

Understanding the Experience of Lending your Smartphone

Jasmine Mai, Cathy Wu, Katrina Yu, Eric Zhang

INTRODUCTION

The goal of this study is to investigate the experience of phone lending to help inform design considerations for lending interactions.

Twenty-one people (ages 18-22) were interviewed.

Participant Profile

All of the interviewees were Dartmouth undergraduate students.

Figure 1: Racial breakdown of participants

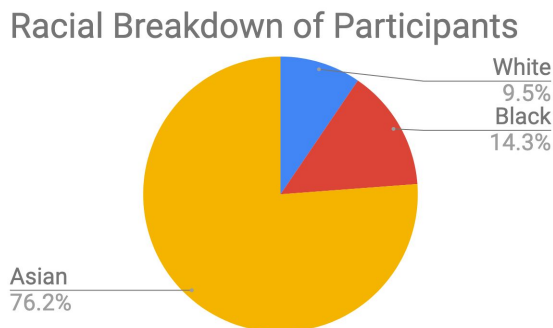
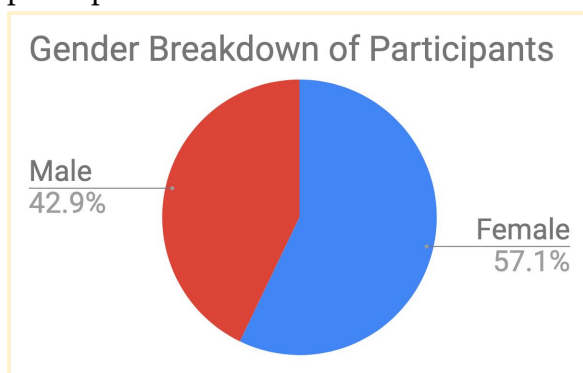


Figure 2: Gender breakdown of participants



Interviews

We conducted 30-minute interviews for each participant. The first part is an experiment where the researcher asks to use

the interviewee's phone. The researcher observes what the interviewee does and says when handing over the phone. The researcher then returns the phone and asks the interviewee what thoughts and concerns crossed their mind. This experiment allowed the researchers to directly observe the phone lending behavior of our participants.

For the second part of the interview, the researcher asks questions about the participant's experience with lending their smartphone. The questions focused on their concerns, protective behavior, and how their lending behavior differs for different people.

To investigate how many modes of privacy our participants would use, we asked them to talk us through a grid exercise. The participants are asked to create different privacy modes by setting restrictions and activating functionalities. The grid exercise aims to answer the question of how many modes an individual would like.

Please refer to the Appendix for the interview questions and the grid exercise participants filled out.

STUDY RESULTS

Lending Habits

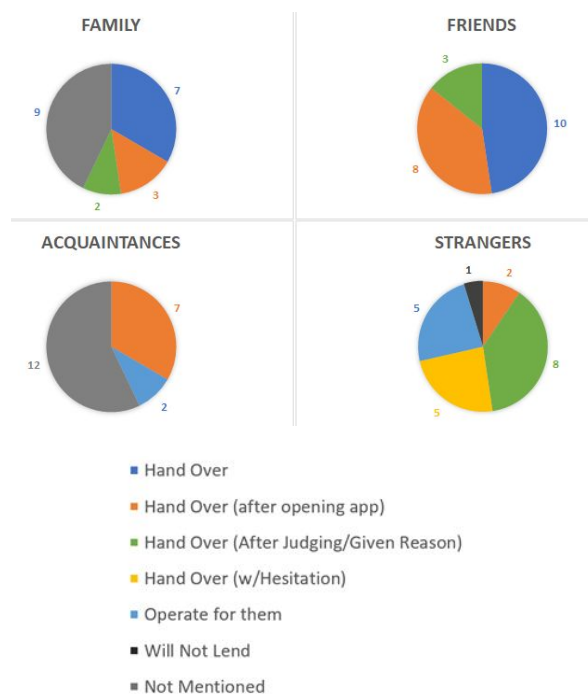
We asked each participant about how they would react if someone asked to borrow their phone. We did not prompt them to talk about specific groups, but across the 21 participants, they mentioned four general groups: family, friends, acquaintances, and strangers. Each interviewee talked about their lending habits with friends and strangers, but not all mentioned family and

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acquaintances. The graphs in figure 3 displays different lending behaviors across different groups. Participants were more willing to hand their unlocked phone to a family member or friend (blue area in Figure 3) without taking any precautions first or asking for a reason. On the other end of the spectrum, interviewees were more cautious. With strangers, five interviewees said that they would not lend the phone at all, but instead operate the phone for the person. Further, the strangers category is the only one where we see a black area indicating that people will decline allowing a stranger to do anything on their phone altogether.

Figure 3: Lending habits by groups



Lending Concerns

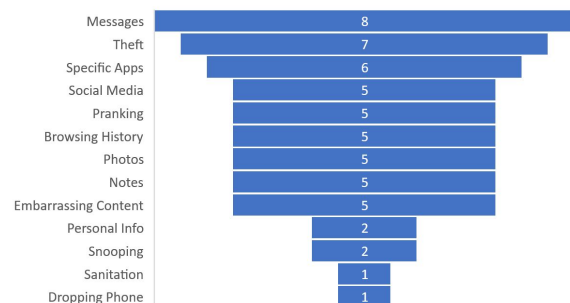
We recorded all the concerns that our participants mentioned in the interview. It is worth mentioning that we did not prompt responses, so participants could have had

other concerns that did not come to mind or did not think to express to us.

Concern for other party's privacy - The top concern that lenders had were borrowers seeing text messages. In this case, they were more concerned about the privacy of their contacts rather than their own privacy. This issue arises as the lender cannot prevent the borrower from seeing the chains of past messages. As a result, the lender will often open a new message window for a borrower who wants to text someone. However, this concern still remains as it is easy to exit out of this new messaging window back to the history of previous texts. This issue also arises in the form of banner notifications from their friends that may appear while the phone is in the borrower's hands.

Hardware concern - The second most prominent concern was the borrower stealing the phone. This typically only applied to strangers. Of the seven interviewees who mentioned theft, three of them said that they would judge the borrower's appearance and intention first and only lend their phone if the borrower seemed trustworthy/ their need to borrow a phone was real.

Figure 4: Concerns regarding phone lending

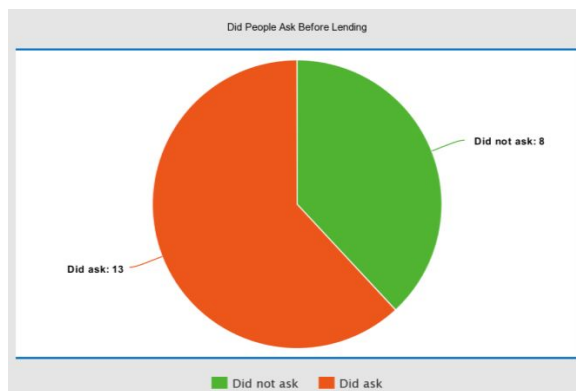


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Protective Behavior

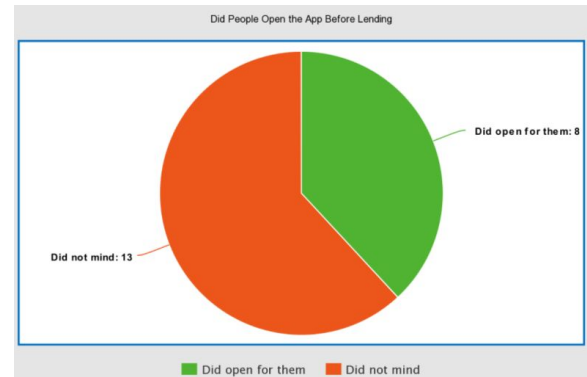
Asking the interviewer's intent - Many of our participants were weary of the interviewer and asked why we needed the phone for before lending it out. Some would be suspicious if there is not a good reason for borrowing. This may be due to a poor privacy control on existing phones. Most of our participants who asked why also cited that many of their friends in the past have messed around without their permission.



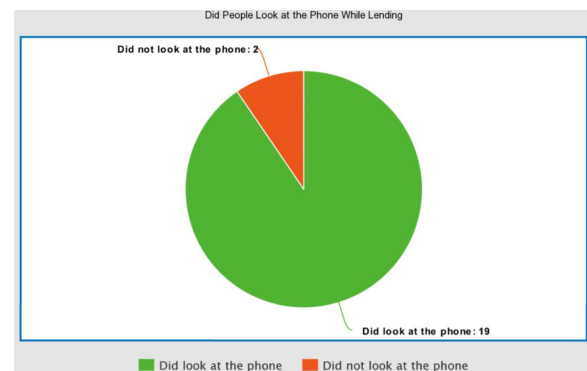
Closing app history - We noticed that quite a few of our participants with iPhones, close their app history before handing over their phone. When asked, some participants said they did not think much of it, but wanted to hand over a phone in a cleaner state. Others, however, noted that they did not want other people to see exactly what they were looking at.

Navigating phone - When our participants were asked to lend their phone for a specific app, half of the participants navigated to the app before passing their phone to the borrower. Reasons for such behavior included saying that they had different phone configuration and wanted it to be easier for the person to find. Another less common reason cited was that the lender

did not want to give borrowers a chance to "snoop."



Keeping phone screen in view - Many lenders feel more comfortable having their phone screen be in their line of sight when their phone is being used. Another commonly repeated idea is that even if the lender sees the borrower doing something unexpected, most lenders do not want to be confrontational in fear of showing mistrust.



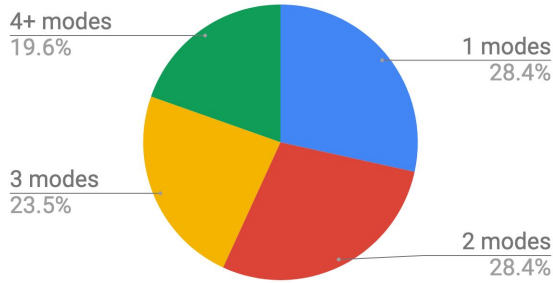
Number of modes

There was a fairly even spread in how many modes people wanted to activate. By a slight margin, the largest number of people wanted one to two modes.

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Number of Modes



Profile grouping

When the participants were asked to create different modes. The most common profile groupings were strangers, close friends/family and then acquaintances. The reason some people only wanted one mode was because they wanted to activate the same level of restriction for everyone. For those who wanted two modes, it was divided between strangers and acquaintances.

Restrictions

Social media- We found that 90% of people don't want strangers to view social media. It is significant to note that the interviewees do not usually add strangers on social media. In addition, 95% of people won't let anyone edit their social media. Six participants said this was because they were afraid their friends would prank them and post something on their behalf. The one interviewee who would allow her friend to edit her social media if they were helping her make a post.

Internet Browsing history - Half of the participants did not want anyone to see their browsing history. The other half of people were only comfortable with their browsing history being accessible to those closest to them, whether it was close friends

or family.

Regarding strangers, 66% did not want strangers to have internet access even without browsing history. Their reason was predominantly fear of a stranger downloading malware and fear of stranger searching something "weird" that would show on their browsing history. Regarding friends, 45% of people do not want their friends to have access to their internet browsing history. We learned that most people do not want others to see their browsing history but also think that people borrowing their phones are unlikely to "snoop" because of social norms.

App Store - On the same note of downloading malware with internet access, 90% of people don't want strangers to access app store. The participants who were comfortable with allowing access to the app store said that the borrower may need a social media app that they do not have installed.

Interested functionalities

During our grid exercises, we suggested two smartwatch functionalities and asked whether the interviewees would activate them. 57% of people said they would activate the functionality to make the phone stay on the selected app. 47% of people said they would use their smartwatch to grant access to additional apps the borrower is asking for.

DESIGN CONSIDERATIONS

Primarily on the insights from our study, we generated guidelines for our solution.

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Target Theft and Privacy - Our features should make the lender more comfortable and confident in lending their phone, especially regarding theft and privacy.

Inconspicuous - The borrower should not notice that the lender has set restrictions specific to the borrower. The solution should have a quick and discreet activation.

Customizable - The solution should allow for varying levels of restrictions, have a one-time setup.

PROPOSED SOLUTIONS

We propose to build an app in which the phone owner can customize profiles for certain groups. The app would come with a few presets such as a family mode, a friends mode, and a strangers mode, that the user could adjust according to their own concerns. All other features below are ideas that would work adjunctly with this app.

Smartwatch enabled - An app that is smartwatch enabled would allow lenders to keep tabs on what is on their phone screen. It would also let the lender lock either certain apps or the entire phone if the borrower begins to do something suspicious.

Fingerprint scanner - Most smartphones today have some form of fingerprint scanner that allows multiple prints to be saved in the phone. Since most users only use two or three fingers to unlock their phone, other fingers (like fourth or pinky) could be used to launch different modes (such as strangers mode or friends mode) that they have customized in the app. This way, the lender

can avoid awkwardness when a borrower asks for his or her phone as lenders can inconspicuously and quickly launch a mode.

Hardware protection - To prevent the phone itself from being stolen, if the phone is on the strangers mode and accelerometer detects that the person is running, the phone will activate a loud alert letting everyone know that the thief is carrying a stolen phone. Since a thief's first step is to remove the sim card, rendering the phone untraceable, this trigger could also lock the sim card tray.

LIMITATIONS AND FUTURE WORK

Limited interviewee demographic - Given the constraints of this study where researchers recruited participants, all participants were their friends. Thus, the participants could have potentially censored certain aspects during the interview—such as their possible mistrust when we asked them for their phone. Further, our participant group was predominantly Asian. All participants were Dartmouth undergraduate students which may have skewed the data in favor of a more trusting behavior of others as the campus is generally known to be very safe. In addition, drawing participants from the Dartmouth undergraduate population restricts age as well—the 21 participants range from 18-22 years old.

CONCLUSIONS

The main question this study seeks to answer is how people currently act in situations where they share technology. One conclusion we arrived at was that people are generally nice. Thus, they will lend their phone despite being uncomfortable with the

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situation. Further, for the sake of avoiding conflict, some will allow the borrower to access whatever they ask for. This is an issue we intend to design for. To facilitate smartphone lending, lenders must be more comfortable with handing their phone over to others. As more smartphone users become more willing to share their technology, borrowers will benefit as well as the possible mistrust, tension, and conflicts are minimized.

Mentality shift - The solutions proposed in this study hold the assumption that borrowers may see restricted functionality as a sign of mistrust from the lender. In the future, we believe that there may be a mentality shift where these security features are default settings and the lender can adjust restrictions to allow the borrower access rather than restrict it.

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Appendix: Interview Questions

Part 1 - Beginning Simulation

1. What ran through your head when I asked to borrow your phone?
2. Tell me about what it was like to have your phone in my hands?

Part 2 - General Interview

3. In what circumstances have you shared your phone screen?
 - Who was it with?
 - Do you have any concerns with what the person may see?
 - Anything you do before you share your phone screen?
4. In what circumstances has your phone been in another person's hands?
 - Who was it with?
 - Can you walk me through what concerns or thoughts you have in thinking about what the person may do?
 - Tell me what you do before you lend your phone?
5. Grid Exercise:
 - Can you group the people you would lend your phone to (in the headers)?
 - Can you talk me through as you fill out the grid and tell me how your privacy concerns differ for people in each group?
6. End simulation:
 - What was on your phone when you unlocked it?
 - What precautions did you take before handing me your phone?
 - What apps or information would you least want me to look at?

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Appendix: Grid Exercise

What can the person holding your phone access?

o = accessible

x = not accessible

	A	B	C	D	E
Can Call					
Can Text					
Can view Social Media					
Can edit Social Media					
Can access app store (view only)					
Can access app store (install)					
Internet access (with access to browsing history)					
Internet access (w/o access to browsing history)					

What functionality would you like to activate?

o = activate

x = not needed

Push notifications disabled					
App access restricted to app asked for					
App access restricted to certain apps					
Incognito mode activated					
Freeze screen to stay on app					
Detect currently opened app on phone through					