Thesis Proposal

Abigail Marsh

June 8, 2017

Abstract

Teenagers are using the internet for a variety of social and identity-based activities, but in doing so, they are exposed to risky situations. The work of ensuring teens' online safety largely falls to parents, many of whom are unprepared to understand the realities and norms of teens' online activity. In this thesis, we will investigate how parents and teens perceive online risks, the efficacy of current tools designed to keep teens safe online, and finally, whether we can improve currently available online safety tools. We have conducted interviews with parents and teens to understand how they perceive digital privacy within their families, and in what situations teens' privacy should be preserved or denied. We propose work to investigate a specific case of online safety, peer-based online conflict among teenagers, also called cyberbullying. In studying cyberbullying, we will investigate whether and how parents and teens define online conflicts differently, with an eye towards miscommunications that could make parenting decisions more difficult. We explore the pressures parents face to employ privacy-invasive and restrictive parenting practices, and their confusion about teens' digital communities that make some parents unsure about communication and education-based interventions. We further present how different groups perceive these various categories of parenting strategies. We further propose to study how current digital online safety tools perform in risky online situations encountered by teens. To understand the current tool landscape, we will study how two existing tools—a parental control software and a family online behavior contract—perform in families using a longitudinal mixed-methods study. For this study, we will investigate whether families use these tools to identify or handle risky situations, and whether they are satisfied or feel safer with these tools in place.

Contents

1 Introduction

Adolescence is a period wherein teenagers begin to explore sense of self, and much of this identity construction is happening online for modern teens [10]. Parents are the first defenders of their children's online safety, but they are often unsure how to guarantee that well-being [12]. There are many online sources, such as monitoring software providers [4] and journalists [19, 23, 49, 51], that encourage online safety practices such as monitoring teens' online behavior or significantly restricting allowed behavior. But research shows that these parenting practices lead to distrust and lessened communication from teens, and can result in teens hiding their behavior from their parents [27, 34, 39, 59].

Existing digital parenting tools frequently encourage parents to prioritize teens' online safety over teen privacy. A recent paper, by Wisniewski et al., analyzed the features of 75 Android mobile apps designed to help teens stay safe online. The authors found that those apps were targeted at parents for monitoring or restricting teens' behavior; considerably fewer apps offered any self-regulation features for teens, and those that did relied heavily on options for the teen to reach out for help from an adult [52].

Some parents might choose instead to avoid tension between themselves and their children by allowing the child to have unmonitored, unrestricted access to the internet. Children of current generations have been called "digital natives," and are assumed to be able to navigate the risks of interacting with other people online fine on their own [43]. However, other researchers dispute the idea the "digital native" generation is naturally able to handle online risks without ever receiving adult guidance [8]. Further, boyd has reported that the skill sets needed to navigate online risks may be unequally distributed across demographic factors and individual access to digital devices [10], indicating that simply growing up in an age of ubiquitous computing is not enough for children to learn how to avoid risky situations online.

Parents concerned with their childrens' online safety are choosing from a set of options that are often frustrating and unfulfilling for both parent and child. However, experts suggest that parenting a child's online behavior does not need to be these things. In past interviews with experts, we have found support for monitoring practices, which experts say encourage parents to be attentive to their children [29]. Experts in this study also suggest that parents communicate with their children about online safety to encourage mutual respect and create an open dialog [29]. In this work, we examine parenting strategies to understand how they can be improved for the benefit of both parents and children. We will accomplish this by examining the outcomes of using current digital parenting strategies to set boundaries for childrens' online behavior, something not covered in existing literature.

This thesis will investigate the current dilemmas facing families, including qualitative studies of what frustrates or confuses them, and why current interventions are failing to address those frustrations. This work proposes to study a specific online risk, cyberbullying, to understand how parents and teens perceive the risk and whether their perceptions differ. This thesis also proposes a study to investigate how current interventions function when teens encounter a risky situation online. This study will examine how families resolve those risky situations, and how parent and child feel about that resolution.

2 Thesis Statement

This thesis will investigate how we can improve adolescent online safety tools so that they both encourage teens to avoid risky online behavior and provide tools for parents that are less invasive of teens' privacy. We will investigate how families with teenage children set boundaries and expectations for teens' digital behavior and how current online safety tools perform in parent-teen conflict situations to further this goal.

Understand parents' and teens' perspectives on teen digital behavior.

This thesis will employ interviews and surveys to understand how parents and teens negotiate appropriate boundaries for teen digital behavior and parental intervention. As detailed in Section 5.1, we will survey parents and teens about online bullying to understand whether there are differences in how both groups evaluate the severity of teen online conflict. Further, in Section 5.2, we detail a study that will investigate parents' and teens' reactions in real situations of conflict or online risk.

We will also draw from past work for qualitative accounts of these boundaries and conflicts in practice and to categorize common types of parental intervention. In Section 4.1, we report an interview study with parents and teens that formed our first understanding of communication gaps between the groups. In Sections 4.2 and 4.3, we report studies in which we built a categorization of parenting strategies, based on interviews with experts, and a survey in which we examined parents' and teens' perceptions of these categories. We will use this information to inform design decisions for a tool that encourages parent-teen communication as a method to work through these disagreements.

Understand family experiences of existing digital parenting tools.

We will use interviews and surveys to investigate a highly-rated parental control software and an online behavior contract supported by the National PTA. Discussed in further detail in Section 5.2, we will conduct a study to examine the process of setting up these tools. Through interviews, we will look for usability concerns and learn how parents and teens negotiate the decisions made about appropriate boundaries for teen digital behavior and for parental intervention. We will additionally investigate how the tools influence both parents' and teens' behavior when the teen crosses one of the established boundaries or experiences some online risks. Throughout these tasks, we will be observing whether using the tool encourages parents to look into teens' private spaces or encourages alternative methods of resolving the conflict.

Additionally, we will survey a wider group of families instructed to use these tools. These survey data will provide a more sensitive measurement of changes in perception of online risk and parental monitoring behavior.

3 Background and Related Work

To investigate whether we can improve existing online safety tools aimed at adolescents and their families, we need to understand what teens are doing online and what existing research

has already said about parent interventions. Below, we discuss work that covers teen online behavior and the risks thereof, interventions based around monitoring and restrictions of teen behavior, and interventions that rely on communication or education.

3.1 Teen behavior and associated risks

Most teenagers are using the internet daily [25], and social media is their primary method of communicating with friends [44]. In her book, *It's Complicated: The Social Lives of Networked Teens*, danah boyd reports results from almost a decade of research and interviews. In that book, boyd writes that teens are socializing online because of new societal norms that restrict teens' mobility and access to public spaces [10]. The internet thus becomes their connection to friends, entertainment, and the larger world.

In the United States, teens have few legal protections online—the Children's Online Privacy Protection Act (COPPA) prevents data collection and distribution for children under 13 without explicit permission from a parent or guardian [2]. The age restriction and parental approval process imposed by COPPA is a hassle for many families, however, and boyd et al. write that parents will help their children to lie about their age when registering an online account, in violation of COPPA [11]. Another law, the Children's Internet Protection Act (CIPA), requires that schools and libraries receiving discounted internet access through a government program block online content that is obscene or harmful to minors [3]. This law is more limited in scope, but is also more enforceable than COPPA, as it puts the burden of action on organizations rather than on families. The Child Online Protection Act (COPA), a precursor to CIPA that never took effect, was also intended to protect children from seeing sexual content online [1]. The law faced a decade of legal challenges from civil liberties organizations on the grounds that it restricted the free expression of adults who wished to view sexually explicit content, before being put to rest in 2009 [50]. Pornography laws also lie at the root of another current child online safety conflict. The broad nature of some existing laws about child pornography intended to apply to adults has resulted in fear-mongering or legal action taken against children who engage in consensual sexting that would have been legal if the sexual activities took place undocumented and offline [16].

In a literature review, Marwick et al. [33] note the importance of studying teen privacy in relation to technology, given that much of teen socialization is online and that teens highly value digital privacy. A Pew research report supports Marwick et al.'s conclusion that teens take active steps to protect their privacy online: 60% of teens keep their online profiles private, 74% have removed people from their friends list, and 26% have posted false information to protect their privacy [28].

In further research, Marwick and boyd found that teens used numerous ad-hoc methods to preserve their online privacy. For one example, teens would couch posts in language that could only be understood by the intended audience [32], a finding also supported by a Pew research report [28]. However, privacy is not always a motivating concern for teens, as Marwick and boyd also found that these teens engaged in privacy-risky behaviors, such as password sharing [32]. One survey found that 30% of teens are sharing passwords with a friend or significant other [26]. Significantly, Marwick and boyd write that teens engaged in behaviors they knew to be privacy-risky and yet still held expectations of privacy in other online situations [32]. These results indicate that teens' online behaviors are governed by

complex and sometimes conflicting motications.

Studies on teen health have examined how teens understand risky sexual behavior [13]. Female teens revealed concerns about risk to be somewhat secondary to the powerful social normative forces driving sexual behavior among teens [13], similarly to how all teens are only sometimes motivated by the previously mentioned privacy risks of online behavior. Pressure to engage in sexual behavior and concern about online privacy are two competing motivations at play in the case of teen sexting [17].

The motivations for taking the previously mentioned online risks may not be justifiable to adults operating in a different context. Research shows that parents do not always recognize teens' preferred privacy boundaries; in an interview study with 10 parents, Cranor et al. found that most of those parents did not consider teens texting friends and other online behavior to be a private activity [12]. Similarly, parents may distrust and be inclined to restrict or monitor apps like Snapchat, which have a reputation as a place for sharing mature content. Despite this reputation, one survey of adult Snapchat users shows that most do not primarily use the app for sexting [46].

Further hampering parent-teen understanding about teens' online behavior are parents' often inaccurate warnings about risks. Despite frequent media scares about sexting, many teens feel like sexting is "no big deal" [24]; one study posits that sexting poses a significant risk primarily to teens who are pressured into it [17]. Parents' dire warnings about sexting may exaggerate the likelihood of negative outcomes compared to the teen's experience, leading teens to ignore even moderate warnings because they believe that the likelihood of all negative outcomes are exaggerated.

Marwick and boyd examine cyberbullying in another study. They report that teens define many online conflicts as drama. Teens define drama as an entertaining act that is less serious than bullying [31]. This finding suggests that if adults approach "drama" behaviors as bullying, teens might be unwilling to take adults' advice. This could leave teens underprepared to navigate an escalation of this behavior.

3.2 Parent interventions: monitoring, motivation and fallout

Parents who go searching for information about monitoring software will find many sources that support the use of these software tools. The parental control software providers have an obvious financial motivation to sell parents on their products. One provider supports parental monitoring by writing, "remember, it's not spying, it's parenting" [4]. The Chief Product Officer of another company is quoted in an article by *The Washington Post* encouraging parents to normalize potentially monitoring practices: "Set up ground rules as a family before you turn them loose. If you do that when they're small, you don't argue with a 16-year-old about privacy. It will just be a part of your family at that point" [23]. A parenting and child development expert quoted in the same article may also have financial motivation: she is a speaker and author who makes frequent media appearances as a parenting expert. She suggests parents interpret child dissatisfaction as a sign of success: "[Teens] will tell you you're ruining their lives... and you will high-five your parenting partner" [23].

Other popular press articles discuss the use of monitoring with more nuance, but they still often suggest parents employ it. An article in *The Christian Science Monitor* quotes experts who question whether monitoring software alone is sufficient to keep kids safe online.

These experts argue that communication must underscore any parent's approach, but the article goes on to quote additional experts that suggest parents should also be restricting teens' online activities [49]. An author in *The New York Times* discusses the proliferation of family location-tracking technologies. The article is framed as a question: "Should you spy on your kids?" The author establishes the privacy risks of location monitoring, quoting danah boyd and another Data & Society researcher. By the end, he suggests that the convenience and safety of monitoring outweighs those privacy concerns, at least in many cases [51].

Parents are seeking advice wherever they can find it, including writing to newspaper advice columnists [19]. One parent writes in to *The Washington Post*:

> How old is old enough for teenagers to have "private" conversations on social media? I feel like a snoop reading my 14-year-old's conversations. However, I feel like a neglectful parent if I don't. My child so far has handled herself well, but there have been some close calls (older boys urging her to play sexual games over Skype, etc.). We have a detente on my reading her stuff. I pretend I don't and she pretends she doesn't know I am looking.

In response, the columnist calls on parents to monitor in moderation paired with a disdain for privacy: "Any sense of privacy is false security, since anything texted or posted in private can end up everywhere" [19]. The thought goes, if corporations and untrustworthy friends can violate your child's privacy, why shouldn't you?

Parents are employing monitoring strategies in their families. According to a Pew survey conducted in 2014 and 2015 of 1,060 parents of teenagers, most parents are monitoring in some form: 61% have checked which websites their teen visits, and 60% have checked their teen's social media profile. Almost half, 48%, have looked through teens' phone calls or messages. And 39% have used parental controls. Parents are also restricting their teens: 65% have taken away a cell phone or internet privileges as a punishment, and 55% have time limits on use [7].

In peer-reviewed research papers, monitoring is treated skeptically. Mathiesen argues against parental monitoring from an ethical standpoint in a literature review, asserting that though monitoring can be helpful in some cases to ensure teens' online safety, they have a greater right to privacy that is more important than monitoring in most cases. Instead, she supports communication and negotiation between parents and children: "Parents and children can engage in democratic negotiation of mutual rights, trust and responsibilities with regard to using the Internet" [34].

Newell, Metoyer, and Moore suggest in another literature review that both covert and overt monitoring likely furthers the distrust between parents and teens that it intends to address, citing work that shows children resist parental monitoring by developing countermeasures, and that children who are subject to environments with parental monitoring see the same incidence of negative outcomes as those whose parents are completely uninvolved [39]. They specifically condemn covert monitoring, writing:

> Covert monitoring by parents is first perceived as non-engagement by the child. Thus, if successful and never disclosed to the child, all of the risks of parental non-involvement are present. If covert monitoring is discovered, many of these

> adolescents will take counter measures (keeping two diaries, secret email accounts, etc.) and resist or defeat parental surveillance. ...Moreover, there is now the issue of trust that must be considered by the child—discovered covert monitoring will likely undermine the practice of two-way information sharing.

One noted difficulty parents face when implementing monitoring is balancing it against teens' independence: in an interview of 10 parents, Cranor et al. found that their parent participants all felt that their children need on- and offline space to mature as they get older, but parents weren't sure to what extent they should monitor children [12], and research has so far not found what level of monitoring is effective. Parenting advice is difficult to prescribe because of parents' uncertainty, natural differences in parenting style [59] and ethical views of monitoring [35].

Yardi and Bruckman write that teens' privacy is often sacrificed for monitoring [59]. Children's awareness of parental privacy invasion starts young—in a qualitative study with children aged seven to eleven, Zhang-Kennedy et al. classified parents as one of four main privacy threats identified by their child participants. By contrast, the parents in their study focused on external threats to children and often relied on privacy-invasive parenting strategies to protect their kids, which were received with annoyance by the children [60]. Although conflict leads to negotiation about teens' privacy rights, some research asserts that mandatory negotiation is damaging, stating "surveillance is a form of oppression" [10].

Further, families that rely on monitoring for children's online safety can also face difficulties if the family member who maintained those systems leaves the household. Jennifer Rode investigated security and privacy practices of 12 households in an ethnographic study, and wrote [45]:

> [T]he centralized nature of technical knowledge in these homes left children particularly vulnerable to security risks in the event of divorce of their parents or other such changes in domestic configuration.

She also finds many examples of harms, ranging from parental access to childrens private diary files and emails, to illiterate young children clicking through security warnings, to a parent who attempted to steal his sons identity for financial purposes. She calls for security and privacy tools that account for the use cases represented by these households, and families more generally, and urges the HCI community to study the tradeoff between childrens online safety and their privacy [45].

Even if parents think teens deserve some privacy, research shows that they often use parenting strategies that directly contradict those rights when trying to keep their children safe online [38]. For example, an interview study of 12 parent-teen dyads found that technologically inept parents favored restrictions that could result in a strangling of teens' social connections [57]. Conflict results when parents and teens disagree about teens' privacy needs [18, 42], or teens communicate less with their parents [18]. Researchers Livingstone and Bober caution that the most privacy-invasive practices can strongly inhibit the growth of a positive, trusting relationship between parents and teens [27].

In an interview with 16 parents of teens, Yardi and Bruckman caution that adults often do not understand teens' online behavior norms well enough to create appropriate rules [59].

In a survey of 249 parent-child dyads, Hiniker et al. investigated rule-setting around family technology use. They found that for both parents and children, context-based rules (e.g. no texting at the dinner table) were harder to follow through with than activity-based rules (e.g. child does not get a cell phone). They draw on related work to explain that people generally have a difficult time "unplugging from digital devices even when they know continued use is rude or unnecessary, and this seems to be the major factor inhibiting context-based rules [20].

Faced with the question of how to impress the gravity of risky online behavior upon teens, many parents and educators also turn to fear as a motivator. Fear has shown to motivate adoption of cybersecurity tools in limited circumstances [22]. However, extensive surveys of the literature on fear appeals suggest that threatening and fear-based communication do not generally reduce risky behavior [41]. Also, fear appeals may lead people to control their fear about risks by ignoring or denying the risk rather than by coping with the posed threat [58]. In sum, prior research on fear appeals suggests that using fear to motivate teens not to engage in risky behavior may just push them to deny the risks, rather than dissuade the behavior.

3.3 Communication, education, and teen-led online safety

Studies of online parenting groups focused on supporting parents of young children or children with special needs emphasize the parent as the primary sharer [6, 47]. These children do not have the agency and reasoning power to make online privacy decisions, and research in this area reasonably focuses on parental behaviors [37]. Further, the online presences of younger children are established and maintained by their parents, who thus make the privacy decisions for them [5]. However, teenagers have a degree of agency and autonomy not present in most younger children, and can play a role in protecting themselves from online risks. In fact, Hiniker et al. found that children are more likely to follow rules for which the child had some input [20].

Teens care about their online privacy and safety. A Pew survey shows that teens are taking control of their online privacy, for example by limiting their online audiences [28]. Marwick and boyd interviewed 166 teenagers, and note how teens are talking in coded language, using slang, abbreviations, and allusions to communicate their private thoughts to friends in plain sight on public accounts [32]. However, these independent initiatives pose challenges because many teens do not understand online privacy risks [36].

One solution is to have those same monitoring and online safety software tools educate teens in addition to what they already provide for parents. A review of apps designed for teen online safety found a "staggering imbalance that favored parental control over teen self-regulation. This imbalance, in part, may be due to well-intentioned yet fear-based parenting strategies aimed at keeping teens safe online" [52]. But, as discussed earlier, communication relying on threats or fear do not reduce risky behavior [41], and people respond to fear appeals by ignoring or denying risks, not addressing the threat [58]. These apps may be well-intentioned, but are unlikely to change teens' responses to online risks without actionable advice and education. The few apps that provided features for teens to take an active role in their own safety offered primarily "reach out" features that connected the teen to their parent; only a handful offered any self-monitoring or impulse control features that allow teens to address risks on their own [52].

Parents could also talk to their kids about online behavior, as research shows that teens and parents are willing to discuss their concerns together when they share a positive relationship [48]. But Yardi and Bruckman found that many parents have trouble implementing authoritative practices that are both demanding of and responsive to children [59]. In an interview paper, Wisniewski et al. conclude that technologically literate parents are the most engaged with what their teens are doing online [57]. In a secondary analysis of 588 teen survey responses, the same research group writes that these parents are also the most successful at keeping teens safe and preserving space for their growth [54].

Evidence suggests that parents are talking about online safety with their kids. In a Pew study, 40% of parents frequently discuss what is appropriate to share online, 39% frequently discuss what is appropriate to view online, and 36% frequently discuss what online behavior towards others is appropriate. Notably, 56% of those parents reported frequently discussing appropriate behavior offline. This gap between frequency of discussing online and offline behavior suggests parents are struggling to find the most effective message for online behavior [7].

Blackwell et al. suggest that parents have limited visibility into teens' device use—they can tell if a teen is using a device at a glance, but not what they are using it for—which obscures the many positive things teens are doing online. As a result, they found that some parents turn to restricting and monitoring because they doubt their child's activities [9].

A recent diary study found that due to a lack of common understanding between parents and teens, parents consistently underestimate the frequency with which teens encounter risky situations online. This communication breakdown exists in part, Wisniewski et al. state, because when teens tell their parents about these risky situations, parents respond by lecturing and punishing [55].

However, online risks provide an educational opportunity for teens. In a secondary analysis of a Pew survey data set, Jia et al. found that teens are more concerned about their privacy after they have encountered a risky situation online [21]. Teens have also been found to perform more risk-coping behaviors after encountering risky situations, demonstrating that they are learning from past experiences [53], and some researchers suggest that low-risk experiences may benefit teens by providing an opportunity to learn resilience [56]. Even adults are largely unable to manage online security risks when they are unfamiliar with the risk [15, 14].

4 Previous Work

4.1 Parents' and teens' perspectives on privacy in a technology-filled world

Abstract

The life of a teenager today is far different than in past decades. Through semi-structured interviews with 10 teenagers and 10 parents of teenagers, we investigate parent-teen privacy decision making in these uncharted waters. Parents and teens generally agreed that teens had a need for some degree of privacy from their parents and that respecting teens' privacy

demonstrated trust and fostered independence. We explored the boundaries of teen privacy in both the physical and digital worlds. Though parents commonly felt none of their children's possessions should ethically be exempt from parental monitoring, teens felt strongly that cell phones, particularly text messages, were private. Parents discussed struggling to keep up with new technologies and to understand teens' technology-mediated socializing. Though most parents said they thought similarly about privacy in the physical and digital worlds, half of teens said they thought about these concepts differently. We present cases where parents made privacy decisions using false analogies with the physical world or outdated assumptions. We also highlight directions for more usable digital parenting tools.

The full manuscript can be found in the 2014 Proceedings of the Symposium On Usable Privacy and Security [12].

Research Goal

Understand how parents of teenagers and teenagers think about privacy across three main areas of the teen's life: physical spaces, such as the teen's bedroom or a diary; social spaces, such as a teens' friendships; and digital spaces, such as a teen's cellphone.

Methodology

We interviewed 20 participants, 10 teens and 10 parents of teenagers, who were recruited locally. We asked participants about their family's technology practices and how decisions were made about the use of new technologies. We also asked teens about their digital personal space. We put each participant's privacy practices in context by also asking about their physical and social privacy expectations and teens' general rights to privacy. We analyzed their responses using content coding.

Results

- Participants recognized teens' privacy as important as a basic right and a show of trust, but parents often saw teens' safety and their own rights as parents as more important than teen privacy.
  - This tradeoff was also mirrored in attitudes towards bedrooms and other physical spaces—parents generally wanted to respect their childrens' space, but would invade it when they felt necessary, as it was their right.
- Eight out of ten parents thought that reading a teens' text messages was ethical. Only four out of ten teens thought the same.
- Parents were using non-technical means (e.g. friending their children on social media, keeping laptops in common spaces) to keep an eye on what their children were doing online. Teens disliked the pressure to have their digital lives constantly available to their parents, and were becoming less active on the biggest social media sites (e.g. Facebook).

- Parents felt their teens were spending too much time online, and thought that the digital world was riskier than the physical one.
- Teens felt that their digital communication with friends was misunderstood as asocial by their parents, who often did not view such communication as private.

4.2 Experts' views on digital parenting strategies

Abstract

American teenagers are spending much of their time online. Online communities offer teens perspective, acceptance, connection, and education that were once more limited by geography. However, the online world also opens teens to risks. Adults must decide how to guide teen online behavior in a space that they may not understand. We interviewed 16 experts about teen online behavior, related benefits and risks, and risk mitigation methods. We found that experts agree on certain mitigation methods, especially communication and education about online behavior, but are divided over monitoring. We propose a set of possible solutions that promote online safety while preserving teens privacy.

The full manuscript can be found as a technical report released by Carnegie Mellon University's CyLab [29].

Research Goal

Understand how experts in adolescent behavior, online security and privacy, education, and related areas view current options for keeping teens safe online, especially with respect to what they perceive as the risks of teens being online.

Methodology

We recruited 16 experts in the fields of adolescent behavior, online security and privacy, education, law enforcement, and the child software protection industry, for one-hour semi-structured interviews about teen online behavior, risks of that behavior, risk mitigation methods used by parents, and teen misrepresentations to get around those mitigation methods. Our experts were identified using news articles, recent academic literature, and suggestions from previous participants. We analyzed the results of these interviews using content coding.

Results

- Our experts identified risk mitigation strategies that broadly fell into seven categories: software-based monitoring, nontechnical monitoring, limitations, fear appeals, education, discussion, and parental complacency (doing nothing).
- Experts were divided over the effectiveness of monitoring and fear appeals. Those who frequently encountered the harms of risky teen behavior felt these methods necessary, and others suggested using them in moderation or not at all.

- All experts agreed that communication, education, and limitations were useful tools for parents to mitigate risky behavior from their teens.

4.3 "How can parents monitor all that?": Parents' and teens' views on digital parenting strategies

Abstract

Parenting digital teens is a challenge facing more parents every day—what is the most successful way for parents to both keep their children safe online and respect their need for privacy? We conduct a 469-person survey of parents (n = 244) and teens (n = 225) about their perceptions of the effectiveness and acceptability of seven parenting strategies and connecting with strangers online. We find that parents' and teens' responses are aligned, though they differ in degree. Where they disagree, we see differing attitudes about privacy-invasive parenting strategies. Our results suggest the need to help parents make more effective use of education and discussion strategies and to develop software tools that both teens and parents will view as effective and acceptable.

This work is complete and in submission to the 2017 Symposium On Usable Privacy and Security [30].

Research Goal

Understand how parents and teens evaluate the effectiveness and acceptability of the seven different categories of parenting practices identified in the study in Section 4.2. Understand how teens and parents evaluate safe and risky traits of online strangers.

Methodology

We recruited 469 participants: 244 parents, both local and from Amazon's Mechanical Turk, and 225 local teens, for a survey about digital parenting practices. The survey took about 5-10 minutes. We asked each participant to rate descriptions of seven categories of digital parenting practices according to whether the practice was effective at keeping teens safe online, and whether it was acceptable to teens. We also asked participants to evaluate whether a teen would be more or less likely to accept an online friend request from someone they did not know if the person had a particular trait, and we tested traits that were both generally indicators of a safe identity (e.g. attending the same high school) and traits that generally indicated risk (e.g. sharing no friends with the teen). We analyzed these responses both between and within our parent and teen populations.

Additionally, local parents were asked to describe the most effective parenting strategy they had used in their own families, categorize it using the seven desciptions they had already seen, and rate it using the same scale as previously given.

Results

- Most local parents described their personal strategy as involving communication, fewer described using monitoring, and very few described their approach as complacent.

- Parents who described using software monitoring often also described conflicts that arose from monitoring.
- Teens viewed software monitoring as less effective than all other strategies except limits, which they also viewed as less effective than most other strategies.
- Parents viewed complacency as less effective than all other strategies, and education and discussion as more effective than all other strategies.
- Both teens and parents ranked more privacy-invasive strategies as less acceptable than the other strategies.
- Parents thought everything but complacency was more effective than teens did, and teens rated complacency as more effective than parents did.
- Teens and parents agreed that privacy-invasive strategies would not be acceptable to teens, but parents overestimated how acceptable the four less-invasive strategies would be.
- Parents and teens ranked all three of the riskier traits of strangers as leading to lower likelihoods of the teens friending those strangers than all three of the safer traits.
- Parents differentiated far more between the safer and riskier traits than did teens.

5 Ongoing and Future Work

5.1 Understanding perceptions of online bullying and conflict from parents and teens

Many parents of teenagers are concerned about whether their children are being bullied online, or are bullying others online—cyberbullying. Marwick and boyd studied teens' perspectives on online conflict, and found that teens talk about that conflict as drama, rather than as the cyberbullying about which their parents are worried [31]. If parents and teens are not using the same language to frame and understand these conflicts, parents and other adult mentors might have a challenging time helping teens who are involved in conflicts online or teaching teens proactive ways to defuse conflict. Teens' different framing might also lead parents to perceive their children as lying about their online behavior, damaging the trust between parents and teens. We investigate how parents and teens understand situations of online conflict using a survey in which participants are randomly shown either a high conflict or low conflict scenario involving teenagers on social media. We will also use qualitative data from interviews with parents and teens to understand how both perceive the concept of cyberbullying.

Research Goals

- Investigate whether parents or teens are more likely to call online conflict scenarios bullying, drama, or a number of other possible descriptors.

- Investigate whether the demographic factors (race, gender) of participants and of scenario characters effects how participants perceive a given scenario.
- Qualitatively understand what cyberbullying means to parents and teens.

Methodology

We are conducting a survey of local parents of teenagers and teenagers. In the survey, we ask participants to evaluate hypothetical scenarios involving online conflict between teens. Each participant is randomly shown one of two possible scenarios, which represent two different levels of possibly bullying behaviors. In one, the teen who starts an online conflict with another teen is engaged by the other teen, the second teen is tagged by the first, and the behavior is described as a one-off incident with no involvement from others. In the second scenario, the teen who starts an online conflict with another teen has a history of saying negative things about the teen, names but does not tag the target teen in the post, and the friends of the conflict-starting teen add their own negative comments in response. We arrived at these scenarios after extensive testing of variations on the underlying scenario with participants on Amazon's Mechanical Turk. The first represents a conflict that may be, but is not necessarily, viewed as bullying, and the second represents a more traditional definition of bullying, as given by Olweus [40].

We have our participants select statements that describe the scenario from a prepared list, which includes things such as "This sounds like a fun interaction" or "This reflects poor judgment." Our list also includes two specific statements meant to gauge whether participants view the scenario as bullying: "This is typical teen drama," and "This is bullying." We draw on Marwick and boyd's ethnographic research about teen online conflict to create these statements. In their 2014 paper, they find that many teens they interviewed defined online conflicts as "just drama," though, they write, adults might have otherwise described them as bullying [31]. We seek to examine whether their finding from interviewing mostly teens holds in a survey of teens and parents. We will also test whether parents and teens agreed with our other descriptive statements in different proportions, and whether other demographic factors, such as gender and race, influenced participants' responses to our scenarios.

We aim to survey at least 100 parents and 100 teens for our study. We will recruit participants from local high school and community events in person, and online through partnerships with local organizations. We will analyze these responses using logistic regression models for each of the descriptive statements, and compare survey responses between survey condition (high bullying or low bullying scenario) and demographic groups (parent or teen, race, and gender).

We have already completed a pilot of this survey with 225 teens and 244 parents, as part of the survey described in Section 4.3. Our biggest obstacle to conducting this survey is recruiting pairs of parents and teens. We plan to overcome this obstacle by connecting this survey to our study of digital parenting tools, described below. This ensures that we are able to survey over a hundred pairs of parents and children.

5.2 Understanding the privacy and safety tradeoffs of digital risk-mitigation tools for families

In our earlier work, we have categorized common types of parenting strategies that parents use to keep their teens safe online [29]. Two meta-categories emerge: monitoring-based strategies and communication-based strategies, which may be used alone or in conjunction with each other. Our interviews with parents and teens revealed that monitoring creates privacy tensions between parents and teens [12], and received mixed reviews from experts, whereas communication was regarded as a necessary part of parenting by all of the experts we interviewed [29]. However, to understand the use of these strategies more fully, we need to also investigate how these strategies play out for parents and teens in real situations. We will study two tools—one, a parental control software designed to allow parents to monitor their child's online activity and device use, and another, a contract designed to allow parents and teens to negotiate the boundaries of teens' online behavior and device use.

In our interviews, we will look for places where parents and children are confused by the set-up interface of the parenting software or digital behavior contract, or otherwise find them unusable. We will also observe how parents and their children negotiate childrens' online boundaries and the limits of parental intervention when filling out the contract or picking software settings. We will examine whether these tools seem to change the ways parents and children act when a child crosses an established boundary or experiences a risky situation online. Throughout the study, we will watch for whether using the tool prompts parents to monitor teens' private spaces closely or prompts them to seek alternative methods of resolving risk and conflict.

We will conduct longitudinal interviews and surveys in tandem to examine these tools. We will ask interview participants in-depth qualitative questions to understand how these tools are perceived, and gauge whether and how perceptions of online risk change when using a parenting tool through the survey.

Please see the Appendix for a table listing the additional documents associated with this study.

Research Goals

- Understand how parents and teens use parental control software when managing the risks of a teen's digital behavior.
- Understand how parents and teens use a digital behavior contract when managing the risks of a teen's digital behavior.
- Understand some of the strengths and weaknesses of both of these approaches.
- Understand the impact of using a parental control software or digital behavior contract on teens' and parents' behavior and perceptions of online risk.

Methodology

For this study, we will conduct two protocols in tandem: (1) we will interview 30 parent-teen pairs twice, at the start and end of a month, about online risk and parenting tool use, and

(2) we will survey 100 parent-teen pairs about online risk twice, at the start and end of a month, about their perceptions of online risk and parenting tool use. In each protocol, we will randomly selecte one-third of our sample to be the control group, one-third to use a highly-reviewed parental control software,[1], and one-third to use a digital behavior contract.[2]

We will audio record interviews with both parent and child in our in-person studies. We will also capture a screen recording of the set-up process for interview participants in the software tool condition. We will observe and audio record the set-up and negotiation processes for participants in both the software and contract conditions. Participants will be prompted to think aloud as they make decisions about their online safety rules so that we can understand why they make those decisions. We will automate capturing participants' Qustodio settings by using a Python script, and will recapture those settings on a weekly basis to check for any changes. Participants who are in the contract condition will email us the contract we create, which we will use as a point of comparison during the exit interview.

Interview participants will also complete a weekly survey over the course of their month in the study. Parents and children will each fill out the survey separately. In that survey, they will be asked to report their experience using the tool (if assigned a tool) in the past week, any changes that the parent has made to the rules or expectations governing the child's online behavior, and to discuss generally how the child has engaged with the internet and their smartphone in the past week. We will look through these weekly reports for interesting situations that occured over the course of the month for us to discuss in depth during our exit interviews with parent and child. We will particularly be looking for situations where the parent and child used the tool they were assigned, did not use the tool they were assigned despite some applicability, or used a different tool than what they were assigned to work through their concerns about the situation. Our exit interviews will also be audio recorded.

Online survey participants will complete a survey at the start and end of the month with no weekly check-in surveys. In these surveys, we will ask some open-ended questions to gauge their motivations for using online safety tools and their family situations, similar to questions asked in the interview. The bulk of the survey, however, will ask questions to measure participants' attitudes toward childrens' online safety, including their perceptions of specific safety risks and the frequency with which they perform their current online safety parenting practices.

We will analyze our interview data qualitatively, to examine themes that emerge from the process of setting up these online safety tools. We will also report qualitative descriptions of how our participants perceive online safety risks to their children (in case of parents) and themselves (in case of children).

We anticipate analyzing our interviews in sections organized by topic. We will first analyze our participants' experiences setting up their assigned tool in the lab, looking specifically for instances of confusion about instructions and settings. We anticipate, based on a pilot interview and our own experiences using Qustodio, that participants will face some challenges posed either by the device they are using, the language and interface of Qustodio, or by mismatches between actual features offered and their own expectations. We will catalogue

[1]Qustodio, `https://www.qustodio.com` PC Magazine Editor's Choice, 2017

[2]The Smart Talk, `https://thesmarttalk.org/` made in collaboration between LifeLock and the National Parent-Teacher Association

those challenges and any that arise from the digital behavior contract. We will also describe the initial contract or settings options chosen by our participants. The remaining segments of our interviews will be analyzed systematically for concepts specific to those sections. For example, we will note which online risks our participants mention without prompting, and we will continually update our list of risks as participants describe risks that we have not anticipated. We will make qualitative comparisons of themes that are presented in the entrance versus the exit interviews.

We will analyze our survey data quantitatively in order to measure whether and how participants' attitudes toward online risk and the frequency of their preventative behaviors change over the course of the month after the introduction of a digital parenting tool.

Additionally, we plan to send out a follow up survey to our participants in the months after they complete the main study. We will ask them whether they have continued to use either of the strategies—the contract or the parenting tool, for which they will receive a one-year license—since the conclusion of the final interview or survey. The content of this survey is left purposefully undefined, so that we may ask questions about related topics as they occur to us.

6 Sample Table of Contents

1. Introduction
2. Background
   (a) Teen behavior and associated risks
   (b) Parenting interventions: monitoring, restrictions, and fear appeals
   (c) Parenting interventions: education and discussion
3. Perceptions of teen behavior and privacy
   (a) Parents' and teens' perspectives on privacy in a technology-filled world
   (b) Understanding perceptions of online bullying and conflict from parents and teens
4. Perceptions of parent interventions
   (a) Experts' views on digital parenting strategies
   (b) "How can parents monitor all that?": Parents' and teens' views on digital parenting strategies
5. Understanding the privacy and safety tradeoffs of digital risk-mitigation for families
6. Conclusion
7. References

7 Timeline

The following is a proposed timeline for the remaining thesis work.

Recruit for tool study
Update protocol for cyberbullying study
Pilot tool study
Create system for capturing tool configuration
Pilot online survey for tool study
Entrance interviews of tool study participants
Send interviews for transcription
Send weekly surveys to participants and recapture settings
Analysis of tool study entrance interviews
Exit interviews for tool study
Send exit interviews for transcription
Draft teaching statement with Eberly Center
Survey online tool study participants, incl. bullying scenarios
Analyze online entrance surveys
Analysis for tool study exit interviews
Looking for online job postings
Draft job materials (research statement, CV, etc.)
Send follow-up tool surveys
Write paper on usability of parenting tools
Submit paper on usability of parenting tools to CHI
Exit surveys of online tool study participants
Analyze online exit surveys
Cyberbullying survey analysis
Write cyberbullying paper
Comparative analysis of entrance and exit online tool surveys
Submit job applications
Write paper on experiences from tool surveys, interviews
Submit paper on tool interviews and surveys to SOUPS
Related works of thesis
Write thesis
Send draft to committee
June 5, 2017
June 12, 2017
June 19, 2017
June 26, 2017
July 3, 2017
July 10, 2017
July 17, 2017
July 24, 2017
July 31, 2017
August 7, 2017
August 14, 2017
August 21, 2017
August 28, 2017
September 4, 2017
September 11, 2017
September 18, 2017
September 25, 2017
October 2, 2017
October 9, 2017
October 16, 2017
October 23, 2017
October 30, 2017
November 6, 2017
November 13, 2017
November 20, 2017
November 27, 2017
December 4, 2017
December 11, 2017
December 18, 2017
December 25, 2017
January 1, 2018
January 8, 2018
January 15, 2018
January 22, 2018
January 29, 2018
February 5, 2018
February 12, 2018
February 19, 2018
February 26, 2018
March 5, 2018
March 12, 2018
March 19, 2018
March 26, 2018
April 2, 2018
April 9, 2018
April 16, 2018
April 23, 2018
April 30, 2018
May 7, 2018
May 14, 2018
May 21, 2018
May 28, 2018
June 4, 2018

References

[1] Child online protection act. https://epic.org/free_speech/censorship/copa.html, 1998.

[2] Children's online privacy protection rule ("COPPA"). https://www.ftc.gov/enforcement/rules/rulemaking-regulatory-reform-proceedings/childrens-online-privacy-protection-rule, 1998.

[3] Children's internet protection act. https://www.fcc.gov/consumers/guides/childrens-internet-protection-act, 2000.

[4] How does teensafe work? https://www.teensafe.com/blog/how-does-teensafe-work/, January 2017.

[5] T. Ammari, P. Kumar, C. Lampe, and S. Schoenebeck. Managing children's online identities: How parents decide what to disclose about their children online. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, pages 1895–1904. ACM, 2015.

[6] T. Ammari, M. R. Morris, and S. Y. Schoenebeck. Accessing social support and overcoming judgment on social media among parents of children with special needs. *Proc. ICWSM*, 2014.

[7] M. Anderson. Parents, teens and digital monitoring. *Washington, DC: Pew Internet & American Life Project. Retrieved January*, 9:2016, 2016.

[8] S. Bennett, K. Maton, and L. Kervin. The digital natives debate: A critical review of the evidence. *British journal of educational technology*, 39(5):775–786, 2008.

[9] L. Blackwell, E. Gardiner, and S. Schoenebeck. Managing expectations: Technology tensions among parents and teens. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing*, pages 1390–1401. ACM, 2016.

[10] d. boyd. *It's Complicated: the social lives of networked teens*. Yale University Press, 2014.

[11] d. boyd, E. Hargittai, J. Schultz, and J. Palfrey. Why parents help their children lie to facebook about age: Unintended consequences of the childrens online privacy protection act. *First Monday*, 16(11), 2011.

[12] L. F. Cranor, A. L. Durity, A. Marsh, and B. Ur. Parents' and teens' perspectives on privacy in a technology-filled world. In *Proc. SOUPS*, 2014.

[13] J. S. Downs. Prescriptive scientific narratives for communicating usable science. *Proceedings of the National Academy of Sciences*, 111(Supplement 4):13627–13633, 2014.

[14] J. S. Downs, M. Holbrook, and L. F. Cranor. Behavioral response to phishing risk. In *Proceedings of the anti-phishing working groups 2nd annual eCrime researchers summit*, pages 37–44. ACM, 2007.

[15] J. S. Downs, M. B. Holbrook, and L. F. Cranor. Decision strategies and susceptibility to phishing. In *Proceedings of the second symposium on Usable privacy and security*, pages 79–90. ACM, 2006.

[16] E. Eckholm. Prosecutors weigh teenage secting: folly or felony? https://www.nytimes.com/2015/11/14/us/prosecutors-in-teenage-sexting-cases-ask-foolishness-or-a-felony.html, November 2015.

[17] E. Englander. Low risk associated with most teenage sexting: A study of 617 18-year-olds. *MARC Research Reports*, 2012.

[18] S. T. Hawk, L. Keijsers, W. W. Hale III, and W. Meeus. Mind your own business! longitudinal relations between perceived privacy invasion and adolescent-parent conflict. *Journal of Family Psychology*, 23(4):511, 2009.

[19] C. Hax. Carolyn hax: Balancing trust and privacy when teens go online. https://www.washingtonpost.com/lifestyle/style/carolyn-hax-give-teenage-daughter-her-privacy-but-monitor-occasionally/2015/07/13/087083b0-201a-11e5-84d5-eb37ee8eaa61_story.html, July 2015.

[20] A. Hiniker, S. Y. Schoenebeck, and J. A. Kientz. Not at the dinner table: parents' and children's perspectives on family technology rules. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing*, pages 1376–1389. ACM, 2016.

[21] H. Jia, P. J. Wisniewski, H. Xu, M. B. Rosson, and J. M. Carroll. Risk-taking as a learning process for shaping teen's online information privacy behaviors. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing*, pages 583–599. ACM, 2015.

[22] A. C. Johnston and M. Warkentin. Fear appeals and information security behaviors: an empirical study. *MIS quarterly*, pages 549–566, 2010.

[23] A. Joyce. How to protect kids online: Apps and tactics used by experts—and real parents. https://www.washingtonpost.com/lifestyle/style/how-to-protect-kids-online-apps-and-tactics-used-by-experts--and-real-parents/2016/12/07/42ef7f14-ad13-11e6-a31b-4b6397e625d0_story.html, December 2016.

[24] A. Lenhart. Teens and sexting. *Pew internet & American life project*, 1:1–26, 2009.

[25] A. Lenhart, M. Duggan, A. Perrin, R. Stepler, H. Rainie, and K. Parker. Teens, social media & technology overview 2015. http://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015/, April 2015.

[26] A. Lenhart, M. Madden, A. Smith, K. Purcell, K. Zickuhr, and L. Rainie. Teens, kindness and cruelty on social network sites. *Pew Internet and American Life Project*, 28, 2011.

[27] S. Livingstone and M. Bober. Regulating the internet at home: Contrasting the perspectives of children and parents. *Digital generations: Children, young people, and new media*, pages 93–113, 2006.

[28] M. Madden, A. Lenhart, S. Cortesi, U. Gasser, M. Duggan, A. Smith, and M. Beaton. Teens, social media, and privacy. *Pew Research Center*, 21, 2013.

[29] A. Marsh, L. F. Cranor, and J. S. Downs. Experts' views on digital parenting strategies. Technical Report CMU-CyLab-17-002, Carnegie Mellon University, February 2017.

[30] A. Marsh, J. S. Downs, and L. F. Cranor. "how can parents monitor all that?": Parents' and teens' views on digital parenting strategies, 2017. In submission.

[31] A. Marwick and d. boyd. 'it's just drama': teen perspectives on conflict and aggression in a networked era. *Journal of Youth Studies*, 17(9):1187–1204, 2014.

[32] A. E. Marwick and d. boyd. Networked privacy: How teenagers negotiate context in social media. *new media & society*, page 1461444814543995, 2014.

[33] A. E. Marwick, D. M. Diaz, and J. Palfrey. Youth, privacy and reputation. *Harvard Law School Public Law & Legal Theory Working Paper Series*, pages 10–29, 2010.

[34] K. Mathiesen. The internet, children, and privacy: the case against parental monitoring. *Ethics and Information Technology*, 15(4):263–274, 2013.

[35] A. Metzger, C. Ice, and L. Cottrell. But i trust my teen: Parents' attitudes and response to a parental monitoring intervention. *AIDS research and treatment*, 2012, 2012.

[36] A. Micheti, J. Burkell, and V. Steeves. Fixing broken doors: Strategies for drafting privacy policies young people can understand. *Bulletin of Science, Technology & Society*, 30(2):130–143, 2010.

[37] T. Minkus, K. Liu, and K. W. Ross. Children seen but not heard: When parents compromise children's online privacy. In *Proceedings of the 24th International Conference on World Wide Web*, pages 776–786. International World Wide Web Conferences Steering Committee, 2015.

[38] M. K. Nelson. *Parenting out of control: Anxious parents in uncertain times*. NYU Press, 2010.

[39] B. C. Newell, C. A. Metoyer, and A. D. Moore. *Privacy in the Family*, pages 104–121. Cambridge University Press, 2015.

[40] D. Olweus. Bullying at school. In *Aggressive behavior*, pages 97–130. Springer, 1994.

[41] G.-J. Y. Peters, R. A. Ruiter, and G. Kok. Threatening communication: a critical re-analysis and a revised meta-analytic test of fear appeal theory. *Health Psychology Review*, 7(sup1):S8–S31, 2013.

[42] S. Petronio. Privacy binds in family interactions: The case of parental privacy invasion. In W. R. Cupach and B. H. Spitzberg, editors, *The dark side of interpersonal communication*. Lawrence Erlbaum Associates, Inc, Hillsdale, NJ, 1994.

[43] M. Prensky. Digital natives, digital immigrants. *On the horizon*, 9(5):1–6, 2001.

[44] P. M. Regan and V. Steeves. Kids r us: online social networking and the potential for empowerment. *Surveillance & Society*, 8(2):151–165, 2010.

[45] J. A. Rode. Digital parenting: designing children's safety. In *Proceedings of the 23rd British HCI Group Annual Conference on People and Computers: Celebrating People and Technology*, pages 244–251. British Computer Society, 2009.

[46] F. Roesner, B. T. Gill, and T. Kohno. Sex, lies, or kittens? investigating the use of snapchat's self-destructing messages. In *International Conference on Financial Cryptography and Data Security*, pages 64–76. Springer, 2014.

[47] S. Y. Schoenebeck. The Secret Life of Online Moms: Anonymity and Disinhibition on YouBeMom.com. In *ICWSM*, 2013.

[48] J. G. Smetana. "It's 10 o'clock: Do you know where your children are?" Recent advances in understanding parental monitoring and adolescents' information management. *Child Development Perspectives*, 2(1):19–25, 2008.

[49] A. Sternstein. Can parental spyware keep kids safe online? `http://www.csmonitor.com/World/Passcode/2017/0224/Can-parental-spyware-keep-kids-safe-online`, February 2017.

[50] L. Tien. After 10 years, an infamous internet-censorship act is finally dead. `https://www.eff.org/deeplinks/2009/01/copa`, Janurary 2009.

[51] N. Wingfield. Should you spy on your kids? `https://www.nytimes.com/2016/11/10/style/family-digital-surveillance-tracking-smartphones.html`, November 2016.

[52] P. Wisniewski, A. K. Ghosh, M. Rosson, H. Xu, and J. M. Carroll. Parental control vs. teen self-regulation: Is there a middle ground for mobile online safety. In *Proceedings of the 20th ACM Conference on Computer Supported Cooperative Work & Social Computing, ACM*, 2017.

[53] P. Wisniewski, H. Jia, N. Wang, S. Zheng, H. Xu, M. B. Rosson, and J. M. Carroll. Resilience mitigates the negative effects of adolescent internet addiction and online risk exposure. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, pages 4029–4038. ACM, 2015.

[54] P. Wisniewski, H. Jia, H. Xu, M. B. Rosson, and J. M. Carroll. Preventative vs. reactive: How parental mediation influences teens' social media privacy behaviors. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing*, pages 302–316. ACM, 2015.

[55] P. Wisniewski, H. Xu, M. B. Rosson, and J. M. Carroll. Parents just don't understand: Why teens don't talk to parents about their online risk experiences. In *Proceedings of the 2017 ACM Conference on Computer-Supported Cooperative Work & Social Computing*, 2017.

[56] P. Wisniewski, H. Xu, M. B. Rosson, D. F. Perkins, and J. M. Carroll. Dear diary: Teens reflect on their weekly online risk experiences. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, pages 3919–3930. ACM, 2016.

[57] P. J. Wisniewski, H. Xu, M. B. Rosson, and J. M. Carroll. Adolescent online safety: the moral of the story. In *Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing*, pages 1258–1271. ACM, 2014.

[58] K. Witte. Fear as motivator, fear as inhibitor: Using the extended parallel process model to explain fear appeal successes and failures. *Communication Monographs*, 1998.

[59] S. Yardi and A. Bruckman. Social and technical challenges in parenting teens' social media use. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pages 3237–3246. ACM, 2011.

[60] L. Zhang-Kennedy, C. Mekhail, Y. Abdelaziz, and S. Chiasson. From nosy little brothers to stranger-danger: Children and parents' perception of mobile threats. In *Proceedings of the The 15th International Conference on Interaction Design and Children*, pages 388–399. ACM, 2016.

Appendix

The following table lists the documents associated with the study described in Section 5.2. These documents may be found in archive of study materials also sent to the committee, study-materials.zip.

Document name
IRB-application_understanding-parenting-interventions.pdf
child-start-interview.rtf
child-exit-interview.rtf
child-entrance-survey.pdf
child-exit-survey.pdf
parent-start-interview.rtf
parent-exit-interview.rtf
parent-entrance-survey.pdf
parent-exit-survey.pdf
check-in-survey.pdf
offline-consent.doc
online-consent.docx
email-confirmation-survey.pdf
generic recruitment text.rtf
offline-recruitment-flyer.docx
online-recruitment-flyer.docx
screener.pdf
Protocol for Reporting Imminent Risks.docx