



What's in it for me? Self-serving versus other-oriented framing in messages advocating use of prosocial peer-to-peer services[☆]



Rajan Vaish^{a,*}, Q. Vera Liao^{b,**}, Victoria Bellotti^c

^a Department of Computer Science, University of California Santa Cruz, Santa Cruz, 95065 CA United States

^b Department of Computer Science, University of Illinois Urbana-Champaign, Urbana, 61801 IL United States

^c Computer Science Laboratory, Palo Alto Research Center, Palo Alto, 94304 CA United States

ARTICLE INFO

Keywords:

Peer-to-peer economy
Prosocial services
Viral marketing

ABSTRACT

We present a study that investigates the effectiveness of self-serving versus other-oriented motivational framing of messages designed to persuade people to sign up for a prosocial peer-to-peer (P2P) service. As part of the study, volunteer message senders were incentivized to recruit people to sign up for one of three types of prosocial P2P services. Senders were given an option of choosing one of four pre-designed invitation messages to send to their contacts, two framed for self-serving motivations and two framed for other-oriented motivations. We found that recipients were more attracted to click on messages emphasizing self-serving benefits. This may not match the expectation of senders, who generally prioritized other-oriented motives for participating in prosocial P2P services. However, after recipients clicked the messages to investigate further, effects of self versus other-framing messages depended on the nature of the service. Our findings suggest that, even for prosocial services, messages offering self-serving motivations are more effective than altruistic ones on inspiring interests. But the overall persuasive effect on conversion may be more nuanced, where the persuasion context (service type) appears to be a critical moderator.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

In the new peer-to-peer (P2P) economy (Botsman and Rogers, 2010) people provide a wide range of tangible goods and services directly to one another and there are a variety of possible motivations for participation (Bellotti et al., 2015). For recipients of goods and services, such as accommodation, transportation, clothing, odd jobs and so on, motivations for participation are often self-serving; a room to stay in Paris, a ride to the airport, a clean basement, etc. Likewise providers of these goods and services can earn supplementary income as self-sufficient “micro-entrepreneurs” (Wong, 2012). However, an emerging category of P2P services are more altruistic or “prosocial” in philosophy, allowing people to provide help and resources to others. Examples include, Freecycle, where people donate items that they no longer need, Repair Café, where volunteers gather to fix broken machines and other items, WellSquad, which matches people with volunteer workout partners and trainers, and timebanks, where people provide services to others in the community.

With its cashless nature, prosocial P2P services often face challenges becoming self-sustaining. A business model with a reliable revenue

stream such as commissions on transactions in a marketplace (common to successful services like AirBnB, Uber and TaskRabbit) can attract venture capital as well as a steady user base in the expectation of incomes. Without such a revenue stream, prosocial P2P services often have to rely on donations to cover the costs of scaling up. Freecycle, for example, has to take donations from the Waste Management garbage collection company. Repaircafe.org solicits donations on its website, and hOurworld timebank network advises its member timebanks to seek grants and donations in order to fund themselves. Meanwhile, as with most volunteer-based endeavor, prosocial P2P services are reported to face challenges in member recruitment and retention (Clary et al., 1992). This is especially problematic considering that success of these services is premised on reaching a critical mass.

Recently, companies like Near-Me, ShareTribe, and MyTurn have appeared, offering platforms (e.g., ready-to-use websites or mobile apps for service exchange) as turn-key solutions for those who want to set up a prosocial P2P business. This lowers one of the significant hurdles a prosocial P2P service faces to bootstrap itself. However, marketing is still the remaining hurdle. In this paper, we aim to contribute insights for removing this hurdle by studying viral marketing strategies of prosocial P2P services. P2P services have been defined as platforms that support

[☆] This study has been funded by the National Science Foundation Grant No. IIS-1218544.

^{*} Corresponding author.

^{**} Co-first author (equal contribution).

E-mail addresses: rvaish@cs.stanford.edu, vaish.rajan@gmail.com, rvaish@stanford.edu (R. Vaish).

assets and/or services exchange between individuals, often in the physical world, enabled by web or mobile technologies (Bellotti et al., 2015). For prosocial P2P services, we adopt a broad definition of “prosocial” by considering P2P services where people contribute to others’ welfare without receiving financial benefits in return.

As with most volunteer-based services, recruiting for prosocial P2P services relies primarily on word-of-mouth (WOM) viral marketing as an economical way to spread the word. Meanwhile, P2P services’ focus on online transactions naturally leads them to exploit *electronic* word-of-mouth (e-WOM) — word-of-mouth marketing spread in online channels such as email, messaging service, and social media. For example, AirBnB and Uber encourage its users to share sign-up links with friends or on social media and reward both the senders and successful converts (i.e. those signing up through the shared links) with free credits. This kind of formal e-WOM promotion is currently less common among prosocial P2P services. We speculate that one reason is that these services could not provide financial rewards to either attract converts or to prompt current users to spread the messages in large quantities. Therefore, while we believe that e-WOM would largely benefit prosocial P2P services, we postulate that viral marketing strategies for these services should emphasize design of message content to make it more persuasive. And one way to do so in a prosocial context is to invoke the “motivations for helping”. Below we review the theoretical framework for such motivations and discuss research questions we attempt to answer through a field experiment.

2. Theoretical framework and research questions

To begin with, we note that altruism is not the only motivation underlying prosocial behaviors. Psychologists have had a longstanding interest in understanding why people help others. What they found is a diverse, and for a long time, puzzling, set of motives. This can be traced back to Comte (1868), who first coined the term “altruism”. By differentiating between people’s motivation and behavior, Comte pointed out that the motivation for engaging in prosocial behavior can be both altruistic — when the ultimate goal is to increase another’s welfare, and egoistic — when the ultimate goal is to increase one’s own welfare. This *pluralism of motivations for prosocial behaviors* have been widely shared by contemporary social psychologists, meanwhile expanding this view to encompass broader set of motives. Specifically, empathy, collectivism, seeking idealism are some of the other-oriented motives for engaging in pro-social behaviors. Seeking instrumental rewards (e.g., through reciprocity), building reputation, and avoiding guilt are some of the self-serving motives behind pro-social behaviors (see review in Batson, 1987; Batson and Powell, 2003; Batson and Shaw, 1991). These theories have inspired communication and marketing scholars, most notably research on utilizing both self-serving and other-oriented rewards in recruiting volunteers and generating charitable support (Bennett and Kottasz, 2001; Phillips and Phillips, 2011; White and Peloza, 2009). Recently, HCI researchers reported similar plurality of motivation to volunteer for both online and offline peer-production groups (Hars and Ou, 2001; Kuznetsov, 2006; Liao et al., 2016).

In the case of prosocial P2P services, we anticipate the pluralism of altruistic and egoistic motivations as well. While empathetic altruism — “helping others in need” — is at the core of the vision of these services, there are certainly opportunities to satisfy self-serving motives, such as getting rid of clutter in Freecycle (HowStuffWorks, 2016), learning new skills in Repair Café and earning reciprocal services in a time-bank (Botsman and Rogers, 2010; Cahn and Rowe, 1992; Cahn, 2000; Seyfang, 2002; Shih et al., 2015). Interestingly, although not exclusively focusing on prosocial P2P services, a recent survey study of motivations for the use of P2P services (Bellotti et al., 2015) reported a divergence of motivational focus between system providers and system users. While system providers place greater emphasis on community (others) oriented motivations — the common ideal center to the notion of P2P

services or sharing economy, users are primarily looking for instrumental values to satisfy personal needs.

Based on the theoretical framework of pluralism of motivations for helping, in this paper, we compare the effectiveness of viral marketing strategies for prosocial P2P services with self-serving and other-oriented framing. Our research contributions are two-folds. First, to the best of our knowledge, we set out to conduct the first study to inform viral marketing strategies in the emerging and growing area of prosocial P2P services. We argue that although these services, in essence, promote altruistic outcomes, there are still plenty of opportunities for people to obtain self-serving benefits while at the same time contributing to the common good. It may be important, even necessary, to highlight the existence of these self-serving benefits at the recruiting stage, as they may not be self-evident for prosocial services. However, the effect needs to be empirically tested in a prosocial context, considering the evidence showing that mentioning instrumental rewards can sometimes backfire and discourage people’s autonomous motivations (e.g., helping others) (Amabile, 1993; Ryan and Deci, 2000).

Meanwhile, there is no conclusion on whether self- or other-framed messages are more persuasive, as their effectiveness was reported to be complicated by many moderating factors, including recipients individual differences and sender-recipient relationships (Bennett and Kottasz, 2001; Maner and Gailliot, 2007; Simpson and Willer, 2008; White and Peloza, 2009). A less studied factor is the nature of the task, and in our context, the service to recruit for. As some argue that outcomes of prosocial behaviors should be considered on a continuum instead of a dichotomy of altruism and egoism (Krebs, 1991), some prosocial P2P services would appear to provide more or less self-serving benefits than others. We note that, among the many kinds of prosocial P2P services on the market, some are mainly to recruit “helpers”. For example, repair café recruits repairers, and local support groups recruit people to provide help for those in need (e.g., older adults). Some other services imply more “reciprocity” that one can easily see the potential instrumental, albeit non-monetary, rewards. For example, by joining a health community like WellSquad, by providing services to others (e.g., workout partner, recovery support), people can improve their own health conditions as well. In this study, we will examine the persuasive effect of self-other framing across different prosocial P2P services.

Second, we contribute a field study that systematically investigates how message framing impacts the progress of e-WOM. Our study is based on the multi-stage model of e-WOM influence proposed by De Bruyn and Lilien (2008). According to the model, e-WOM starts at the *awareness stage* when a message reaches an recipient. Next is the *interest stage*, in which the recipient decides to open the message and investigate the service or product. Finally, the recipient reaches the *decision stage* of acquiring the product or service. To capture activities of these stages, we built a web platform to seed and disseminate viral marketing messages in the real world, and collect data on the behaviors of senders, recipients and the interpersonal relations between them. We focus on examining how message framing on self-serving versus other-oriented motives impacts the key stages of e-WOM—sender’s pass-along decision, recipient’s interest in the message, and recipient’s convert decision. Meanwhile in all these stages we pay attention to the mediating effect of service type to recruit for. Specifically, we ask:

RQ1. How do senders choose between self-serving or other-oriented motivations to persuade their contacts to join a prosocial service? How does the preference differ for different services?

RQ2. Are self-serving or other-oriented motivations more effective in raising recipients’ interest to investigate further? How does the effect differ for different services?

RQ3. Are self-serving or other-oriented motivations more effective at getting interested recipients to sign up for such a service? How does the effect differ for different services?

In addition, we also want to investigate whether interpersonal factors between the sender and the recipient, such as their closeness (tie strength) and similarity (homophily), influence the effectiveness of viral marketing. Interpersonal relationship has long been a primary focus of researchers studying e-WOM. Our study provides a new context to identify key factors that e-WOM practices for prosocial services should target for. We ask:

RQ4. How do interpersonal factors affect the sign-up decision?

In the remainder of this paper we discuss additional prior work that informed our research, present our experimental study and then results addressing the research questions. We conclude with a discussion of our findings.

3. Related work

3.1. Effectiveness of word-of-mouth marketing

Word-of-mouth (WOM) marketing — a key focus of the study described in this paper — can be highly cost-effective (Trusov et al., 2009), particularly now that it takes place through *electronic* communications (e-WOM) (Helm, 2000). For this reason it has attracted a lot of attention from researchers seeking to make it more effective. Watts and Dodds (2007) countered the conventional idea that the most efficient approach in WOM efforts was to seed a campaign with “influentials”. Instead, they showed in a simulation that a critical mass of “easily influenced” individuals willing to influence others is a more important driver of virality. So a key issue in e-WOM is to understand what factors motivate senders’ referral decisions.

Several studies empirically examined senders’ motivations. According to a study of viral marketing by Phelps et al. (2004), caring and helpfulness were two top reasons given for sending on “pass-along” email. Ho and Dempsey (2010) surveyed 582 participants to measure personality traits and proclivity for consuming and forwarding e-WOM content to others. They found that a strong tendency to *consume content*, and scoring highly on the traits of *individuation* (wanting to stand out), *altruism* and *personal growth initiative* (Robitschek, 1998) were associated with the tendency to forward online content to others. When consumers do decide to forward e-WOM content, they also seem to consciously filter what they send, and this can be sensitive to the target of the content. In an experimental e-WOM simulation, Greenacre et al. (2012) found that information senders behave altruistically and “assess information in a manner that considers how it will be useful in terms of the preferences of the receiver.” By answering RQ1, our study seek to inform the effectiveness of self-serving versus other-oriented messages in motivating senders’ pass-along decisions.

On the recipient side of the equation, De Bruyn and Lilien (2008) replicated the Milgram “small world” experiment in which participants were asked to forward an email to someone who was likely to get an email eventually forwarded to a target individual somewhere in the US. The data collected from tracked message forwardings and subsequent survey responses were used to develop a multi-stage model of e-WOM influence. In this model, different factors exert differential influence, depending on stage of the decision-making process. According to De Bruyn et al., e-WOM starts at the *awareness stage* when a recipient receives a message. At this stage, before opening, the recipient considers his or her relationship with the sender. Next is the *interest stage*, in which the recipient conducts a cost-benefit appraisal of whether it is worth investigating the content; at this point, knowledge of the sender’s tastes, expertise and experience may be factors. Then the recipient reaches the *final decision* stage and again considers costs and benefits of acquiring the product or service. Here considerations relate more to information about the product than anything to do with the sender.

De Bruyn et al. also considered several key dimensions of the relationship between the sender and the recipient that might be significant at different stages of the decision process. They found that *tie strength*

influenced a recipient to open a message. *Perceptual homophily* (attitudinal/lifestyle similarity) did not affect the chance of the recipient opening the message but increased the chance that the recipient would click on the link in the message and visit the recommended website. *Demographic similarity* had a negative impact; a decrease in opening the message, a decrease in visiting the website and a decrease in exploring the offer. The authors postulated that demographic dissimilarity may signal new and valuable information and perspectives (De Bruyn and Lilien, 2008). Another relevant study Palka et al. (2009) found *homophily* to be a key determinant as to whether a recipient would open a message and use the messaged content. *Sender expertise* was also influential in recipients deciding to use the content.

While previous work tended to focus on examining the personal and inter-personal factors of the sender on the recipient’s responses to e-WOM messages, we investigate the effect of message framing, specifically self-serving versus other-oriented framing. Based on De Bruyn’s model, we study recipients’ response by focusing on the interest stage (opening a message) and the decision stage (signing up) to answer RQ2 and RQ3. In addition, to address RQ4, we are interested in how the interpersonal factors of tie strength (De Bruyn and Lilien, 2008) and homophily (De Bruyn and Lilien, 2008; Palka et al., 2009) with the sender impact a recipient’s tendency to open a message and sign up.

3.2. Motivations for participation in prosocial P2P services

With increasing popularity of P2P services, researchers have begun understanding motivations of users of these services. By studying users of a diverse selection of P2P services (including those providing financial benefits such as car renting) in Amsterdam, van de Glind (2013) documented that the top motivations given for P2P service use were financial, other people’s recommendations, contribution to the community, socializing, and environmentalism. In a recent, large-scale survey, the top five motivations for P2P service use were found to be, in descending importance, convenience, price, better service quality, couldn’t find elsewhere, and recommendation (Owyang et al., 2014). Bellotti et al. (2015) interviewed users of P2P services of all kinds and found that both receivers and providers of goods and services in the systems were motivated by self-serving ends and social attractions, this held even for prosocial services.

However, there has been little work on what motivates people to participate in specifically *prosocial* P2P services. One exception is Suhonen et al. (2010), issued surveys to users of an explicitly prosocial P2P service called Kassi where users offered and requested goods and services to and from one another. The main motivations were found to be *altruistic*, *reciprocal* (seeking to give back when they had received something from the service) and to a lesser extent, *self-serving*.

The most extensive literature on the theme of prosocial P2P services is focused on timebanking, a service in which members provide only services (not goods) to one another in exchange for time dollars (Cahn and Rowe, 1992). Seyfang (2002) reported on motivations of 18 members of the UK’s Rushey Green timebank for joining and participating. They were, in descending order of prevalence, to help others, to get more involved in the *community*, to improve the *neighborhood*, to *meet people and/or make friends*, to *get help for oneself*, and finally to *earn time credits*. Two thirds of the respondents felt that the timebank had helped them achieve their objectives. Members also benefit from *enhanced skills* and *self-esteem* as a result of participation.

Collom (2007, 2011) surveyed members of a US timebank. He found that members were motivated by *personal needs*, *socializing*, *values* of the timebank and by *altruism*. Overall, they were attracted by information about aspects of the timebank that matched their motives. Recently, Shih et al. (2015) conducted a large survey and log data analysis of US timebanks which showed that high- and low-timebank-utilizers had differing motivations, with the smaller population of high utilizers motivated by *idealism* and *altruism* and the larger populations of low utilizers by *self-serving*, *instrumental motives*.

By considering prosocial P2P services as digital platforms where people contribute to others' welfare without receiving financial rewards, another relevant line of research is on the motivation of digital volunteerism. Similarly, a diverse set of motivation have been reported. In studying online crisis information volunteers (Starbird and Palen, 2011), altruism, personal connections with those in crisis, making an impact, and social relationship with other volunteers have been reported for continued involvement in volunteering. In studies of volunteering in peer-production services such as Wikipedia (Nov, 2007; Yang and Lai, 2010) and open-source software (Ye and Kishida, 2003), while other-oriented motivations such as helping others and collective idealism were reported, self-serving motivations such as learning, social needs and career development were also identified, sometimes emphasized more than the former.

Although studies specific to prosocial P2P services are limited and only emerging recently, the motivations we reviewed above are largely consistent with the theoretical framework of pluralism of motivations for prosocial behaviors — some are motivated more by self-interest and others by other-oriented motives. Instrumental rewards, reciprocal services, self-improvement, social benefits are common self-serving motives to participate in prosocial P2P services, even if monetary awards are absent. In addition to empathy-based altruism, another common other-oriented motive specific to the context of P2P services is the idealism for a better community or contribute to the common good. The studies reviewed above also suggest that the extent of these motives may vary across different types of prosocial P2P services.

3.3. Message framing

A considerable amount of prior work has tackled message framing (how a message is worded) as a means to make communications more persuasive. The most widely known work is focused on health-related messaging, especially on comparing gain and loss framing, i.e., the message emphasizes a benefit or a loss resulting from the behavior being promoted. And a recent meta-analysis (Gallagher and Updegraff, 2012) suggests that, overall, the effectiveness of positively and negatively framed messages depends on the behavior that is targeted.

Scant work has looked at promoting prosocial behaviors, and the majority of them targeted charity support and volunteer recruiting. A few studies explored comparing the altruistic and egoistic framing. For example, Bennett and Kottasz (2001) experimented with recruitment advertisement for charity volunteers by enlisting the egoistical versus altruistic advantages. They found individual differences and higher persuasiveness when the message framing is consistent with the recipient's personal value (high versus low altruistically inclined). Similar moderating effect of individual difference in value orientation was reported in Simpson and Willer (2008). White and Peloza also examined these opposites in the context of marketing appeals for charitable donations. They found that self-benefit appeals are more effective when people's responses are private, but other-benefit appeals work better when people's responses are public. They suggest that the reason is people's desire to conform with societally approved norms (White and Peloza, 2009). Feiler et al. (2012) conducted multiple studies to compare the persuasiveness of charity donation advertisements emphasizing altruistic, egoistic and both reasons. They found that messages mixing both reasons may backfire by eliciting psychological reactance.

Cahn (2000) explored the self-other framing in combination with loss-gain framing, focused on promoting environmentally sustainable behaviors and they found that *self-referencing*, in combination with *gain-framed* messages, is more powerful whereas *loss-framed* messages work better with *self-other-referencing* — describing how the behavior affects others.

Results of these studies suggest that there is no universal preference between self- and other-framing, as the effect is moderated by many factors including individual differences, message contents and information contexts. In our study, we focus on a potential moderator — service type

— to inform viral marketing strategies for a broad category of prosocial P2P services, some of which may evidently provide more self-serving benefits than others. If the moderating effect is absent, we may be inclined to believe that certain framing, self-serving or other-oriented, has universal appeals for recruitment of prosocial P2P services. Otherwise, it may be necessary to tailor the message framing for different services.

In persuasion literature, another relevant, probably more widely studied message framing is on individualism versus collectivism. Originated from Hofstede's cultural dimension theory (Hofstede, 1983), this framework particularly draws attention in adapting persuasive strategies across cultures (e.g., America vs. Asia) (see review in Hornikx and O'Keefe, 2009). As we reviewed in this section, collectivism — benefiting the community — is a common motivation seen in prosocial P2P services, and we will include it as a type of other-oriented message in our study.

In summary, our study made novel contributions by examining the persuasiveness of self-other framing in the context of e-WOM and prosocial P2P services. Instead of simply looking at the outcomes of a single persuasion event, as most previous work did, we carefully examined how the message framing impacted different stage of e-WOM process, and compared the results across multiple services, to provide nuanced insights for viral marketing strategies of prosocial P2P services.

4. Methodology: a field experiment of viral motivations in invitations to join peer prosocial services

This work aimed to investigate how self-serving and other-oriented framing appealed to senders and recipients of viral marketing messages promoting prosocial P2P services. In this section, we introduce our methodology for conducting a field experiment to answer the research questions. We first discuss how we designed and validated the message framing, before introducing the experimental design.

4.1. Motivational message design

To fully capture the contrast between self-serving and other-oriented framing, we chose to design viral marketing messages with multiple types of motivation within the two more general classes of framing. Prior work on motivations for participation in P2P services (Bellotti et al., 2015; Collom, 2007, 2011; van de Glind, 2013; Owyang et al., 2014; Seyfang, 2002; Shih et al., 2015; Suhonen et al., 2010) suggests that some self-serving motivations may be more immediate and tangible, while others may be more long-term. For example, joining a timebank offers immediate instrumental benefits—getting things done—but it also offers the longer-term self-serving possibility of developing skills and a good reputation. Similarly, altruism may be directed immediately at specific individuals, or towards longer-term, idealistic benefits for the community or society at large, e.g. helping a neighbor in need, versus building a supportive and prosperous community. Therefore, from the various motivations of using P2P services as we reviewed in previous work, we selected a more immediate and a more long-term type of motivation with self-serving and other-oriented framing. Specifically, we designed messages leveraging the following types of motives:

Self-serving Motivations

1. *Instrumental (immediate gain)*: Tangible benefits fulfilling a personal need or desire, e.g., getting a service from others.
2. *Self-improvement-oriented (long-term gain)*: Increasing one's resources, e.g., skills or reputation.

Other-oriented Motivations

1. *Altruistic (immediate benefit for other individuals)*: Fulfilling others' needs at one's own expense, e.g., doing a favor for someone.
2. *Idealistic (long-term benefits for community/society)*: Seeking to make the community/society a better place for all, e.g., creating a supportive community in the neighborhood.

	Time Bank	Mobile Health	Group Activity
Instrumental	Join a timebank! Get yourself the services and favors you need for free!	Join a mobile health community! Get yourself fit and strong more easily!	Join a group activity planning platform! Give yourself the adventure and fun you are looking for!
Self-improvement-oriented	Join a timebank! Develop your self-respect and empowerment by providing services!	Join a mobile health community! Develop your self-respect and empowerment with exercise!	Join a group activity planning platform! Develop your self-respect and empowerment through adventure!
Altruistic	Join a timebank! Help and support others by providing the services they need!	Join a mobile health community! Help and support others in achieving their health goals!	Join a group activity planning platform! Help and support others in accomplishing their dream adventures!
Idealistic	Join a timebank! Make our society a better place with more connections and support for all!	Join a mobile health community! Make our society a better place with more health and strength for all!	Join a group activity planning platform! Make our society a better place with more joy and excitement for all!

Fig. 1. Final motivational message set for three kinds of prosocial system.

In this study, our goal was not to identify the most effective marketing messages for one service but to inform about the general appeal of self-other framing for prosocial P2P services. Therefore, we conducted experiments of viral marketing campaigns for multiple prosocial P2P services, specifically:

1. *TimeBanks*: Communities in which people provide (off-line) services to others and earn time dollars that they can spend on receiving services.
2. *Mobile Health Communities*: Communities where people help each other achieve their health goals, e.g., teaming up to exercise together, providing informational and emotional support, giving supervision.
3. *Support Group Activity Services*: System where users post activities they want to accomplish and others can sign up to provide help and support, e.g. donating resources, helping with planning, joining the activity.

While it is impossible to study a comprehensive list of prosocial P2P services in one study, we attempted to include service types that are distinctive and appear to provide varying levels of self-serving benefits. Health communities, as we hypothesized, could evidently signal self-serving health benefits, even for those who are not familiar with the services. In contrast, campaigns for support group services are more likely seen as recruiting “helpers” that can provide support. Timebanks, on the other hand, may be a new concept to many while previous work shows that community service is often seen as its core notion. We will explore whether, and how, the service type mediates the effect of self-other framing.

For each service, we designed four motivational invitation messages advocating joining the service, each expressing one of the four motives above. Followed O’Keefe and Jensen (2008), we created a “message kernel” that represented the desirable root state corresponding to one of our four motivation types. For example, a self-serving message would be, “Join a timebank! Get yourself the **services and favors** you need for free!” We always used a double-barreled kernel, such as “favors” plus “services” to strengthen the appeal. In a rapid pre-study evaluation with 15 volunteers, we determined that positively framed messages as in the example above, were seen as more persuasive than negatively framed messages (Gallagher and Updegraff, 2012) (e.g., “don’t waste money paying for services you need”). Following careful, iterative refinement of the message design, we ended up with four message variations for each of the three service types for a total of twelve messages (see Fig. 1).

4.1.1. Message validation

To validate that the messages reflected the four types of motivation they were designed for respectively, we asked 5–15 volunteers to rate

each of the 12 messages on four 7-point Likert scales (agree-disagree) reflecting each motivation type (the number per message varied due to the random assignment process). The scales were:

- Instrumental: “The service seems to offer something I want for myself.”
- Self-improvement: “The service seems to enable me to become a better kind of person.”
- Altruistic: “The service seems to enable me to help others.”
- Idealistic: “The service seems to enable me to pursue higher ideals for society.”

We then calculated a weighted rating on each of the 4 scales for the four types of motivational messages designed. The weighting compensated for the fact that some motivational messages were rated higher than others on all, or most scales. To do so, we first calculated, for each scale, the *average scale score* for each of the 4 types of motivational message (i.e., averaging scores across the 3 services), then we calculated each message type’s *average message type score* across all scales. To calculate the final weighted scale score for each message type, we divided the *average message type score* by the *average scale score*. The final score meant that, if the number was greater than 1, the message type scored higher than average on that scale. The weighted scores in Table 1 show that each message is rated highest on the motivational scale it is intended for, supporting the validity of our message design.

The analysis shown in Table 1 also suggested Instrumental and Self-improvement messages received higher ratings both on their own and on each other’s scales (4 purple-shaded cells in Table 1, upper left) than the other two other-oriented scales. The converse was true for altruistic and idealistic messages, that received higher ratings on both their own and each other’s scales (4 green-shaded cells in Table 1, lower left) than on the self-serving scales. This is to be expected, as messages designed to be within each class of motivation framing are supposed to be more similar to each other. To verify this, we conducted a factor analysis on all four message type’s ratings on each of four scales to confirm any underlying motivational factor(s) that clustered the ratings. Factor analysis revealed that these motivation ratings could be explained by a single factor ($X^2 = 4.45$, $p < 0.001$), which we will call *FMotive*, and the loading of each scale’s ratings is shown in Table 2. In this table, the two other — oriented motivations — altruistic and idealistic — positively load on *FMotive*, and the self-oriented motivations — instrumental and self-improvement — negatively loaded on *FMotive*. We can also see that the loading of the former two is close, and the negative loading of the latter two is also close. We take it as evidence that our manipulation of messages reflected an underlying motivational disjunction between self and other framed messages, and that both our instrumental and self-improvement messages reflected motivation on the self-serving end, while both our altruistic and idealistic messages reflected motivation on the other-oriented end. In the remainder of the paper, we will combine the former two types of messages, and the latter two types of messages, to focus on comparing the more general self versus other framing.

4.2. Experimental method

To understand the effects of motivational messages, we developed an experimental web platform PeerX. PeerX is designed to be a viral marketing platform, which allows a user to sign up and share referral messages to join prosocial P2P services with connections. To avoid confounding effect of varying quality of specific services, we presented PeerX as a curator website for various types of prosocial P2P services, and invite users to sign-up on PeerX to stay updated about a category of prosocial P2P services they are recruited for. To develop the experimental platform, we used API from InviteReferrals.com, a web service providing support for customizable e-WOM campaigns. The API also enabled us to track senders’ and recipients’ activities, which we will explain in more detail below.

The action flow of sending referral messages on PeerX (see Fig. 2) consisted of users signing up on a website, agreeing to a research con-

Table 1
Weighted scores for the four motivational scales for each type of motivational message.

	Instrumental message type	Self-improve message type	Altruistic message type	Idealistic message type
Instrumental scale	1.24	1.14	0.81	0.81
Self-improve scale	1.14	1.24	0.81	0.81
Altruistic scale	0.80	0.93	1.21	1.06
Idealistic scale	0.87	0.84	1.11	1.18

Table 2
Loadings for message type ratings on a single factor (FMotive).

Rating Scale	Loadings on Factor, FMotive
Instrumental	-0.224
Self-Improvement	-0.121
Altruistic	0.997
Idealistic	0.702

sent notice, then selecting a viral marketing message to share with specific friends. Message order was randomized but remained the same for each user, as one was allowed to return to the page to select other messages to share with other contacts. We asked them to select the best message for friends they are recruiting for and only allowed sharing via *narrowcast* media; Facebook messages/invitations and email. So broadcast media such as Facebook shares and Twitter were avoided because we would not be able to estimate the number of exposures. Participants were prevented from modifying the message in any way.

Our study lasted two weeks including a recruitment phase, an experiment phase and a subjective data collection phase.

4.2.1. Participant recruitment phase

This phase centered on volunteers signing up on PeerX, selecting a message and sharing it with contacts. In the rest of the paper, we call these volunteers *seeds* and the contacts they chose to send to, *recipients*. We call the recipients who eventually signed up, *converts*. We recruited seeds through Craigslist ads in Chicago, LA, New York, and the San Francisco Bay Area, university mailing lists and our organization's large volunteer list; seeds were not screened. The average age of seeds is 30.9 and of converts 28.5. Overall, 59.52% of the participants were female.

The incentive was a maximum payment of \$50, which seeds could earn by sending messages to their friends with \$5 for each one that signed up (up to \$30) and completing the post-experiment survey (\$20). We kept the payment low to minimize temptation to make extra effort persuading contacts to sign up that we could not track (e.g. by calling). To keep things as close to natural e-WOM as possible, recipients were not paid to sign up, nor were they made aware that seeds were being paid. After recruitment, we had 95 seed volunteers.

4.2.2. Experiment phase

The experiment lasted for a week, where seeds were asked to sign up on PeerX and recruit friends selecting any of the motivational messages. Seeds were allowed 72 h to make the referrals. Each was directed to a page introducing only one of the three service types — TimeBanks, Mobile Health Communities and the Support Group Activities service. The selection was random and a seed who focused on one service was not made aware of the other services. To study how seeds made choices among the messages, we added two steps in the PeerX *sharing process* (Fig. 2):

1. *Message Selection*: Seeds were asked to select one of the motivational messages that they felt would be most enticing to friends they wanted to invite. Seeds were allowed to return to the message selection page to choose different messages for different contacts. There was no limit on the number of iterations a seed could perform.
2. *Message Sharing*: After selecting messages, seeds were asked to pick recipients of the message from the contact list imported from their email or Facebook. After confirming the selection, the selected invitation message will be sent to the selected contacts in bulk.

To study how recipients reacted to the invitation messages, we also designed a two-step process for *signing up*:

1. *Click (interest stage)*: After the seeds finish the sharing process, selected recipients received the invitation message. The message contained only the designed motivational message in bold, and a link to a PeerX webpage for the service they were recruited for. If the message successfully raised the recipients' interest, he or she would click the link to explore more.
2. *Convert (decision stage)*: On the web page, we provided a short article explaining the corresponding prosocial P2P services (TimeBanks,

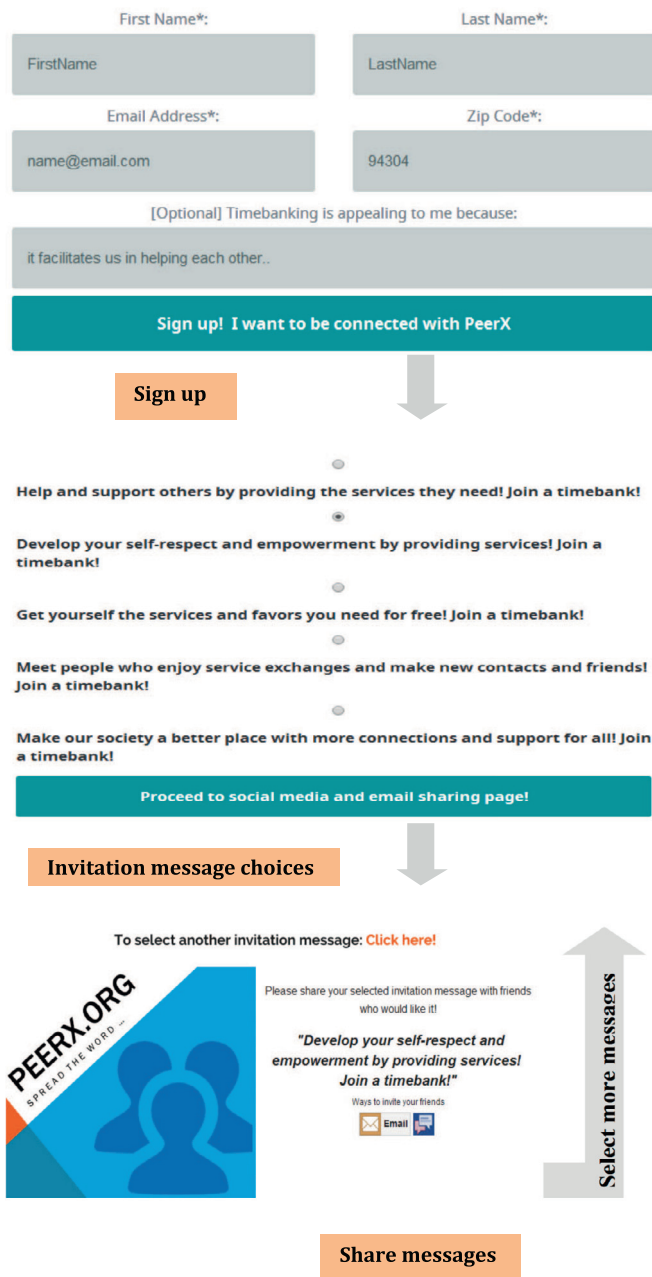


Fig. 2. Seed participation process on the experiment platform.

Mobile Health Communities and the Support Group Activities service), as well as links to several examples of the type of service. We wrote the article in an objective, factual way to avoid unwanted persuasion effect. At the end of the page we encouraged recipients to sign up on PeerX to connect with these services we curated and stay updated about new services in the category. We provided them with the same sign-up form that was given to seeds (Fig. 2 top page). After signing up, they were given the option to become unpaid seeds to recruit others, although few chose to do so in our experiment.

By using the InviteReferrals API, we were able to track seeds' and recipients' activities in the above stages, including *which messages* seeds selected to send to *which recipients*, whether the seeds *clicked* the message and eventually *converted* by signing up.

4.2.3. Subjective data collection phase

In order to collect information about the backgrounds of and relations between seeds and recipients, we administered two surveys – for seeds and converts respectively. Within 48 h after seeds finished inviting, or converts finished signing up, we sent the survey to the email address they used to sign up. Survey responses were a mixture of open-ended textual, checkboxes and scales. All scales were seven-point Likert scales with consistent anchors. We allowed 48 h for completion. Broadly, the survey covered:

1. *Demographics*: Gender, employment status, highest educational qualification and income range.
2. *Interpersonal Relationships*: Information about a seed's relationship with a named recipient. For each seed we asked for up to four recipients (to avoid overtaxing the seed). Of these, two were randomly selected recipients who didn't convert, and two were randomly selected ones who did (if fewer than two, then only one or zero was asked about). For each recipient, we asked the seed to rate strength of their social tie and homophily. For social tie strength we used a compressed version of the De Bruyn and Lilien scale (De Bruyn and Lilien, 2008) by asking them to rate their relationship with the recipient on *closeness*, *intimacy*, *emotional intensity*, and *reciprocity*. We averaged these ratings (Cronbach's alpha 0.91) to create *tie strength index*. For homophilic strength we used the 4-item McCroskey et al. scale (McCroskey et al., 1975) by asking them to rate their similarity on *experience*, *behaviors*, and *life outlook*. We averaged these ratings (Cronbach's alpha 0.92) to create *homophily index*.
3. *Reasons to convert (for converts only)*: To gain insights on converts' reasons to join, we asked two open-ended questions at the end of the survey: "Why did you choose to sign up or not sign up for the service on PeerX?", and "How did you feel about receiving the PeerX message from your friend?"

5. Field experiment results

In this section, we discuss results on senders' choices between messages with self- versus other-serving framing (RQ1), and which message framing is more effective in attracting clicks — recipients - interest (RQ2) — and eventually leading to successful converts (RQ3). For each of the research question, we examined whether the effects differed between different prosocial P2P services. Lastly, we investigated how tie strength and homophily between senders and recipients impacted the e-WOM results (RQ4). To begin with, we review the descriptive results of the field experiment and the data cleaning process, which is critical for analyzing the noisy data from the field deployment.

5.1. Experiment data overview

On PeerX, we recorded seeds' (and a small number of converts who joined and volunteered to seed the next iteration) invitation activities in two stages — selection of messages and sending invitations. In total, we recorded all 95 seeds we recruited and 33 converts reached the selection stage. Eventually, 67 of them (including 4 unpaid converts) successfully sent out at least one invites. Among them, 28 were recruiting for Time-Bank, 21 were recruiting for mobile health community, and 18 were recruiting for Group Activity services. 1975 invitations were sent out in total, leading to 166 referral clicks and 60 converts. In Table 3 we presented the number of participants who selected or sent at least one message for each type of motivation.

We conducted a Chi-square analysis of order position in experimental presentation of selected messages and found no significant effect ($\chi^2 = 4.45, p = 0.34$). This meant that seeds were selective in their message choices instead of simply following the presented order. We also found no significant effects related to participant demographics (collected from survey responses at the end of our study) such as age, gender and education, and so excluded these from our analysis.

Table 3
Number of participants who selected and sent at least one messages for each type of motivation.

Message Type	No. of Particip'ts	Status
Instrumental	41	MsgSelected
Self-Improvement	27	MsgSelected
Altruistic	45	MsgSelected
Ideological	35	MsgSelected
Instrumental	25	MsgSent
Self-Improvement	12	MsgSent
Altruistic	24	MsgSent
Ideological	22	MsgSent

5.2. Data cleaning

During analysis, we found that 7 participants sent messages to huge numbers of contacts, suggesting that they did not, as requested, select messages best suited for those contacts. We removed their data as outliers, restricting analysis to those who sent 50 messages/invitations or fewer. After this step, we analyzed a dataset of 60 participants sending out 478 invitations, resulting in 145 clicks and 55 converts.

We further investigated the effect of referral medium, as we gave both email and Facebook Invite/Message sharing options. After removing the outliers, we found that the convert rate (number of successful converts divided by the number of messages) were rather low for Facebook invites — 3.5% compared to 17.6% for emails. This may be because Facebook campaigns are often considered spam (Gao et al., 2010), which could mean that other non-experimentally controlled factors such as a recipient's spam experience could be more influential on recipient behavior and this might swamp message type effects in driving the tiny number of converts. With such sparse and uncertain data from Facebook and to maintain consistency and evaluate statistical significance hereon, for this paper, we decide to focus only on data based on email referrals for analyzing recipients' behaviors.

Based on just the email referral data, after removing the outliers we found a total of 272 invitations sent by 47 participants, causing 102 referral clicks and resulting in 48 converts.

5.3. Senders' message selection (RQ1)

To answer RQ1 — how the motivational difference in message and service affect senders' selection of the invitation — we explored the invitations sent as recorded by our platform. Overall, we found that 209 self-serving messages and 269 other-oriented messages were sent. A Chi-square analysis compared this result to the null hypothesis of equal selection showed the difference was marginally statistically significant $\chi^2 = 3.53, p = 0.06$, suggesting that overall senders preferred other-oriented motivation. This preferential pattern was consistent across message channels, with 110 self-serving versus 162 other-oriented messages selected for email referrals ($\chi^2 = 4.64, p = 0.03$).

We then explored whether senders' preference for other-oriented framing differed between services. We plot the number of self- and other- serving messages sent for each service in Fig. 3. The figure suggested that senders did discriminate between services in their preferential selection of message framing. In particular, they seemed to have preferred other-serving framing for recruiting for Time Banks, but self-serving framing for Mobile Health Communities.

To validate the results, we conducted pair-wise chi-square analyses for selection of self-serving and other-oriented messages between services. We used senders' selections for Health Community as baseline for comparison, as it seemed to be the one for which seeds distinct

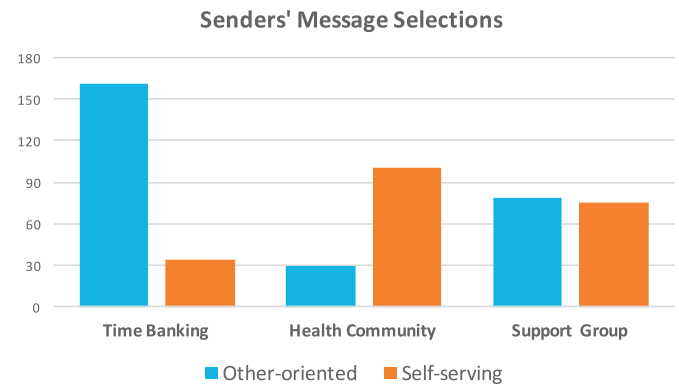


Fig. 3. Number of invitations sent out, broken out by type of system and type of message (self-serving or other-oriented).

tively preferred self-serving framing. The difference within each pairing of services (Health-with-Group and Health-with-Timebank) is statistically significant after Bonferroni correction—a method that compensates for multiple comparisons risking spurious significant results — for the two pairs: Health vs. Group: $\chi^2 = 23.50, p < 0.001$; Health vs. Timebank, $\chi^2 = 113.10, p < 0.001$. We also further tested the main effect of message motivation type for each service, by conducting chi-square analysis against “equal selection” between the two message framing. We found it to be significant for Timebanks ($\chi^2 = 44.91, p < 0.001$), Mobile Health ($\chi^2 = 30.03, p < 0.001$), but not for group activity ($\chi^2 = 0.01, p = 0.91$).

To summarize, we found that senders sent more other-oriented invitations for timebanks, and more self-oriented invitations for Mobile Health, but did not show a motivation type preference for the group activity service. This result was generally consistent with our hypothesis that health community might be seen as more on the self-serving end than the other two, and it suggested that senders did make the selection of message framing by considering the service type to maximize its persuasiveness.

5.4. Recipients' attention (RQ2)

We then compared the effectiveness of messages with self-serving (motivational type = 1) and other-serving motivations (motivational type = 0) on attracting recipients' interests — their clicking on the message to explore more on PeerX. We ran a mixed-effect logistic regression on whether a click (clicked = 1, not clicked = 0) was generated by each message, by including the message motivation type (other-oriented motivation as baseline) as a fixed effect independent variable, and participant as a random effect — because some participants sent multiple messages. We excluded data from Facebook invitations as mentioned. We found a marginally significant positive effect of self-serving moti-

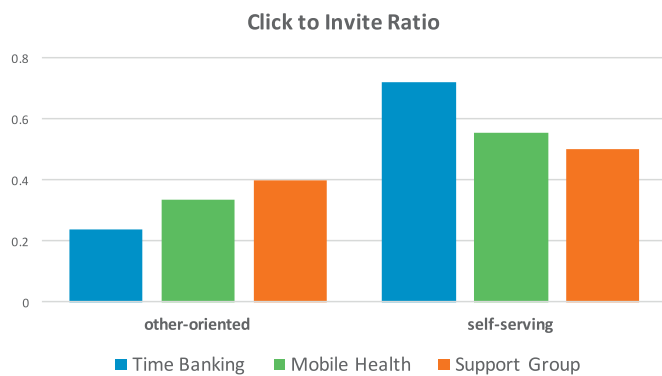


Fig. 4. Click-to-invite ratio for self-serving and other-oriented type of messages across all the services.

variations ($\beta = 1.13$, $SE = 0.68$, $Z(46) = 1.69$, $p = 0.08$), suggesting that receivers were more likely to click on email messages with self-serving motivations. In fact, we found that messages with a self-serving motivation (55.5%) were nearly twice as likely to be clicked as those of other-oriented motivation (27.8%).

We found no significant moderating effect of service, meaning that regardless of the type of service, recipients were consistently attracted more to self-serving than other-oriented motives (see Fig. 4). This could potentially be explained by the fact that at the attention stage, by simply reading a short message, recipients had little awareness of the prosocial nature of the services, or the differences between the services, and mentioning of self-serving benefits is generally more appealing for raising interests than other-serving motives. There is a concerning implication that echoes Bellotti et al. (2015) — a potential mismatch between the emphasis of advocates of prosocial P2P services on other-oriented motives, at least for some services (e.g., Time Bank), and the actual effectiveness in drawing interests. Without awareness of the availability of self-serving benefits, many may simply glance and ignore the invitation messages.

5.5. Recipients' convert decision (RQ3)

To compare the effect of self-serving versus other-serving motivations on converting clicks into sign-ups, we ran a mixed-effect logistic regression on whether a convert happened (convert = 1, no convert = 0) for each message link clicked, by having message type as a fixed-effect independent variable, and participant as a random effect. We found no significant difference between the two classes of message motivation ($\beta = -0.09$, $SE = 0.77$, $Z(32) = -0.11$, $p = 0.91$). This means that overall there is no significant difference in the persuasiveness between the two message framing for getting those who started exploring the services to eventually sign up.

As participants opened the PeerX to investigate further on the services, details about the nature of the service would impact their convert decisions, as De Bruyn's model suggested. We therefore tested the interactive effect between message type and service. We ran the same logistic regression but including service type, where we dummy coded "TimeBank" and "Group Activity" by having "Mobile Health" as the baseline for the other two services (due to its higher convert ratio from self-serving than from other-oriented messages; see Fig. 5). We found a marginally significant two-way negative interaction between self-serving motivations and the support group activity platform ($\beta = -3.90$, $SE = 1.78$, $Z(27) = -2.19$, $p = 0.03$).

Fig. 5 illustrates the difference in self- versus other-framing motivation in convert ratio across the three types of services. It seems that, only for mobile health community, self-serving framing was more effective in generating converts at the decision stage. To confirm the results, we tested the main effect of message motivational type (self-oriented=1, other-oriented=0) for each service, and indeed found it to

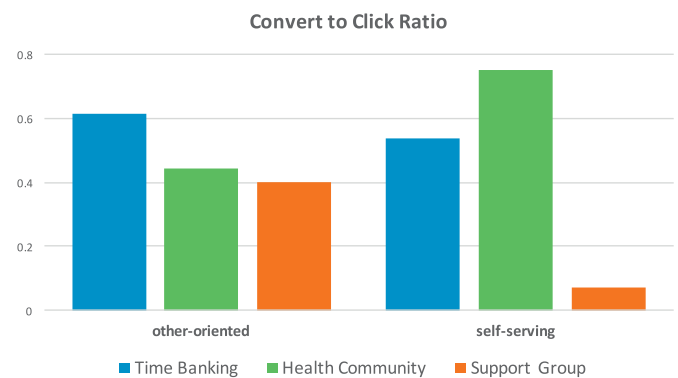


Fig. 5. Convert-to-click ratio for self-serving and other-oriented type of messages across all the services.

be marginally positively significant for mobile health communities ($\beta = 1.32$, $SE = 0.85$, $Z(10) = 1.56$, $p = 0.10$), and marginally positively significant for support group activity services ($\beta = -2.36$, $SE = 1.49$, $Z(8) = -1.58$, $p = 0.10$).

We note the result, again, is consistent with the hypothesis that mobile health communities may appear to be the category of services providing more self-serving benefits than others. Meanwhile, the results imply that, while self-serving motivational framing is more effective in the interest stage, it may not work as well for services that appear to focus more on other-oriented motives (e.g., emphasizing "support" and becoming helpers for others). Those originally attracted by the self-serving benefits may not convert if they find the service unable to bear out the message claims.

5.6. Effects of interpersonal factors (RQ4)

As discussed in the methodology section, we invited seeds to fill in a survey after the experiment phase, which asked to rate their interpersonal relations with up-to-four people that they invited. Half of them were successful converts and the other half were not. Specifically, the survey used a four-item scale (closeness, intimacy, emotional intensity, reciprocity) to measure their tie strength, and a three-item scale (experience, behavior and future outlook similarities) to measure their homophily, with the named recipient. We received responses from 55 seeds. To answer RQ4, here we examine whether higher tie strength and homophily increased chance of success in referral, and which factor had stronger effect.

Tie Strength. We conducted a mixed regression model on whether a conversion (convert = 1, no convert = 0) was generated among the referrals for which we received a survey response. We included the tie strength index between the sender and the recipient as the fixed-effect independent variable. Sender was included as a random effect variable. We found no significant results of the social tie strength ($\beta = 0.23$, $SE = 0.28$, $Z(54) = -0.80$, $p = 0.42$).

Homophily. We ran the same logistic regression model on whether a conversion was generated, by having the homophily index between the sender and receiver of the message as the fixed-effect independent variable. We found that the homophily index had a marginally significant positive effect, suggesting that higher homophily between referrer and referee may predict a higher chance of conversion ($\beta = 0.40$, $SE = 0.24$, $Z(54) = 1.67$, $p = 0.09$).

The above results suggest that homophily between the sender and the recipient had stronger effect on generating successful conversion than tie strength. This is only partially consistent with conclusion from De Bruyn and Lilien (2008) who found that both tie strength and

value/attitudinal homophily (but not demographic homophily) had positive effect on success of e-WOM. We will consider the implications in the Discussion section.

5.7. Qualitative results for conversion

As discussed in the methodology section, in addition to quantitative data collection, we asked two open-ended questions to gain insights on converts' reasons to join — “how did you feel when receiving the message?” to probe their reasons for paying attention to and clicking the messages, and “why did you choose to sign up?” to understand why they chose to convert. In total, 20 converts responded to these questions.

5.7.1. Reasons for attention: interests and social connection with the sender

When asked about their first perception of the message, most of these converts agreed that the messages piqued their interest in exploring the services, describing themselves as “curious”, “interested”, “surprised”, etc. For example, “I thought it sounded like an interesting concept. I’ve seen lots of people trying personal bartering services and slightly different services...” Some also mentioned that the short message itself was not enough to convince them to join but reading more on PeerX was what mattered. 4 converts explicitly mentioned that they were attracted because the messages were from a social connection — “I felt good because it made me feel like someone else was looking out for my interests. That feels good.”. Overall, we did not observe fine-grained reasoning on self-serving or other-oriented motivation at this stage, where participants were not yet exposed to the detail of the services.

5.8. Reasons for conversion: self-serving benefits, other-oriented benefits and social connection with the sender

For reasons to convert, 8 out of the 20 converts ascribed it to the social ties — “because it was the suggestion from a friend” or “I trust my friend’s judgment”. The rest were attracted to the services themselves, describing them as “interesting” or “intriguing”. Among them, 3 people explicitly mentioned self-serving motives, as in “see if it can help me achieve a few micro goals.” and “use it to advance my professional life”. 2 referred to more other-serving motives, such as “a nice way to help people do small deeds”. Interestingly, we noticed that most of these motivation specific reasons they gave echoed the referral messages they received. We considered this to be evidence that recipients paid attention to referral messages and the messages were able to frame their perceived benefits of the service as self-serving or other-oriented.

6. Discussions

Our study was designed to study how message framing with self-versus other-framed motives impact e-WOM for prosocial P2P services. Specifically, how senders choose between the two motivational framing, and which is more effective in driving interest (clicking) and conversion (joining). We first briefly review the results around our research questions:

RQ1. *How do senders choose between self-serving or other-oriented motivations to persuade their contacts to join a prosocial service? How does the preference differ for different services?* Overall senders selected more messages emphasizing other-oriented motives. However, consistent with Greenacre et al. (2012), we found that senders paid attention to the service in question when deciding how to motivate recipients to join it. They sent more other-oriented messages when promoting timebanking and more self-serving messages when promoting the mobile health service.

RQ2. *Are self-serving or other-oriented motivations more effective in attracting recipients’ attention to investigate further? How does the effect differ for different services?* Self-serving messages appeared to be more persuasive in drawing recipients’ interest. That is, recipients were more likely to

click on messages that *appealed to their own interests* even though the invitations were about joining prosocial services. This preferential effect of self-serving framing is consistent across services. This is not surprising considering that participants had not yet been exposed to the details of the services at this stage. The take-home lesson here is that, in general, *self-serving motivations may be more effective in the interest stage.*

RQ3. *Are self-serving or other-oriented motivations more effective at getting interested recipients to sign up for such a service? How does the effect differ for different services?* Once recipients had clicked on links, it seems they evaluated the nature of the service, as we saw very different effects of message motivation class, depending on service type as far as conversions (signing up) went. This supports the multi-stage model of e-WOM De Bruyn and Lilien (2008), which suggests that at the decision stage recipients would carefully evaluate available information about the service. Specifically, Support Group Activity service conversions were more likely if recipients received other-oriented messages. However, Mobile Health service conversions were more likely if recipients got self-serving messages. It may be that the description of Support Group Activity service led participants to see it as being primarily about connecting with and supporting others in need, whereas health activities are seen as being primarily about one’s own self-serving motivation to be healthy. This divergence of appeal is certainly deserving of further study, but the take-home lesson here is that *the type of motivation that works best for sign-up may depend on the service in question.*

RQ4. *Do interpersonal factors affect the sign up decision?* As in Palka et al. (2009), we did find that homophily (similar experiences and values), as rated by message senders, has a positive effect on message recipients’ inclination to join a prosocial service. Our qualitative data also suggested that, in addition to interest piqued by the message and the services, social factor played an important role in successful conversion. So in our study, *interpersonal factors, especially homophily, had positive impact on persuading others to join prosocial P2P services.*

6.1. Implications

Based on the results, we draw three broader implications for both viral marketing of prosocial P2P services and eWOM in general.

First of all, even for prosocial P2P services, we found that self-serving motives appeared to be more appealing in viral marketing, but the preferential appeal may be more nuanced than for non-prosocial services. Previous research studying motivations of using general P2P services Bellotti et al. (2015) suggested that there may be a mismatch between the emphasis of founders/advocators of P2P service and the users, as the former tend to have a more idealistic focus (including altruism and societal idealism), but the latter mainly look for instrumental benefits. In specifically prosocial services, we found that such mismatch still exists. However, the higher appeal of self-serving motives is mainly at the interest stage, where recipients had little awareness about the nature of the services. The preferential effect wore off after recipients started investigating further on the services, at least for ones that have more evident prosocial focus. Still, advocates of P2P services should consider actively promoting self-serving benefits the services can provide, in order to broaden the awareness and interest to begin with. This is, in fact, a marketing strategy that is often adopted by non-profit organizations (Clary et al., 1992) to first attract volunteers with instrumental rewards such as free tickets, souvenirs, socializing opportunities, then cultivating more autonomous motivation for helping in the long-term. However, in both our study and Bellotti et al. (2015), advocates of P2P services were inclined to emphasize the other-serving or idealistic values of the services, which could result in lost opportunities in recruiting.

Second, we found that service type moderates the preferential effect between self- versus other-framing. Consistently we found that mobile health community services, the ones we hypothesized to provide more evident self-serving benefits, incurred higher preference for self-serving

framing, both for the choices of the senders and for driving the conversion. But we failed to observe such preference for self-serving framing with other two types of services. This implies that blindly applying self-serving (or other-serving) framing to viral marketing messages for all kinds of prosocial P2P services may not be the optimal strategy. Instead, we recommend that, as recipients come into the decision stage by closely investigating the service, to further elaborate the benefits of the service, potentially by mentioning multiple types of motives. Otherwise it may carry the risk of backfiring, as recipients find the services unable to provide enough self-serving benefits, but are unaware of other types of benefits with the initial framing of the services.

Moreover, our results suggest that persuasion context is a critical moderating factor to consider when studying the persuasive effect of self-other framing. Unlike gain-loss framing messages that are usually semantically equivalent, self-other framing alters the meaning of the message. Therefore, one should consider the fitness of the context, as in whether self- or other-serving benefits are prominent enough in the context to support the message claims. To the best of our knowledge, as most previous work studying moderators of self-other framing focused on individual differences of message recipients, our study provide a novel case to illustrate the contextual differences.

Lastly, both our quantitative and qualitative results suggest that interpersonal factors are critical in e-WOM. Different from previous studies (De Bruyn and Lilien, 2008), we found that homophily is a strong predictor of conversion success than tie strength between senders and recipients. We postulate that homophily may play a more important role in prosocial context, as previous research suggests that personal value, particularly egoism versus altruism orientation, tends to have a strong effect on responsiveness to self- versus other-framing. Value homophily could either serve as persuasion itself (i.e., recipient would follow the sender's choice because they share similar values) or have an impact on the sender's choice of message for the recipient (i.e., the sender knows better which message framing is more persuasive for the recipient). Unfortunately we do not have the data to identify the cause. Future research should further explore the moderating effect of recipients' and senders' value orientation and their similarity on e-WOM for prosocial services with self-other framing.

7. Limitations and future work

The main limitation of our work is the small sample size. This is typical of e-WOM. Based on the data from half-a-million users, our API platform — InviteReferrals shares its findings on referral program statistics (InviteReferrals, 2016). A typical conversion rate is 2–3%. In our case, 1975 invitations caused 166 visits/ referral clicks (8.4%) and 60 signed up (3%) on PeerX. Given the fact that converts were not paid, this is an encouraging conversion rate. But, combining these with the seeds still left us with a small study population.

However, with the small sample size, we relied on relatively large effects to obtain significance in our statistical analyses. Thus our findings are suggestive of a large impact of e-WOM message motivation framing for prosocial services and indicate, counter-intuitively, that it may be far more effective to appeal to self-interest than altruism to engage initial interest in prosocial services.

Our decision to remove the Facebook data was due to the tiny number of clicks Facebook messages generated. Given the low rate of survey responses from all recipients we cannot tell whether people do indeed respond differently to messages posted via this medium from the way they do in email. This might be an area for further investigation.

8. Conclusions

We conducted a unique study of the effects of two kinds of motivational framing (self-serving and other-oriented) in messages used for viral marketing of prosocial P2P services. Our findings suggest that although message senders tend to prioritize other-oriented motives, self-

serving benefits are more effective in attracting recipients' interests (causing clicks) even for prosocial P2P services. However, when it comes to signing up, recipients also consider the nature of the service itself and possibly whether it bears out the promise of the message. As a result, we suggest that, in general, prosocial P2P service providers should emphasize the self-serving benefits of using their services in e-WOM marketing efforts. But there may be some systems where benefits to others are highly compelling and since, outside of a study such as ours, one is not limited to one framing or another, promotional messaging could also be designed to convey these altruistic benefits as well as self-serving ones, particularly after initial interest has been stimulated.

References

- Amabile, T.M., 1993. Motivational synergy: toward new conceptualizations of intrinsic and extrinsic motivation in the workplace. *Hum. Resour. Manage. Rev.* 3 (3), 185–201.
- Batson, C.D., 1987. Prosocial motivation: is it ever truly altruistic? *Adv. Exp. Social Psychol.* 20, 65–122.
- Batson, C.D., Powell, A.A., 2003. Altruism and prosocial behavior. *Handbook of Psychology*.
- Batson, C.D., Shaw, L.L., 1991. Evidence for altruism: toward a pluralism of prosocial motives. *Psychol. Inq.* 2 (2), 107–122.
- Bellotti, V., Ambard, A., Turner, D., Gossman, C., Demkova, K., Carroll, J.M., 2015. A muddle of models of motivation for using peer-to-peer economy systems. In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. ACM, pp. 1085–1094.
- Bennett, R., Kottasz, R., 2001. Advertisement style and the recruitment of charity volunteers. *J. Nonprofit Public Sect. Market.* 8 (2), 45–63.
- Botsman, R., Rogers, R., 2010. What's mine is yours: The rise of collaborative consumption. what is mine is yours. PPT.
- Cahn, E., Rowe, J., 1992. *Time Dollars: The New Currency That Enables Americans to Turn Their Hidden Resource-Time-Into Personal Security & Community Renewal*. Rodale Press.
- Cahn, E.S., 2000. *No More Throw-Away People: The Co-Production Imperative*. Edgar Cahn.
- Clary, E.G., Snyder, M., Ridge, R., 1992. Volunteers' motivations: a functional strategy for the recruitment, placement, and retention of volunteers. *Nonprofit Management and Leadership* 2 (4), 333–350.
- Collom, E., 2007. The motivations, engagement, satisfaction, outcomes, and demographics of time bank participants: survey findings from a US system. *Int. J. Community Currency Res.* 11, 36–83.
- Collom, E., 2011. Motivations and differential participation in a community currency system: The dynamics within a local social movement organization1. In: *Sociological Forum*, vol. 26. Wiley Online Library, pp. 144–168.
- Comte, A., 1868. *The Positive Philosophy of Auguste Comte*. W. Gowans.
- De Bruyn, A., Lilien, G.L., 2008. A multi-stage model of word-of-mouth influence through viral marketing. *Int. J. Res. Market.* 25 (3), 151–163.
- Feiler, D.C., Tost, L.P., Grant, A.M., 2012. Mixed reasons, missed givings: the costs of blending egoistic and altruistic reasons in donation requests. *J. Exp. Social Psychol.* 48 (6), 1322–1328.
- Gallagher, K.M., Updegraff, J.A., 2012. Health message framing effects on attitudes, intentions, and behavior: a meta-analytic review. *Ann. Behav. Med.* 43 (1), 101–116.
- Gao, H., Hu, J., Wilson, C., Li, Z., Chen, Y., Zhao, B.Y., 2010. Detecting and characterizing social spam campaigns. In: *Proceedings of the 10th ACM SIGCOMM conference on Internet measurement*. ACM, pp. 35–47.
- van de Glind, P., 2013. The consumer potential of collaborative consumption. *Research MSc in Sustainable Development—Environmental Governance Faculty of Geosciences, Utrecht University, Netherlands* August.
- Greenacre, L., Burke, P.F., Denize, S., Pearce, R., 2012. The choice of content by information providers in word of mouth communications. *Acad. Market. Stud. J.* 16, 19.
- Hars, A., Ou, S., 2001. Working for free? motivations of participating in open source projects. In: *System Sciences, 2001. Proceedings of the 34th Annual Hawaii International Conference on*. IEEE, pp. 9–pp.
- Helm, S., 2000. Viral marketing-establishing customer relationships by 'word-of-mouth'. *Electron. Markets* 10 (3), 158–161.
- Ho, J.Y., Dempsey, M., 2010. Viral marketing: motivations to forward online content. *J. Bus. Res.* 63 (9), 1000–1006.
- Hofstede, G., 1983. National cultures in four dimensions: a research-based theory of cultural differences among nations. *Int. Stud. Manage. Org.* 13 (1–2), 46–74.
- Hornikx, J., O'Keefe, D.J., 2009. Adapting consumer advertising appeals to cultural values: a meta-analytic review of effects on persuasiveness and ad liking. *Ann. Int. Commun. Assoc.* 33 (1), 39–71.
- HowStuffWorks How the freecycle network works.. Accessed: 2016-03-21 <http://money.howstuffworks.com/freecycle-network3.htm>.
- InviteReferrals Referral program statistics and average numbers. Accessed: 2016-03-21 <http://www.invitereferrals.com/blog/referral-program-statistics>.
- Krebs, D.L., 1991. Altruism and egoism: a false dichotomy? *Psychol. Inq.* 2 (2), 137–139.
- Kuznetsov, S., 2006. Motivations of contributors to wikipedia. *ACM SIGCAS Comput. Soc.* 36 (2), 1.
- Liao, Q.V., Bellotti, V., Youngblood, M., 2016. Improvising harmony: opportunities for technologies to support crowd orchestration. In: *Proceedings of the 19th International Conference on Supporting Group Work*. ACM, New York, NY, USA, pp. 159–169. doi:10.1145/2957276.2957303.

- Maner, J.K., Gailliot, M.T., 2007. Altruism and egoism: prosocial motivations for helping depend on relationship context. *Eur. J. Social Psychol.* 37 (2), 347–358.
- McCroskey, J.C., Richmond, V.P., Daly, J.A., 1975. The development of a measure of perceived homophily in interpersonal communication. *Hum. Commun. Res.* 1 (4), 323–332.
- Nov, O., 2007. What motivates wikipedians? *Commun. ACM* 50 (11), 60–64.
- O’Keefe, D.J., Jensen, J.D., 2008. Do loss-framed persuasive messages engender greater message processing than do gain-framed messages? A meta-analytic review. *Commun. Stud.* 59 (1), 51–67.
- Owyang, J., Samuel, A., Grenville, A., 2014. Sharing is the New Buying: How to Win in the Collaborative Economy.
- Palka, W., Pousttchi, K., Wiedemann, D.G., 2009. Mobile word-of-mouth—a grounded theory of mobile viral marketing. *J. Inf. Technol.* 24 (2), 172–185.
- Phelps, J.E., Lewis, R., Mobilio, L., Perry, D., Raman, N., 2004. Viral marketing or electronic word-of-mouth advertising: examining consumer responses and motivations to pass along email. *J. Advertising Res.* 44 (04), 333–348.
- Phillips, L., Phillips, M., 2011. Altruism, egoism, or something else: rewarding volunteers effectively and affordably. *South. Bus. Rev.* 36 (1), 23.
- Robitschek, C., 1998. Personal growth initiative: the construct and its measure. *Meas. Eval. CounselingDev.* 30 (4), 183.
- Ryan, R.M., Deci, E.L., 2000. Intrinsic and extrinsic motivations: classic definitions and new directions. *Contemp. Educ. Psychol.* 25 (1), 54–67.
- Seyfang, G., 2002. Tackling social exclusion with community currencies: learning from LETS to time banks. *Int. J. Community Currency Res.* 6 (1), 1–11.
- Shih, P.C., Bellotti, V., Han, K., Carroll, J.M., 2015. Unequal time for unequal value: implications of differing motivations for participation in timebanking. In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. ACM, pp. 1075–1084.
- Simpson, B., Willer, R., 2008. Altruism and indirect reciprocity: the interaction of person and situation in prosocial behavior. *Social Psychol. Q.* 71 (1), 37–52.
- Starbird, K., Palen, L., 2011. Voluntweeters: self-organizing by digital volunteers in times of crisis. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. ACM, pp. 1071–1080.
- Suhonen, E., Lampinen, A., Cheshire, C., Antin, J., 2010. Everyday favors: a case study of a local online gift exchange system. In: *Proceedings of the 16th ACM international conference on Supporting group work*. ACM, pp. 11–20.
- Trusov, M., Bucklin, R.E., Pauwels, K., 2009. Effects of word-of-mouth versus traditional marketing: findings from an internet social networking site. *J. Market.* 73 (5), 90–102.
- Watts, D.J., Dodds, P.S., 2007. Influentials, networks, and public opinion formation. *J. Consum. Res.* 34 (4), 441–458.
- White, K., Pelozo, J., 2009. Self-benefit versus other-benefit marketing appeals: their effectiveness in generating charitable support. *J. Market.* 73 (4), 109–124.
- Wong, J., 2012. The Rise of the Micro-Entrepreneurship Economy. *Fast Co. Exist.*
- Yang, H.-L., Lai, C.-Y., 2010. Motivations of wikipedia content contributors. *Comput. Hum. Behav.* 26 (6), 1377–1383.
- Ye, Y., Kishida, K., 2003. Toward an understanding of the motivation open source software developers. In: *Proceedings of the 25th International Conference on Software Engineering*. IEEE Computer Society, pp. 419–429.