-monetary rewards. One possible explanation is that the numerical weight information describing the bags of M&M (1.6 oz and 19.2 oz) also invoked transitionally-oriented, money-market schemas, just as the \$1 and \$5 gift cards did. Another possible reason is that our participants figured out the monetary value of the M&M bags. Indeed, instead of real bags of M&M candies, we sent responders Amazon gift cards for M&Ms. Although these Amazon gift cards have a default product attached, people could reject it and use the card to buy other products. In that way, the gift card for the M&M rewards worked the same as a standard gift card of \$1 or \$5. In designing this non-monetary reward, we had expected that people would only learn of the cash value of the M&Ms after completing the task. Although we have no direct evidence of this, it is possible that friends participating in the same task communicated with each other about the value of the candies, converting a gift into an explicit payment.

In the experiment, participants' friends were getting paid by a third party (i.e., CMU researchers) rather than directly from the requester. We believe that the involvement of third-party payers should not affect our hypotheses or the interpretation of the results because the underlying mechanisms are based on the extent to which the *presence* of payment either explains away friends' motivation to help or provides a rationale for why friends do not help. Overall, our paper examines how the mere presence of different types of extrinsic payment affects responses rate and perceived relationship strength. Accordingly, our predictions are the same regardless of who provides the payment – the requesters themselves or a third party.

The study is also subject to limitations. First, participants in the study self-selected friends from whom to solicit help, resulting in a biased sample of friends with whom they had stronger than average relationships. It will be interesting to examine how rewards affect response rates and relationships across different friend types (e.g., close friends to acquaintances). Also, future research could extend this work, by examining the effects of rewards on the extended friends network (i.e., friends of friends).

Second, in this study, we only collected information about relationship strength and attributions from the requesters' standpoint, but not the responders'. Future work should also examine how the presence of absence of external rewards influences the responders' perception of relationship strength with requesters.

Practical implication

This paper provides practical implications for designing a social-network-based sharing economy service. These services involve the sharing or selling of under-utilized assets including physical assets, inventory, capitals, skills and time, often through online applications. The sharing economy is growing into a "mega-trend" [44]. Trust is essential for the success of the sharing economy, whether individuals are taking a ride from a stranger or renting them a room. The advantage of a social-network-based sharing service is that social networks produce trust between participants without relying on regulation, background checks or explicit reputation systems. This paper suggests that overlaying external payments on the exchange of services among friends increases the likelihood that the requested work would be done, without undermining friendships. Indeed, because the inadequacy of payment can provide a rationale for why friends might not help, the external payments might actually preserve relationships.

CONCLUSION

This paper deepens our understanding of how and why payments among friends for services affect personal relationships. It also illustrates the potential value of new social-network-based sharing services.

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