"Does Anyone Know How to Get Good Answers?" How Social Network Questions Shape Replies

JAIME TEEVAN, MEREDITH RINGEL MORRIS and KATRINA PANOVICH
Microsoft Research, Redmond, WA, USA and
Massachusetts Institute of Technology, Cambridge, MA, USA

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Social networking tools make it easy for people to ask questions of large groups of their personal acquaintances. In this article, we explore how the questions people ask of their social networks via status message updates shape the replies they receive. We present the results of a survey of 624 people, in which participants were asked to share the questions they have asked and answered of their online social networks. We observe interesting variations in how people ask natural, real-world questions that suggest that the effectiveness of a question posed to one's social network could depend on who asks the question, when the question is asked, and how the question is phrased. To understand whether these factors actually do shape question replies, we conducted a controlled study in which 282 participants posted variants of the same question as their status message on Facebook. By analyzing the quantity, quality, and speed of the responses, we find that by controlling the time of day a question is posed and how the question is phrased, and by maintaining a strong network, a person can increase the likelihood of quickly receiving many high-quality answers.

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1. INTRODUCTION

In addition to using status messages to simply describe one's current status, many social network users use their status messages to ask questions of their networks (Morris et al. CHI 2010). The way that questions are asked can range from straightforward:

> Can anyone recommend a good zombie-pocalypse novel?

to quite involved:

> I'm looking for suggestions of a good post-apocalyptic novel to read. Recent books I've enjoyed were World War Z and The Passage; zombie or vampire-caused apocalypse suggestions are extra-good.

Question-based status updates can serve multiple purposes, including creating social awareness, encouraging the asker to reflect on a current information need, building social ties, and, of course, finding answers (Morris et al. ICWSM 2010). For example, the request for a book suggestion both helps the asker find a book to read and lets people know that she enjoys zombie-themed fiction. Valuable replies might include book recommendations, but could also include discussions of other forms of zombie-tainment or an invitation to have coffee together at the bookstore.

In this article, we begin by investigating the way people naturally use social networks for question asking, and find that there are strong trends in the way people phrase their questions. Social psychology research suggests that how people make requests of others influences the responses they receive. For example, a study of people waiting in line to make photocopies revealed that those in line were much more likely to let someone cut in front of them if the request to do so included a meaningless justification ("because I need

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Authors' addresses: Jaime Teevan, E-mail: teevan@microsoft.com; Meredith Ringel Morris, E-mail: merrie@microsoft.com; Katrina Panovich, E-mail: kp@mit.edu.

to make copies") (Langer et al. 1978). To explore this phenomenon in online communications, we conducted a controlled experiment designed to tease out how the way online social network questions are asked influences the answers received. We show that question phrasing, who poses the question, and when the question is asked influence the online responses received. For example, the straightforward question about zombie-pocalypse books will probably receive more recommendations, while the longer one may receive more social comments about the genre.

The article is structured as follows. Following an overview of social question asking research, we highlight relevant findings from a survey of 624 users of social networking services (Morris et al. CHI 2010). We describe the survey methodology, and show that there are common, and at times unexpected, ways that people phrase the questions they ask of their social networks. We then present and expand on the results of a controlled experiment that reveals how the questions posed to a social network influence the answers received (Teevan et al. ICWSM 2011). We describe the experimental framework, wherein 282 Facebook users posted experimenter-selected variants of the same question as their status messages and sent us the responses they received, and present the results. We look at how who asks the question, when the question is asked, and how the question is phrased affect the quantity, quality, and speed of the replies. We conclude by discussing the implications of our findings.

2. RELATED WORK

Status message question-asking is a way to find information online, making it a type of "social search". We begin our discussion of related work with a brief overview of what social search is and what makes it different from other, more traditional forms of search. Because this article focuses on a particular aspect of social search, namely question asking, we then review the most well-studied type of online question asking, Community Q&A. Although question asking on Q&A sites has been well studied, a more natural way for people to ask for information is the less understood behavior of broadcasting questions via a social networking tool. We conclude our discussion of related work with an overview of why this behavior is particularly interesting to study and what is currently known about it.

2.1 Social Search

The term *social search* refers broadly to the process of finding information online with the assistance of social resources, such as by asking friends, reference libraries, or unknown persons online for assistance. Social search also sometimes refers to the process of conducting a search over an existing database of social content created by other users, such as searching over the collection of public Twitter posts (Teevan et al. WSDM 2011) or searching through an archive of questions and answers (Ackerman and Malone 1990). Unlike this work, our research focuses on instances of social search where the desired content is generated in direct response to a need.

Collaborative search (Morris & Teevan, 2010; Golovchinsky et al. 2010) is a type of social search where several users share an information need, and they actively work together to fulfill that need, sometimes using specialized collaborative search tools (Morris & Horvitz 2007). In this article, rather than studying groups explicitly collaborating on shared information needs, we focus on cases where individual information seekers turn to their social network as an information resource.

Wells and Ranie (2008) found that people use a mixture of internet searching and social resources (e.g., phone calls or face-to-face meetings) to answer many types of

questions. Torrey et al. (2009) found that craft-artists kept their social networks informed of current projects in the hopes of receiving "gifts of information", i.e., pointers to relevant online resources that might benefit their projects. Some researchers have proposed more formal models of information seeking with the use of social resources. For example, Pirolli (2009) developed a model of social information foraging, and Evans and Chi (2008) described the various stages in the search process at which searchers engaged with other people.

To understand how the use of social resources compares to solitary search, Evans et al. (2010) conducted a study in which eight participants completed two searches. For one, participants used only non-social resources (e.g., search engines and link following); for the other they used only social resources (e.g., calls or emails to friends or using a Q&A site). They found targeting questions to specific friends versus asking a social network had similar outcomes; questions posed to the social network received more answers, but those targeted to individuals received richer answers. Morris et al. (ICWSM 2010) observed twelve people simultaneously querying their Facebook friends and conducting Web searches on the same topic, and found that users valued the quick response times of search engines, but also appreciated the personalized and occasionally serendipitous nature of answers from social contacts. In this article we look more deeply into the logistics of questioning one's network in order to understand how properties of the question and of the asker affect outcomes.

Social search and traditional search approaches can work in support of each other. Some researchers have built special tools to integrate social information with search engine use. For example, HeyStaks (Smyth et al. 2009) is a browser plug-in that enables users to mark search results as relevant; these results are then boosted in the rankings of socially connected users who do searches on similar topics. Working in the other direction, Search Buddies (Hecht et al. 2012) explored providing algorithmic search content to the questions people ask naturally in social contexts.

2.2 Community Q&A

One of the best studied forms of question asking online is the use of venues such as electronic bulletin boards, newsgroups, and question-answering sites to post questions targeted either at a particular community or to the world at large. We refer to the class of sites where users post questions to be answered by a set of users who they do not know personally as *Q&A sites*. Harper et al. (2008) identified two categories of questions posted to Q&A sites: *conversational* questions, intended to spark discussion, and *informational* questions, soliciting specific facts. They found that informational questions have higher archival value than conversational ones.

In this article, we explore factors related to the quantity, quality, and speed of the replies people receive to their social network status message questions. Researchers have found that questions posted to Q&A sites receive answers within 2 (Zhang et al. 2007) to 9 hours (Hsieh and Counts 2009), although recent work suggests that questions on some sites, like Stack Overflow, can receive responses much faster. Mamykina et al. (2011) found that 92% of Stack Overflow questions are answered in a median time of 11 minutes. Their research suggests that aspects of the question may influence the speed of response, with, for example, questions that invite discussion being less likely to receive fast responses. Harper et al. (2008) found that the properties of answers on Q&A sites most related to judged quality were the length of the answer and the number of hyperlinks it contained. We have explored both of these properties as measures of the

quality of social network responses. However, as less than 1% of the observed responses contained a hyperlink, we focus on length in the studies that follow.

Market-based (Hsieh and Counts 2009) and reputation-based (Chen et al. 2006) systems have been explored as ways to add value to Q&A sites. Raban and Harper (2008) point out that a mixture of intrinsic (e.g., gratitude) and extrinsic (e.g., reputation or money) factors motivate Q&A site users to answer questions. Beenan et al. (2004) found social psychology techniques, such as making users feel their contributions are unique, result in increased participation, and Ackerman and Palen (1996) found intrinsic motivations, such as the visibility of expertise, were important. Liu et al. (2008) used machine learning to predict satisfaction with answers received on a Q&A site, and found important predictive factors included the asker's length of membership and the question topic, while the answerer's reputation played only a small role. Burke et al. (2007) studied how post phrasing impacted response likelihood on Usenet groups, and found that messages making requests were likely to get more responses than those not making requests.

2.3 Social Network Question Asking

Although question asking on Q&A sites is reasonably well understood, a more natural way for people to ask questions of their network is to broadcast the question via a social networking tool. Many popular social networking services, such as Facebook and Twitter, enable users to write a brief *status message*, which is then visible to their connections on the network. For example, at the time the studies presented in this article were conducted (summer 2009), Facebook's status message could be up to 423 characters long, and the prompt "What's on your mind?" encouraged the user to fill in the status box. On Twitter, status updates could be up to 140 characters long, and the prompt "What are you doing?" was used. Work by Madden and Zickuhr (2011) found that 65% of online U.S. adults used status updating services like Twitter or Facebook, and the number is growing rapidly.

There are several factors that differentiate the experience of asking a question on a Q&A site (Section 2.2) from that of asking on a social networking site. First, questions on Q&A sites can be posted anonymously (or under a pseudonym), whereas on a social networking site, the asker's identity is known to the readers of the question. Second, the audience of potential answerers is typically much smaller on a social networking site than on a Q&A site, since it consists of only the direct contacts of the asker rather than an entire community or the internet at large. Also, social networking sites typically impose a limit of only a few hundred characters on message length, whereas many Q&A sites allow much longer, more detailed questions to be posted. Additionally, social network Q&A occurs naturally in the course of the other social interactions that are the primary purpose of such sites. In contrast, Q&A sites require a user to visit a specialized site with the explicit intent of information seeking. As a result of these differences the questions in these two venues represent different formalities, urgencies, and types of information needs, making it is valuable to study question asking behavior on social networks.

Researchers have tried to understand the extent and manner of use of social network status messages for question asking. Honeycutt and Herring (2009) analyzed Twitter messages containing @ symbols and found 3 of 200 were meant to "solicit information." Naaman et al. (2010) found that questions to followers comprised approximately 5% of Twitter posts that they manually coded. We conducted two surveys on the topic. The first survey (Morris et al. CHI 2010) looked at the social network question asking behavior of 624 U.S.-based Microsoft employees (73% full-time employees and 27% college-student

interns). In this article, we highlight important findings from this work, showing that there are common, and at times unexpected, ways that people phrase the questions they ask of their social networks. We also present the results of a controlled experiment inspired by these survey findings, to help us better understand effective social network questioning techniques. Our second survey (Yang et al. 2011) studied 933 Microsoft employees from four countries (the U.S., U.K., China, and India) to measure cultural differences in social network question asking. The findings from the cross-cultural survey were largely similar to those of the initial one, lending support to the notion that our findings extend beyond a single demographic.

Subsequent studies of information seeking on Twitter by Efron and Winget (2010) and Paul et al. (2011), and on Facebook by Lampe et al. (2012) provide findings that complement the results from our surveys. For instance, Efron and Winget (2010) create a taxonomy of question types on Twitter that is similar to ours, but also includes categories for non-information-seeking "questions," such as spam. Lampe et al. (2012) use regression models to identify what factors make people more likely to view Facebook as a good source for information seeking. Panovich et al. (2012) explored who is likely to contribute valuable information in social network Q&A, and found that strong ties offer more valued contributions than weak ones.

Some question answering systems use social networking services as their infrastructure, but questions are posted to a large audience of unknown users, rather than to known connections. As an example, LazyTweet [lazytweet.com] aggregates Twitter-based questions and allows any Twitter user to view and respond to them. Recent work by Nichols and Kang (2012) explores factors impacting question responses from targeted strangers on Twitter. Other question answering tools, like Q&A sites, allow people to post questions to be answered by people who are not part of the asker's network. Newer services like Quora [quora.com] seek to create a network structure based on non-anonymous Q&A interchanges, thus creating an experience that combines expertise-finding, social-network communication, and information-seeking. In contrast, we study Q&A exchanges that occur informally among a closed, pre-established network of users.

Some systems help people connect with expert individuals to ask questions directly. For example, Collabio (Bernstein et al. 2009) and Aardvark (Horowitz and Kamvar 2010) are expertise-finding tools that use social networking infrastructure, and Farrell et al. (2007) explored how tagging can be used to identify expertise within a corporate community. Although we observe people sometimes target questions at expert responders with the questions they broadcast, the questions are still seen by a person's entire network rather than routed directly to pre-identified experts.

In summary, social network question asking as a type of social search is an emerging area for exploration. Researchers have shown that the behavior is prevalent and have begun to characterize it. But unlike with community Q&A, little is known about what makes for a successful social network question. To fill this gap, we present a descriptive survey of effective natural question asking behavior. We then go a step beyond the descriptive studies that have been used to understand all types of online question asking, and present a unique controlled study that reveals causality among a number of question factors and the response quality, quantity, and speed.

3. METHODOLOGY: SURVEY OF NATURAL QUESTION ASKING

We being by looking at people's natural social network question asking behavior. We conducted a survey on the topic in the summer of 2009. Our initial findings were presented at CHI, the ACM Conference on Human-Computer Interaction (Morris et al.

CHI 2010). In this article, we reiterate and expand on the survey findings that motivate our subsequent experiment regarding the impact of Facebook question phrasing and user demographics on replies received. We focus on discussing the naturally-occurring variations in question-phrasing and their reported impact on responses. Morris et al. (CHI 2010) also contains a detailed qualitative analysis of the types and topics of questions asked and the motivations behind social network Q&A, which we do not discuss here.

3.1 Survey Content

In addition to collecting basic demographic information and background information about participants' use of social networking services such as Facebook and Twitter, the survey asked a series of questions related to social network question asking, such as whether respondents had ever used their status message to ask a question of their social network. If they had done so, they completed several follow-up questions about the frequency of this behavior, the types of questions asked, and the responses received. Additionally, we asked participants who reported asking a question to log onto the social network and copy and paste an example of a question they had recently asked into the survey form.

We also asked whether participants had ever answered a question they had seen posted by someone else as a status message. We then asked several follow-up questions to understand the motivation behind choosing to answer or not answer questions. Those who reported answering a question were asked to log onto the social network and copy and paste an example of a question they had answered, along with the text of their answer.

As with all survey studies, there are inherent inaccuracies possible in self-report data. It is also possible there was a selection biases in the questions participants chose to share with us. For example, participants may have primarily chosen to copy and paste questions that were successful or on socially acceptable topics.

3.2 Participants

Six hundred and twenty four people completed our survey. Respondents were all Microsoft employees. Consistent with company demographics, 25.5% female and 74.5% male. Most (72.8%) were full-time employees, although 27.2% were university students working as summer interns. Participants were recruited by advertisements to the company's e-mail distribution lists on the topics of social networking, and to lists targeted toward summer interns, with a response rate of approximately 20%. We specifically advertised the study to the interns in order to ensure a diverse perspective representative of typical social networking system users, since studies show that such tools are heavily used by university students. Of our survey respondents, 28.3% were aged 18-25, 40.1% aged 26 – 35, 25.5% aged 36 – 45, and only 6.1% aged 46 and over.

Participants reported using a variety of social networking technologies, including Facebook, Twitter, MySpace, Friendster, LinkedIn, and Orkut. However, Facebook and Twitter were the two most prominent services, with 98.1% of participants having a Facebook account and 71% having a Twitter account. We therefore focus our discussion of the survey results only on the use of these two services. Participants with Facebook accounts reported a median network size of 209 friends, while those with Twitter accounts reported a median of 25 followers.

Our findings should be interpreted in light of possible biases introduced by the demographic of our survey population. The demographic issue is somewhat mitigated by

the inclusion of a large number of college interns in the survey sample; the age ranges and network sizes of our participants were reasonably close to those of the broader social network user population. However, our survey population was more tech-savvy and less gender-balanced than the general social networking audience. A subsequent cross-cultural survey (Yang et al. 2011) of social network Q&A behavior found largely similar results (with a few noteworthy differences between Asian and Western cultures), lending increased confidence that our findings were reasonably representative.

4. RESULTS: THE QUESTIONS PEOPLE ASK THEIR SOCIAL NETWORKS

As expected, participants in our study reported sometimes using social network services to find practical information, indicating agreement (median = 4 on a five-point Likert scale) with the statement, "I use sites like Facebook and Twitter to get useful information." Half (50.6%) of respondents said they had used their status messages to ask a question. We were provided with a total of 249 examples of questions participants had posted or answered (some participants were unable to provide an example despite having asked or answered a question due to inability to locate the example or privacy concerns). Examples ranged from silly ("Didn't it used to be a requirement to have talent to be famous?") to complex ("Bikers: Any advice on the right bike for me? Doing it for exercise. Around town (suburban, not city). No offroading. Under $200?"). In this section, we examine this set of questions to better understand how participants phrased the questions they asked of their social network, and to explore which ones received the fasted, most useful responses.

4.1 How the Questions Were Phrased

The questions we collected were generally short. Although during the study Twitter allowed status updates to be up to 140 characters long, and Facebook up to 423, the example questions had a mean length of only 75.1 characters (13.8 words), or about the same length as the title of this article. The majority of the questions (71.9%) consisted of a single sentence (mean = 1.4 sentences). Multi-sentence questions typically used the extra sentence(s) to provide additional context about the question, such as explaining the motivation for asking. For example, one participant asked, "Just went curling today. Guess I'm into weird sports. What should be my next sport?"

A majority of the examples (81.5%) were explicitly phrased as questions and included a question mark. For example, one respondent asked, "So what's the going rate for the tooth fairy?" However, a minority of the examples (the remaining 18.5%) were phrased in statement form and ended with a period. Questions that were phrased as a statement were often preceded by inquisitive phrases such as "I wonder," or "I need." An example of a question phrased as a statement includes, "I am looking for a good point and shoot camera. Suggestions are welcome."

Although most questions were implicitly directed to the asker's entire network (e.g., "How do I put sunblock on my back?"), many of the questions (20.9%) used the phrase "anyone" to explicitly indicate that the asker was seeking an answer from any member of their network. For example, one participant asked, "Does anyone know who won American Idol?" Questions were also often directed to "someone," "somebody," or "anybody." Some askers scoped their question even more specifically, directing it only at a subset of their network that had a particular expertise. For example, one participant asked, "Can anyone in Puget Sound area recommend a stylist?"

		Response actually received in								
		5 mins.	15 mins.	30 mins.	1 hour	6 hours	1 day	>1 day	Never	Total
Response expected in	5 mins.	19	8	5	5	3	7	0	1	48
	15 mins.	1	10	4	9	1	7	0	1	33
	30 mins.	1	0	6	9	5	10	0	5	36
	1 hour	1	0	2	13	9	19	1	1	46
	6 hours	0	0	0	7	1	26	5	3	42
	1 day	0	0	0	1	2	15	9	0	27
	>1 day	0	0	0	0	0	0	5	3	8
	Never	1	0	1	1	1	9	5	3	21
	Total	23	18	18	45	22	93	25	17	23

Table 1. The speed in which participants expected a response compared with the speed in which participants actually received a response. For example, 19 people expected a response within 5 minutes and received a response within that speed. Cells are shaded to represent the number of participants in each cell. Overall, participants expected faster responses than they actually received.

4.2 Which Questions Received Answers

In addition to providing information about question asking on social networks, participants also provided information about question answering. They shared with us their subjective experience with the speed and helpfulness of the replies they received to their question, and provided information about when they themselves chose to answer and not answer questions that others had posted. Many participants reported having answered questions. Three-quarters (73.4%) had seen a question posted as a status message by another member of their network. Of those, nearly all (93.4%) said they had answered such a question on at least one occasion. Here we examine the factors affecting answer speed and helpfulness.

Social network question asking appeared very likely to generate a response. All but 6.5% of questions shared via the survey received an answer. It is possible, however, that respondents were biased towards sharing examples with us that had received responses.

Overall, the 93.5% of respondents who shared a question that received a response reported that their questions were answered promptly; 24.3% claimed to have received a response in 30 minutes or less, 42.8% in one hour or less, and 90.1% within one day. As can be seen in Table 1, participants generally expected fast response times, and received slower responses than expected. A third (31%) expected a response within 15 minutes or less, but only 15.7% received one that quickly; 62.5% expected a response within one hour, but only 39.8% got one. Expectations and reality approached each other at the one day mark, with 88.9% of participants expecting a response within a day or less and 83.9% receiving one. Despite the discrepancy between expected and reported answer speed, getting a response within one day seemed acceptable to most people, with 89.3% reporting they were satisfied with the response time they experienced.

The responses gathered via a social network appear to be very valuable. Participants were asked to characterize whether or not the responses they received were helpful. Of

the participants who received a response, 69.3% reported that they found the responses helpful. The remaining 30.7% reported receiving unhelpful responses.

We examined whether the common question phrasings described earlier influenced the self-reported speed or helpfulness of the responses received. We found that question length influenced response helpfulness, with the questions that had fewer sentences receiving more useful responses than those with many sentences ($r = -0.13$); we found no correlation between question length and response speed. It may be that multi-sentence inquiries appear more similar to a typical social status update and less like an actual question. The use of punctuation and scoping terms did not correlate strongly with reported response speed or helpfulness.

We also explored whether traits of the asker influenced answer speed and helpfulness. Demographic factors like gender and age did not significantly influence either answer speed or helpfulness. However, when we looked at the asker's social network habits, such as the network posted to or the frequency of updating one's status, we found significant influence. The frequency of using the social network holds was particularly important, with those who update their status frequently receiving faster responses ($z = -2.1$, $p = .033$). Most (87.0%) frequent updaters reported receiving responses in one day or less, while only 64.5% of infrequent updaters received responses within one day. We found no difference in answer speed or helpfulness regardless of whether the question was posted to Facebook or Twitter.

5. METHODOLOGY: CONTROLLED STUDY OF QUESTION ASKING

The survey revealed strong trends in question phrasing, and suggested some characteristics of question phrasing and the asker's social network use that might influence the question's response. Our curiosity piqued by these results, we set out to better understand the factors affecting the responses to social network questions. To do this in a controlled (rather than descriptive) manner, we asked many different people to post the exact same question as their status message and send us the answers that question received. By looking at the differences in replies received by different subsets of askers, we are able to understand how who asks a question influences the replies. By having some participants to post the question in the morning and others in the afternoon, we gain insight into the effect of time of day. And by carefully varying the question phrasing along the important axes we observed in the survey, we are able to explore the impact of how a question is worded.

In this section, after describing the study protocol we present the question variants we analyzed and the measures we used to compare the success of the responses received. Portions of the work presented here related to question phrasing were presented as a poster at ICWSM, the International AAAI Conference on Weblogs and Social Media (Teevan et al. ICWSM 2011).

5.1 Study Protocol

In the controlled study, we asked 282 people to post a variant of the question, "Should I watch E.T.?" as their Facebook status message (see Figure 1 for an example). We chose for people to ask for opinions about a movie because the question type (opinion) and topic (entertainment) are popular among natural social network questions. Morris et al. (CHI 2012) report opinion questions represent 22% of the questions asked of social networks, and entertainment questions represent 17%. The popular science fiction film *E.T.* [Universal Studios, 1982] chosen due to its popularity across age groups and its

Figure 1. Participants captured screenshots from Facebook to record the responses received. In this example, the participant is asking a 2-sentence question in the morning, phrased as a statement and directed at "anyone".

innocuous nature, so the question would seem natural when posed by participants from a variety of backgrounds. However, although the question we studied is of a common type and topic, it is unknown how results will generalize to other types and topics. Self-reported response metrics from our survey (Morris et al. CHI 2010) found that some question types (particularly rhetorical questions) received slower responses. Although we did not observe an influence of topic on response time or utility, Liu et al. (2008) found some influence of question topic on response metrics on traditional Q&A sites.

Participants were sent a calendar appointment containing the text of a question and instructions to post it verbatim as their Facebook status at the time specified by the appointment. Specifics of the assigned questions are discussed in detail in the next section. We chose to study a single social networking service to avoid confounds due to variation among different services. Facebook was selected because it is currently the most popular social networking tool, and because it has a comment system that enables easy response tracking. Participants were asked to not reveal that the update was not genuine, to not comment on their status or on any of the responses received, and to not update their status for at least 24 hours after posting the study message. Three days after posting the question, we asked participants to send a screenshot from Facebook containing the text of the replies they received (e.g., Figure 1). Participants also completed a short questionnaire asking about their social network and demographic information.

5.2 Study Conditions

We studied variations in questions posted along three dimensions: traits of the question asker, the time of day the question was posted, and how the question was phrased.

Properties of the Asker

We explored how the properties of the person asking the question affected the responses received. All 282 participants were Microsoft employees and recruited via email distribution lists related to social networking or college-aged interns, but participants' demographics, social network use, social network makeup, and avatars varied.

Demographics: We explored how gender and age influenced responses. Ninety seven (34.4%) of the participants were female. The median age of participants was 34.

Social network use: In our survey we observed that a question asker's social network habits, such as the network posted to or the frequency of updating one's status, significantly influenced the responses they received. Thus we also looked at how factors such as network size, update frequency, length of membership, and even whether the participant had asked a question previously affected the responses received. Participants in the study were required to have an existing Facebook account. Most (238, 84.4%) reported having had the account for over a year. The median social network size was 215.

Social network makeup: In addition to network used, we explored whether the composition of people's networks was important. Participants identified what portion of their network was composed of colleagues, classmates (current or former), family, and social acquaintances. Classmates and social acquaintances were the most common relationship types, and family the least. While we examined relationship categories, we did not explicitly explore tie strength (Gilbert & Karahalios, 2009). A study by Panovich et al. (2012) found that strong ties were slightly more likely to provide valuable response to Facebook-based inquiries.

A few participants had network members in common, and responses occasionally included observations from mutual friends noting duplicate status messages across individuals. Such overlaps were infrequent, however, as our 282 participants were selected from a company of over 80,000 employees, and reported that social friends, rather than colleagues, were the most common type of network member. These infrequent observations of similar posts due to network overlap affected all study conditions equally and thus are unlikely to impact our results. Respondents that commented on the question similarity did not seem to suspect anything amiss. Rather, their response indicated that they assumed the phenomenon was due to an external event, such as a news article about the movie *E.T.* or a re-release of the DVD. For example, one response stated, "Strange, you're the second person in the past few days to ask the same question. And I have no opinion, might have seen it once when I was little, but I've forgotten!"

Profile Picture: We also looked at how participants represented themselves to their social network by analyzing their profile picture. These pictures were coded along two dimensions: (1) cinematographic measures of how close the shot was (from extreme close-up to extreme long shot), and (2) the presence of someone other than the participant in the shot.

Time of Day

We also explored how the time of day the question was posted affected the responses. Participants were asked to update their status message with the provided question either in the morning (7 am to 10 am) or afternoon (4 pm to 7 pm). Although we were not easily able to control for time zones, these time intervals ensured non-overlapping periods for questions posted within the continental United States (all but three participants). While the question askers and respondents were occasionally in different time zones (50% estimated that most or all of their network lived in the same time zone as they did), this

Punctuation	Length	Scoping	Example	# posted
Question	1 sentence	None	Should I watch E.T.?	26
		Anyone	Does anyone think I should watch E.T.?	26
		Movie buff	Do my movie buff friends think I should watch E.T.?	27
	2 sentences	None	Taking it easy. Should I watch E.T.?	18
		Anyone	Taking it easy. Does anyone think I should watch E.T.?	26
		Movie buff	Taking it easy. Do my movie buff friends think I should watch E.T.?	20
Statement	1 sentence	None	I wonder if I should watch E.T.	24
		Anyone	I wonder if anyone thinks I should watch E.T.	27
		Movie buff	I wonder if my movie buff friends think I should watch E.T.	23
	2 sentences	None	Taking it easy. I wonder if I should watch E.T.	21
		Anyone	Taking it easy. I wonder if anyone thinks I should watch E.T.	22
		Movie buff	Taking it easy. I wonder if my movie buff friends think I should watch E.T.	22

Table 2. The different question phrasings studied, and the number of participants who posted each.

factor affected all conditions equally and thus was unlikely to influence our results. Of the 282 participants, 138 posted their question in the morning and 143 in the afternoon.

Phrasing

We varied how the basic question ("Should I watch E.T.?") was phrased along three axes: punctuation, number of sentences, and scope (see Table 2 for specific phrasing). The axes were chosen based on findings from our survey of social network question-asking, which found that questions naturally varied in these ways.

Punctuation: The basic inquiry was phrased as a question (ending with a question mark) or as a statement (ending with a period), since we found that 18.5% of the questions in their sample were actually phrased as statements. Prior research in the "offline" world (Francik and Clark 1985) has found that explicit requests are more successful than implicit ones. Our hypothesis was that stating the question explicitly as a clear question would help distinguish it from a more typical status update and increase the number of responses the question received.

Number of Sentences: The basic question either was only one sentence long, or included a preceding sentence ("Taking it easy.") to provide some additional information about why the asker was considering watching the movie. In our survey we found longer questions to social networks reportedly got slower answers, so our hypothesis was that the additional context-setting sentence would increase the appearance that the question was a regular status update, and hurt response metrics. Our goal in choosing the contextual sentence was for it to be vague enough to be plausible for users having a variety of backgrounds. Other choices for the additional sentence may have affected responses differently.

Scope: The basic question provided no explicit scoping. However, in our survey we observed that 21% of questions were addressed to "anyone". For this reason, we tested variants that used the term "anyone" to signal that an answer from any of the user's contacts was welcome, or referred specifically to "my movie buff friends." We hypothesized that specific scopings would encourage responses by reminding users of the unique contributions they could bring to bear on the questions (Breenan et al. 2004; Karau and Williams 1993).

Each of the twelve phrasing variants was posted by anywhere from 18 to 27 participants (Table 2). Participants were randomly assigned a variant, with effort made to balance demographics across conditions. The distribution of participants to each variant was initially equal, but some participants dropped out; all analysis is based on the 282 participants that completed the entire study. Post-hoc analyses verified that the assignment of participants to condition resulted in approximately equal distributions of traits (demographic, social network use, and social network makeup) across conditions.

By partitioning the question space evenly across each axis, we were able to explore each overarching difference with a larger number of participants (from 89 to 153). For example, each inquiry can be phrased as a question or as a statement regardless of how it is scoped; 143 participants posted the question phrased as a question, and 139 participants posted the question phrased as a statement. See Table 7 for a summary of the total number of participants in each question-phrasing condition.

5.3 Response Metrics

In our analysis, we compare the quantity, quality, and speed of the responses received as a function of the different experimental conditions described above.

Quantity

Quantity measures relate to how many responses were received. We looked at several quantity measures, all of which provide a consistent picture. The measures of quantity we present here are: the portion of questions under a particular condition that received responses (referred to as "percent with response"), and, on average, how many responses were received given that the question was responded to (referred to as "number of responses").

Quality

We also explored several measures of response quality. Not all responses were directly useful to the task of deciding whether or not to watch *E.T.* Responses were coded along two quality dimensions. The first quality dimension coded whether the question received a direct answer recommending whether or not the participant should watch *E.T.* (e.g., "YESSS! One of my favorite movies of ALL time," or, "Soooo boring. I vote no."). The second quality dimension coded whether the response provided potentially valuable information that might interest someone who is deciding whether to watch *E.T.*, even though such responses may not directly answer the initial question. In addition to offering a direct answer, other examples of "useful" responses included providing facts about *E.T.* ("… Drew Barrymore's first time in a movie…") and suggestions of alternative films the asker might enjoy ("I'd suggest *Weird Science*…"). Coding was done using a grounded theory approach (Glaser and Strauss, 1977), with a two-phase process that involved a first pass through all of the responses to develop a coding scheme of answer types, followed by a second pass to label each response. In this article we talk about the percent of questions that received direct answers (referred to as "percent answered"), and the percent that received responses containing useful information ("percent useful").

Response length is another potential measure of quality. Longer responses can contain more information, and previous research (Harper et al. 2008) shows response length is an indicator of response quality on Q&A sites. Given that a question received a response, we also used the average length in characters of the responses as a measure of quality ("response length").

		Quantity		Quality			Speed
	Count	**Percent with response**	**Number of responses**	**Percent answered**	**Percent useful**	**Response length**	**Time to first response**
Overall	282	82.3%	3.207	58.9	72.0	55.581	1:27

Table 3. The average quantity, quality, and speed of the responses our 282 participants' questions received.

Speed

To measure how quickly questions received responses, we studied the average time it took for a question to receive its first response given that at least one response was received. This information was coded from the timestamps captured in the screenshots of participants' Facebook interactions (e.g., Figure 1). This we refer to as "time to first response". Posting times for questions and answers were captured in the screenshot participants sent us (Figure 1). Because response time distributes logarithmically, we use the log of the response time to keep long times from dominating. Our findings, however, are consistent regardless of whether we use the log or not.

Statistical Tests

Significance between variants for a particular dimension is calculated using two-tailed independent samples *t*-tests. ANOVA tests were performed first for dimensions having more than two variants, and significance for these cases is reported only when both the ANOVA and the follow-up *t*-tests were significant. Stepwise linear regressions were also performed to better understand the relative influence of the factors studied on each of our response metrics; all factors we report when discussing regression analyses influenced the models significantly ($p < .05$).

6. RESULTS: UNDERSTANDING WHAT IMPACTS RESPONSES

In this section, following a brief overview of the general question-answering behavior we observed, we discuss how the different study conditions (including who asked the question, when the question was asked, and how the question was phrased) affected the responses received.

6.1 Overview

Overall, the 282 questions posted received a total of 744 responses. A summary of the quantity, quality, and speed of those responses can be found in Table 3.

Response Quantity

Most (82.3%) of questions posted received responses. When a response was received, there were on average 3.207 responses (median=3, maximum=11). Figure 2 shows the distribution of how many responses were received for each question. Our regression model indicated that using only one sentence ($\beta=.17$) and using a question mark ($\beta=.16$) were the two significant factors in determining whether a response was received ($R=.23$, $R^2=.05$). Having a higher total number of responses was significantly influenced by four factors: using fewer sentences ($\beta=.25$), having a larger network ($\beta=.19$), including scoping ($\beta=.18$), and asking in the afternoon ($\beta=.13$) ($R=.40$, $R^2=.16$).

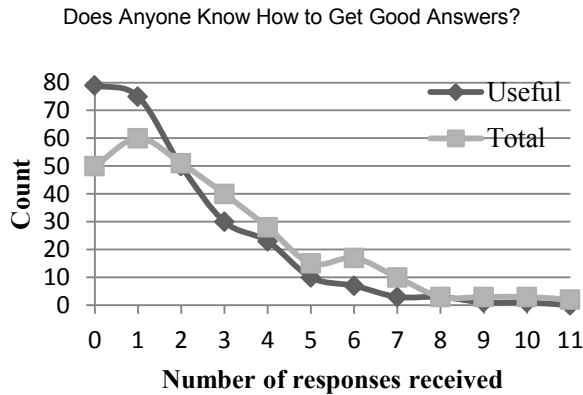Does Anyone Know How to Get Good Answers?

Figure 2. The total number of responses and the number of useful responses received to the 282 questions posted to Facebook. Overall, 744 responses were received.

Response Quality

The average response was 55.7 characters long, which is even shorter than the average question we observed in the survey. Many of the responses were useful. Of the 744 responses received, 346 (46.5%) included a direct answer to the question. As mentioned earlier, even responses that did not answer the question often included useful information to help the asker make the decision on their own. In total, 513 responses (69.0%) included either an answer or useful information relating to the movie (or both). The distribution of how many useful responses each question received can be seen in Figure 2. A majority of the questions (72.0%) received at least one useful response.

A number of questions received a mixture of some useful answers and some purely social responses. Purely social responses can provide the user with utility (e.g., a feeling of connectedness with friends, humor, etc.). Many of the social responses included jokes (63, 8.5%) or social comments (183, 24.6%) inspired by the question's topic, although some responses did not refer to the question at all (e.g., "Missing you at MGX!!"). For the purposes of this study we only classified responses pertaining directly to the movie recommendation task as useful, as described earlier in the Response Metrics section.

Although participants were instructed not to respond to any requests for clarification, 120 (16.1%) of the responders tried to engage the participant in a dialog in order to better answer the question. The types of clarifications people requested ranged from asking who the person would be watching the movie with ("With family or without?") to what version of the movie would be watched ("Is it the one where they changed the guns to radios?"). The most common requests for clarification included asking whether the person had seen the movie before ("Watch it again or for the first time?"), and what was meant by E.T. ("The movie or the entertainment show [Entertainment Tonight]? I will reserve my judgment until you answer."). Clarification was not always necessary, though, because the responders often knew a lot of background about the asker. In 43 responses (5.8% of the total responses received) there was evidence that the responder used information about the asker to answer the question. For example, one person replied, "If I remember correctly, you watched it and cried like a baby."

Respondents also talked among themselves, for social reasons, to clarify the question, or to comment on others' answers. Fifty-five of the 512 follow-up responses (10.7%) referred to a previous response (we compare only with follow-up responses because it is impossible for the first response to a question to comment on a previous
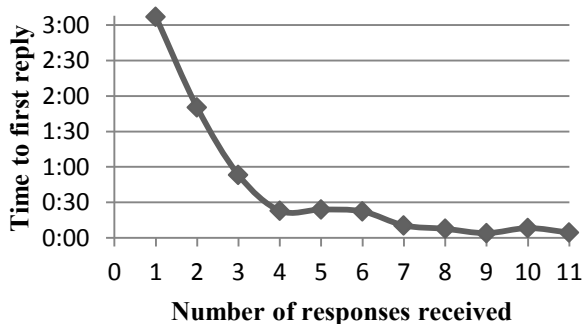
Figure 3. The average time to first response as a function of the number of responses a question received.

response). Examining the text of the responses, it appears many subsequent responders are influenced by earlier responders even when that influence is not overt. There are many examples of strings of similar jokes and similar wording in response to the same question. For example, all of the responders might phrase their response as, "You should," instead of "Yes," or they might expresses opinions about Drew Barrymore's role without directly referring to the previous responder's comments.

As further evidence that previous responders influenced subsequent responders, questions were most likely to receive an answer in the first response. A majority (56.5%) of the first responses answered the question, while only 42.0% of the subsequent responses answered the question ($p < .01$). Controlling for number of responses, the trend is even more obvious. For example, when comparing the first and second response of the 51 questions that received exactly two responses, we observe that 68.6% of the first responses included an answer, while only 35.3% of the second responses did ($p < .01$).

Our regression models indicated that using scoping ($\beta=.24$), using fewer sentences ($\beta=.18$), and having a prior history of using status messages for question asking ($\beta=.15$) were the most significant factors in increasing response length (R=.33, $R^2=.11$). Eliminating the extra sentence ($\beta=.26$) and asking in the afternoon ($\beta=.19$) were the most significant factors in eliciting responses that directly answered the question (R=.34, $R^2=.11$).

Response Speed

The first response appeared on average 1 hour and 27 minutes after the question was posted, and all responses appeared on average 3 hours and 34 minutes after. The time to response is heavy-tailed and appears to follows a power-law distribution. Half of all the questions that received a response received their first response within 22 minutes. Half of all responses occurred in the first hour and 25 minutes after the question was posted. Participants who received their first response quickly were more likely to get more responses in total. This may be due to the increased prominence of commented-upon items in the Facebook News Feed. The News Feed feature also makes it less likely people notice status messages after long intervals, since newer updates seem to receive prime screen real estate. Figure 3 shows the number of responses received compared with the time to the first response. Our regression model indicated that having a large network

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Asker			Count	Quantity		Quality			Speed
				Percent with response	Number of responses	Percent answered	Percent useful	Response length	Time to first response
Demo.	Gender	Male	185	80.0%	3.115	56.8%	**68.1%**	53.251	1:20
		Female	97	86.6%	3.369	62.9%	**79.4%**	59.687	1:40
	Age	≤ 35	150	83.3%	3.384	62.7%	73.3%	52.304	**1:02**
		36+	132	81.1%	3.000	54.5%	70.5%	59.410	**1:57**
Social network use	Number of friends	≤ 200	133	**75.2%***	**2.600***	**50.4%***	**63.2%***	53.854	**2:15***
		201+	148	**88.6%***	**3.667***	**66.4%***	**79.9%***	56.890	**0:52***
	Time on network	< 1 year	44	79.5%	2.914	**43.2%**	63.6%	56.541	1:53
		> 1 year	238	82.8%	3.259	**61.8%**	73.5%	55.411	1:23
	Update frequency	< weekly	181	83.4%	3.351	59.1%	73.5%	54.322	**1:09**
		> weekly	100	80.2%	2.938	58.4%	69.3%	57.929	**2:03**
	Asked before	No	113	80.5%	**2.736***	55.8%	67.3%	59.090	1:23
		Yes	168	83.4%	**3.511***	60.9%	75.1%	53.317	1:30
Social network makeup	Friends	Few	185	80.0%	3.135	55.7%	70.3%	56.457	1:28
		Lots	95	86.6%	3.333	64.9%	75.3%	54.039	1:27
	Family	Few	59	83.1%	3.449	57.6%	67.8%	58.079	1:44
		Lots	222	82.0%	3.137	59.0%	73.0%	54.753	1:23
	Classmates	Few	211	80.6%	3.041	56.4%	69.2%	57.211	**1:47***
		Lots	69	87.0%	3.667	65.2%	79.7%	50.673	**0:35***
	Work	Few	236	83.5%	3.259	60.6%	74.2%	54.690	1:24
		Lots	45	75.6%	2.882	48.9%	60.0%	59.910	1:46
Picture	Closeness of shot	Close-up	85	**88.2%**	3.080	60.0%	**78.8%**	56.919	1:52
		Long shot	95	**75.8%**	2.722	54.7%	**63.2%**	49.732	1:25
	Another person	No	218	80.7%	**2.926***	56.4%	69.3%	53.995	1:41
		Yes	48	87.5%	**4.310***	70.8%	79.2%	62.755	0:45

Table 4. The quantity, quality, and speed of response along the dimensions studied. Significant differences ($p < .05$) are shaded and ($p < .01$) are indicated with a *. Counts do not always sum to 282 because not all participants reported in all cases.

(β=.22) and eliminating the extra sentence (β=.13) were the two most significant factors in reducing time to first response (R=.26, R^2=.06).

6.2 How Who Asked Affected Responses

We looked at features of the person asking the question to see if traits of the asker influenced the types of answers that person received. As discussed in greater detail below, the biggest predictors of response quantity, quality, and speed proved to be social, with the number and types of friends a person has being particularly important. Table 4 shows the average quantity, quality, and speed of the responses for different groups of participants. Note that the properties of the asker were not always independent of each other. Table 5 shows the correlations between the dimensions we studied. Age, for example, tends to correlate with social network use (younger people tend to have more friends) and social network makeup (younger people have a higher proportion of their network made up of college friends than of work friends).

Asker		Demo.	Social network use				Makeup
		Age	Num. friends	Time on net.	Update freq.	Asked before	Classmates
Demo-graphics	Gender	0.148	-0.029	-0.080	-0.048	-0.015	-0.058
	Age		**-0.294**	-0.160	-0.078	-0.003	**-0.445**
Social network use	Num. friends	**-0.294**		**0.262**	-0.228	0.174	**0.310**
	Time on net.	-0.160	**0.262**		-0.142	0.046	0.132
	Update freq.	-0.078	-0.228	-0.142		**-0.419**	0.020
	Asked before	-0.003	0.174	0.046	**-0.419**		0.124
Social network makeup	Friends	-0.117	0.099	-0.068	0.020	0.001	0.020
	Family	0.117	0.041	0.008	-0.021	0.035	-0.027
	Classmates	**-0.445**	**0.310**	0.132	0.020	0.124	
	Work	0.204	0.009	0.223	-0.126	-0.042	-0.055
Profile picture	Closeness	-0.216	0.042	0.002	0.019	-0.031	0.083
	Another person	-0.175	0.021	-0.038	0.051	-0.108	0.067

Table 5. The Pearson correlation coefficient between various properties of the asker. Columns only show attributes for which there is at least one correlation with an absolute value greater than 0.25. Values greater than 0.25 are highlighted. The highest correlations tend to be among social network use.

Demographics

Demographic factors such as gender and age had only a small influence on our response metrics. There was a weak relationship between gender and response quantity, quality, and speed. The general trend was for women to receive slightly more responses, as well as slightly higher quality responses, but at a somewhat slower speed. The average time to first response was 20 minutes slower for women than men. The only significant difference we observed between the two groups was that women received a higher proportion of useful answers from their networks (79.4% v. 68.1%, $p < .05$).

Although the relationship was not quite as strong, age was also consistently correlated with success metrics such that younger people received more, higher quality, and faster responses. When we compared the differences between participants who were 35 and under and those who were over 36, none of the differences were significant except that younger people received significantly faster responses (1:02 hours v. 1:57 hours, $p < .05$).

Social Network Use

Consistent with what we expected given our survey results, people with a lot of friends, who had been on Facebook a long time, and who updated their status message frequently received better responses along every metric studied. The strongest results pertain to the number of friends people had. People with fewer than 200 friends were much less likely to get a response than people with over 200 friends (75.0% with few friends received a response v. 88.7% with many), and received many fewer responses when they did (2.59 vs. 3.67). The responses for those with smaller networks were also shorter (138.4 characters v. 211.6 characters) and slower (2 hours and 16 minutes v. 52 minutes). These differences are all significant ($p < .01$).

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		Quantity		Quality			Speed
Time of day	**Count**	**Percent with response**	**Number of responses**	**Percent answered**	**Percent useful**	**Response length**	**Time to first response**
Morning	138	84.1%	**2.802***	**52.2%**	73.9%	**61.186**	**1:50**
Afternoon	143	80.4%	**3.609***	**65.0%**	69.9%	**49.761**	**1:05**

Table 6. The quantity, quality, and speed of response along the dimensions studied. Significant differences ($p < .05$) are shaded and ($p < .01$) are indicated with a *. Time of day data is missing for one participant.

The content of the responses also varied somewhat as a function of how many friends people had. People with larger networks were more likely to get an answer (66.4% v. 50.4%, $p < .01$) or to receive useful information (79.9% v. 63.2%, $p < .01$). People with more friends also got many more social responses; 46.7% of their responses included some social commentary, compared with only 35.7% of responses to people with fewer friends ($p < .05$). This may be because people with many friends use Facebook to help maintain those real-world connections, and the social exchanges necessary for that maintenance may spill over into all uses of the network, including question asking.

Social Network Makeup

In general, the self-reported makeup of our participants' social networks did not seem to be particularly related to response success, with almost no significant differences emerging. The one exception was that people who had many current or former classmates in their social network appeared more likely to receive more, better, and faster responses. The time to first response was significantly ($p < .01$) faster (1:47 hours v. 0:35 hours) for people with lots of classmates in their network. This may be because people who joined a social network while in school are younger (online social networks being a relatively new phenomenon) and have larger networks (students often forge network connections that persist after a person graduates).

Profile Picture

We also observed a relatively strong relationship between how people chose to present themselves to their social networks via their profile picture and the responses they received. Profile photographs that showed the participant closely were significantly ($p < .05$) more likely to receive a response (getting responses for 88.2% of all questions, rather than 75.8%), and significantly ($p < .05$) more likely to receive a useful response (78.8% v. 63.2%). More social profile pictures also seemed to be relate to more successful question asking, with all measures being somewhat better if another person was included in the picture, and significantly ($p < .01$) more responses being received in such cases (4.310 v. 2.926).

6.3 How the Time of Day Affected Responses

We explored how when the question was posted affected the responses received. Table 6 shows how time of day influenced responses. Participants received significantly ($p < .01$) more responses in the afternoon (3.609) than in the morning (2.802). However, participants received significantly longer answers in the morning (61.2 characters long v.

Phrasing		Count	Quantity		Quality			Speed
			Percent with response	Number of responses	Percent answered	Percent useful	Response length	Time to first response
Punctuation	Question	143	**88.1%***	3.413	63.6%	**80.4%***	56.930	1:25
	Statement	139	**76.3%***	2.962	54.0%	**63.3%***	53.979	1:30
Length	1 sentence	153	**88.2%***	**3.681***	**72.5%***	**80.4%***	55.246	**1:08**
	2 sentences	129	**75.2%***	**2.546***	**42.6%***	**62.0%***	56.048	**1:55**
Scope	None	89	77.5%	**2.623**	53.9%	**62.9%***	43.837*	1:37
	Anyone	95	83.2%	**3.241**	61.1%	73.7%	57.671*	1:20
	Movie buff	98	85.7%	**3.655***	61.2%	**78.6%***	63.264*	1:27

Table 7. The quantity, quality, and speed of response as broken down by how the question was phrased. Significant differences ($p < .05$) are shaded and ($p < .01$) are indicated with a *. For scope, significance is marked as compared with *None*. There were no significant differences between *Anyone* and *Movie buff*.

49.8 characters long, $p < .05$), and there was a trend towards having a somewhat higher proportion of their questions answered then. This may be because more users check Facebook toward the end of the day, resulting in more reactions to afternoon posts, but those who also check in the morning have fewer new items in their News Feed and can therefore devote more time to crafting high-quality answers to the messages they see.

The differences in the types of responses offered in the morning compared with the afternoon reflect this. Questions posted in the afternoon were significantly more likely to receive an answer than those posted in the morning (65.0% v. 52.2%, $p < .01$). They also received those answers faster; the time to the first response was, on average, 45 minutes faster in the afternoon (a marginally significant difference, $p = 0.053$). Responders were significantly more likely to offer alternative movie suggestions in the morning (11.7% v. 5.3%, $p < .01$). This may be because respondents assumed a question about movies posted in the morning asked about an event that would occur farther in the future, whereas a question about movies in the afternoon might reflect a more immediate desire to begin watching a film. A handful of responders wondered why the question was posed in the morning, asking, for example, "So are we going to watch E.T. for our 9 am meeting?"

6.4 How Phrasing Affected Responses

How the question was phrased strongly affected response quantity, quality, and speed. The general trend we observed is that better question phrasing resulted in better responses, where "better" phrasing means the question was stated as a question, posed as a single sentence, and explicitly scoped. Table 7 summarizes the impact of phrasing on responses.

Punctuation

Questions phrased clearly as a question received better responses. A higher portion of questions with a "?" received responses (88.1% v 76.3%, $p < .01$), and those responses contained more answers and useful information. Questions phrased as statements may look more like regular status updates, and thus not be responded to as a question as often. This suggests that prior psychosocial research findings that explicitly phrased requests

are more effective than implicit requests extend to online environments, as well (Francik & Clark 1985). A few responders commented on the statement phrasing, mentioning the use of "wonder." One asked, "Why are you wondering about that now, almost 30 years later?"

Number of Sentences

Of the phrasing variants we explored, it appears that the presence of an additional contextualizing sentence was particularly influential. The differences in success metrics were all significant ($p < .01$, except for speed, which was $p < .05$). Questions that included the additional sentence, "Taking it easy," fared worse, receiving fewer and slower responses. Questions with context were also much less likely to receive actual "yes" or "no" answers. Only 42.6% of questions with context received an answer, while 75.4% of the questions without it did.

Rather than providing additional motivation to provide a response, the extra sentence we studied seemed to interfere with the ability to get an answer. This may be because the extra sentence hid the fact that there was a question being asked, because people are less likely to read longer status updates, or may relate to the specifics of the contextual sentence we provided. We saw a number of people comment on the fact that the questioner said they were taking it easy, from references to the Eagles song "Take It Easy", to demands that the person stop taking it easy ("What are you doing taking it easy? Get over here and work!"). None of the ten responders who commented on the presence of the phrase "Taking it easy" answered the actual opinion question. A more user-specific context may not cause such a detriment. However, the strangeness of the phrase was clearly related to the time of day; almost all of the participants who got a comment on the contextual sentence were in the morning condition, when it was expected the asker should be working rather than relaxing.

When we compare the content of responses received (as opposed to comparing the questions), we see a similar pattern arising based on the presence of the extra sentence as we saw with the time of day. Although the responses received were equally likely to include useful information (68.4% of the questions with two sentences included useful information, and 69.2% with one sentence did), the particular useful information varied; when the question was posed with context people were more likely to get an alternative movie suggestion (13.4% v. 5.4%, $p < .01$), and questions without the extra sentence were more likely to get a yes or no answer (49.3% v. 40.9%, $p < .05$).

One benefit of including a contextualizing sentence is that it reduced requests for clarification. Only 33% of the two sentence questions received responses requesting clarifications, as compared to 49.6% of the one sentence questions ($p < .01$).

Scope

One of the more interesting findings of our study was that scoping made a significant difference in the responses received, with explicitly scoped questions resulting in better responses. For example, asking "my movie buff friends" yielded significantly ($p < .01$) more replies, more useful information, and longer replies. In contrast, the particulars of the scoping did not affect responses in significant ways. Scoping the question broadly to indicate that an answer was welcome from "anyone" resulted in more or less the same improvement noting that inquiry was meant for the specific sub-group "my movie buff friends."

The scoping, however, may also carry a penalty. While scoping may make people more likely to answer if they feel they have expertise, it may also make them less likely

to answer if they do not. People who responded to "movie buff" questions sometimes excused themselves for not being a movie buff, saying, for example, "I don't think I qualify to answer…but I would say you should." One respondent even went as far as to ask someone else who did have the appropriate expertise. "Ron says 'Yes, it's a classic. It might seem dated, but it has lots of topical references and you get to see Drew Barrymore in her non-nude phase.' (I don't qualify to comment.)"

7. DISCUSSION

Although originally designed for social purposes, social networking tools are increasingly being appropriated for productivity-oriented tasks. This was seen both in the survey we presented as well as work by others (e.g., DiMicco et al. 2008; Lampe et al. 2008). The findings of the studies presented in this article contribute to the open problem of understanding how to harness the power of social media to accomplish productivity tasks.

The results from both studies indicate that response times to questions posed on social networks can be faster than those on traditional Q&A sites, despite the reduced audience size (Hsieh and Counts 2009; Zhang et al. 2007). The results also suggest that social network questions are particularly likely to receive useful responses, with 69% of the questions collected via the survey and 72% of the questions in the controlled study receiving useful responses. It is likely that many more questions received responses that provided value, as even responses that appear purely social can often be valuable to the question asker (Morris et al. ICWSM 2010).

By having a large number of people post carefully designed variants of a single question on Facebook, we were able to tease apart in a controlled manner how important factors identified via our survey affected response quantity, quality, and speed. We manipulated the time of day questions were posted, punctuation, length, and scoping, and explored how properties of the asker and their social network related to these response metrics. Our findings demonstrate that seemingly small changes to the questions people post to their social networks can result in significant changes in response quantity, quality, and speed.

The characterization of the questions we collected via the survey proved valuable in identifying interesting variations to study in a controlled manner, and even correctly identified some of the potential impacts of these question styles and user characteristics. For example, survey participants reported that questions with fewer sentences received more useful responses, and this finding was confirmed in the controlled study. Likewise, social network use appeared important in both studies. Those who update their status frequently reported receiving faster responses in the survey. In the controlled study, the frequency of update seemed relatively less important, but social network size was very important. Gender and age did not appear to be significant influencers in the survey, nor in the controlled study.

However, lack of significance in the characterization survey did not inherently lead to lack of significance in the controlled study. The use of punctuation and scoping terms, for example, did not correlate strongly with reported response speed or utility in the survey, but did in the controlled study. This could be the result of a number of factors, such as the particulars of our question topic and additional contextual sentence, or survey respondents' inability to accurately self-report their question asking experience. Nonetheless, studying people's natural question asking patterns was useful in identifying common variations worthy of further study.

Understanding how to effectively get high-quality information from social networks has implications both for individual users of social networking sites, as well as for those

designing social search tools. Individual users can use what is presented here to pose questions at the right time of day and with the right structure so as to prompt additional or quicker responses. The development and maintenance of one's social networks also seems important if a person is to use it to maximum effect. The projection of a more social persona may lead to better responses (e.g., if a person were to change their profile photo to include other people), but it is also possible that the relationship we observed arises merely because more social people project more social personas and have stronger networks.

Since some of the questions people post to their social networks are ones that they have first tried to answer on their own via Web search (Morris et al. 2010), search engines could use what we have learned to prompt users to turn to their social network when appropriate. Appropriate times to transition may include instances where the asker needs assistance (e.g., they cannot find the answer on their own) or is particularly likely to receive a response (e.g., the searcher has a large network or it is the right time of day to receive a quick response). If a search engine were to automatically federate a query to a social network on behalf of a user, then using questions that prompt quick and numerous responses could increase the likelihood that results could be reintegrated into the user's search engine experience during a search session. Additionally, phrasing using the techniques described here could assist a search engine in generating human-sounding queries despite potential computer generation.

Hecht et al. (2012) have explored an approach to merge social question asking and search engines by providing algorithmic responses to Facebook questions. In addition to observing that the way a question is asked can influence the question's responses, we also saw evidence that the initial replies people provided influenced subsequent replies. It is likewise likely that the algorithmic responses provided by Hecht et al. (2012) will influence subsequent responses, and a controlled study along the lines of what we have presented here would be interesting to further understand the influence of responses.

While the studies presented in this article provided many insights into the factors influencing the quantity, quality, and speed of responses to questions posed on Facebook, they also raise new questions. For example, although the movie review question we studied represents a very common question type and topic for social network status questions (Morris et al. 2010), it is unknown how our results will generalize to other question types and topics. Likewise, the exact content of the additional sentence is probably important, and a more urgent sentence (such as, "Need help now!") might make it so that longer questions receive faster responses. There is also much that can be learned by studying other phrasing variants, other additional sentences, or other participant demographics.

Given the importance of a person's social network on the replies received, we suspect the strength of social ties between the asker and respondent (Gilbert and Karahalios, 2009; Panovich et al., 2012) is likely to impact response metrics. However, who sees a social network question is not easy to control. We do not know exactly who sees the questions a person posts, since details of the Facebook News Feed are not published. The feed might, for example, bias toward showing users posts containing certain urgent keywords. Even by studying only a few such variations, we were able to identify several factors that influence social Q&A responses, and we believe there is significant promise in the approach. We plan to investigate these topics in future studies to further understand the nuanced issues influencing Q&A exchanges on social networks.

8. CONCLUSION

In this article we presented an investigation of question asking behavior on the popular social networking services Facebook and Twitter by surveying 624 people on their use of these services for question asking. Our analysis identified several interesting characteristics of the questions asked and explored the relationships between answer speed and quality, properties of users' questions (phrasing), and properties of users themselves (age, gender, and social network use habits). Building on these naturalistic findings, we conducted a controlled study in which 282 participants posted a question as their Facebook status message, with variations in time of day, length, punctuation, and scoping. We found that a more social question asker will get a better response from their social network, especially in the afternoon, and that phrasing a question well leads to better responses. Keeping the question stated as a question (as opposed to a statement), explicitly scoping the audience (even using the generic scoping "anyone"), and keeping the question short (even at the expense of removing context) led to more, better, and faster responses.

The data presented contributes to our understanding of social networks, in particular by exploring how a variety of factors impact social networking tools' utility at helping users achieve a question-asking task. In addition to deepening our knowledge of social networks, these findings can also be used by people creating social search and social Q&A tools to optimize system features.

ACKNOWLEDGMENTS

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