

# An Exploration of Rules and Tools for Family Members to Limit Co-Located Smartphone Usage

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## ABSTRACT

Smartphones play an increasingly large role within our lives, shaping our interaction with friends and family members. Though smartphones facilitate seamless communication, there is a growing concern that people overuse smartphones in front of family members, which can sometimes deteriorate family relationships. We report on a survey examining smartphone usage among three types of family members: children, partners, and other adults living in the household. We examine the rules and tools that they use to reduce their smartphone usage. Results show that people have many rules to limit their co-located smartphone usage. However, the rules vary widely between the three types of family members. Furthermore, participants reported a lack of smartphone-based tools to help them reduce smartphone usage. Considering these results, we suggest recommendations for designing smartphone-based tools intended to help reduce co-located smartphone usage within families.

## CCS CONCEPTS

• Human-centered computing~Human computer interaction (HCI)-HCI design and evaluation methods~User studies

## KEYWORDS

Smartphone Usage, Co-Located Family Members, Rules, Strategies and Tools, Limit Smartphone Usage

## 1 Introduction

Smartphones have become powerful and versatile tools entwined with our daily activities. People use smartphones not only for connecting with friends and family members, but also for accessing information anytime, anywhere, thus augmenting human capabilities through smart technology. Although the smartphone is a productive and often essential tool for many of our everyday activities and increases the quality of life, there is a growing concern that people develop smartphone addictions and continue to use their phones in undesirable ways, such as in the presence of others, i.e., in a co-located situation [8, 9, 15, 24]. Prior

research revealed that people often use smartphones in the presence of their family members, or romantic partners [24], even during family activities such as meals, playtime, and bedtime [14, 29]. This behavior can deteriorate relationships, damage interpersonal connectedness and create frustration among co-located people [18, 21, 24, 29].

There have been attempts, both in industry and academia, to develop products that help people reduce their smartphone use [12, 23]. For example, there exist smartphone apps that allow people to track their smartphone activities and habits and motivate them to reduce smartphone usage [27, 31]. These apps typically provide the user with detailed usage statistics, such as the time spent on different activities/apps, the number of times the screen has been unlocked, and the number of used apps. Researchers showed that some parents use such tracking apps to monitor and restrict their children's smartphone usage [9, 14]. Accordingly, these apps have the potential to help reduce children's, or the adult's own smartphone usage. However, little is known about whether and how smartphone-based tools can help families reduce undesired co-located smartphone usage.

Despite the potential benefits of augmenting human capabilities through smartphones, there are concerns about smartphone overuse. In this paper, we follow this path of tool-based assistance to reduce smartphone usage. Our aim is to inform the designs of tools used to reduce smartphone usage within families. To achieve this, we conducted a crowdsourced survey where we investigated what tools (e.g., software or hardware solutions) and what rules or mutual agreements that family members have to reduce smartphone usage in the presence of each other. Our survey results show that families have more rules for children to restrict their smartphone usage than for partners and other adults in the home (e.g., grandparents, adult siblings). Additionally, for partners and other adults, participants reported having rules for not using smartphones in different contexts. These rules were mostly set to reduce smartphone usage in co-located situations such during mealtimes, social gatherings, or outdoor activities. Most survey participants expressed that they were not familiar with apps or tools to reduce smartphone usage. However, they were positive about the idea of using technological solutions that might help reduce co-located smartphone usage in the family.

In summary, our contributions are as follows: 1) we explore people's smartphone usage in the presence of their family

members; 2) we contrast smartphone usage rules and other tools that families use for three types of family members – children, partners, and other adults – to limit their smartphone usage activities; and 3) we offer recommendations that inform the design of tools aimed at limiting co-located smartphone usage.

## 2 Related Work

### 2.1 Smartphone Overuse

Smartphones provide people with the ability to access information on-the-go and communicate with others at any given moment. Yet there is growing evidence that the convenience of smartphones (e.g., notifications and updates) may be counterproductive and lead to unwanted excessive device usage behavior [2, 10, 30, 32]. Consequently, smartphone overuse is an active area of research that examines people's smartphone usage behavior. For instance, prior research showed that excessive use of smartphones may decrease productivity at the workplace [8] and even cause health problems such as lack of sleep, and depression [32]. In a crowdsourced survey, Elhai et al. [10] observed problematic smartphone uses to be correlated with anxiety, need for touch and a fear of missing out. Parents' overuse of smartphones inspires smartphone use among their children [30], e.g., smartphone use has become common even among toddlers [16]. A rich body of research investigated how young children are being affected by the overuse of technology [2, 16, 30]. Smartphone overuse not only affects individual users, but also creates problems while people are engaged in group activities, social gatherings, and co-located time with family members. In the following section, we summarize such negative effects of smartphone overuse.

### 2.2 Negative Effects of Co-Located Smartphone Usage

Smartphone overuse often creates distractions and annoyances during group activities [15, 19, 25]. The lack of social interaction caused by excessive smartphone usage may contribute to disengagement from group interactions, and hence decrease the sense of group belonging or a community-feeling [25]. Prior research has also shown that smartphone overuse affects family relations, lowering the quality of interpersonal communication experiences [9, 24]. Additionally, smartphones are designed as private and personal devices: the activities that take place on the screen, when desired, can easily remain completely unknown to co-located persons. Users often fail to pay adequate attention to those co-located with them, even during on-going in-person conversations [14]. Consequently, people often feel ignored when their family members use smartphones in front of them [24]. This may sometimes lead to anger and frustration among couples and people in close relations [13]. Parents' smartphone overuse may bring adverse effects on their children, and cause feelings of being ignored or neglected. In extreme cases, children may even get injured as they attempt to engage in risky activities to gain a parent's attention [17].

These well-documented negative effects of smartphone overuse in co-located situations have motivated and call for further investigations of how to help people reduce their co-located smartphone usage. We summarize these efforts next.

### 2.3 Co-Located Smartphone Overuse and Reduction Strategies

A rich body of research examines different ways to reduce people's smartphone overuse and smartphone addiction. Some strategies are based on either information [27, 31] or on motivation [13, 20, 26]. The main idea behind information-based strategies is to provide smartphone users with statistics about their smartphone habits - typically including the daily on-screen time and app-based or activity-based information - to create awareness and trigger reflection [27, 31].

Motivation-based strategies rely on gamification to help users set goals related to smartphone non-use and track their achievements [13] or they rely on apps that encourage group activities to reduce an individual's smartphone usage [20, 26]. For instance, Ko et al. [17] proposed an approach that allows a group of co-located users to lock each other's smartphones during group activities. They also explored persuasive approaches to reduce smartphone overuse based on self-monitoring, goal setting, and social competition [20].

Other projects have focused on smartphone overuse in families. Jarusriboonchai et al. [15] proposed an approach to communicate a person's smartphone activities to co-located family members by displaying the icon and name of the app that is currently used on the back of the phone. Children have also been found to show smartphone-related addictive behavior [5]. Parents often oversee children's exposure to technology, and this parental mediation is important to regulate children's smartphone usage [23, 29]. Accordingly, researchers have examined ways to decrease children's technology use and improve the quality of the viewing content [3, 7, 28], children monitoring apps, as well as the moral and ethical concerns of using them [11, 34]. They have also explored technology-rules and parent-child agreements that restrict children's technology use [6, 14]. Such rules are often based on context (e.g., at dinner or after bedtime). Our research goes beyond these studies by exploring and comparing the rules people use to reduce co-located smartphone usage among varying types of family members.

Though there is significant evidence indicating the overuse of smartphones and its consequences, very little is known about rules that people commonly use among family members to reduce co-located smartphone usage (e.g., at home when their family members surround them). Additionally, there has been a lack of research exploring technological solutions such as smartphone apps or tools that people use to accommodate the rules to reduce smartphone usage to support co-located interpersonal engagement.

### 3 Study Procedure

We conducted a crowdsourced survey study examining users' smartphone usage, rules, and tools that they have used to limit smartphone usage in the presence of other family members. We used a crowdsourcing platform, Amazon Mechanical Turk (AMT), to run our study. We were inspired by the prior research that showed AMT to be a convenient and reliable platform for conducting survey studies [1].

Please describe the situations in which you and your partner have agreed that you should not use your smartphones?

Please describe the house rules, if any, regarding the smartphone usage for the other adults (i.e., excluding you and your partner) in your household.

Please describe the house rules, if any, regarding the smartphone usage for children (i.e., age below 18) in your household.

Please describe if you are aware of or use any apps, tools or strategies to reduce your smartphone usage.

Figure 1. Sample questions from the survey study.

We used an online survey designed with Qualtrics<sup>1</sup> to collect data. In our survey, there were several sections aiming to collect specific information from participants. For instance, we first collected demographic information such as participants' age, gender, and household conditions. After that, we asked about participants' co-located smartphone usage (e.g., how often they use smartphones in the presence of family members, where and when this commonly happens, and what types of apps they use). We included questions on rules in the household – especially for children, partners, and other adults – to restrict smartphone usage in the presence of other family members (Please see Figure 1 for sample questions). We asked whether they are familiar with any tools that help reduce smartphone usage. We used both open- and close-ended questions to collect responses about participants' smartphone usage, rules, and tools. Figure 1 shows a sample of our questions. Note that the questions do not explicitly include the word “co-located”. However, in the study information, we provided explicit instructions that we are especially interested in

situations when family members are co-located, e.g., any place such as home, shopping mall, restaurant, park.

We posted our survey as a task to Amazon Mechanical Turk. Participants were compensated with \$1.00 for their participation. We included two qualifications for participants: a minimum of 70% approval rate and a minimum of 50 previously completed jobs in AMT. We also included additional requirements for participation: a participant must own a smartphone and be either married, or in a common-law or partner relationship and living in the same household. The survey was available in AMT for seven days.

### 4 Study Results

For our analyses, we excluded responses from participants who had no children and from participants who left one or more questions unanswered and/or provided one or more invalid answers. Accordingly, our results are based on the responses from 59 participants, 26 female and 33 male.

We report quantitative data using standard statistical methods such as mean and standard deviation. Thematic analysis was used to analyze qualitative data, where two researchers performed open coding and reconciled codes into a common code set.

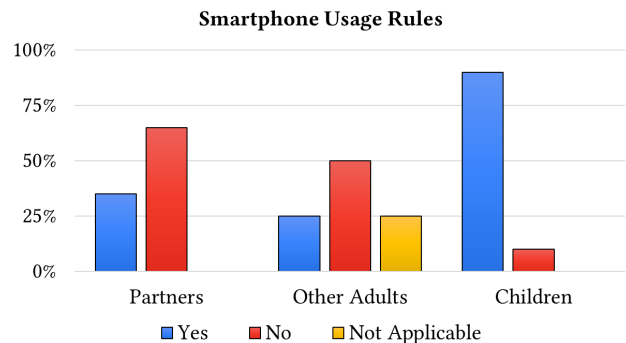


Figure 2: The existence of smartphone usage rules in families

#### 4.1 Demographics and Smartphone Usage

Out of 59 participants, 21 were between 25 and 34 years old, 24 were between 35 and 44 years, 7 were between 45 and 54 years, and 5 were between 55 and 64 years. Two participants were 65 years or older. Our participants were from the USA (35 participants), India (22 participants), Mexico (1 participant), and Sri Lanka (1 participant). They reported having a mean of 1.29 children (SD=0.86) who are 18 years old or younger. Participants reported to own smartphones for an average of 8.31 years (SD=4.47) and use them for an average of 3.11 (SD=1.85) hours per day. Participants, who live in India, reported spending more time on smartphones per day (3.55 hours, SD=2.48) than participants from Mexico (2 hours), Sri Lanka (2 hours), and the USA (2.95 hours, SD=1.39). Participants reported that they use their

<sup>1</sup> Qualtrics XM. <https://www.qualtrics.com/>

smartphones for a wide range of purposes: communication (such as email, text messages, phone calls, Skype), social media (such as Facebook, Instagram, Snapchat), games, music, and entertainment (such as Netflix, Spotify, Youtube), and Internet browsing (e.g., news, hobbies, travel, food, banking).

### 4.2 The Existence of Rules in the Family

Figure 2 provides an overview of participants' responses to whether or not they have any rules or agreements in their family regarding co-located smartphone usage. In 36% of the families, the partners have such rules or agreements regarding their own usage. Twenty-five percent of the participants reported that they did not have any other adult than their partner in the family; thus, the question was not applicable to them. 50% reported that they had no rules for other adult family members, and 25% reported having rules. Ninety percent of participants had rules for their children.

### 4.3 Rules for Partners

We asked participants whether they have any rules or agreements with their partners to reduce co-located smartphone usage. Thirty-six percent of the participants said that they have house rules with their partner on using smartphones when they are co-located. Figure 3 shows details of the rules that people have for their partners.

We recorded and coded a total of 30 responses from participants on rules or agreements which either referred to locations or situations (7 responses from participants from India, 1 from Mexico, and 22 from the USA). We found that mealtime (30%) and family time with kids (27%) were the two most common contexts where people have rules or have agreements on not to use smartphones.

"We agree as a family that we won't use our smartphones during mealtime." [P50, male]

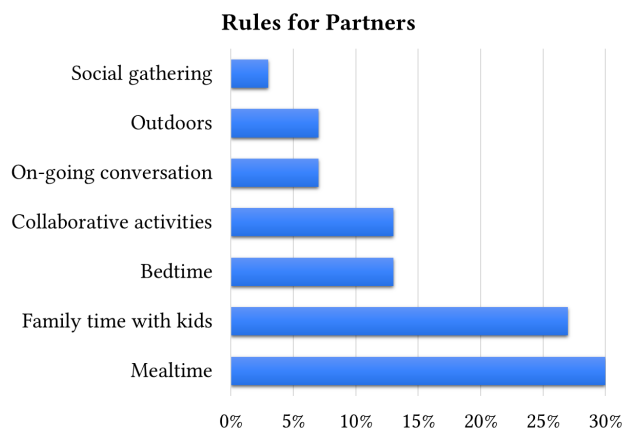


Figure 3: Commonly observed rules to limit co-located smartphone usage for partners

"We agreed that no one should use their smartphone unless it's really important when we're out having fun as a couple or as a family when attending to our kids." [P55, female]

Other commonly referred contexts, where partners had rules or agreements not to use the smartphone were during collaborative activities (13%), bedtime (13%), on-going conversation (7%), outdoors such as shopping mall or parks (7%), and social gatherings (3%). These rules or agreements often exist to ensure quality time among couples.

"We have agreed not to have phones on while shopping together or eating out. We turn them off or turn them down, that we not have the phones in the bedroom with us. That when we do things together we do not have them on." [P53, female]

"At the dinner table at home and out because we want to spend time talking about our days." [P43, female]

We asked the 38 participants who did not have any rules on how they would feel about having rules on co-located smartphone usage. More than half (55%) of these participants responded that they regarded the idea of using rules positively as such rules could possibly help to ensure the quality time with the partner.

"I think we should come up with some guidelines for smartphone usage and that would make me feel a little better about our communication with one another." [P34, female]

Thirteen percent of the participants who did not have any rules or agreements were neutral about introducing such mechanisms. The remaining participants (32%) expressed concerns about having rules or strict agreements. These concerns are mainly due to a fear of missing communication opportunities or not being able to meet commitments. However, they also provided their opinion on having some kind of 'soft' rules to reduce smartphone usage.

"That [*having rules*] was impossible as I was working in a company I may get calls at any time and I am answerable to my company calls." [P19, male]

"I think hard and fast rules are pretty pointless and intruding. I think having common sense etiquette "soft rules" is a good thing though" [P41, male]

Additionally, a few participants see rules as unnecessary additions to their daily smartphone activities and felt that they should be able to act on their own accord.

"It bothers me to have to follow rules about using my phone since I am an adult." [P54, male]

### 4.4 Rules for Other Adults

We used an open-ended question to collect information on the house rules that participants have for adults (excluding them and their partner) regarding co-located smartphone usage. Twenty-five percent of our participants said that this question did not apply to them as they did not have any other adults other than their partner living in their household. Fifty percent of the

participants mentioned that they do not have any rules for the other adults in the household. These participants expressed that they believe that their adult household members are mature enough, have mutual respect and do not have to follow any formal smartphone rules.

“Our daughter is an adult so we don’t tell her what to do.” [P38, female]

“We are respectful of each other, so we do not have to set limits or rules” [P45, female]

One participant mentioned that their parents, who live with them, use phones very infrequently, and accordingly there were no rules or agreements to limit their smartphone usage.

“There is no rule as my mom is an aged woman and does not use her phone everyday.” [P11, male]

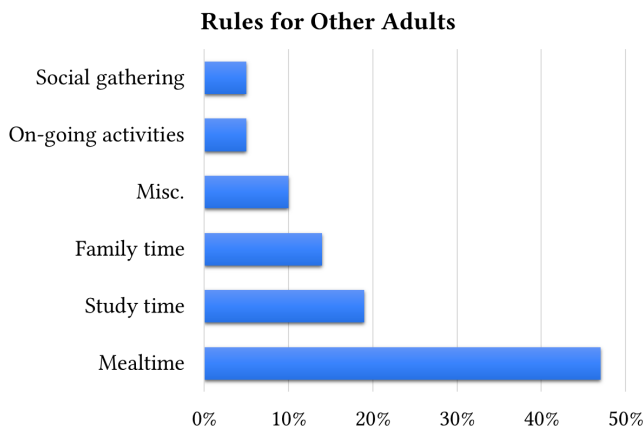


Figure 4: Commonly observed rules for other adults

The remaining 25% of our participants reported having rules to restrict co-located smartphone usage for other older adults (excluding their partner). Figure 4 shows the rules that people have for other adults. We had 21 responses in total about such rules (6 responses from India, 1 from Mexico, and 14 from the USA). Among these, 47% were about restricted smartphone usage during mealtime (i.e., breakfast, lunch, and dinner time). Many of these responders said that they had set such rules to facilitate conversations and to ensure quality time among family members at the dining table.

“We have one rule that stands out strong for others [adults] too, do not have the phone on at the dinner table, whether we are at someone’s house or not, we do not turn on the phone.” [P53, female]

Furthermore, 19% of the responses were about having rules not to use smartphones during study time.

“We told twin sons aged 20, not to use smartphones during study time, and they kept their smartphones outside their bedroom to make it sure.” [P20, female]

We also received responses on having rules not to use smartphones in the presence of family members to ensure family time (14%). Such rules are commonly set when family members are together for having quality time with others.

“No phones during family time – [while we are] watching a movie, playing a game, etc.” [P57, female]

We also observed rules not to use smartphones during on-going activities such as conversations (5%), during social gatherings (5%), and in various other contexts (10%), such as while on vacation.

“I don’t let the kids look at the phone when I try to talk to them.” [P25, female]

“I told [my older adult] not to use smartphones while we are together with our relatives.” [P4, male]

#### 4.5 Rules for Children

We asked participants whether they have house rules regarding smartphone use for their children. Most participants (90%) said that they do have rules aimed at limiting their children’s smartphone activities when they are co-located with their children. We found 59 coded responses in total on different such rules. Figure 5 provides an overview. Among the 59 responses, 32% were about time-based rules (e.g., no more than 30 min per day or no smartphone after 8 pm) and 24% were about content-based or app-based rules such that the rules did only apply to, for example, games or for watching YouTube videos.

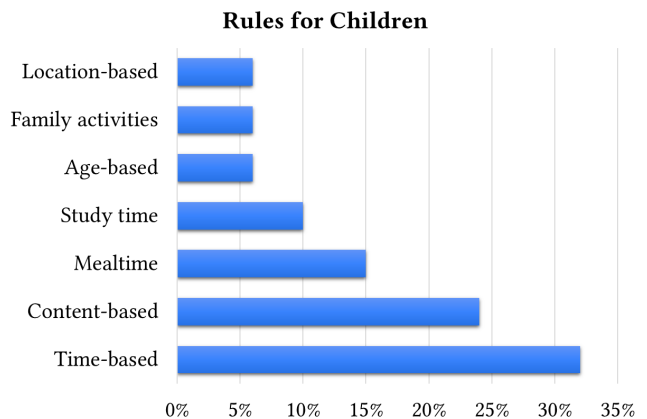


Figure 5: Commonly observed rules for children

“[Our] childrens’ smartphone usage is limited during the week to only a few hours. We also try to make sure that the kids stay focused on educational games. During the weekend I do give them several hours of free time on their electronic devices though.” [P40, female]

Six percent of the responses were about location-based rules (e.g., no smartphones in private spaces such as their bedroom or bathroom). Such rules were commonly set to ensure that the child

was engaged with family members in purposeful activities. A typical response was:

“We do not allow our sons to use their smartphones in private such as their bedroom or bathroom. We also have their settings configured so their phones may not be used between 10 pm and 6 am.” [P50, male]

Other common rules regarded restricting smartphone use during mealtime (15%), during study time (10%), and during family activities (6%).

“We have “no phones at the table” in effect since phones came out. I can’t stand kids being on their devices all the time, so I ask them to put them away.” [P31, male]

“Our child is only allowed to use it if her homework is done and not during dinner or after 7:30 pm. On the weekends it’s fine but not when we are having family time.” [P43, female]

Several survey participants (6%) have age-based rules to regulate and to communicate to the children what they are allowed to do on their smartphones at a certain age. Some participants even mentioned having multiple rules to ensure their children are growing up without being adversely affected by excessive smartphone use.

“For our daughter, aged 11 has restrictions about usage of smartphone. She uses our smartphones to watch kids’ channels and some comedy serials. Earlier, she was watching it before going to school and was lazy. After that, we gave instructions not to use smartphones in the morning and soon after back from school. Allowed only after her completion of homework in the evening.” [P20, female]

#### 4.5 Tools to Reduce Co-Located Smartphone Usage

We asked participants if they used any tools to reduce smartphone usage with the family. Only ten participants (17%: 7 from the USA and 3 from India) were aware of such tools and mentioned app names such as iPhone’s Screen Time [32] and Circle [4]. Three participants said that they used such tools to track their own daily smartphone usage and four participants said that they used such apps to monitor their children’s smartphone activities or to track and limit their children’s smartphone/Internet usage time. The remaining three participants said that they were aware of apps that restrict smartphone usage; however, they did not report the app or tool name nor mentioned details about their usage.

“I use this to make sure and help me stick to time limits for the kiddos. It makes them ask me permission for more time because it will shut off the device after the time I specified.” [P40, female]

“When my son was 12 and first got his phone we used an app to limit what he could access and the amount of time he could use his phone for things likes games or the internet.” [P57, female]

Another question asked about the importance of having tools to reduce co-located smartphone usage. Seventy-five percent of

participants expressed that it is important for them to have tools to help them either monitor or control their family members’ smartphone usage. Some of the participants even expressed their intention to use such tools or apps for ensuring quality time among family members.

“I am not aware of any apps to reduce [*smartphone usage*]. In the future, I will try to use it.” [P20, female]

We also observed that some participants expressed concern regarding privacy issues when using tools to reduce smartphone usage in the family. More specifically, they expressed their concern on how such tools would be used to gather data and share information among family members as they are not comfortable with tools that invade their privacy.

“Because I know how important is the personal privacy and I don’t like to cross the line (even if my partner does it)” [P2, male]

“I think my husband would rather shoot a bullet in his foot rather than share anything on his phone with anyone at all, even me. He’s very very protective of his phone.” [P25, female]

## 5 Discussion and Recommendations

Our results revealed that people have many rules or agreements in their families to limit family members’ smartphone use. We observed that there are several common contexts for which people tend to set rules to restrict co-located smartphone usage, such as during mealtime and family activities. We also observed that the number of rules set for a family member varies depending on its age: having several rules for a child is prevalent, whereas people are more reluctant to have rules for adults, such as their partner, grown-up children, or for a parent who lives in the household. Rules also widely vary according to the type of family member they concern. Rules for children often come in many forms; they are targeted at many contexts and serve various purposes. For instance, parents commonly set time-regulating rules for their children to ensure that their smartphone usage does not become harmful. Parents also often use rules that restrict usage in certain locations (e.g., in the bedroom) or during certain activities (e.g., during homework). Many parents have rules that forbid specific on-screen activities or the use of certain apps.

People have fewer and less varied rules, or agreements, with their partners or other adult family members. When such rules exist, they mostly concern usage during mealtimes or while engaged in activities with the children during family time.

We also observed that many of our survey participants are not aware of any tools that could help them limit their own or other family members’ smartphone usage. However, while they emphasized the importance of having such tools, they also expressed privacy concerns.

Based on the study results, we offer the following recommendations for designers who are interested in designing tools to reduce co-located smartphone usage in families.

**Relationship-based design:** Tools should be designed to accommodate different types of family members (e.g., partner, parents, children, adults). If the tool is running on a device which is shared among family members, the tool should also have capabilities to recognize who is currently using the device (e.g., child vs. adult, owner vs. borrower), and activate the appropriate rules accordingly.

**Flexibility:** Tools should be flexible and allow users to create a wide range of rules, both in terms of strictness and in terms of rule content. For example, tools should offer the possibility to create strict rules for children but also 'softer' rules that correspond to mutual agreements between partners. Tools should also enable the use of many different configurations, such as for time-based, content-based, and age-based rules.

**Creating awareness:** Tools could also support smartphone activity awareness features such as the possibility to share smartphone usage statistics among family members. For instance, based on the activated permissions, a tool could share smartphone information about which apps are currently running app or which is the currently longest-running app and help users to be more aware of co-located family members' smartphone activities.

**Real-time monitoring:** Tools should have support for monitoring smartphone activities in various levels of detail, which is configurable based on relationships. For instance, tools could capture images of a child's smartphone screen and transfer it to a co-located parent's phone in real-time. In this way, parents could be more aware of the exact on-screen activities of their children. Real-time screen sharing could also help with troubleshooting any difficulties that other family members might have with their smartphones. Naturally, trust and relationship building are important to consider. Depending on the age of the children, detailed tracked of activities may show a lack of trust by parents and deteriorate the parent-child relationship [11, 34]. Thus, techniques for real-time monitoring could present the possible tradeoffs to users in consideration of a child's age and maturity level.

**Offering privacy:** Tools should offer different privacy levels so that users can select a level that they are comfortable with. For instance, partners could select a high-privacy level which only allows receiving and sharing abstract information or information from, or about, only a limited set of apps. For parents, who want more exact details about a child's on-screen activities, tools could offer less restrictive privacy settings. Again, designers and users would need to consider the tradeoffs of knowing and regulating the smartphone usage of children with the need to develop trust and build one's relationship.

## 6 Conclusion and Future Work

In this paper, we report on the results from a crowdsourced survey that explored rules and tools that parents use in their families to limit and reduce smartphone usage. Our results showed that, in most families, parents make conscious efforts to both reduce their own and other family members' smartphone usage through

various rules or agreements. The applied agreements or rules vary depending on the type of family member they apply to – the partner, a child, an adult child, or a parent living in the same household.

Many of our survey participants reported that smartphone usage in co-located situations in the family is a great concern and, accordingly, they stressed the usefulness of and the desire to have tools that may potentially assist them in their efforts to reduce co-located smartphone usage in their family. Based on clear patterns and commonalities in our survey participants' answers and comments, we propose a set of five general, but important, recommendations regarding the design of such tools.

We do acknowledge that our crowdsourced survey was limited in terms of the number of participants which is similar to other crowdsourced studies (e.g., 52 participants in [1]). We do believe that adding more of participants would further ascertain the results. Additionally, the participants were only from the USA, India, Sri Lanka and Mexico. Accordingly, we plan to conduct a similar follow-up study with a larger sample and with participants from more diverse backgrounds to investigate culture-based rules for co-located smartphone usage and to compare the findings with the results from our current study. Our plans for future work also include implementing and evaluating smartphone-based tools that encourage families to reflect on their smartphone activities and, if they desire, help them to reduce both general usage and usage in co-located situations.

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