

Founder Center: Enabling Access to Collective Social Capital

Nicolas Kokkalis^{1,2}, Chengdiao Fan^{1,2}, Thomas Breier², Michael S. Bernstein¹

¹Stanford University, ²Affinity Hive Inc.

{nicolas, chengdiao, msb}@cs.stanford.edu, thomas@affinityhive.com

ABSTRACT

Social costs and limited reach inhibit our use of social capital to solicit help. However, individuals are not the only holders of social capital: groups also possess reputations and social capital, and are often prepared to vouch for their own members. In this paper, we design methods for mobilizing this *collective social capital* in sociotechnical systems, enabling an individual to ask a trusted group whether it is willing to invest its reputation in doing them a favor. We instantiate this concept with Founder Center, a web platform in which members of a local entrepreneurship accelerator ask the accelerator community to collectively make them introductions to potential funders. In a field experiment, enabling access to collective social capital in this community nearly doubled the odds of members making a social capital request. Requests fulfilled utilizing collective social capital were at least as effective as ones utilizing traditional interpersonal social capital.

Author Keywords

Collective social capital; social computing.

ACM Classification Keywords

H.5.3. Information Interfaces and Presentation (e.g. HCI): Group and Organization interfaces

INTRODUCTION

Social relations provide more than just emotional support: they are also a source of access, information, and help. Friends, family, and other relations help us gather information [2, 10], answer our questions [2, 18, 25], share materials we need [10, 31], and gain us entry to exclusive events [10]. This value that relationships with others provide is known as *social capital* [10, 30, 31]. Social capital is transacted online as well: for example, it is gathered using social network sites [11] and spent asking questions on those sites [25, 18, 33].

Unfortunately, social capital use remains inhibited. People often feel uncomfortable asking friends or community members for favors [33, 5], and even when they ask, their

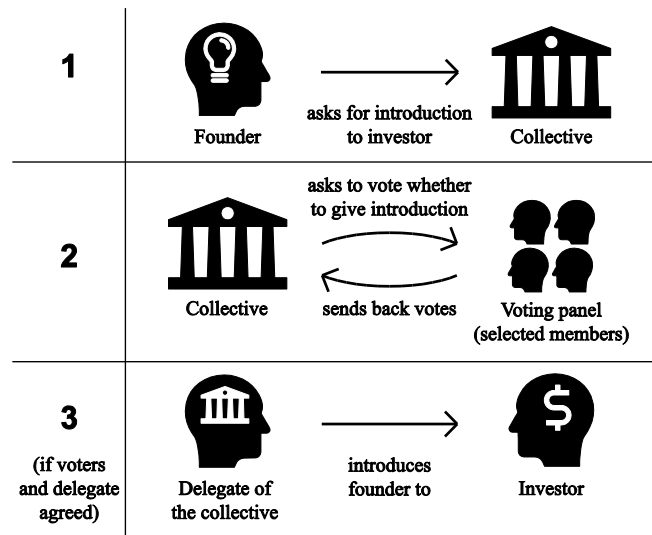


Figure 1. Founder Center introduces a design pattern for collective social capital use, embedded in an entrepreneurship community: (1) a founder asks the collective for an introduction to an investor; (2) the collective asks selected members (voting panel); (3) a delegate of the collective sends the introduction on behalf of the collective if the panel agreed.

network may not have access to the resources they need [25]. This reluctance, combined with the limited reach of our networks, limit the use of social capital today.

In this paper, we focus on this limitation in one representative use of social capital: introductions to sought-after individuals, as when a friend provides an introduction to a potential business customer (Figure 1). Introductions share many characteristics with other common uses of social capital, for example question asking, borrowing materials, and requesting access to a private event. In all cases, the goal may be difficult for to access on our own, a social relation can provide that access (at some reputational risk to themselves), and the request for help spends some social capital with that relation. By designing solutions that aid introduction requests, we aim to generalize to these other uses of social capital as well.

In this paper, we suggest that one major reason for the underutilization of social capital online is that current socio-technical designs assume that only *individuals* can transact social capital [11, 18, 25], as when a friend provides introduction to a famous colleague. However, social capital use need not be restricted to individuals: offline, social

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Permissions@acm.org.

CSCW '17, February 25-March 01, 2017, Portland, OR, USA

Copyright is held by the owner/author(s). Publication rights licensed to ACM.

ACM 978-1-4503-4335-0/17/03...\$15.00

DOI: <http://dx.doi.org/10.1145/2998181.2998244>

capital is also held by groups, or *collectives* [2, 10, 7]. For example, the alumni of a research group hold that group in high esteem, so an introduction to a famous alumnus could be made by the research group on behalf of a new member. Likewise, neighborhood groups could collectively decide to grant individuals access to a local shared space for events; a new member of a profession could ask a group of more senior professionals to endorse them in requesting access to potential customer information.

In this paper, we focus our attention on these transactions of *collective social capital* [2]. We define collective social capital as the relational value, trust and reputation that a collective possesses and expends with other individuals or collectives, and the norms of reciprocity arising from its social connections [14, 30, 31]. Explicitly designing for collective social capital can broaden our pro-social behaviors, because people feel more comfortable utilizing a collective resource than an individual resource [28, 16], and pooling the resources of the collective can provide greater reach than the individuals can provide alone [2]. This work introduces a design strategy in which (a) the requester petitions an online collective to use the collective's social capital on the requester's behalf, (b) members of the collective decide whether to spend the collective's social capital to fulfill the request, and (c) the group carries out the request using its collective name and reputation.

This approach is manifest in *Founder Center*, an online community designed for collective social capital exchanges for entrepreneurs to receive introductions to potential investors. It was deployed in a university-affiliated startup accelerator. Founder Center enables start-up founders to ask the startup accelerator organization to make an introduction to a funder on their behalf. The collective's decision is put up to a vote by a panel composed of up to five members of the community who know the investor well and can make an informed decision about whether the collective should put its reputation on the line with the introduction. If the votes pass a threshold, the collective makes the introduction. By introducing collective social capital as a design route for soliciting introductions to potential funders—a rare and valuable resource for the entrepreneurship community—we demonstrate a design approach that can be adapted to promote social capital exchanges for other forms of information, social ties, access and goods.

An 11-month field experiment with Founder Center compared the likelihood of asking for an introduction when only individual social capital was available to when collective social capital was also available. The inclusion of collective social capital doubled the number of requests issued and accepted. Introductions from the collective were also equally effective as those made using individual social capital. In a survey, users shared that asking the collective provided advantages, such as avoiding the awkwardness in asking individuals and surfacing the best connection that

may not be obvious or available to them through personal connections.

In sum, this work contributes an approach for enabling access to collective social capital in socio-technical systems. Further, we contribute an exemplar of this approach in Founder Center, and an evaluation demonstrating that the approach unlocks social capital requests that were previously inaccessible.

RELATED WORK

People often seek help online. This help may come from their online social networks or from using search engines to algorithmically locate published information [25]. Asking social networks is especially effective for context sensitive inquiries such as recommendations, opinions and introductions [18], making it one of the most well-studied uses of individual social capital online.

Help seekers can push questions to individuals (e.g., via email [6] or posting on mailing lists [34]), post on social streams for friends to pull (e.g., Twitter, Facebook) [25], or publicly post on Q&A communities (e.g. Stack Overflow, Quora) [1, 23, 26]. Asking friends directly can result in more and faster responses but may cause discontent if abused, resulting in long-term social capital losses [34]. Posting questions on social streams poses less pressure on one's network, but people can be reluctant to post or answer certain types of questions publicly [25]. Hybrid approaches for identifying and calling out relevant respondents have tried to address this by using automated responses on social networks [17] and expertise-based recommendations to better target queries [18, 24]. Founder Center draws on many of these lessons, extending them by asking collectives the favor rather than individuals.

Despite the benefits of using social capital, people can be careful or reluctant to spend it. People may feel embarrassed to ask for help because this discloses weakness or ignorance [5], and they may not want to expend others' effort [33]. One route to overcoming this embarrassment or hesitance is for recipients within the network to opt in or volunteer in advance [8]. Paid crowds may be more appropriate in cases like this [20, 19], but even crowd workers can fail to fulfill highly contextual requests. We propose that collective social capital may be another route, since it does not imply utilizing any specific friend's time and requests may be kept private within a subset of the community.

These efforts all dovetail on an understanding of social capital within social network sites. Ellison et al. [11] analyzed the effects of social network systems on the social capital of its users and demonstrated a significant connection between Facebook usage of college students and their social capital. The usage of Facebook tended to form bridging social capital and lowered the barriers of initiating communication with others. They concluded that a gain in

Resource	Information	Social Ties	Access	Goods
Decision Making	Everybody	Elected Panel	Expert Panel	
Execution	Centralized	Decentralized	Machine	

Table 1. Design Space: We chose to study a resource relying on *social ties* (introductions) where a dynamically-assembled *expert panel* makes the decisions that an individual executes in a *centralized* manner.

social capital increased the extent to which participants could ask their network for small favors.

In our work, we draw on the broader social scientific literature surrounding social capital, in particular collective social capital. Interactions in dense social networks can foster a communal spirit among members and generate collective benefits in form of social capital [32]. Social capital is always generated collectively, but can be spent by individuals and groups alike [12]. Most collectives do not have all required resources within their boundaries [4]. Therefore, collectives as a whole also build up and utilize social capital [27] to tap outside knowledge through their networks to external organizations and individuals [4]. In many cases, it is in the collective’s interest to support its members, so it could be beneficial to allow members of the collective utilize the collective’s social capital for individual benefit. On the other hand, the collective social capital might suffer if too many members informally reach outside of the collective [27].

Our work explores this tradeoff. A collective’s bonding social capital glues its members together in social relations through shared identities, while its bridging social capital enables a collective to connect with external individuals or groups for information or assets [30,31].

DESIGN SPACE

This paper focuses on introduction requests as a representative case for collective social capital utilization. What does the broader design space of collective social capital look like, and what approaches might be accessible to social computing designers? In this section, we reflect on the design space of collective social capital, and motivate our decisions for the Founder Center prototype (Table 1).

One axis is the kind of *resource* being sought by spending social capital. Prior work in social capital use in social network sites has typically focused on requests for *information* [2, 10, 25]. However, the desired resources can also be physical items, for example *goods* (e.g. borrowing an expensive A/V system). Introductions fall into the general category of *social ties*: other examples include learning about people who one might get in touch with, and getting publicity from the group in front of respected peers. Finally, groups can provide *access* to an event such as a conference, trip, or meeting. Tradeoffs exist: information

requests may occur more often than other forms online today, but because they are more common, they can be seen as less costly. We focused our design on social ties because the startup accelerator community was already participating in these social capital exchanges.

Second, *decision making* defines how a collective makes a decision on whether to spend its social capital to help a member. We articulate three possible decision protocols: votes from *everyone* (direct democracy), an *elected panel* (representative democracy) and *expert panel* (jury). While everyone’s voice is taken into account in direct democracy, it usually takes time to collect input and is hard to scale if requests are frequent. An elected panel may be more scalable, but the elected representatives may not be the members most relevant or equipped to decide on each request. An expert panel — a small set of group members who are determined most relevant to this request — requires panel recruitment for each new request, but can be faster and more calibrated. We chose an expert panel for Founder Center, because the domain required that the decision be made by people who are familiar with the investor.

Third, *execution* specifies how the collective decision is carried out—in other words, if the collective decides to help, who specifically does it? *Centralized* gives power to one or a few group delegates to execute. Delegates can provide a personal touch to the group’s decision, for example writing an email on behalf of the group. However, the system can also bottleneck if the delegate is unavailable. When *decentralized*, anyone in the group can implement the collective decision—for example, any member of the decision-making panel can directly answer a technical question. However, decentralization could also bottleneck if nobody volunteers, suffering from social loafing. *Machine* — for example, an auto-generated email on behalf of the group — can execute the collective decision automatically when the requests can be automated, and speed fulfillment such as granting online registration to an event. However, it can feel less personal. We chose to use a centralized delegate to increase personalization when sending introductions.

How can this approach be generalized to other domains? Exploring the potential resources that people pursue offers one perspective. A first example might arise when a student at music school who seeks a critique (*information*) from a famous alumnus submits their request to the school. The school might decide via inputs from the student’s direct advisors and teachers, and delegates at the alumni center might contact the famous musician. A second example: a staff member of a TV show who wants to attend the white house correspondents’ dinner (*access*) asks his show to recommend her, and the show calls for votes from everyone working for the show to decide who represent them to attend this dinner. Third: obtaining the endorsement of a prestigious environmentalist organization can increase a group’s chance of getting their proposal for a local

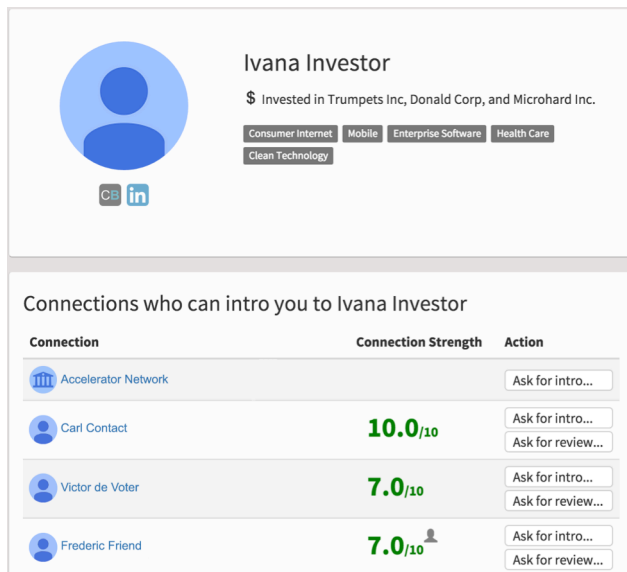


Figure 2. Founder Center allows founders to see other members who can introduce them to an investor. The more emails exchanged, the stronger the connection strength. The collective social capital [anonymized] appears at top.

government funding approved (*goods or economic resources*).

DESIGNING FOR COLLECTIVE SOCIAL CAPITAL

We aim to design a system that supports individuals in using their social capital to exchange favors — e.g., introductions to investors — and when individual social capital is ineffective, enable them to access collective social capital by asking a group for help.

We implemented our design, *Founder Center*, in the setting of startup investor introductions. Social capital plays a crucial role in the decision of whether to make an introduction: good or bad introductions can boost or harm the social capital of the person who made the introduction; and startup founders need to get to know investors potentially several times a year, as fundraising is essential to building a company. We begin by describing this context and motivation in more detail.

Founder Center Context

Startup founders spend social capital through introductions to people who can support them, for example investors for fundraising, journalists for publicity, leads for sales, job recruits or even co-founders. Those who make introductions put themselves at risk if the introduction does not go well, but benefit from the assist if it does go well. This form of tightknit network with reciprocal exchange is found not only in the technology industry; it is also common in regional economies as well as craft industries such as construction, publishing, film and recording [29].

In our context, one of the main challenges that early stage startups face is fundraising. Finding introductions to investors is nearly entirely reliant on access to social capital,

and it occurs frequently and with high urgency among entrepreneurs. So, for this research, we collaborated with a local startup accelerator that helps connect its members to external investors. To accelerate and assist the process of introductions, we designed a web based platform called Founder Center and launched it within our partner accelerator.

The accelerator has a strong reputation in the entrepreneurial community. This cachet suggests that it can mobilize its social capital with investors, providing us with a platform for understanding collective social capital. To study whether the accelerator’s collective social capital can be leveraged to make introductions, we enabled users to request introductions in the accelerator’s name.

Members of the accelerator community will not use a technology intervention unless it solves the introduction problem better than their existing bricolage of tools, especially email [15]. We thus designed Founder Center to solve an information problem that founders face when seeking introductions: they need to know who in their community knows a given investor well enough to make the connection. Connections on professional social networks such as LinkedIn are too coarse to give founders trustable information about who knows a potential investor well enough to make an introduction. To grant Founder Center this ability, we relied on the insight that tie strength is related to how frequently people communicate online [13]. Thus, in exchange for access to detailed connection information in Founder Center, users allow the system to mine their high-level communication statistics by logging in with their Google email accounts. If the logged-in email account was used for most of the founders’ business-related conversations, this gave a good representation of their professional networks and revealed connections with other founders as well as investors.

Based on such information, the server identifies investors on the founder’s contact list by cross referencing investor profiles of affinityhive.com and analyzes the email header metadata between the founder and each investor to compute *connection strength*. Connection strength is a value between 0 (“not at all”) and 10 (“exceptionally well”), indicating how well the founder may know the investor. Founder Center automatically determines a connection strength based on the number of reciprocally-traded emails between the pair of people. In many cases, Founder Center users were interested to adjust these scores manually. Additionally, the founder can add qualitative information — such as how they met the investor — to give more context to the connection strength. The resulting data help each founder understand who can give them the warmest introduction to the investors they are targeting.

Individual Social Capital

On Founder Center, founders (*askers*) have the possibility to get introduced (to *investors*) by sending an introduction request to another founder (*connector*). In this section, we

describe how they can use individual social capital to do so, followed by the design for utilizing collective social capital.

To get introduced to an investor, founders browse, filter and search to identify the investors accessible by the community — currently 9,846 investors accessible via the social networks of its members. Then, for each investor, the system suggests potential connectors who might make the introduction, ordered by connection strength. The founder sends requests to connectors to inquire whether they would be willing to make the introduction to the investor. The connector now must judge whether to act on the request, evaluate whether the founder and the investor are a good fit, and decide whether they will spend their individual social capital to make this introduction. For example, a founder may only be willing to make introductions to famous investors in exceptionally strong cases.

Once the connector accepts the request, they can then make the introduction through the system by sending an email to the investor and cc'ing the asker. These steps are visualized in a pipeline. The founder can track and confirm outbound requests for each investor in an outbox, whereas connectors can respond to inbound requests and make introductions in an inbox.

Collective Social Capital

Instead of asking a strong or weak tie in the community for an introduction, founders on Founder Center can request introductions directly from the collective — an introduction written on behalf of and endorsed by the startup accelerator. The collective is presented as a possible connector called “Accelerator Network” in the interface alongside other connectors (Figure 2). The collective is always placed on top of the connector list but has no connection strength visible. Placing the collective on top makes it easy to differentiate the collective from all other individuals.

Founders can ask the collective for introductions just like they would another member. If the collective agrees, the founder receives an introduction to the investor made on behalf of the accelerator. For the collective to act as a connector, it needs to specify which investors it can reach. In our implementation, the collective can connect to any investor who is known by at least one member fairly well (connection strength 4/10 or higher). We have also prototyped an option where investors can explicitly opt in to being contacted by the collective.

The collective needs to make decisions about whether to spend its social capital on each introduction request. Sending too many undeserved introductions results in a tragedy of the commons where the collective's social capital with investors is eroded; sending too few under-utilizes the opportunity.

Thus, in Founder Center, introduction requests are evaluated by a vetting panel of up to five members who are dynamically chosen for each request. Allowing any member to vote might mean that those with relevant information are

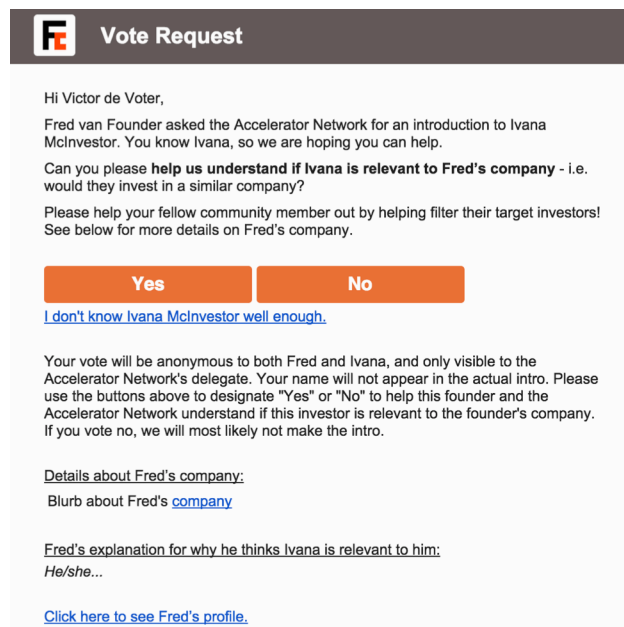


Figure 3. Vetting panel members are chosen dynamically per request based on their knowledge of the investor.

drowned out; centralizing in a single person risks losing the collective intelligence. Members are chosen based on their connection strength with that investor, proxying for their ability to speak with authority about the investor. These members receive an email to vote on and vet the founder's request based on their personal assessment of the founder's fit and relevance to the targeted investor (Figure 3). We use connection strength to select voters because it reflects how well this member knows the targeted investor (a point verified in feedback by founders themselves as they used the tool). If a founder knows an investor, the founder usually knows about their investment interests and styles, and can give advice on whether a given company is a good fit for the investor. The system selects the panel also based on voters' frequency of participation in former votes (to prevent asking the same individual too many times). Limiting the size of the voting panel gives a strong voice to members who actually know the investor and prevents spamming the entire collective for every request. This ensures its scalability.

Social loafing would predict that requests will languish and remain unanswered, since unlike individual social capital requests, no single person has responsibility for responding. So, Founder Center utilizes a *delegate* who coordinates the request and review process. The collective's delegates review the proposed voting panel, review the summary of the panel's votes, and make the final decision (Figure 4). Essentially, Founder Center uses two expert panels: dynamically selected voters who vet on the request in its specific context (relevance to the specific investor), and the delegate who vets on whether the request abides by the accelerator's rules and whether it abuses the system. The final decision of the delegate is either accept or reject the

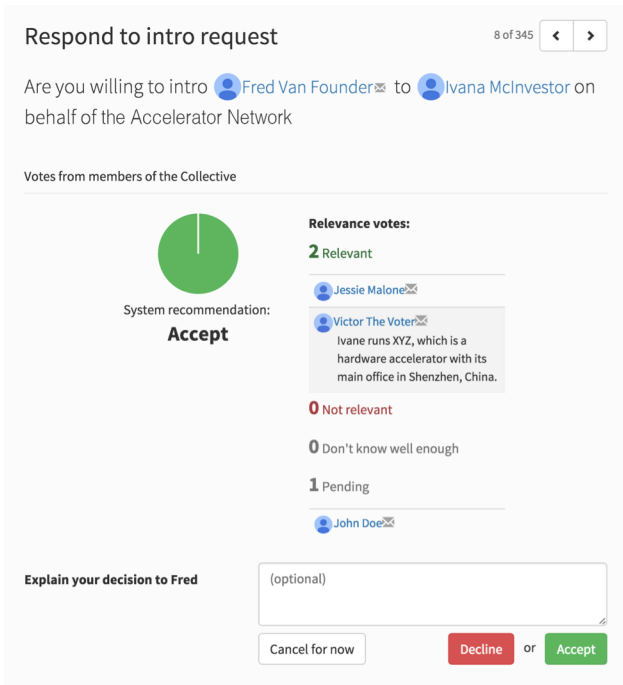


Figure 4. The collective delegate’s inbox dashboard, where they review votes from the vetting panel.

request. Accepting means that this introduction request is queued up for the delegate to either ask the investor whether they are interested or directly make the introduction soon; rejecting means that the collective will not make the introduction this time, usually attached with a reason, such as “this investor is not relevant to your company’s market”. Often delegates are selected by the organization based on whether the person has significant contextual knowledge and is aligned with the organization’s mission and principles. Multiple delegates can be selected with equal power to manage the requests based on their availability. So in this deployment, the accelerator selected an employee to be its own delegate for Founder Center and opted to let him make the final decision. This can prevent abuse by voters and may support outstanding founders that lack reputation.

Finally, the delegate communicates the collective’s final decision to the founder and then sends the introduction to the investor on behalf of the collective (Figure 5). In our design for Founder Center, the delegate from the second expert panel also happened to be the same person who executed the collective’s decision.

EVALUATION

Founder Center proposes a design approach to letting members of a collective access the collective’s social capital and vote on requests. Its thesis is that access to collective social capital will increase users’ comfort with asking for support and make additional opportunities available beyond the individual’s social network.

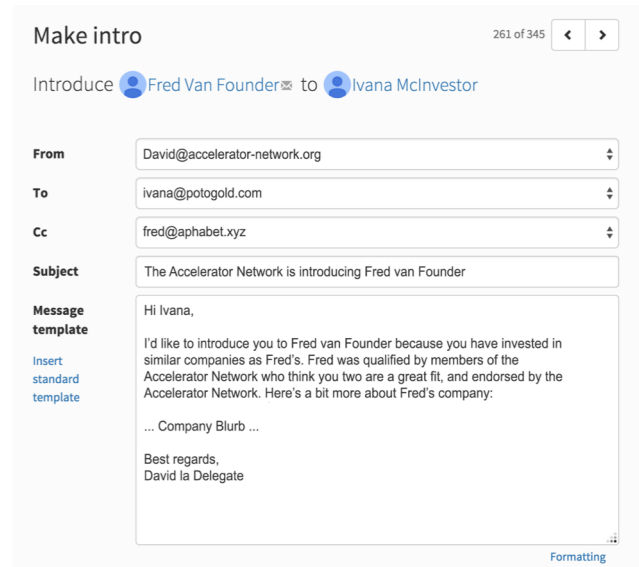


Figure 5. If the collective agrees to make the introduction, a delegate introduces the asker on behalf of the collective.

We operationalized this into three hypotheses:

- H1: access to collective social capital will increase the *number of unique investors* asked for introductions by each individual on Founder Center.
- H2: access to collective social capital will increase the *total number of introduction requests* sent through Founder Center.
- H3: traditional individual introductions are more effective than introductions utilizing collective social capital, in terms of increased connection strength.

Measuring unique investors (H1) means that if one participant asks multiple founders for the introduction to the same investor, the number of unique investors is only one. This measure ensures that we capture not just whether founders ask additional people for introductions (H2), but whether they ask introductions to more people overall (H1). Also, since introductions made by the collective come on behalf of a group rather than a known individual and potentially seem less personalized [9], we hypothesized (H3) that collective introductions would be less effective than ones made by individuals.

Method

To evaluate whether access to the collective increased the number of people requested and the number of requests on the platform, we ran a within-subjects experiment. All founders in the community could join the study by using Founder Center during a period of eleven months. Only a subset of the community is actively fundraising at any given time, so in practice, during the eleven months of our study, 68 founders in the community used the system to request introductions to investors and 45 of those founders requested introductions to investors who were part of the study, thus an effective 66% participation rate.

The study was a within-subjects design with randomization occurring on *investors*, not founders. Each investor was randomized to be either visible to founders as only accessible through individual social capital only (control), or through collective social capital as well (treatment). Thus, all 45 participants were exposed to both conditions as they browsed.

We randomized all 2,239 investors who at the beginning of the study had a connection strength of at least 4/10 into a *control* or *collective* condition. The sample selection cutoff of connection strength ≥ 4 ensured that sampled investors could be introduced by the collective. This cutoff applies to both conditions: investors in the system with connection strength below 4 were not included in the experiment. If an investor was in the control condition, participants could only use individual social capital to ask for an introduction, i.e. could only ask other founders. In the collective condition, users could also access collective social capital by asking the startup accelerator for an introduction. To better control for variability in investor desirability, this randomization was unique to each participant — the investors who appeared in the control and collective conditions were different across different participants. To enable randomization while maximizing accessibility of collective social capital, the randomization was weighted such that 75% of investors were in the collective condition. So, each participant had about 1680 investors (75% of 2239) in the collective condition and 560 (25% of 2239) in the control condition.

With this randomization deployed, we measured the introduction requests to investors in the available set. We measured the number of introduction requests created by the 45 participants, the number of the requests accepted, and the number of unique investors the founder requested introductions for. We also collected qualitative data by surveying participants after the experiment on why or why not they asked the collective vs. other founders for investor introductions. We interviewed the delegate, founders who did not participate in the experiment and one investor accessible through the collective about their respective point of views in the process.

To test our hypotheses, we performed Chi-square tests between conditions, adjusting the “expected” column of the contingency table to account for the fact that 75% of investors were in the collective condition. We also performed logistic regressions on each founder-investor pair: the dependent variable was whether the founder asked for an introduction to the investor, and the independent variable was a binary indicator variable capturing whether the investor was in the control or collective condition.

If H1 and H2 are supported and access to a collective increased social capital use, there are two possible explanations. One is that use of collective social capital is complementary to use of individual social capital, meaning that collective social capital unlocked an additional set of

opportunities that were inaccessible or unused by individual social capital. This explanation would imply that the number of individual introductions is unaffected by the manipulation, and collective introductions account for the entirety of the increase. The competing explanation would be that collective and individual social capital overlap, which would imply that enabling collective social capital would impact the use of individual social capital as well, either raising it (through increased engagement) or lowering it (through preference to ask the collective instead of individuals).

One way to differentiate between these explanations is to compare the number of introduction requests made via *individual* social capital in the control and collective conditions. If this difference is significant, having access to the collective caused a change in the number of individual social capital requests; if the difference is not significant, individual social capital requests were not measurably impacted. We thus also compared the number of individual social capital requests across conditions.

Results

During the study period, 45 founders made a total of 1229 introduction requests to seek introductions to 837 unique investors for fundraising.

Founders asked for introductions to significantly more unique investors when collective social capital was accessible ($\chi^2(2, N=837) = 76.053, p < .0001$; Table 2). The collective condition resulted in 737 unique investors, compared to 100 in control condition. Adjusted for the non-equal distribution of investors into the control and collective conditions, the comparison would be roughly 246 unique investors in the collective condition to 100 in the control condition, or a 2.5x increase (Figure 6). The logistic regression also confirmed that the odds for participants requesting introductions to investors in the collective condition is 2.1 times higher than that in the control condition ($e^\beta = 2.1, p < .0001$). H1 — that founders asked for introductions to more investors when collective social capital was available — was confirmed.

Was collective social capital use complementary to individual social capital use? A chi-square test comparing the number of unique investors targeted by introduction requests to individuals was not significant ($\chi^2(2, N=379) =$

Difference: collective vs. control?	Created	Accepted	Introductions
# unique investors	✓ (p < 0.001)	✓ (p < 0.001)	n.s.
# requests	✓ (p < 0.001)	✓ (p < 0.001)	n.s.

Table 2. Significance of Chi-Square tests between study and control conditions on introduction requests to unique investors and all requests created, accepted and fulfilled.

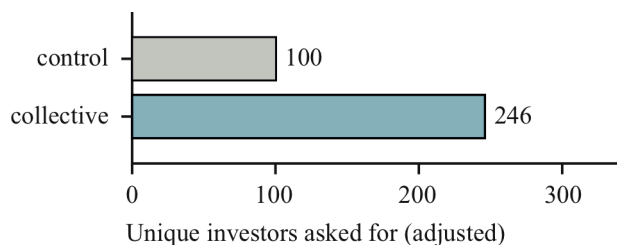


Figure 6. Founders asked for introductions to more investors when collective social capital was available. Unique investor introduction requests were 2.5 times higher when collective social capital was accessible.

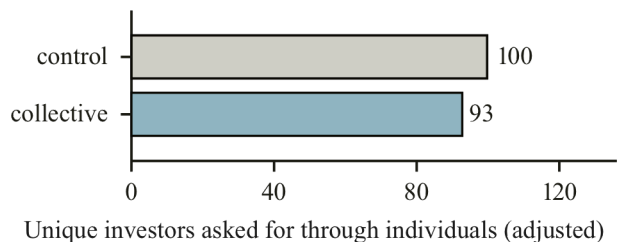


Figure 7. The number of individual social capital requests was not affected by the availability of collective social capital. So, the increase in requests was driven nearly entirely by collective social capital requests.

0.388, $p=.53$). There were 279 unique investors targeted in the collective condition and 100 in the control condition who are targeted through only asking individuals. These numbers, adjusted for the sampling difference, are 93 investors in the collective condition and 100 in the control condition (Figure 7). So, collective social capital was used in complementary ways to individual social capital — individual social capital was utilized identically in both conditions, and the difference was nearly entirely due to a large number of introductions requested through the collective.

Only counting unique investor requests: in the collective condition, 737 were asked, 358 were accepted and 62 introductions were made (adjusted for the non-equal distribution, this is 246 requests, 119 accepted and 21 made); in the control condition, 100 were asked, 37 accepted and 16 introductions were made. In terms of acceptance, significantly more requests to unique investors were accepted in the collective condition ($\chi^2(2, N=395) = 51.484, p < .0001$).

In terms of total introduction requests, not just unique investors, significantly more introduction requests were created — 1066 (355 adjusted) collective vs. 163 control ($\chi^2(2, N=1229) = 90.298, p < .0001$), again a doubling of the control (Figure 8). Significantly more were also accepted — 388 (129 adjusted) vs. 41 ($\chi^2(2, N=429) = 54.565, p < .0001$). These results confirmed H2: the accessibility of collective social capital increases the total number of requests sent. People asked more for favors overall when asking the collective became an option. As

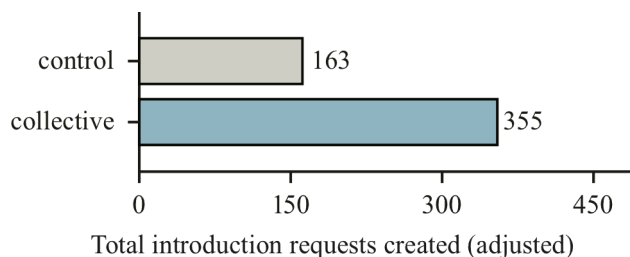


Figure 8. When collective social capital was available, founders not only asked for introductions to more unique investors but also sent more requests overall, in some cases requesting the same investor from multiple sources. Here, the adjusted introduction requests sent in each condition.

before, a chi-square comparing the number of individual social capital requests was not significant ($\chi^2(2, N=621) = 0.516, p = .47$), indicating that the difference was due to an influx of collective requests rather than any impact on the use of individual social capital: the behaviors appear to be complementary. Taking these results together, H2 was also supported.

In terms of number of introductions made: there were 65 introductions made in the collective condition (21 by the collective and 44 by individuals) and 16 in the control condition. A chi-square test comparing the number of completed introductions in the collective condition (65, 22 adjusted) vs. control condition (16) was not significant ($\chi^2(2, N=81) = 1.189, p=.28$). The delegate sent out 126 individual vote requests to voting panel members, 2.4 on average per introduction request. Voting panel members had a 47% response rate (31 positive, 12 negative, 16 neutral), resulting on average 1.1 votes per introduction request. The delegate accepted 42% of positively recommended decisions from the panel and did not act on the rest.

To evaluate the efficacy of introductions made by the collective versus individuals, we studied the change in connection strength between the introduction askers and the investors after introductions were made for each condition. If an introduction was effective, asker and investor would get to know each other, thus their automatically-measured connection strength would later go up. We measured the final connection strength two weeks after the study concluded. An unpaired t-test comparing the connection strength between the asker and the investor after introductions were made by individuals ($\mu = 1.74, \sigma = 1.88$) to that by the collective ($\mu = 2.74, \sigma = 1.15$) was significant ($t(57) = -2.87, p < .01$). In other words, askers and investors developed significantly stronger connections when introduced by the collective vs. by individuals. This result contradicts hypothesis H3, and indicates a potential strength of collective social capital above and beyond individual social capital.

Why were collective introductions more effective on average? We investigated response rates by investors and found that introductions by individuals had low response

rates, indicating unsuccessful introductions. Focusing on only successful introductions by removing all the no-response introductions from the data, a similar unpaired t-test comparing the connection strength between the asker and the investor after introductions were made by individuals to that by the collective was not significant ($t(45) = 1.83, p > .05$). These two results indicate that introductions made by the collective were more likely to successfully connect people, and were equally effective as individual introductions when the individual introductions did get a response.

What is the mechanism behind founders' increased willingness to approach the accelerator network (utilizing collective social capital) compared to individual members in the community (i.e., utilizing individual social capital)? Is it that the collective has access to a stronger network, or that people feel more comfortable asking? Our hypothesis is that people feel more comfortable asking the collective *when it has stronger ties than any of their individual connections*. This hypothesis would predict that Founder Center users will ask the collective whenever their individual ties are not sufficient to achieve a strong introduction. As one founder stated in the survey, "[asking the collective is a] good approach because you can't really be sure who has a strong connection to the investor".

We performed a logistic regression analysis, which supported this hypothesis. The dependent variable was whether each introduction request was made to the individual (0) or the collective (1). The independent variable was the maximum connection strength (between 0-10) available between the asker and all of their accessible individual connectors. We added a control for the maximum connection strength of all the potential connectors in this network — a proxy for the connection strength between the collective and the investor. This control isolates whether collective's connection strength with the investor is a confounding factor; in other words, whether participants asked the collective because the collective had higher connection strength, even though the collective's connection strength was never displayed in the user interface. The regression confirmed that the odds of asking for a collective introduction decreased by 7% ($z=-2.0, p<0.05$) for each one-unit increase in accessible individual connection strength. In other words, the higher the individual tie strength accessible to the user, the more likely they were to ask individuals. The collective's connection strength with the investor also significantly influenced the choice of asking the collective or individuals, but negatively ($z=-5.7, p<0.001$). This means that the stronger the collective is connected with the investor, the less likely for askers to choose the collective. The collective's connection strength with the investor was correlated with the connection strength between reachable connectors and the asker ($r=0.13, p<.0001$). In other words, when individual ties are higher, the collective's connection strength with the investor is also generally higher. People ask the collective not because of its high connection strength

with the investor, but do so when they do not have a better choice from their individual ties.

Our post-experiment email survey to 14 participants resulted in 6 responses and one follow-up interview. In the survey and interview, we focused on founders' decision-making process for when to utilize individual vs. collective social capital. In addition, we also interviewed the delegate, one investor and one founder who chose *not* to use collective social capital, in order to understand its breakdowns and limitations.

One participant described asking individuals as awkward: "a little weird to ask founders you don't know well to make introductions...[because] people tend to not know investors as well as it appears they do." Even though connection strength was provided by the system, some participants still struggled with the usual tradeoff of which individuals to ask for the introduction. On the other hand, participants did not show such concern when asking the collective. In regard to "asking the [accelerator network]", the collective, one said in an interview, "conceptually it's strong because you can never really tell [how well individual founders connect with the investors]. I know we [the system] rank the connectivity to investors, but you want to throw the request out there to whoever has the best relationship to the person. And that's not always obvious on the surface. So I think throwing it out to the collective is actually a good approach because you can't really be sure who has a strong connection or strongest to the investor."

There were two challenges that limited the use of collective social capital. One was the collective's slow response time. As one participant put it: "It's only going to be successful as long as the collective is responsive." Founders indicated that they had few qualms asking the collective, but that it took too long for the collective to respond and there was a lack of transparency in the process. One reported: "The biggest thing I've noticed is the lack of clarity in the process. I've asked for a ton of intros from the accelerator network (~90) and I haven't met a single investor from it [yet]". The processes behind our design did take time: requesting and receiving votes from the vetting panel, review of the votes, and final follow-through.

One reason for this perceived breakdown was that the accelerator's delegate did not follow through on all requests. The accelerator had insisted on the use of a delegate to vet the panel and make final decisions — as opposed to, for example, one of the vetting panel members for each request — but it was clear that the delegate became a bottleneck. To understand the delegate's role and work, we also observed and interviewed him. He felt that he needed more effective interfaces to process a large influx of requests, to remember his context with each request (e.g., where he left off last time, what his next follow-up items were). He recognized that the volume of inbound requests is large, but he was very engaged in the process. The delegate remained

positive, but it is clear that improving their throughput or finding ways to assist them will be critical.

The second challenge was with the mental model of asking a collective. One non-user reported feeling uncomfortable doing so because he has no visibility on who will see the information submitted in his request. He said, “To ask for an intro, I have to send information about my unclosed [fundraising] round. If I send it to the collective, I am not sure whether my existing investor will see that information and use that information against me in my round.” People may have privacy and confidentiality issues when asking a collective because who sees and processes the request is not entirely clear. However, this founder invented an unexpected use for collective social capital: as a proxy for how highly the investor thinks of the startup accelerator. The founder said: “I used the Accelerator Network to filter investors I want to approach. Investors accessible through the accelerator are more closely connected with the community, therefore better than a random investor I find on other platforms online. Then, I asked people who know the investor well to introduce me”. So, people may not use their collective social capital to directly get the favor, but to understand whether his affiliation with the collective can play a role in the later meeting. In this way, collective social capital can give indirect guidance on how to use individual social capital.

In an interview, one investor mentioned that if the delegate is not one of the collective’s leaders, then he would wonder if the message was a “newsletter sent to thousands”. It is important for him that he understands how many other recipients receive a message he also receives. As a solution to this, he proposed that either one of the leaders (a delegate) continues to send the introductions, or if the introduction comes from an administrative assistant, it should clearly articulate how many people are receiving this introduction.

Founder Center outgrew the study

Our study results only capture a fraction of the overall use of Founder Center system by the accelerator community. Due to the fact that this was deployed on a real community, we ran the study only on the initial set of 2239 investors selected during the randomization and not the complete dataset. Founder Center has grown to include new functionality for founders to connect to investors. To give a view on values provided by the system to this community overall in practice, we include some statistics on its use even outside of our experiment. Since the study began, the system grew to provide access to 13,027 investors, and has been used by 620 founders, 132 of whom requested introductions. 1,476 introductions were made through the system (94 of them involved mechanisms described in this paper and 1,382 through new functionalities introduced outside of the study). We plan to work on automating the delegates’ job as much as possible.

DISCUSSION

Enabling access to collective social capital increased the odds of individual members asking for help online. Founders were comfortable interacting with a collective actor and treated it just as other individual actors in social capital exchanges, often strategically asking *both* entities for the same investor introduction. In 18% of unique asker-investor pairs in the collective condition, the asker asked both the collective and at least one other individual founder for the introduction to the same investor. Is it possible that they are simply hedging their bets? Or did they turn to the collective if they expected the individual request to be fruitless? Perhaps not: in 78% of these cases, the founder asked the collective first and then asked individuals. Uncovering specific reasons why they requested the collective first remains future work.

Our study was meant to test the effects of the accessibility of collective social capital on individuals and did not measure its effects on the collective itself. We wanted to see whether the principles about individual social capital in online interactions also apply to collective social capital. We demonstrated that individuals are willing to interact with collective actors, but we did not provide data on specific benefits for the collective to help individual members. We assumed that the collective actor spends and collects social capital the same way individual actor does — making worthwhile introductions to investors increases the collective’s social capital with the investor and with the asker. Future work can verify this assumption by examining longitudinal response rates from investors to collective introductions — if investors continue to respond, it suggests that there is value in the process. Qualitative studies could also unearth more regarding the gains and losses of social capital for the collective in these interactions, and whether collective social capital carries similar reciprocal properties as individual social capital so that it can be sustainable. For example, after the collective does a favor for the member, would the member reciprocate the collective somehow?

How can we design online systems to enable groups to provide collective social capital as a resource for individuals, while being able to regulate its use and avoid free riders [3]? Our design had the delegate regulate many processes, for example reviewing the vetting panel’s decision in accepting requests, to have extra protection of the collective’s social capital and to avoid its abuse. However, this was slow. Could the collective accomplish some of the same goals without central control? For example, we have deployed a homepage feed where the requests sent to the collective are visible to the whole community. Through this mechanism, improved translucence [21, 22] can prevent abuse of collective social capital. Future designs should incorporate more incentives and channels for individuals to reciprocate the collective, because any collective resources are prone to the dilemma of free riders. If the regulation is well designed and the

decision to accept the request is accurate, the system could even automate the introduction making part of the process.

Future work can also investigate the relationship between individuals' roles as introduction connectors and vetting panel voters. As a connector, individuals have to agree to put their social capital on the line to make the introduction to an investor; as a vetting panel voter, individuals contribute their knowledge about the context of the investor and their judgment of whether the asker is relevant to the investor. Their votes can potentially gain social capital relative to the collective but do not directly risk their social capital with the investor. Are individuals more willing to provide knowledge and wisdom than spend social capital to directly make the introduction? Our statistics on the response rates of individual introduction requests and votes suggest it is possible. The response rate to introduction requests by individuals was 28%; the response rate to the vetting panel requests was nearly double that, at 47%. Moreover, 64% of the votes came with open-ended, free-text explanations that provided more context to help the collective to make decision and the asker in their fundraising. Future work can test whether more social interactions can be mobilized by centralizing the social capital exchange with the collective while saving individuals from risking personal social capital.

Our study had several limitations. We did not include a condition where introductions were only accessible through the collective, which would have enabled a test on its effect on users' asking behavior without the presence of individual connectors. However, this condition was infeasible because the manipulation would be transparent to founders—it would appear dubious that nobody individually knows the investor while the collective knows them. It was also possible that there was a novelty effect with the collective social capital: founders asked more for introductions because asking the collective was new. However, this study lasted 11 months, so we do not expect that novelty was the main driver of the results.

Furthermore, the delegate in this deployment became a bottleneck for the collective to make more introductions. Much of the process could be automated and was designed so initially, such as approving the voting panel and sending the vote requests to these panel members. However, our study had to run in cooperation with the accelerator who requested that they should have the centralized power, in that they chose to overlook who are selected as voting panel, manually send the vote requests and add the delegate as the second decision-making expert panel to avoid social loafing. Yet at the same time, the selected delegate was not always responsive, causing requests to languish and leading to fewer introductions made overall. In an ideal deployment, the collective, through the system, could automatically reach out to voters, collect their votes and directly make the intro based on voters' decision.

Finally, in order for the collective to be effective at introducing founders to investors, ideally it would establish a bridge to the investors first. For example, a member of the collective might want to get an investor to opt in to receiving introductions from the collective. The startup accelerator plans to do this, but they reported it will take them months to reach out to thousands of investors.

CONCLUSION

People are often reluctant or unable to spend their individual social capital. We have drawn on sociological concept of collective social capital to explore whether individuals could tap into social capital held by groups or organizations they belong to, rather than individuals for asking favors. We proposed a design pattern that enables users to leverage collective social capital by making requests that are vetted by members of the collective. We embedded this concept in a platform for entrepreneurs in a startup accelerator to ask the accelerator collective for introductions to investors. The availability of collective social capital increased the number of users' requests.

A more uninhibited social capital exchange could benefit the social dynamics to online communities, and help us better understand how they function. The primary positioning of the present research is systems and design. However, the strong effects of our intervention suggest that collective social capital merits attention from social scientific research to better examine how online communities already engage with and spend collective social capital. In this way, we imagine a tight loop of science and design in driving forward our understanding.

ACKNOWLEDGMENTS

This research was made possible through collaboration between the HCI lab at Stanford University and AffinityHive Inc. We thank the following interns and employees of Affinity Hive: Pierre-Morgan Gate who built the majority of the collective social capital code and a lot of underlying Founder Center infrastructure, Alexander Popp and Michael Chromik who created many front end structures for Founder Center adapted for collective social capital and contributed to the research included in the first draft of the paper. We also thank StartX for being open to experiment within its community and for all the compliments they have given us over the years when using Founder Center. This work was supported by a National Science Foundation award IIS-1351131 and an Office of Naval Research grant N00014-16-1-2894.

REFERENCES

1. Mark Ackerman and Thomas W. Malone. 1990. Answer Garden: A tool for growing organizational memory. In *Proceedings of the ACM SIGOIS and IEEE CS TC-OA conference on Office information systems (COCS '90)*, 31-39.
2. Paul S. Adler and Seok-Woo Kwon. 2002. Social capital: Prospects for a new concept. *Academy of management review* 27, 1: 17-40.

3. Robert Albanese and David D. Van Fleet. 1985. Rational behavior in groups: The free-riding tendency. *Academy of management review* 10, 2: 244-255.
4. Vikas Anand, William H. Glick, and Charles C. Manz. 2002. Thriving on the knowledge of outsiders: Tapping organizational social capital. *Academy of management executive* 16, 1: 87-101.
5. Victoria M.E. Bellotti, Sara Cambridge, Karen Hoy, Patrick C. Shih, Lisa Renery Handalian, Kyungsik Han, and John M. Carroll. 2014. Towards community-centered support for peer-to-peer service exchange: rethinking the timebanking metaphor. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '14), 2975-2984. <http://doi.acm.org/10.1145/2556288.2557061>
6. Joel Bloch. 2002. Student/teacher interaction via email: the social context of Internet discourse. *Journal of Second Language Writing* 11, 2: 117-134
7. Pierre Bourdieu and Loic J. D. Wacquant. 1992. *An Invitation to Reflexive Sociology*. University of Chicago Press.
8. Erin Brady, Meredith Ringel Morris, and Jeffrey P. Bigham. 2014. Friendsourcing for the greater good: perceptions of social microvolunteering. In *Proceedings of the AAI Conference on Human Computation and Crowdsourcing*. 2014.
9. Robert B. Cialdini. 1993. *Influence: The psychology of persuasion*. Morrow.
10. James S. Coleman. 1988. Social Capital in the Creation of Human Capital. *American Journal of Sociology* 94: S95-S120.
11. Nicole B. Ellison, Charles Steinfield, and Cliff Lampe. 2007. The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication* 12, 4: 1143-1168.
12. Emanuele Ferragina. 2010. Social Capital and Equality: Tocqueville's Legacy: Rethinking social capital in relation with income inequalities. *The Tocqueville Review/La Revue Tocqueville* 31, 1: 73-98.
13. Eric Gilbert and Karrie Karahalios. 2009. Predicting tie strength with social media. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '09), 211-220.
14. Alvin W. Gouldner. 1960. The norm of reciprocity: A preliminary statement. *American sociological review*, 161-178.
15. Jonathan Grudin. 1994. Groupware and social dynamics: eight challenges for developers. *Communications of the ACM* 37, 1: 92-105.
16. Garrett Hardin. 1968. The tragedy of the commons. *Science* 162, 3859: 1243-1248.
17. Brent Hecht, Jaime Teevan, Meredith Ringel Morris, and Daniel J. Liebling. 2012. SearchBuddies: bringing search engines into the conversation. In *Proceedings of the Sixth AAI Conference on Weblogs and Social Media* (ICWSM '12), 138-145.
18. Damon Horowitz and Sepandar D. Kamvar. 2010. The anatomy of a large-scale social search engine. In *Proceedings of the 19th international conference on World wide web* (WWW '10), 431-440.
19. Jin-Woo Jeong, Meredith Ringel Morris, Jaime Teevan, and Daniel J. Liebling. 2013. A crowd-powered socially embedded search engine. In *Proceedings of the Seventh AAI Conference on Weblogs and Social Media* (ICWSM '13), 263-272.
20. Nicolas Kokkalis, Thomas Köhn, Johannes Huebner, Moontae Lee, Florian Schulze, and Scott R. Klemmer. 2013. TaskGenies: Automatically Providing Action Plans Helps People Complete Tasks. *ACM Transactions on Computer-Human Interaction* 20, 5, Article 27, 25 pages.
21. Travis Kriplean, Jonathan Morgan, Deen Freelon, Alan Borning, and Lance Bennett. 2012. Supporting reflective public thought with considerit. In *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work* (CSCW '12), 265-274
22. Kurt Luther, Casey Fiesler, and Amy Bruckman. 2013. Redistributing leadership in online creative collaboration. In *Proceedings of the 2013 conference on Computer supported cooperative work* (CSCW '13), 1007-1022
23. Lena Mamykina, Bella Manoim, Manas Mittal, George Hripcsak, and Björn Hartmann. 2011. Design lessons from the fastest q&a site in the west. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '11), 2857-2866.
24. David W. McDonald and Mark S. Ackerman. 2000. Expertise recommender: a flexible recommendation system and architecture. In *Proc. of the 2000 ACM Computer supported cooperative work*, 231-240.
25. Meredith Ringel Morris, Jaime Teevan, and Katrina Panovich. 2010. What do people ask their social networks, and why?: a survey study of status message q&a behavior. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '10), 1739-1748.
26. Kevin Kyung Nam, Mark S. Ackerman, and Lada A. Adamic. 2009. Questions in, knowledge in?: a study of naver's question answering community. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '09), 779-788
27. Hongseok Oh, Myung-Ho Chung, and Giuseppe Labianca. 2004. Group social capital and group

- effectiveness: The role of informal socializing ties. *Academy of management journal* 47, 6: 860-875.
28. Mancur Olson. 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Harvard University Press
 29. Walter W. Powell. Neither market nor hierarchy: Network forms of organization. 1990. *Research in Organizational Behavior* 27: 305-353.
 30. R. Putnam. 1993. *Making democracy work: civic tradition in modern Italy*. Princeton University Press.
 31. R. Putnam. 2000. *Bowling Alone: the Collapse and Revival of American Community*. Simon and Schuster.
 32. Robert D. Putnam. 1995. Bowling Alone: America's Declining Social Capital. *Journal of Democracy* 6, 1: 65-78.
 33. Jeffrey M. Rzeszotarski and Meredith Ringel Morris. 2014. Estimating the social costs of friendsourcing. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '14)*, 2735-2744.
 34. Amy X. Zhang, Mark S. Ackerman, and David R. Karger. 2015. Mailing lists: why are they still here, what's wrong with them, and how can we fix them?. In *Proc. of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI '15)*, 4009-4018