Exploring Social Context in Mobile Information Behavior

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ABSTRACT
This paper reports on the social context of mobile information behavior based on an interview and diary study (n=19). We examine different types of mobile information behavior and how these are affected by social variables. In addition, we compare social and non-social mobile information behavior in terms of where it occurs, applications utilized, expressed information needs of users, and levels of satisfaction. We promote a broader view of how social context shapes and is shaped by mobile information behavior.

Keywords
Mobile technology, information behavior, diary studies, interviews, social context.

INTRODUCTION
The widespread adoption and use of mobile devices, has moved information interactions from the home and workplace to the street, and given new meaning to 24/7 information access. Much work in the area of mobile information behavior has focused on how mobile search differs from desktop search, with the conclusion that it tends to be less sophisticated and less successful than desktop searching (Kamvar, Kellar, Patel & Yu, 2009; Sohn, Griswold & Hollan, 2008). At the same time, people are performing complex information activities, such as browsing, downloading and sharing content, using mobile devices (Smith, 2012). Given the untethered nature of mobile use, these activities are embedded in and influenced by constantly evolving situations of use.

Physical context is an important variable in mobile use: we experience the impact of the physical environment on how, where, and when we use mobile devices. Yet the social context of mobile use may be equally important in influencing mobile information behavior. In a recent study of “just-in-time” information behaviors, 27% and 41% of those sampled indicated they used their mobile phones to settle an argument or coordinate a social gathering, respectively, within the past month (Rainie & Fox, 2012). Further, mobile search is often conducted in the presence of others (Church & Oliver, 2011; Amin, Setlur, Xi, Hayashi & Hong, 2009; Teevan, Karlson, Amini, Brush & Krumm, 2011), and searches may be socially motivated (Rahmati & Zhong, 2012) or prompted by conversations (Church & Smyth, 2009; Sohn et al., 2008).

With the growing recognition that information interactions evolve from mobile users’ social contexts, a number of apps have been developed to support mobile information interaction (Reis, Church & Oliver, 2012; Reis & Church, 2013). Examples include apps for sharing search results and web page rankings (Kotani, Nakamura & Tanaka, 2011), or travel information among proximal users (Yang, Hwang & Shih, 2012). Another set of apps seeks to address the physical act of sharing. For instance, Teevan, Morris and Azenkot (2014) designed an app with a “collaborative mode” activated by changing the phone’s orientation. Collectively, these apps presume that information sharing takes place in real time with co-located others.

Research suggests that mobile interactions with a social component are prompted when people are co-located. As such, mobile apps attempt to leverage physical proximity in their design. However, given the connectivity afforded by mobile devices, do users always need to be co-located? Are there additional social factors that motivate and shape information interaction? How do social and more individualistic mobile information interactions differ? We explored these questions by drawing upon an interview and diary study conducted with 19 mobile users. Our goal was to investigate mobile information behavior – where it took place, how it evolved, what motivated it, and how satisfying it was. Our analysis revealed interesting insights on the social aspects of mobile information behavior (IB). In this paper, we focus specifically on the social nature of mobile IB – contrasting social and non-social interactions, with the aim of developing a greater understanding of how social social context shapes and is shaped by mobile IB.

RELATED LITERATURE
What is social context?
Information science is theoretically and methodologically informed by various social frameworks and ideas, for example, social capital, social networks, and social norms and authority. Specifically with respect to IB, collaborative information seeking and use is a rich research area that considers the design and evaluation of information systems.
Further, IB models and studies are inherently social: “people” are a common source of information and the individual user is seen as operating within a socio-cultural context (for instance, see Wilson’s information behavior models including Wilson (1981)). Social media and web recommender systems have led to increased awareness of how social elements influence the information search process. Evans and Chi (2010) administered a critical incident survey to over 150 people via Amazon Mechanical Turk. They found that social interactions were embedded throughout the search process, in all types of queries (e.g., transactional, informational, navigational), and that they increased with task difficulty.

Thus we know that there are social influences on information behavior at the micro (e.g., individuals searching for information) and macro (e.g., the ways in which community norms or social networks influence where and how we fulfill information needs) levels. Further, we value context for the ways in which it shapes and helps us make sense of experience (Forlizzi & Battarbee, 2004). Savolainen (2009), among others, posits that the social context makes information seeking and sharing meaningful. However, context, specifically social context in this case, is difficult to define (Courtright, 2007; Kelly, 2006; Kari & Savolainen, 2007; Kuhlthau & Vakkari, 1999), i.e. what is not context?

One view is that context may be defined broadly, e.g., at the societal level), or narrowly, e.g. at the situation or activity level (McCarthy & Wright, 2004). With regard to the latter, “co-experience”, for instance, is a term used to define the social context of technology use, where experiences are co-constructed around a product that is used concurrently or independently (Forlizzi & Battarbee, 2004); personal experiences are created and altered as a result of social interaction (Battarbee & Koskinen, 2005). Co-experience demonstrates that activity- and situation-level interactions are not isolated, but build and converge over time, thus impacting broader individual or societal contexts. Dourish (2004), for example, emphasizes embodied interaction where “users...negotiate and evolve systems of practice and meaning in the course of their interaction with information systems” (p. 28).

In order to draw a line in the sand, we distinguish situation from context. McCreadie and Rice (1999) define situation as “the particular set of circumstances from which a need for information arises” and context as, “the larger picture in which the potential user operates; the larger picture in which the information system is developed and operates, and potential information exists” (p. 58). In this paper, we adopt these definitions, focusing on situations of information interaction, and try to view them in light of the mobile users broader context.

The social nature of mobile information behavior

User experience studies have shed considerable light on the social nature of mobile information behavior. Mobile IB is sparked by random conversations among tightly-knit groups, motivated by curiosity or the desire to assist others, and focused on information fact finding, such as answering a trivia question or locating an address (Church, Cousin & Oliver, 2012; Amini et al. (2013). Tan, Goh, Theng and Foo (2012) looked specifically at mobile tourism. They found differences based on whom users sought information from depending on their stage in the search process. Friends and family were utilized more in the earlier stages of trip planning (i.e., information gathering and query definition), but participants drew upon strangers (passers-by, hotel staff, etc.) more in the latter stages that involved the use, synthesis and evaluation of information.

These studies point to the fact that most social information interactions occur amongst people who are already engaged in a social activity (with the exception of Tan et al.’s (2012) the mobile tourism study), and that mobile IB evolves out of social situations. However, these findings must be considered in terms of their methodological design and the behaviors being investigated. Firstly, the majority of mobile user experience studies have been survey or lab-based (Teevan et al. 2014; Kotani et al, 2011; Amini et al., 2013), rather than in the field. There are some exceptions to this, as some research has been diary-based (and therefore more naturalistic). Yet, this group of studies tends to be highly domain-specific, as in the case of the mobile tourism study. Secondly, some diary studies have asked participants to specifically log only social or co-located search activities (Church et al. 2012; Tan et al., 2012; Reis & Church, 2013), which may lead to a priming effect, where participants alter their search behavior to include more of the activities of interest to the researchers. These caveats raise the question of how we should capture the social aspects of mobile information interaction, and identify a need to contrast social and non-social behaviors in the mobile realm.

CURRENT STUDY

The current study aimed to explore social mobile information behavior in a broad and naturalistic way. We employed a diary and interview study to examine mobile information behaviors as they occurred, without asking participants to focus on any one type of information interaction in terms of what they chose to record in their diaries. In our analysis, we compared information interactions with and without social components in order to understand how the “social” fits into the bigger picture of mobile IB. It also allowed us to look at a broader range of social mobile information seeking activities, not only those that were co-located.

The questions that guided our examination of the data were:

1. How do we define “social” mobile IB?
2. Are social and non-social mobile interactions fundamentally different from an IB perspective?

We discuss our findings by i) looking more qualitatively at the social search events as described by participants to give
us an understanding of the meaning of “social” in mobile information seeking contexts, and ii) looking more quantitatively at the differences between facets of social and non-social interactions, such as location, app used, motivation for IB and level of satisfaction. We discuss our findings with regard to the use of mobile devices for social and non-social information activities.

**METHOD**

**Participants**

We conducted an interview and diary study with 19 mobile users (11 females, 8 males). The average age was 24.2 years old (range of 19 to 37) and 14 were students. Participants indicated that they used Android (n=10), iPhone (n=7) or Blackberry (n=2) devices, and had owned their current devices for an average of 13.5 months (range of 1 to 30 months). They used their mobile devices for a variety of tasks including: communicating via social media; looking up directions; looking up reviews for products or services (e.g., restaurants); verifying information (e.g., store hours of operation); browsing online news; and shopping.

**Procedure**

Participants were recruited through posters placed around a university community and through the online classified site, Craigslist. These virtual and non-virtual strategies were chosen to solicit both student and non-student participants. Participants completed an initial interview (45 minutes in duration), diary entries in situ over a five-day period, and a final interview (1.5 hours on average). We chose a relatively short (five days) duration for the diary-recording period, since participants would be less likely to remain till the end of a longer study (Nylander et al., 2009; Cui & Wang, 2012; Taylor et al., 2008). Interviews took place in a quiet room at a university and were audio recorded. Participants were compensated $5 for interview one (pre-), and $20 for interview two (post-).

**Pre-Diary Interview**

The pre-diary interview consisted of an overview of the study and informed consent. Basic demographic and mobile use information was also gathered using questionnaires. The primary aim of this interview was to introduce the diary study. We created a list of activities of interest and diary entry categories based on previous work (Komaki, Hara & Nishio, 2012; Nylander, Lundquist, Brännström & Karlson, 2009; Sohn et al., 2008; Church and Oliver, 2011) The research discussed the list of activities with participants (examples: news browsing, status-checking or searching using social media sites, searching for restaurants, travel or product reviews, fact-checking or looking up directions, or transaction-based activities such as e-shopping or e-banking), and relayed the information to be recorded for each diary entry: nature of the information activity (app, information sought, queries typed or steps taken); day, time and location; and whether the information need was satisfied completely, partially, or not at all. Participants were asked to take a picture of the location in which the activity took place. They were instructed to send the text and photo diary entries to the lab email address. To ensure that participants felt comfortable with and retained these instructions, they were asked to record and send a practice diary entry before leaving and received a paper copy of the instructions to take away with them.

**Diary Collection Period**

During the diary data collection period, the researcher sent participants a daily email reminder to note, record, and submit diary entries. As diary entries were submitted, the researcher organized them into folders labeled according to participant identification numbers. The average number of entries was 12.3 (SD=10.7) (Range: 2 to 45) with a total of 234 diary entries. A simple power point slide presentation was used to pair the photo and text diary entry.

The researchers identified the number of diary entries submitted by each participant and used a random number generator to select five events for discussion in the final interview. This number was used because we did not have time to discuss every diary entry to sufficient depth in the final interview. A random sample of events gave us a better snapshot of the type of IB activities typical for each participant. These five random events were moved to a second power point presentation file to be used in the post-diary interview. Six participants had five or fewer diary events, and therefore we discussed all entries with these individuals.

**Post-Diary Interview**

The power point file containing the five random events guided the post-diary interview. In addition, interviewees were asked to identify a “notable” event (i.e., what was significant or stood out for them) by clicking through the power point presentation containing all diary entries. A notable event allowed us to observe what was significant to the participants themselves. In some cases (n=5) the notable event was one of the five random events. The five random and one notable diary entry resulted in 102 total diary entry event descriptions.

For each of the random and notable events, we asked participants a series of questions (adapted from Komaki et al., 2012; Sohn et al., 2008). Specifically, we asked them to describe why they recorded each diary entry, how the information activity arose, the representative photo, and the social context (if any). For example, was an information search undertaken in the presence of other people? For the notable event, they were also asked to elaborate upon the context of the event and why it was “notable.” Finally, the researcher asked participants questions about their general mobile behaviors, such as how reliant they were on their mobile devices, and how much their situation (e.g., location) informed their mobile experiences.

**Data Preparation and Analysis**

This interview/diary study yielded data in different formats:

- Pre-diary interview: 19 audio-recorded interviews and questionnaire data on participants’ general mobile information behaviors;
• Diary recording period: 234 diary entries featuring short text and photographic descriptions;
• Post-diary interview: 19 audio-recorded interviews based on five randomly selected and one participant selected “notable” diary entry, for a total of 102 entry descriptions.

This paper focuses on the post-diary interview data of the 102 diary entry elaborations, 43 of which had an explicit social component (n=43). Of the 17 notable events, seven (41.1%) were social in nature. Our content analysis of the transcribed interviews focused on examining the IB of mobile users, specifically their motivations and goals for searching, constraints they encountered in performing their search, and the domain and/or topic of their information seeking. Within these larger categories, strong social elements were observed.

Our coding scheme consisted of four main facets (motivation; requirements and constraints; goals; and domain or topic) with sub-facets. This is based on existing frameworks for exploring tasks in information search (Li & Belkin, 2008), and mapped well to existing literature on mobile search. The coding of motivational sub-facets was based on the framework of Taylor et al. (2008).

The lead author performed the majority of the coding, and worked with the third author to assess the reliability of the codes. All diary entries were assigned a unique number ranging from 1 to 102. We randomly selected a subset of events (n=14) from the full sample using a random number generator (http://www.randomizer.org/). The approximate amount of training required to reach acceptable reliability levels was five hours, which included the second coder learning to use the qualitative software (i.e., Dedoose) and apply the coding scheme. The calibration process involved coders conducting independent analyses, discussing disagreements, and introducing more specificity into the definitions and examples in the coding manual. The Kappa statistic was calculated to determine consistency amongst the two coders (Gwet, 2010). The inter-coder reliability for each of the four main facets ranged from 0.66 to 0.856 (p<0.001), which is considered moderate to excellent agreement. Disagreements were discussed by referring to the definitions and examples in the coding manual. Codes agreed upon by both coders were included in the final results.

RESULTS
We present by examining the information interactions that were social in nature. Next, we contrast the social and non-social mobile IB according to specific characteristics, including location, application used, satisfaction levels, and purpose: hedonic (pleasure-oriented) versus utilitarian (productivity-oriented) (Van der Heijden, 2004).

How do we define “social” in the context of mobile IB?
We observed that social IB was defined both in terms of users’ behaviors and motivations. Specific types of social activities included: co-located mobile searching (on the same or different devices), searching for information on behalf of others (i.e., someone else’s information need, or initiated by someone else), and sharing search results (both concurrently or at another time and place). Participants were also motivated to perform mobile information activities for the purposes of connecting with others, but also to avoid social interactions (social avoidance). Table 1 displays these social information behaviors and motivations, and the number of events that fit within these categories. (Note: these categories were not mutually exclusive, e.g., a search event may be co-located, shared and conducted on behalf of others)

<table>
<thead>
<tr>
<th>Type of social information activity</th>
<th>No. of Entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-located</td>
<td>10</td>
</tr>
<tr>
<td>On behalf of others</td>
<td>5</td>
</tr>
<tr>
<td>Shared results</td>
<td>15</td>
</tr>
<tr>
<td>Socially motivated</td>
<td>24</td>
</tr>
<tr>
<td>Social avoidance</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
</tr>
</tbody>
</table>

Table 1. Number of Social Information Behavior Events

Co-located searches tended to evolve out of conversations or needs that arose in situ. For example, P03 described bringing up a television program during conversation that her brother did not know about. This led to them to search for show clips on YouTube and web apps on her mobile.

Another participant (P04) shared how an information search arose from a conversation about her handbag, while waiting for the bus with a friend:

"We were waiting for the bus and she commented that she liked my satchel, and, [...] her plan to get a bag that would last longer, [...] but I, for the life of me, I couldn’t remember the name so I hopped on my phone and, um, and I started looking up canvas totes."

Other co-located searches came about due to unexpected situations. P06, for example, was driving with her mother when they came upon a motor vehicle accident. She described traffic coming to a halt and feeling confused - "at first we didn’t know what was happening" - and trying to make sense of what she was seeing from her viewpoint. She used her phone to try to locate information, and was informed by other motorists in the same situation:

"I think probably anything that I found online was just something that someone in a similar position as me had, like called in to a traffic center."

This event was quite extreme and unique in our data set, but goes to demonstrate how mobile users rely on their phones for sense-making purposes as they try to interpret their
immediate environments. In another instance, a participant (P13) shared that she and a companion were once lost as they hiked in the woods and she had tried to use the GPS on her phone to help them navigate the trail.

Other “in the moment” co-located searches could be classified as every-day life information needs and seeking. For instance, P09 used his mobile to look for a restaurant. Although two others in the group had mobiles, he was the primary searcher, using the group’s location and food preference (“Indian restaurants”) as criteria for the search. This same individual described another search in which he and a friend arrived at a movie theatre to find that the movie they wanted to see was not playing. Rather than return home, they determined that the movie was playing at another theatre. While P09 used his phone to identify the theatre the movie was playing at, his friend concurrently “used his phone to figure out where the cinema was.”

**Searching on behalf of others** sometimes took the form of being assigned a role within a social group. P11 described searching for places to have breakfast on a Saturday morning while her mom drove. P08 relayed being put “in charge” of directions during a family outing: “we had a big day planned, so my parents wanted me look up the route so that we wouldn’t get lost again.” Similarly, P06 had to locate the phone number of a business to make sure it was open while she and her father drove to the location. All of the above examples took place in vehicles, with the participants acting as searchers for information needs that arose in situ.

In other cases, the people for whom the information was being sought were not physically present. P05 received a text from her mother requesting a library book, which prompted a transit search: “I needed to find out the best bus route to get there [the library].” Other requests also came through texts, including requests to locate specific services for friends. Since P07 was known to have an unlimited data plan, two different friends sent him messages on separate occasions to ask him to locate a teashop and a gas station for them.

**Sharing search results** was naturally a consequence of co-located searching and searching on behalf of others. Out of the fifteen shared searches, eight events were also co-located, three were also on behalf of others, and one event was all three (shared, co-located and on behalf of others). The results of three search results were shared socially from participants’ own individual searches. For instance, P16 used his mobile to check the score of a basketball game, and this information was used conversationally at another point in the day. P15, while visiting a bookstore with her family, saw a book on sale. Before purchasing, she checked another bookstore website to see how the book had been reviewed by other readers, and then shared the purchase and reviews with her parents. These two examples are noteworthy in that they highlight how information obtained for and by oneself may be used socially. The latter also demonstrates the use of a social tool (online reviews) to guide just-in-time decision-making.

**Socially motivated** events were commonly carried out on social networking sites (SNS), such as Facebook. A number of participants described checking SNS to “see what everybody else is up to” (P04), or get status updates (P11, P12, P15, P21). This “checking” behavior extended to email (P16, P19, P21) and online course management systems (P15) to see if there were new emails from contacts, respond to social invitations, or obtain information about group academic assignments or meetings. In the use of these various applications, however, participants described triaging and prioritizing information (P21) and sharing information, e.g., photos, with friends (P11).

In other cases, participants discussed looking for information for social purposes, such as negotiating transit schedules and routes to meet someone (P20), or finding the location of a restaurant for a social gathering later in the day (P05). An illustrative example came from P04 who was going “up to campus to go to, uh, chair a panel at a conference.” She decided to look up the program for the conference to see “if I was going to know anyone from Waterloo, where I did my undergrad.”

**Social avoidance** was also observed in the data, though it was less articulated. However, in one case, a participant used her mobile phone to remove herself from a social situation, a nightclub, where she was not enjoying herself:

> ...this was me trying to make sure I could catch the last Seabus [...] I was actually hoping that I would find out it was sooner so that I could leave faster because it wasn’t awesome, [...] I did tell people [...] to say no it’s really soon because this was midnight and the last one’s at 1:15 [...] I told a ton of people in hopes that they would be like no, no, you should just go then (P6).

The desire to keep to oneself in public places, such as while riding the city transit (Taylor et al., 2008), is common practice for mobile users but did not constitute mention in the interviews.

**Do social and non-social mobile IB differ significantly?**

We examined whether there were differences between social and non-social information interactions, both in terms of their characteristics and in participants’ perceptions of their success. As 43 of the 102 interview events were social in nature, the remaining 59 were categorized as “non-social”. Tables 1 and 2 illustrate the locations, apps, goal types and satisfaction levels for the social and non-social search events. Chi-square tests of independence were performed to determine if there were significant differences between social and non-social search events. These are reported only when results were significant.

As shown in Table 2, there were negligible differences between social and non-social information events according to where they took place. However, a higher percentage of
social searches took place in vehicles (14.6% compared to 1.7%), while more non-social searches were conducted on public transportation (25.9% compared to 12.2%) and at home (29.3% versus 24.4%). Outside, which included on the street or in public places (e.g., restaurants and cafes), was similar in terms of social and non-social mobile IB.

<table>
<thead>
<tr>
<th>Location</th>
<th>No. of social events</th>
<th>No. of non-social events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>10 (24.4%)</td>
<td>17 (29.3%)</td>
</tr>
<tr>
<td>Work</td>
<td>3 (7.3%)</td>
<td>3 (5.2%)</td>
</tr>
<tr>
<td>Campus</td>
<td>6 (14.6%)</td>
<td>7 (12.1%)</td>
</tr>
<tr>
<td>In car</td>
<td>6 (14.6%)</td>
<td>1 (1.7%)</td>
</tr>
<tr>
<td>In transit</td>
<td>5 (12.2%)</td>
<td>15 (25.9%)</td>
</tr>
<tr>
<td>Outside</td>
<td>4 (9.8%)</td>
<td>8 (13.8%)</td>
</tr>
<tr>
<td>Public Place</td>
<td>7 (17.1%)</td>
<td>7 (12.1%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>41</td>
<td>58</td>
</tr>
</tbody>
</table>

Table 2. Location of social and non-social search events

<table>
<thead>
<tr>
<th>Application/ tool</th>
<th>No. of social events</th>
<th>No. of non-social events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web browser, e.g., Google</td>
<td>15 (34.9%)</td>
<td>31 (52.5%)</td>
</tr>
<tr>
<td>SNS, e.g., Facebook</td>
<td>10 (23.3%)</td>
<td>1 (1.7%)</td>
</tr>
<tr>
<td>Email</td>
<td>7 (16.3%)</td>
<td>0</td>
</tr>
<tr>
<td>Location-based, e.g., Google maps, Transit</td>
<td>8 (18.6%)</td>
<td>11 (18.6%)</td>
</tr>
<tr>
<td>News or entertainment, e.g., YouTube</td>
<td>2 (4.7%)</td>
<td>13 (22%)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (2.3%)</td>
<td>3 (5.1%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>43</td>
<td>59</td>
</tr>
</tbody>
</table>

Table 3. Application used for social and non-social search events

Exchanging the applications used by searchers (Table 3), it is not surprising to see that social information activities involved social networking sites (23.3%) and email (16.3%) more than non-social activities. Both social and non-social interactions relied upon location-based apps, including Google maps. More non-social information interactions were conducted using news and entertainment apps (22.0% compared to 4.7%), or web browsers and search engines (52.5% versus 34.9%). The Chi-square test for independence showed that application use was not equally distributed amongst social and non-social activities, $\chi^2 (5, n= 102) = 27.63, p < .000.$

<table>
<thead>
<tr>
<th>Event</th>
<th>Purely utilitarian</th>
<th>Purely hedonic</th>
<th>Both</th>
</tr>
</thead>
</table>

Table 4. Goal of social and non-social mobile searches

To look at the purpose or the higher-level goal of an information interaction, we categorized each as having utilitarian or hedonic goal (Table 4). Utilitarian activities provide instrumental value to the user, implying an objective external to the interaction (e.g., location-based searches), as opposed to hedonic activities, which may not aim to fulfill any such objectives and are driven by pleasure or entertainment (Van der Heijden, 2004). Overall, more searches were performed for utilitarian purposes than for hedonic (64% compared to 36%). The purpose of the search was not associated with whether it was conducted in a social or non-social context (Table 4).

In the diary entries, participants noted whether their information need was “completely”, “partially” or “not at all” satisfied for each information activity. In general, participants were highly satisfied with their interactions, though a greater number of social information needs were “partially” rather than completely satisfied (Table 5), but this difference was not statistically significant. Looking specifically at the cases where needs were not satisfied, the two social events were unsuccessful because the app crashed, or a suitable app for the situation could not be found. The reasons for feeling dissatisfied with non-social information events included not being able to connect to the internet, not being able to complete a bank transaction, not finding good search results or instructions for troubleshooting. Thus, less than optimal levels of satisfaction for both social and non-social information interactions were related to the usability of the device or not being able to locate the information sought.

<table>
<thead>
<tr>
<th>Event</th>
<th>Completely satisfied</th>
<th>Partially satisfied</th>
<th>Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td>30 (73.2%)</td>
<td>9 (21.9%)</td>
<td>2 (4.9%)</td>
</tr>
<tr>
<td>Non-Social</td>
<td>47 (83.9%)</td>
<td>5 (8.9%)</td>
<td>4 (7.1%)</td>
</tr>
</tbody>
</table>

Table 5. Level of satisfaction for social and non-social search events

Looking specifically at the 17 notable events that were selected by the participants, 7 were social in nature. Of the notable social events, 6 were completely satisfactory, with only 1 partially satisfactory. Of the 10 non-social notable events, 7 were completely satisfactory and 3 partially.

**DISCUSSION**

Our interview/diary study enabled us to examine everyday life mobile IB. In this paper, we explicitly examined the social nature of mobile IB by analyzing interview data where participants discussed five random and one notable
diary entry. We isolated and explored social and non-social mobile IB based on characteristics of the recorded information activities, e.g., location, level of satisfaction, etc. An interesting observation was that photos collected as part of the diary entries were rarely useful in identifying whether an activity was social in nature. Participants avoided taking photographs of other people, so the only way to probe social context was through the interviews. For this reason we were constrained to analyzing the 102 interviewed events, instead of all 234 diary events.

To understand how social context shapes and is shaped by mobile IB, we first unpacked social context. Previous literature has looked at social mobile IB by focusing on co-located or collaborative searching (Amini et al., 2013; Church et al., 2012; Kotani et al., 2011; Komaki et al., 2011; Reis & Church, 2013; Reis et al., 2012; Teevan et al., 2014). However, our analysis highlighted that the social is embedded in mobile IB even when information interactions do not involve collaboration or co-located others. As our study illustrates, information activities can also take place when information needs arise from other people who may not be physically present with the mobile user. Information activities may also be conducted for personal reasons, and then shared with others. Mobile IB is also highly influenced by social motivations, such as the need to find out what others doing through SNS (Oulasvirta, Rattenbury, Ma & Raita, 2012), or to connect with others and keep track of social events. At the other end of the spectrum, mobile IB is sometimes motivated by the need to avoid unwanted social interactions (Taylor et al., 2008). Thus, in the mobile setting, the social context must focus on more than the immediate situation, synchronicity of time and place, and the proximity of other people. It must explore searchers’ motivations and subsequent activities (e.g., sharing at a later time), and include how mobile users reach out through their devices to close contacts and strangers to seek and share information. By focusing on a greater variety of situations and activities, we will arrive at a broader view of social context in mobile IB.

Concurrent with existing research, social mobile IB is often prompted by conversation, especially with co-located others (Church & Smyth, 2009; Sohn et al., 2008). The fact that mobile devices are easily integrated into everyday life and facilitate quick access to information (Nylander et al., 2009) make them less conspicuous and more appropriate in social situations (Rahmati & Zhong, 2012); the affordances of these devices (i.e., small, portable; wireless connectivity) is likely why they play a larger role in information activities that arise from conversations or social interactions. However, in our study, conversations occurred between participants and remote individuals, and information activities and social interactions were not always synchronized. Our participants became information intermediaries between friends and family and their just-in-time information needs. Further, some searches were situated within a more drawn out process of articulating personal information needs and eventually sharing information with others.

We compared social and non-social mobile IB. More non-social information interactions took place at home, or on transit; on the other hand, more social information events took place in a vehicle other than a bus or commuter train.. Although home may be considered a “private” space, transit is a public space, and this may speak to the desire to avoid or block out other people when commuting (Taylor et al., 2008). In our study, many of the information activities that took place in a car were precipitated by the proximity of the individuals or the just-in-time information needs that arose enroute to a destination, e.g., finding directions, or business hours, etc. The data we gathered about where our participants conducted their information activities confirmed that a significant amount of mobile IB occurs in non-mobile settings, such as at home or in the workplace (Church & Oliver, 2011; Nylander et al., 2009). We also observed that there were some locations, namely outside or public spaces, where social and non-social information activities occurred on par. This likely speaks to the portability of mobile devices and the availability of Internet connectivity. Information needs can be resolved immediately whether they are individually or socially motivated.

When looking at the apps or tools used by participants in our study, we found social activities involved more SNS and email apps for the purposes of actively connecting to or keeping track of others. However, more non-social information activities were conducted using news and entertainment apps, suggesting that these kinds of activities are often solitary in nature.

The goals of the information activities were consistent across social and non-social interactions; there were a higher percentage of activities with utilitarian motivations for both. This illustrates how mobile information interactions are prevalent in different types of tasks, be it for work, or specific result-oriented or entertainment purposes, regardless of the social component. There may be value in considering both types of motivations in the design of mobile apps. Consider, for example, the limited screen real estate of a mobile news app. Mobile users wanting to find specific information need to see the search feature immediately, whereas those who want to pass time want browsable news categories or headlines.

Our mobile users’ information needs were generally met with high satisfaction. The reason for this may be that mobile information interactions are usually quick and less complex than “desktop” information activities (Kamvar et al., 2009; Nicholas, Clark, Rowlands & Jamali, 2013), and often lead to a definite answer (e.g., the address of a restaurant), and hence result in high satisfaction levels. If, on the other hand, the search purpose is purely hedonic (as 39.2% of all interviewed searches were), the activity does not have to meet specific objectives (Van der Heijden,
2004), again leading to high satisfaction levels. This may also be the reason why the number of “completely satisfied” information interactions were higher when there was no social component (83.9% compared to 73.2%) and there were more “partially satisfied” social interactions. When there is no specific information need, the activity results are less likely to “completely” satisfy the need. In fact, in looking at the six interactions where the information need was not met “at all”, the reasons were often related to technical problems, such as apps crashing or Wi-Fi and GPS connections being unavailable, rather than the quality of search results itself.

We also examined the notable events that were selected by participants. More than 40% of these events were social in nature. This highlights the fact that mobile search events within a social context tend to be significant to users and that the social context makes information seeking and sharing meaningful (Savolainen, 2009): shared experience impacts and shapes mobile IB. Increasing our understanding of social context warrants further investigation as mobile information needs and use continues to increase.

CONCLUSION AND FUTURE DIRECTIONS

Everyday life social interactions trigger, impact, and shape mobile information needs and experiences. The definition of social context in mobile IB should be extended to include all information behavior where “people” feature more prominently component. These may be co-located or collaborative information behaviors, information seeking prompted or initiated by others, the use of search results to share with others, and information seeking motivated by the need to connect with or avoid others. In fact, our findings show that often these kinds of information behaviors take place without the presence or co-location of the “others” involved in the activity.

Our results show that there are many similarities between social and non-social IB, in terms of satisfaction and motivation. However, there were some differences in location, showing that non-social information activities often take place at home or on transit, when compared to social searches; social searches, on the other hand, often take place in vehicles with co-located others, where participants were prompted to either search on behalf of others, or share search results with them. These findings may inform the design of location-based apps that make the sharing of search results easier and improve the co-experience.

A limitation of the study is that we could not extract in-depth interview data for all 234 diary events, which would have given us a much larger and richer set of social and non-social information activities. However, we did look at a random snapshot of events, which should have provided a fairly representative sample of events. We tried not to prime participants to focus on the social aspects of their IB; rather we left the kind of information activities to report more open. Our diary collection period of five days may not have generated a typically representative range of events for each participant. However, we tried to include both weekdays and weekends in the five-day period for variability. We had hoped the photos taken as part of the diary entries would illuminate social characteristics of the information interactions, but we found we needed to rely more on self-reports obtained during the interviews for contextual information. We took a broad approach to coding social events, so as not to leave any event out that may have a social component. However, the types of information activities reported were dependent on qualities of participants: some participants were obviously more “social” (the random set of events selected for the interview contained many that were social in nature) while others were not (four participants had no diary entries that were social in their interview set).

For future research, we believe there is merit in designing in-depth naturalistic, possibly longitudinal, studies using log-, diary- and interview-based techniques, from which a model of mobile IB could emerge. This would also allow a detailed description of the nature and effect of social components in mobile IB, and how it shapes and influences user experience. To be able to design and afford better experiences with information interactions on mobile devices, research that takes into account the significance of social elements in the highly dynamic and context-dependent landscape of mobile IB is the next necessary step.

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