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A Social Ecological Approach Towards Empowering Foster Youth to be Safer Online

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A SOCIAL ECOLOGICAL APPROACH TOWARDS EMPOWERING FOSTER YOUTH TO BE SAFER ONLINE

by

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ABSTRACT

Teens in foster care are some of the most vulnerable youth to encounter serious offline risks, such as sex trafficking. Research shows that children who are vulnerable offline are more likely to be vulnerable online. Therefore, it is important to understand how the internet plays a role in how foster youth are exposed to these risks, so that we may develop effective interventions that empower foster youth against becoming victims of these online risks. A comprehensive review of the literature (Chapter 2) emphasized the unique sets of characteristics and challenges of foster youth that create substantial nuance and require a deeper understanding beyond that of the general population. As such, my dissertation takes on a social ecological approach to adolescent online safety for foster youth by including the following three studies: 1) an interview study with 32 caseworkers that investigates how case managers work with foster families to address concerns of online safety (Chapter 3), 2) an interview study with 29 foster parents that examines how they mediate foster teens' (ages 13-17) technology use at home and the types of risks the teens encounter online (Chapter 4), and 3) co-design sessions with 20 youth and semi-structured interviews with 13 parents to develop best practices for conducting research related to adolescent online risk behaviors, specifically those sexual in nature (Chapter 5).

Our findings confirmed that online safety is a great challenge within foster families, particularly as it relates to sexual risks (e.g., unsafe sexual interactions with strangers). Further, case managers and foster parents do not receive the necessary training or guidance to handle situations related to online safety which prevents them from providing the appropriate resources to foster youth. Finally, our research highlighted the importance of focusing ethical practices beyond risk mitigation to protecting youth (e.g., providing help resources, like national crisis hotlines, during our studies could help teens navigate online risks independently).

This dissertation is dedicated in loving memory of my grandfather ("Abuelito").

You instilled in me the importance of an education and I made you a promise. This is for you.

We honor the lives of our dearly departed by living as the person they would want us to be.

"Cuídate y ten siempre tu mente en lo que estás haciendo que yo estaré, aunque lejos, pero en mi mente cuidándote." –Tu Abuelo que te quiere mucho (junio 12, 2004)

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Badillo-Urquiola, K., Abraham, J., Kumar Ghosh, A., and Wisniewski, P. (2018) “A Stakeholders' Analysis of the Systems that Support Foster Care.” In *Proceedings of the 2018 ACM Conference on Supporting Groupwork (GROUP '18)*. Association for Computing Machinery, New York, NY, USA, 158–161.

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CHAPTER 1: INTRODUCTION

In this chapter, we introduce the motivation and topic of this dissertation, summarize our theoretical framework, outline our research questions, and describe the structure of the chapters. The goal is to present an overview of the entire dissertation research.

Motivation for Dissertation

Throughout these six years of my Ph.D. academic journey, I centralized my research around online safety. I conducted research with participants as young as 7 years old [8] to as old as 70 [72], but my population of interest remains to be teens between 13 to 17 years old. The goal of my research is to generate solutions for supporting adolescent online safety [8,9,71,74,133]. Yet, most the work within the broad field of adolescent online safety has predominantly been focused on the general teen population e.g., [82,88,170]– typically white, more affluent families, and/or children living in a two-parent household. Unfortunately, taking on this approach overlooks the reality that not all teens live in these types of situations. Therefore, it puts those that are at higher risk of struggling online at a disadvantage. For this reason, I shifted my dissertation research to focus on investigating online safety for more vulnerable youth, such as youth in the foster care system. The following sections provide context into the importance of my research.

Foster Youth in the United States

Around the world, there are millions of children living in foster care situations. In the U.S., foster care (also referred to "out-of-home care") is a temporary service given to children and families after a child is removed from their home because of abuse and/or neglect [187]. These

children (newborns to adolescents) are placed into a temporary home setting (e.g., non-relative or "traditional" placements, relative or kinship care, pre-adoptive homes, group homes, and supervised independent living) in hopes of achieving family reunification and to ensure the healthy development of the child [188,189].

According to the Adoption and Foster Care Analysis and Reporting System (AFCARS), there are approximately 442,995 children within the United States (U.S.) foster care system and about 24% of them are adolescents between the ages of 13 and 17 [190]. Many of these youth experience a multitude of traumatic events in their lives. Research has consistently confirmed that youth in foster care are susceptible to higher levels of risk than those who are not in foster care and have more detrimental outcomes due to their risk experiences [121,128]. For instance, nearly 80% of foster youth have had at least one adverse experience related to parental divorce, death, domestic violence, or family drug addiction with almost half (48.3%) experiencing four or more of these traumatic events before they reach adulthood [17]. However, very little research has examined the influence of networked technologies (e.g., social media, mobile smart devices) on foster youths' risk behaviors, adverse experiences, or negative outcomes [6,63].

Adolescents, Technology, and Online Risks

In terms of adolescent technology use, in general, we know that technology currently consumes a large portion of teens' lives. According to Pew Research, more than half of the teens in the United States report going online multiple times a day, if not constantly being connected [2]. The prevalence of technology use has been shown to expose teens to several online risks. For instance, one in five teens will unintentionally be exposed to sexually explicit materials online

[109]. One in nine teens will receive an unwanted online sexual solicitation [109]. Therefore, the focus of this dissertation will be on online sexual interactions.

The potential for adolescent online risk exposure has motivated researchers in the Human-Computer Interaction (HCI) community to begin to study effective methods for keeping teens safe from these online risks e.g., [5,16,61,83,168]. Some suggestions include building trust through discourse [83], emphasizing teen resilience [168], and moving toward design solutions that promote active parental mediation [96] and teen-self regulation, as opposed to solutions that are privacy invasive and reinforce restrictive parenting practices [166]. However, such recommendations may not be generalizable to foster youth as they are a particularly vulnerable population of teens. Therefore, this dissertation research aims to highlight the importance of considering the unique needs of foster families and foster youth (ages 12-17) to design sociotechnical solutions that directly promote their online safety.

A Stakeholder's Analysis of the Systems that Support Foster Care

The child welfare system in the U.S. operates on the local level rather than the national level. Therefore, it can be complex to understand. To gather a better understanding of how the system works, we conducted a stakeholders' analysis with publicly available information and refining it with information I gathered from my subsequent dissertation studies. The goals of this analysis were two-fold: 1) to identify the key stakeholders, and 2) understand their unique goals as they pertain to caring for foster youth. We provide this information in the following sections.

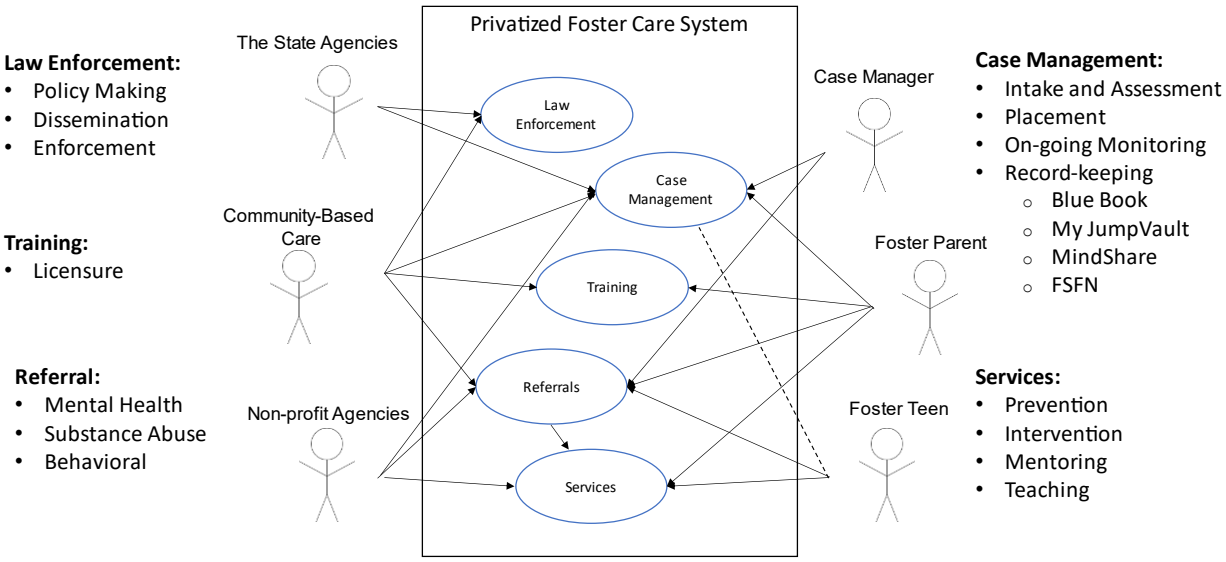

Figure 1. Use Case Diagram of (Privatized) U.S. Foster Care System

Who are the primary stakeholders?

In conducting this dissertation, we uncovered interesting complexities related to the number of different stakeholders and systems that support foster care. We developed a use case diagram (Figure 1) to model the basic goals and interactions within the foster care system. On the periphery of the diagram, we present the key stakeholders (or actors). Within the diagram are their individual tasks and goals (ovals and lines). We initially identified 3 primary stakeholders—caseworkers, foster parents, and foster teens. However, throughout our interviews and research, we realized there were additional, critical stakeholders (e.g., the state agency, community-based care agency, and non-profit agencies).

Starting with the **state agency**, the state governs the laws, opens the case, and either passes it on to a community-based care agency (if privatized) or provides the welfare services themselves

(if not privatized). Florida is a privatized system, so our use case is through the perspective of a privatized system. **Community-based care organizations** are responsible for enforcing laws, licensing foster parents, and working with non-profit organizations to provide welfare services. In our county, this would be Embrace Families [191]. **Non-profit organizations**, per insights from our representatives, assign licensed social workers to the foster teens' birth family and provide necessary support to the birth family and teen. This would be an organization like Children's Home Society [28]. The primary task of a **licensed social worker** (case manager) is to act as a "coach" for the birth family and foster teen, as well as refer them to any services that may support their needs. **Foster parents** are responsible for taking care of the teen, advocating for the teen's needs, and making sure the case plan (developed by the social worker) is followed. Finally, **teens in foster care** are required to follow the case plans developed by the case manager. We concluded that the system works similar to a hierarchy in which the state agency has the most power, and the foster parents and teens have the least. In the following section, we delve further into the goals and needs of each stakeholder.

What are the goals and needs of the stakeholders?

Our interviews confirmed that the overall goal of the foster system is reunification of the teen with their birth family (though in extreme cases it may be finding a permanent home). To reach this goal, each stakeholder focuses on their own individual goals. For instance, a caseworker's goal is for both the birth parent and foster teen to meet the goals of their case plan. The foster parent's goal is to figure out the needs of the teen to help find a permanent home. To reach these goals, stakeholders must be able to complete their tasks and perform their individual

roles effectively. Unfortunately, each stakeholder has numerous unattended needs. For example, foster parents feel as though there is a *"lack of support*" from caseworkers or foster care agencies when teens are misbehaving or *"things go awry."* We delve further into these challenges in Chapters 3 and 4. Next, we discuss the theoretical framework that guided my dissertation work.

Theoretical Framing

We leveraged Bronfenbrenner's Social Ecological Framework for Human Development to frame our research designs and questions. We provide a summary of this framework next.

The Social Ecological Model of Adolescent Resilience

For this dissertation, we implement the **social ecological perspective of adolescent resilience** [157] as the theoretical lens to understand the multifaceted nature of adolescent online safety for teens in foster care. Adolescent resilience theory is a strength-based approach developed to explain divergent outcomes related to various teen risk behaviors, including substance abuse, violent behavior, and sexual promiscuity [150,182]. Resilience is an individuals' ability to thrive in spite of significant adversity [182]. A key component of resilience theory is that resilience cannot occur in the absence of risk [51]. Instead, it is in the interaction between the individual and the environment where teens can acquire the necessary resources to overcome adversity to achieve successful outcomes.

These interactions are modeled in Bronfenbrenner's 1970s conceptual model [21], The Social Ecological Framework, which has been widely used within several contexts, such as child abuse [65], youth violence [155], and resiliency [157]. This theory postulates that our behaviors and experiences are affected and shaped by a multifaceted of factors. These factors are embedded

within an individual's environment, which consists of several interconnected systems at varying dimensions (see Figure 2): intrapersonal (individual), interpersonal (micro- and meso- systems), community (exo-system), societal (macro-systems), and time (chrono-system). The first level of the model is the intrapersonal or individual level which includes factors directly related to the teen's biology or characteristics. The next level is the interpersonal level or micro-system level which are considered the close social relationships (e.g., family or friends). Then there is the mesosystem level, which is the interactions that happen among the micro-systems (e.g., communication between friends and siblings). The community level or exo-system which typically are the more distal social interactions (e.g., neighbors, co-workers). Finally, there is the macro-system or societal level which encompasses cultural or social norms as well as societal policies.

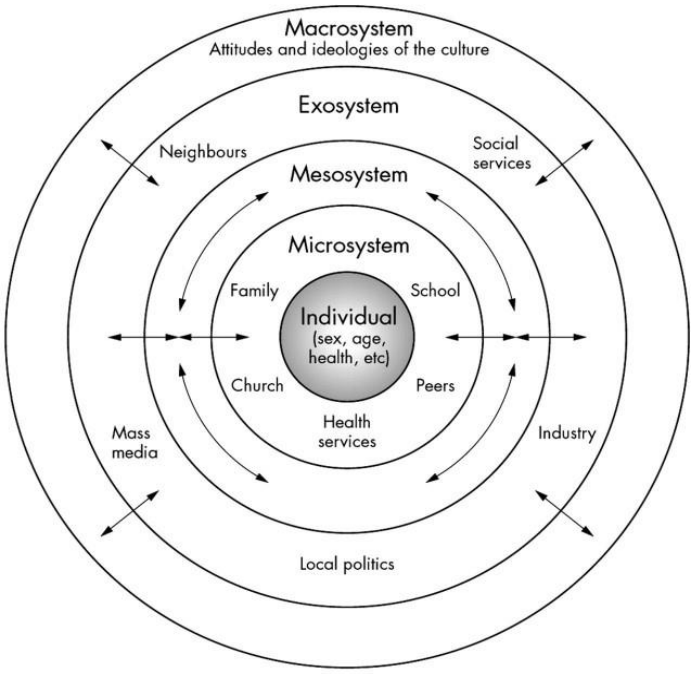

Figure 2. Bronfenbrenner's Social Ecological Framework [21]

The social ecological perspective of resilience acknowledges the nested social systems (e.g., individual, family, peer, school, and community [12]) in which teens are embedded that

contribute to the proximal processes that facilitate their well-being under stressful circumstances [157]. Promotive assets help reduce the likelihood of risk exposure, while protective factors serve to mitigate harm resulting from it [182]. While parental involvement has consistently been identified as a promotive asset [157], teens without parental support can still thrive in the face of adversity by cultivating a sense of personal agency and developing coping strategies to effectively manage risks on their own, providing a sense of empowerment [157].

Leveraging the information from the stakeholders' analysis with Bronfenbrenner's Social Ecological Framework, we designed three separate studies to investigate adolescent online safety within the child welfare context in relation to the social systems of the model (Figure 3). In the following section, we share the research questions that guided this work.

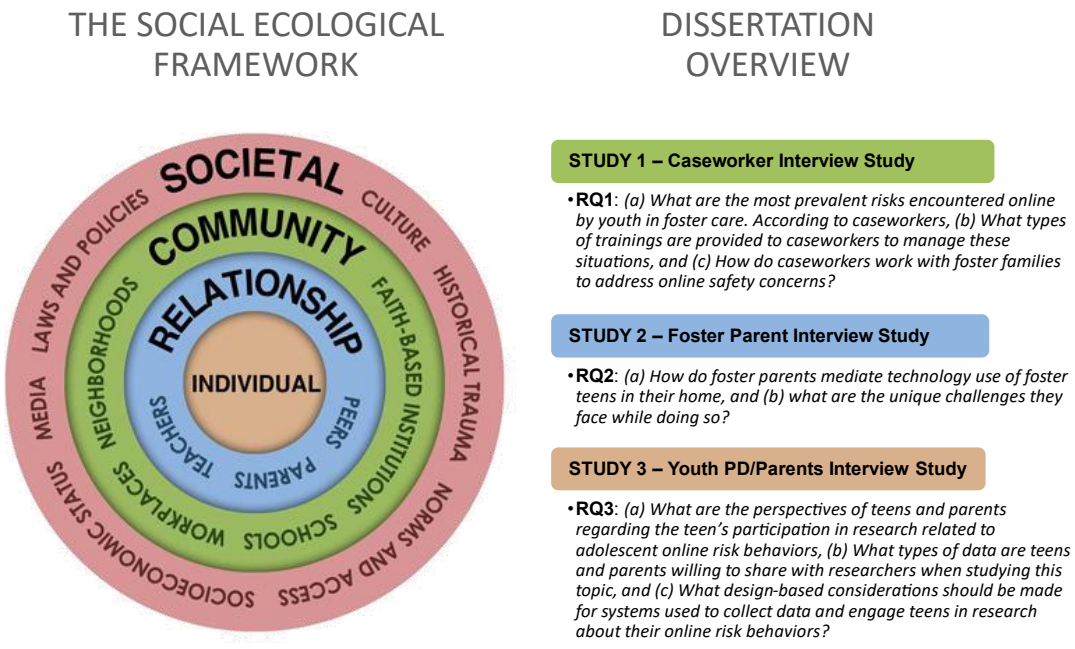

Figure 3. Mapping the Dissertation to the Social Ecological Framework [21,183]

Research Questions

The Social Ecological Framework helped me develop a plan for my dissertation and guide my engagement with the foster care community. In hopes of identifying the multidimensional factors that shape the online experiences and behaviors of youth in foster care, we posed the following research questions:

- **RQ1:** *(a) What are the most prevalent risks encountered online by youth in foster care, according to caseworkers? (b) What types of trainings are provided to caseworkers to manage these situations? (c) How do caseworkers work with foster families to address online safety concerns?*
- **RQ2:** *(a) How do foster parents mediate technology use of foster teens in their home, and (b) what are the unique challenges they face while doing so?*
- **RQ3:** *(a) What are the perspectives of teens and parents regarding the teen's participation in research related to adolescent online risk behaviors, (b) What types of data are teens and parents willing to share with researchers when studying this topic, and (c) What design-based considerations should be made for systems used to collect data and engage teens in research about their online risk behaviors?*

We answer these questions in Chapter 3 to 5. The following section provides an overview of these chapters.

Dissertation Overview

In **Chapter 1** (this chapter), we introduced our problem statement, the purpose of this dissertation, our theoretical framing, and our high-level research questions. In **Chapter 2** we provide the results of our systematic literature review. We synthesize the literature from Human-Computer Interaction (HCI) and Psychology related fields regarding the high-risk offline behaviors of foster youth, research that pertains to foster youth and technology use, and, more generally, adolescent online safety as it relates to other vulnerable teen populations to provide insights into the current gaps of the literature concerning adolescent online safety for teens in the foster care system.

We designed three different studies based on the gaps we identified within the current literature. We present each of them in the subsequent chapters. My first study (**Chapter 3**) focuses on the community level by interviewing 32 social workers of foster youth to understand how they work with foster families and other stakeholders to address online safety (**RQ1**). Our findings revealed that case managers are most concerned about online sexual risks, especially sex trafficking. This is mostly because they are trained in providing comprehensive services to sex trafficking victims as well as managing the secondary effects through crisis intervention training. They rarely receive training for general online safety situations. This creates several challenges for case managers as they are not fully prepared to support foster families with every day online risks.

Chapter 4 presents an interview study with 29 foster parents of 42 teens (ages 13-17) who were part of the child welfare system. The goal of this study was to understand how foster parents mediate technology use in the home and the online risk experiences of their teens (**RQ2**). We discovered that foster parents felt strong tensions between trying to provide their foster teens a

sense of ‘normalcy’ by providing them technologies, but also trying to keep their foster teens safe online. Many of these foster parents reported that their foster teens had experienced high levels of online risks (i.e., sexual risks), such as sexual solicitations, sexting, and sex trafficking. Based on these reports, we focused our future studies on investigating solutions for sexual-related risks.

Due to the number of teens in the previous studies that experienced online sexual risks, we wanted to shift our focus to understanding the daily online experiences of youth in foster care to identify areas of needs within the social ecologies of child protection (family, peer, school, and community). However, we realized that this is a very sensitive research topic that will require additional diligence in preparing this research, especially when including the participation of youth in foster care. Therefore, **Chapter 5** presents a study that includes co-design sessions with 20 youth and semi-structured interviews with 13 parents to develop best practices for conducting research related to adolescent online risk behaviors, specifically those sexual in nature (**RQ3**). Overall, we found that teens wanted to share their personal experiences and benefit society, while parents wanted researchers to tackle a topic that they felt was a prevalent problem for teens. Yet, they both had significant concerns regarding data privacy of the sensitive disclosures made by teens during such studies. Participants also saw the potential for using the research study as a tool for risk reporting and mitigation, where researchers could act as liaisons between the teens and other parties (e.g., counselors, law enforcement, parents) to share pertinent risk details and facilitate resources or even help teens directly by giving them strategies for mitigating online risks they encountered during the study. Yet, this poses several challenges to researcher. We unravel these tensions further in the chapter.

Finally, the final two chapters summarize our ongoing and future research. In **chapter 6**, we give a summary of our ongoing ecological momentary assessment diary study. We used the findings from study 3 to develop an ecological momentary assessment mobile diary app to study the online experiences of foster youth. **Chapter 7** provides a summary of the outcomes and broader contributions of this research. It also presents our future research directions. Overall, this dissertation provides a strong foundation for designing, developing, and maintaining programs, practices, and policies for the online safety of foster youth that will reduce digital inequalities and mitigate against high-risk outcomes.

CHAPTER 2: LITERATURE REVIEW

Citation: Badillo-Urquiola, K., Harpin, S., and Wisniewski, P. (2017) "Abandoned but not forgotten: providing access while protecting foster youth from online risks," In the Proceedings of the 2017 ACM Conference on Interaction Design and Children (IDC 2017). Stanford, CA. (30% acceptance rate)

In this chapter, we present the findings of our systematic literature review that helped us frame our overarching research study questions. We draw from existing literature to argue that researchers, designers, and practitioners will likely need to conceptualize new and different approaches when studying and developing interactive systems for the purpose of adolescent online safety, so that they meet the unique needs of foster youth. We do this by synthesizing research regarding the high-risk offline behaviors of foster youth, research that pertains to foster youth and technology use, and more generally, adolescent online safety literature as it relates to other vulnerable teen populations. Overall, we found evidence that foster youth are particularly susceptible to both offline and online risks, though very little research has empirically examined the role technology may play in exacerbating or mitigating such experiences on or offline.

Introduction

Due to the novelty of our topic, we first chose to conduct a comprehensive review of the literature related to foster teens and their online risks to synthesize themes around three main topics: 1) foster youth's high-risk behaviors and outcomes, 2) foster youths' online safety and technology use, and 3) more generally, online safety of vulnerable populations of teens. To identify relevant research across multiple disciplines, we first searched a diverse set of digital libraries, which included the ACM Digital Library, PsychInfo, ProQuest Education, and ProQuest

Sociology. After these searches were exhausted, we used Google Scholar to conduct a broader search to ensure inclusivity and multidisciplinary perspectives. We also cross-referenced the citations of each article to identify any additional articles that should be included. The following search terms were used within the search criteria for each of our three main topics:

1) **Foster youth susceptibility to offline risks**: "foster care," "adolescents," "teen," "youth," "risks," and "challenges."
2) **Foster youth and online risks**: "foster care," "adolescents," "teen," "youth," "technology," "social media," "online safety," and "online risk."
3) **Vulnerable and "at-risk" youth online safety**: "at-risk," "vulnerable," "adolescents," "teen," "youth," "susceptible," "technology," "social media," "internet," and "online safety."

We searched specifically for articles that were peer-reviewed and published between the years of 2006 and 2017. An initial analysis was performed by reading titles and abstracts to identify relevant articles and remove irrelevant sources. Note that we performed the third search on vulnerable youth and online safety after we found so few publications that were related to foster youth and technology use.

Synthesizing the Literature

Overall, we found extensive research in the areas of foster youth and offline risks, as well as online safety for vulnerable or at-risk adolescents. Of the literature found, we summarize the 20 most relevant sources for these two topics. In contrast, little research was found specifically at the intersection of online safety, technology use, and foster youth (only 5 articles). Therefore, we

summarize the findings from all articles we identified within this topic. We summarize the literature related to these three topics below and provide key themes across the literature.

Foster Youth as a Particularly Vulnerable Population

Teens within the foster care system experience higher levels of risk and harm compared to other teens [24], which make them particularly vulnerable population of youth to study. Vulnerable youth have encountered previous harm and are thus more susceptible to future harm [172]. Researchers have investigated foster youths' extreme vulnerabilities to health, developmental, social, and emotional risks. For example, Gramkowski et al. [78] found that approximately 43% of foster youth reported being sexually active compared to 34% of a comparative teen sample. Given the higher level of risk activity, foster youth are more susceptible to detrimental outcomes, such as substance use [121], poor health [50,78], and early pregnancy [128]. As an example, Oshima et al. [128] used a longitudinal study design and discovered that over 50% of the foster youth became pregnant before the age of 19.

Spiegel [145] Nuggets that foster teens are also less resilient to risks when they have a history of physical or sexual abuse, placement instability, and delinquency. Other risk factors that have been found to contribute to negative long-term outcomes include child maltreatment, school transitions, and child welfare factors [120,128,145]. In contrast to studying the high-risk outcome and risk factors of foster youth, some researchers have also studied the protective factors that help these teens succeed and live healthy lives. Salient factors include intellectual ability, educational attainment, religiosity [38,42], social support, extracurricular activities, and types of supportive environments [84,120,128,145]. These protective factors have been shown to counteract negative

outcomes, such as teen pregnancy, homelessness, mental illness, substance use, and criminal involvement [45,92,128,145]. Additionally, quite a few studies focused on older teens transitioning into adulthood or "aging out" of the foster care system [50,120,121,128,145]. These studies emphasized that the risks and problems foster teens faced in their youth follow them into adulthood. Studies suggest that many of these teens lack the proper skills and knowledge to live independently, such as not having a high school diploma [93]. Due to their lack of access to technology, many foster youths lack the ability to perform basic tasks, such as searching for a job online [184].

Benefits vs. Risks of Technology Use by Foster Youth

We identified only five articles (recently published between 2015-2017) that discussed youth in foster care in combination with technology use or online safety. An overall trend we identified was that the articles represented a spectrum of perspectives, from the benefits of technology use to the potential risks associated with it. Given the lack of research in this area, we give a detailed summary of the findings from each of these emerging studies below, focusing on the trade-offs between benefits and risks.

Gustavsson and MacEachron [79] were the first to take a digital perspective of foster youths' development by exploring the benefits and potential risks associated with internet use by applying positive youth development theory (PYD). For example, they found that the internet can serve as a means for foster youth to find an immense amount of information on topics of personal importance (e.g., medical health, employment, school work). Access to technology also provides foster youth the ability to build social connections and receive social support. Yet, the internet may

also expose them to false, offensive, or threatening information that could cause harm. By implementing the "five Cs" of PYD (i.e., competence, connections, confidence, character, and caring), the researchers offered policy-level suggestions for supporting foster youths' safe internet use. For example, policies should cover ways to mitigate risks and enhance competency of healthy online practices for foster teens. Ultimately, they advocated for involving foster youth in the strategies to combat internet-related risks.

Fitch [58] created a framework for developing privacy guidelines for social media disclosures so that foster youth and their networks (e.g., case workers, foster parents) would not expose them to undue risks. Using Critical Systems Heuristics as a guide, this framework provides twelve guiding questions organized under the following four categories: 1) *motivation* – who the disclosures may benefit, 2) *power* – who has authority or the information, 3) *knowledge* – who is considered the expert on the topic, and 4) *legitimacy* – what is appropriate to disclose? The purpose of utilizing this framework was to include foster teens as stakeholders in developing policies that regulate their social media use. While Fitch advocated foster youths' involvement in policy development, he acknowledged that this approach could open up issues of liability for foster agencies.

Denby et al.'s [35,36] DREAMR project sought to help foster youth develop healthy relationships through the use of smartphones. Using the relational competence framework, they hypothesized that enhanced communication with social service providers would serve as a protective factor against various risk outcomes. The researchers gave teens access to mobile phones paired with a web-based application. Using survey-based and focus group data to triangulate the experience through the eyes of the teens, they found both positive and unintended

consequences of the intervention. Most teens found the smartphones to be easy to use, enabling them to develop a closer bond with their social service providers. However, 43% of teens were also frustrated with the program due to the restrictions implemented on the phones (e.g., limited contact lists). This prevented the teens from building a trusting and positive relationship with their caseworkers.

To compare and contrast the literature summarized above, the first two studies were primarily policy focused, whereas the latter three included empirical evidence from foster youth and foster parents. However, all of the studies illustrated a clear tension between advocating for access to technology so that foster youth could benefit and addressing the need for protecting teens from undue harm from online risk exposure.

Online Safety of Vulnerable and "At-Risk" Youth

Considering the limited research at the intersection of technology use, online safety, and foster youth, we expanded our search to "at-risk" and vulnerable populations of teens. Broadening our search offers evidence for the importance of studying and designing for the unique needs of vulnerable teen populations, which include foster youth. Our search yielded literature on a variety of vulnerable teen populations, including those who are lesbian, gay, bisexual, and transgender (LGBT) [34], struggle with anorexia [67,164], have a diagnosis of attention deficit hyperactivity disorder (ADHD) or Asperger syndrome [98], or are homeless [44,81,136,172]. Similar to foster youth, many of these teens have been marginalized from society and struggle with adversity in their everyday lives.

These vulnerable subpopulations of teens have been found to face very difficult challenges associated with engaging online. Having culturally and societally stigmatized identities often lead teens to search for social support or relationships in online communities that otherwise are not available to them [34,67]. However, teens who suffer from anorexia nervosa, for instance, often fall victim to online threats due to disclosing personal details about themselves in online forums [164]. While online discussion forums have many benefits, researchers have found some community forums to be unhealthy. For example, in a pilot study conducted with patients suffering from eating disorders (ED) and parents, approximately 35.5% of patients used Pro-ED sites, communities that support and guide those that want to maintain their eating disorder activities. Over 70% of teens studied said they used weight loss websites, while 52% of their parents claimed they did not [164]. Similarly, individuals with ADHD, Asperger syndrome, or similar disabilities often find themselves at a higher risk of cyberbullying within online platforms [98]. However, their parents were also unaware or misinformed regarding their online experiences. About 73% of parents indicated their child had never been bullied, even though over 21% of the youth said they had been cyberbullied within the last two months [98].

Arguably, homeless teens may be the most similar population to foster youth for a number of reasons. First, many homeless teens have spent time in the foster care system prior becoming homeless [44]. They are also likely to not have a stable family environment, reporting a history of sexual and physical abuse, as well as family dysfunction [136]. Despite their housing instability, homeless teens still access the internet frequently. Harpin et al. [81] found that over half (55.6%) of teens living on the streets of Denver accessed the internet regularly. Similarly, Rice and Barman [136] found that 72% of homeless youth in Los Angeles accessed the internet within the last two

days of participating in their survey. While many homeless youths own their own cell phone (46.7%) [81], they also rely on free internet access, such as from public libraries and youth service agencies [136]. While these studies examined technology-aided interventions for homeless teens, they did not examine the associated risks of providing access.

Identifying Gaps in the Literature

Offline Programs vs. Technology-based Interventions

We identified some potential limitations and gaps in the existing literature that helped inform the succeeding studies of this dissertation. First, most of the research on foster teens and offline risks offered solutions that relied on mentoring or relational nurturing to encourage positive psychological and behavioral outcomes among foster youth [100,120]. Unfortunately, many of these programs put in place to support the unique needs and circumstances of teens in foster care are underfunded, poorly monitored, and heavily influenced by politics [69]. This may be why the DREAMR researchers [35,36] have turned to study more technology-based interventions that help create the infrastructure for positive relationship building within foster youths' existing social networks. However, before implementing and investigating technology-based interventions, we must take a user-centric approach to design and engage with stakeholders within the foster care system to identify the unique challenges these systems should address. Therefore, in Chapter 3, we chose to interview case managers of foster youth to understand the role of technology within the foster care system and how they work with foster families to manage online safety (RQ1).

Few Empirical Findings related to Technology's Role in Foster Youth Outcomes

The offline risk literature deeply examined the prevalence of and outcomes associated with different risk behaviors, as well as protective factors that helped to mitigate these high-risk outcomes. However, this literature did not examine offline risks in relation to online risks or how technology may influence different risk outcomes. For example, some adolescent online safety literature suggests that teens who have mobile smart devices expose themselves to more sexual-related risks [137]. Yet, this literature makes no mention of technology use and its influence on risk outcomes. Otherwise, the research conducted thus far on online safety and risks of foster youth has been largely theoretical or policy-oriented (i.e., no empirical data from foster youth) [58,79]. For example, focusing on the potential benefits of giving foster youth access to technology [6,35,36,79] or proposing policies for protecting foster youths' privacy while online [58,79]. In chapter 4, we chose to further investigate the role of foster agencies and caregivers in mediating technology use to implement more appropriate policies that support the online safety of foster youth. Therefore, we interviewed foster parents on how they mediate technology within the home and their challenges in doing so (RQ2).

An Overall Lack of Knowledge regarding How to Ensure the Online Safety of Foster Youth

While foster youth are often identified as stakeholders in the policies designed to keep them safe online, more emphasis seems to be placed on the goals of foster parents or agencies who are charged to protect foster youth [6,35,36]. Researchers who performed a 40 year review of research on out-of-home-care [100] found that priority, from an agency perspective, has typically been placed on increasing authority and control— there is a belief that if we restrict or limit, we are

safeguarding teens. Interestingly, this mentality mirrored some of the prevailing perspectives we found in the adolescent online safety literature, which have been shown to be overly restrictive and, likely, ineffective [83,166]. So, then the question becomes: How do we ensure the online safety of foster youth?

Our review has shown that other populations of vulnerable teens face similar adversities as foster youth: yearning for belonging and positive connections; a history of trauma, sometimes in the form of sexual and physical abuse; and unhealthy relationships leading into adulthood [44,67,145]. We found a number of underlying similarities shared by these teens that could inform future research and design regarding online safety and risks for foster teens. For example, engaging in behaviors or communities online that intensify their serious behavior and mental health [67,69]. Suggestions have been made to develop programs that educate parents and teens on internet safety, as well as appropriate reactions and reporting [98]. However, more investigation is needed to understand the online risks of marginalized teen populations and whether such findings are generalizable to foster youth. However, since risk-based research is a sensitive topic for teens, especially those in the foster care system, in chapter 5, we used a participatory design method to understand best practices for conducting risk-based research with teens. This study provided insights into how we could conduct research that considers the protection of youth while also including their perspectives as part of the solution (RQ3).

Summary

Overall, we found that many of the current programs and technologies implemented to help foster youth navigate their many daily challenges are not effective and poorly implemented.

Furthermore, these interventions are not specific to supporting foster youth with their online interactions. Much of this poor implementation may be a result of overlooking the perspectives of foster teens and placing more emphasis on the goals of their authorities (e.g., foster care agencies). In our next chapters (Chapters 3-5), we use the Social Ecological Framework to ensure that our research takes a more holistic approach to including perspectives of stakeholders across the different social systems of foster youth. Our next chapter presents our first interview study with case managers on their perspectives in managing adolescent online safety.

CHAPTER 3: UNDERSTANDING CASEWORKERS' PERSPECTIVES ON ONLINE SAFETY FOR TEENS

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Our first study focuses on the community level of the Social Ecological Framework by investigating the exo-systems or communities (social workers) that provide the necessary supports to caregivers (foster parents) for effective childbearing [157]. Some of the work presented in this study partially overlaps with an undergraduate honors thesis I co-advised with Dr. Pamela Wisniewski [1].

Introduction

Child welfare workers (i.e., case managers) play a critical role in supporting families; they ensure families receive the appropriate services as outlined in their case plans. Case managers also work closely with prospective foster parents to prepare them for their new responsibilities related to caring for foster youth. Unfortunately, many child welfare agencies are under-staffed and under-resourced, resulting in case workers managing as many as 130 cases or more per year, often leading to high turnover rates; some states have rates as high as 30 percent [23]. These challenges prevent case managers from providing the appropriate support to families. However, what happens when these challenges are combined with the ever-growing access to ubiquitous technologies?

Research has shown that foster youth are more susceptible to higher levels of risks [7], but it is unclear the impact emerging social networking sites and other technologies [3,131] have on

case managers responsibilities. Therefore, to understand how case managers work to address online safety concerns and foster youth technology use, we posed the following research question:

RQ1: *What are the most prevalent risks encountered online by youth in foster care, according to caseworkers?*

RQ2: *What types of trainings are provided to caseworkers to manage these situations?*

RQ3: *How do caseworkers work with foster families to address online safety concerns?*

To answer these questions, we conducted semi structured interviews with a total of 32 case workers and 31 foster parents of teenagers between the ages of 13-17 years old. We conducted three separate thematic analyses to understand how these stakeholders work together to address online safety concerns and the types of systems they have for support. We found that case managers were most concerned about online sexual risks, emphasizing concerns about sexual exploitation. Yet, case managers are primarily trained to focus on more severe risks like sex trafficking and do not tend to receive more general online safety training. In addition, case managers felt that responsibilities in managing online safety were unbalanced among them and other stakeholders (like foster parents or residential homes). Ultimately, our findings urge researchers to question whether online safety should be prioritized. We conclude by recommending areas within the social ecological model of adolescent resilience where programs, practices, and policies can be enhanced.

Background

To situate our study, we provide a summary of previous research conducted at the intersections of child welfare and adolescent online safety. We focus on the supportive role case managers provide foster families and foster youth.

The Role of Child Welfare Workers in Supporting Foster Youth

Child welfare workers, specifically case managers, are legally responsible for the physical and social-emotional well-being of foster youth. Their job is to create a clear plan for the child to be reunified with their biological family (or under other special circumstances find a permanent placement). They are also responsible for maintaining a collaborative and supportive relationship with foster parents. Unfortunately, reports by the Casey Family Foundation show high turnover rates (20-40%) for case managers (optimal rates are below 10-12%) [186]. Previous research attributes this to case workers not being well supported and feeling undervalued [192].

To address these challenges, previous research has focused on investigating the effectiveness of supportive communication technologies [35,36]. For example, Denby et al.'s DREAMR project studied the role smartphones can play in promoting the well-being of foster youth through relationship building with their social service providers and mentors. Overall, while the smartphones facilitated a closer bond with their case managers because they were easy to use, the program restrictions created barriers that prevented them from building closer trusting relationships with their case managers.

While this research provides strong evidence of the important role technology has in the development of healthy relationship between foster youth and their social ecological systems of

support, it does not address online safety. Therefore, our study focuses on studying the role case managers have in foster youth's online safety.

Interview Study Design

We recruited child welfare workers who were 18 years-old or older and had managed one or more cases with foster teens (between the ages of 13-17) within the past five years. We used a semi-structured interview method, asking questions within the following categories:

- **Background:** Participants' motivations for becoming a child welfare worker, their personal experiences, and the types of case(s) they have managed.
- **Potential Challenges:** Whether participants felt like managing cases with teens presented any unique challenges compared to those with younger children, and if these challenges have changed over time. Whether case managers received training to meet these challenges.
- **Teen Technology Access:** What technologies teens use daily (e.g., social media apps). These questions were inspired by Livingstone et al.'s work on digital inclusion related to children and the digital divide [104].
- **Online Risks:** We asked participants if they were aware of any online risks (e.g., cyberbullying, sexual solicitations, exposure to explicit content [169,170]) teens may have encountered online.
- **Systems of Support:** Whether participants received any type of assistance or training from their supervising agency related to technology or online safety.

Whether there were any technical systems of support in place for managing cases (e.g., child's history or placement information).

- **Blue Sky Visioning** [156]**:** We asked participants what type of support or new technologies could make their lives easier in terms of protecting foster teens from online risks.

We also asked follow-up questions during the interview to clarify interesting discussion points that came up in the conversation. At the end of the interview, participants answered a few optional demographic questions that asked about their age, sex, highest education level, current employment status, household income, and ethnicity.

Data Collection and Recruitment

We conducted interviews via phone or Zoom to accommodate the busy schedules of the case workers. Upon scheduling the interview, we emailed participants an IRB approved informed consent form to review. Prior to the interview, we asked participants whether they had any questions and obtained their verbal consent to participate in an audio-recorded interview.

Recruitment efforts began February 2018, and the last interview was conducted April 2020. We contacted over 100 child welfare organizations within the foster care community by word-of-mouth, in-person, via social media, by phone, and through email. These agencies distributed our study information and flyer to potential participants. We incentivized participation with a $20 Amazon.com gift card distributed to the participant via email upon completion of the interview. We conducted 31 interviews with the average interview length at 42 min. All interviews were transcribed for later analysis, resulting in a total of 21 hours and 59 minutes of recorded audio.

Analysis

To answer our research questions, we conducted three separate reflexive thematic analyses [20] to answer each of our three research questions. We first read thoroughly through the transcriptions multiple times, making notes of ideas and generating initial codes. We then refined our codes using axial coding. We grouped our final codes conceptually into themes to generate our final codebook (Table 1).

Table 1. Final codebook for caseworker interviews.

RQs	Themes	Codes	Illustrative Quote
Online Risk Types (RQ1)	**Caseworkers were Most Concerned about Sexual Risks**	**Sexual Exploitation (75%; N=24)**: Teen victim of sex trafficking or engaging in prostitution.	*"In the last couple of years, human trafficking has gotten significantly worse."* -CW32, Female from Colorado
		Sexting/Solicitations (25%; N=8): Sending or receiving sexually explicit photos or messages to entice someone.	"*underaged teens that were using it for sexting"* -CW1, Male from New York
		Pornography/Sexualized Content (25%; N=8): Viewing or posting sexually explicit material for the purpose of sexual arousal.	"*…pornography have been an issue before*" -CW17, Male from Florida
	Technology Facilitated Physical Risks	**Runaway (19%; N=6)**: Foster teens use the internet and/or mobile phones to run away from their home or residence.	"*Unfortunately, they would use social media to meet older men and when they would run away, they would use social media to go to those men as well*." -CW7, Female from Florida
		Illegal Drug Activity (19%; N=6): Foster teens used the internet to perform illegal drug activities (e.g., selling, buying).	"*...underaged teens that were using it to try and buy narcotics and then underaged teens using trying to sell narcotics to underaged teens in the residence*." -CW1, Female from New York
		Fights (3%; N=1): Teens faced aggression or conflict	"*Cyberbullying, not that much, but…the fights, yes."* -CW9, Female from Florida
	Technology Facilitated Contact-Related Risks with Unsafe People	**Strangers (25%; N=8)**: Unknown individuals that contact teens or are contacted by teens.	"*Being able to communicate with strangers is a big challenge and is one of the most unsafe things for our teens."* -CW23, Female from Florida
		Other Teens (9%; N=3): Teens within and outside of the foster care system.	"*That is one of our biggest issues with our teens right now, you know, inappropriate talking to other*

RQs	Themes	Codes	Illustrative Quote
			teenagers." -CW21, Female from Massachusetts
		Family Members (6%; N=2): Family such as parents, cousins, and other relatives.	"*One of the kids I have, his mother's not supposed to be contacting him… she does it anyways."* -CW4, Female from Florida
	Online Harassment was a Secondary Concern	**Cyberbullying (22%; N=7)**: Teens faced online harassment.	"*...she was getting some negative feedback and some cyber bullying."* -CW26, Female from Florida
Types of Training (RQ2)	**Training Primarily Focused on Sex Trafficking**	**Sex Trafficking Training (56%, N=18):** Training on handling cases of teens with histories of sex trafficking.	"*So, I also was HT certified, and you had to be- you had to have a lot of training in human-trafficking to be able to work with a child who has experienced that."* -CW3, Female from Florida
		Online Safety Training (38%, N=12): Training on maintaining the internet safety of foster youth.	"*I've definitely participated in at least several internet safety trainings*." -CW21, Female from Massachusetts
		Crisis Intervention Training (28%, N=9): Training on handling cases of foster teens with crisis or trauma histories.	"*In child and family services in two places I worked, they treat you to what they call therapeutic crisis intervention to help you prepare for resident going into crisis.*" -CW1, Female from Florida
Managing Online Safety Among Stakeholders (RQ3)	**Responsibilities are Unbalanced Among Stakeholders**	**Caseworkers have Limited Availability (47%, N=15)**: Case workers have multiple responsibilities that limit their availability with foster parents.	*"A lot of [case managers] don't have the availability to do a lot for teens…*" -CW23, Female from Florida
		Limited Foster Care Placements (41%; N=13): Caseworkers overwhelmed because there are limited living placements	*"So, it's definitely a challenge because the setting of a group home compared to a foster home is really not the same."* -CW9, Female from Florida
	Caseworkers Serve as Mediators	**Foster Family Conflict (22%; N=7):** When foster parents and youth encounter conflict, case workers are often the intermediaries.	*"Be the mediator. You want the kids to think that- to know that you support them and that you're trustworthy, so you're not just taking sides. I'd say the more difficult part is probably talking to the foster parent about it."* -CW10, Male from Florida

Findings

We begin this section by summarizing the key characteristics of our participants. Then, we present our findings from our thematic analyses. First, we cover the types of online risks foster youth encountered that case managers found to be most concerning. Then, we discuss the types of training case managers receive to help them navigate these online risks. Finally, we share the challenges case managers face in managing adolescent online safety among different stakeholders.

Participants' Characteristics

Most of the caseworkers we interviewed identified as female (N=25), while the rest identified as male (N=6). They all had college degrees; most with a bachelor's (N=21), followed by graduate (N=11), and associate (N=1). Only one did not work full-time, because they were a student. Yet, they also had a wide range of experience; most of the caseworkers had less than 5 years of experience (N=14), while 10 of them had over 10 years of experience and the remaining 8 of the caseworkers had between 5 to 10 years of experience. Table 2 provides a summary of the caseworkers' characteristics.

Table 2. Summary of caseworkers' characteristics.

Case Worker	Education	State	Gender	Years of Experience
CW1	Associates	New York	M	5 years
CW2	Bachelors	Florida	F	4 years
CW3	Bachelors	Florida	F	4.5 years
CW4	Bachelors	Florida	F	1 year
CW5	Graduate	Florida	F	2.5 years
CW6	Bachelors	Florida	F	5 months
CW7	Bachelors	Florida	M	4 years
CW8	Graduate	Florida	F	5.5 years
CW9	Bachelors	Florida	F	5 years, 7 months
CW10	Bachelors	Florida	M	5 years
CW11	Graduate	Florida	F	15 years
CW12	Graduate	Kentucky	F	2 years
CW13	Bachelors	Florida	F	5 years
CW14	Graduate	Florida	F	12 years

Case Worker	Education	State	Gender	Years of Experience
CW15	Graduate	Florida	F	10+ years
CW 16	Bachelors	Florida	F	2 years
CW17	Bachelors	Florida	M	4.5 years
CW18	Bachelors	Florida	M	16 years
CW19	Graduate	Florida	F	6 years
CW20	Bachelors	Florida	F	4 years
CW21	Bachelors	Massachusetts	F	2 years
CW 22	Graduate	Florida	F	3 years
CW23	Bachelors	Florida	F	3 years
CW24	Bachelors	Florida	F	3 years
CW 25	Bachelors	Florida	M	7 years
CW26	Bachelors	Florida	F	16.5 years
CW27	Bachelors	Colorado	F	18 years
CW28	Bachelors	Colorado	F	15 years
CW29	Graduate	Colorado	F	12 years
CW30	Graduate	Colorado	F	30.5 years
CW31	Bachelors	Colorado	F	21 years
CW32	Graduate	Colorado	F	5 years

Online Risks Foster Youth Encounter Online (RQ1)

We identified four themes related to the online risks foster youth encountered reported by the case managers. We discuss each of these themes in the next subsections.

Caseworkers are Most Concerned about Sexual Risks

Overall, we found that caseworkers were most concerned about sexual risks. Most of the caseworkers (75%; N=24) shared stories about foster youth being victims of **sexual exploitation**. Case managers primarily focused on sex trafficking, but also mentioned teens being involved in prostitution. Those that mention sex trafficking, mostly shared stories involving teen girls as the main victims. They often talked about these risks starting online with the teen talking to strangers:

> *"We've had kids that have come to us that have been **human-trafficking victims** and that- a lot of that starts online."-CW10, Male from Florida, 5 yrs.*

Caseworkers also shared that they find it hard to keep track of these risks because the teens do not necessarily need to have a data plan or a phone to access their social media websites. They can go to a library or even the local McDonalds with a borrowed phone and to access the WIFI. Teens also had multiple devices, which made it hard to confiscate them. There was not much mention of how teens acquire their devices:

> *"We **can't monitor** who she's talking to. I mean, she can go to the public library and say, 'I'm going to do my homework,' but she can sign into Facebook and talk to her trafficker. And a lot of my kids—I have a kid right now that has a trafficking history, and she has 8 cellphones. I mean, I only know of 8, **who knows how many she actually has**." -CW5, Female from Florida, 2.5 years*

Caseworkers also made a strong distinction between sex trafficking and prostitution. The key distinction being that prostitution is classified as willful actions, versus sex trafficking which happens when the victim is forced. Yet, when case managers talked about prostitution, they emphasized that the teens do it because they are "*looking for love in all of the wrong places."* Therefore, teens develop different types of pressures that entice them to prostitute themselves.

> *"Our kids are not **prostituting** because they want to, they've been enticed into it or feel like they have to." -CW15, Female from Florida, 10+ yrs.*

Caseworkers were also concerned about other sexual risks like sexting/soliciting as well as pornography/sexualized content. **Sexting/soliciting** (25%; N=24) involved sending and/or receiving sexually explicit photos or messages to entice someone. Many of these stories involved both girls and boys. However, when describing these risks case managers shared that foster youth could have engaged as either a perpetrator or a victim. For example, there was a case where a foster parent's biological adult daughter was soliciting several of the foster teenage boys, but at the same time there were also some foster teenage boys soliciting her as well.

> *"I had a case where my teenage boys… were **soliciting** one of their old foster parents' daughter and that conversation was very like explicit between the daughter of the foster parents and them… text messages, pictures, videos that were exchanged by this daughter who was an adult and our teenage boys." -CW16, Female from Florida, 2 yrs.*

When discussing **pornography/sexualized content** (25%; N=24), caseworkers recognized that older teens are in the age where they want to engage in sexual exploration and that doing so can positively help their mental health wellbeing, however, because of the teens' legal situation and case plans, they're often restricted from activities that can help them in this exploration.

> *"With my offenders, **it is normal for a 16, 17, 18-year-old boy to look up porn, but they can't** because of their legal situation… my one that hit the 300 images in 6 hours – I had a conversation with him and said you know you knew that was going to be problematic for you. What can we do to help you control that more. And he's like I'm going to ask the team to take my phone away… So I think **trying to normalize what is normal** teenage curiosity male or female." -CW30, Female from Colorado, 30.5 yrs.*

This caused a tension for the Caseworkers in that they wanted to provide teens developmentally appropriate opportunities as a way of normalcy but also keep the teen safe from these online sexual risks.

Technology Facilitated Physical Risks

We found that technology facilitated physical risks. These were risks that happened offline but were facilitated through conversations or behaviors that happened online. Caseworkers (19%; N=6) shared stories about teens contacting their friends or previous abusers to help them **run away** from their foster home.

> *"A lot of our girls **will run away**. They will go and they may not tell their primary worker that they hooked up with somebody."-CW15, Female from Florida, 10+ yrs.*

These runaways often ended up in even more severe situations like sex trafficking or getting raped. Case managers (19%; N=6) also mentioned stories of teens engaging in **illegal drug**

activities, including buying, selling, and using narcotics. Most of the time case managers discovered these risky situations because the teens post images of themselves using the drugs or they directly tell the case manager.

> *"…but when they are in their **personal time using their phone** and then they can make **particular [drug] deals** and things of that nature, that's the scary part. A lot of times we don't know we can't really catch it until they're maybe gone in the act or they come back and show us that's what they've done." -CW25, Male from Florida, 16.5 yrs.*

Although there were not many (3%; N=1), case managers shared instances of teens posting videos on social media about them engaging in physical **fights** with other teens. Case managers emphasized that many foster youth, especially their human trafficked teens, come into the foster care system already being exposed to these types of risks. For example, some teens use drugs as coping mechanisms, while others run away from home back to their previous abusers because of their attachment to them.

Technology Facilitated Contact-Related Risks with Unsafe People

Technology was also a facilitator for contact related risks with unsafe people. These are risks related to risky communication. **Contacting strangers** (25%; N=8) was the biggest challenge because that often lead to other types of risks like sex trafficking or running away from their foster home. Much of these conversations were with adults on social media platforms.

> *"We took her cell phone away because she was talking to a—she was 15 or 16—she was talking to this guy who is like 21 or 22." -CW2, Female from Florida, 4 yrs.*

Caseworkers also shared that there were incidents of foster youth inappropriately talking online with **other teens** (9%; N=3) and that sometimes these interactions lead to teens exposing other teens to risks.

"[Teens] ***expose one another*** *and don't recognize what it is until it's too late."-CW27, Female from Colorado, 18 yrs.*

Another challenge is teens contacting restricted **family members** (6%; N=2). As part of their case plan many teens are prohibited to contact previous abusers – these can be biological family members or previous foster homes.

"One of the challenges that we have with our kiddos that we have in our custody and ***having phones****, we struggle a lot with their parents– with* ***having inappropriate contact with their parents****." -CW29, Female from Colorado, 12 yrs.*

Much of these situations were described as results of teens exhibiting attention-seeking behaviors. Unfortunately, these interactions with unsafe people often lead to further traumas and mental health risks.

<u>Online Harassment was a Secondary Concern for Caseworkers</u>

There were also a few reports (22%; N=7) about **cyberbullying**, but caseworkers treated these risks as a secondary concern. They mostly focused on the more severe sexual risks like sexual exploitation (i.e., sex trafficking). They didn't really share much about more general online safety issues.

"She actually just got in trouble for being a ***bully on social media*** *to another girl in her group home."–CW20, Female from Florida, 4 yrs.*

When they did talk about more general online risks, they did not seem to be informed about them. For example, this participant talked about her teen getting on Backpage and because it felt like something inappropriate, she slightly addressed it, but she did not really know.

"One of my teens was ***getting on backpage****, whatever that may be, and we had to explain to her that you know everything on the web is not meant for every child." -CW6, Female from Florida, 5 months*

This was interesting, because Backpage was a classified advertising website (similar to Craiglist) that was taken down in 2018 because of profiting from prostitution ads and its involvement in illicit commercial sex [193].

Caseworkers Training Primarily Focused on Sex Trafficking (RQ2)

For our second research question, we focused on identifying the types of trainings caseworkers received to manage online safety and address these risk situations. We found that caseworkers have very minimal training related to online safety. Most of their training primarily focuses on **sex trafficking** (56%, N=18). When they did mention **online safety** (38%, N=12), it was mostly in the context of sex trafficking and does not really go into the more general types online safety risks.

> *"With my agency we have to have 40 hours of continuing education, with the state we have to have 20 every year, and then we have **human trafficking every quarter**, and one of the **human trafficking training did go over online safety**" –CW8, Female from Florida, 5.5 yrs.*

They also mentioned receiving **crisis intervention training** (28%, N=9), however, again this was mostly focused on the secondary effects of teens getting involved in sex trafficking, not really the less severe types of risks.

> *"Your typical case manager doesn't get sent to the expensive conferences so then **they ended up struggling and watching silly trainings** on things that weren't nearly as beneficial as what I had the benefit of attending. **There was one day long trainings**…about how to work with teenagers who may or may not be **suicidal or experiencing mental health crises**. So that was, I think a really impactful training. But, some of them felt like- more of a waste of time" –CW3, Female from Florida, 4.5 yrs.*

Since their training and preparation focuses on sex trafficking, they do not really have to think about other types of online risks. This is probably why sex trafficking was such a prominent theme.

Caseworkers Struggled with Managing Online Safety Among Stakeholders (RQ3)

For our final research question about managing online safety among stakeholders, we identified two overarching themes. We discuss each of these themes in the next subsections.

Responsibilities are Unbalanced Among Stakeholders

We found that almost half of the participants (47%, N=15) had **limited availability** for foster families because they were overwhelmed with their primary responsibilities. This challenge forced case managers to put online safety as a second priority.

> *"A lot of **[foster parents] don't have the availability** to do a lot for teens as far as transporting and getting them to and from school or getting them to the necessary appointments that they have." –CW23, Female from Florida, 3 yrs.*

Many times, this is a result of foster parents not being able to fulfill a necessary activity like transporting or setting up a doctor's appointment for the teen, so the responsibility ultimately falls on the caseworker. Caseworkers explained that they are legally responsible for the children on their caseloads, that means every aspect of their life. Sometimes the caseworker even has custody of the child. Foster parents serve as overseers, and should be taking care of the child's wellbeing, but because the caseworker is legally responsible, if a task does not get done, it ultimately gets push to them. This leaves caseworkers with very limited time to focus on online safety. It also **limits the choices for placement** (41%; N=13). If a teen is not placed with a foster parent, they then move to a group home. Unfortunately, group homes are understaffed and overcrowded, because foster families do not want to take care of teens. Teens in foster care are typically more challenging because they often struggle with attachment disorders and/or behavioral problems.

> *"Younger children are way easier to place in foster homes. Our **teenagers often wind up in group homes**. And the older they are, they generally get placed further away from the county that they like generate from because of lack of space…" –CW13, Female from Florida, 5 yrs.*

Ultimately, these different challenges not only make it difficult for case managers to work with other foster care system stakeholders on online safety, but it also makes the reunification process harder.

Caseworkers Serve as Mediators

Finally, when **foster families encounter conflict** (22%; N=7), case workers are often the intermediaries between those conflicts.

> *"You want the kids to think that - to know that - you support them and that you're trustworthy, **so you're not just taking sides**. I'd say the more difficult part is probably talking to the foster parent about it, because…you don't want to tell them what they– how they run their house, but you also **have to kind of chime in and give advice and try to smooth things over** when stuff like that happens." –CW10, Male from Florida, 5 yrs.*

Since it is their responsibility to support both the foster parents' parenting and the teens sense of normalcy, they must be careful in making sure they are balancing these values as a neutral party. This is often difficult because it requires each party to negotiate a compromise.

Discussion

In this section, we discuss the implications of our findings as well as recommendations towards training and education, policies, and technology solutions.

Case Managers are too Focused on Imminent Risks to Care about Online Safety Concerns

Overall, caseworkers did not share many typical online risks. They mainly focused on the more severe cases. This is most likely a result of being trained specifically to identify and manage more imminent types of risks like sex trafficking. Previous research investigating case managers' decision-making practices shows that much of the training and tasks of case managers are heavily influenced by bureaucratic processes and mandated systems [142], so they are trained to evaluate risks for compliance. They are also juggling so many other tasks that since online safety is not a mandatory part of their job, it is left as a secondary priority. Ultimately, this perspective to online safety raises an important question: if caseworkers are not concerned about online safety, does it really matter? To develop a more comprehensive understanding of the situation, we decided to interview foster parents on their perspectives of adolescent online safety and technology mediation within the home (Chapter 4).

Recommendations for Design, Training, and Policy

As is, the foster care system works similar to a hierarchy in which the state agencies have the most power, and the foster parents and teens have the least. However, our findings show that this creates an imbalance of responsibilities for the case managers (who are often working for state agencies). Therefore, we challenge technology designers, practitioners, and policy makers to move from this top-down focused systems approach to include more bottom-up opportunities. To accomplish this, we provide the following recommendations:

First, states should **mandate trainings on online safety** for child welfare workers. These trainings should go beyond the traditional abstinence training for combating imminent risks (e.g.,

sex trafficking), to focus more on holistic, comprehensive methods. While abstinence training is a commonly adopted strategy for reducing risks, it has also been shown to be less effective than comprehensive education [97]. These trainings can include topics for creating open dialogue and online responsibility, as well as cover strategies for effectively monitoring a teen's technology use. These trainings should also focus on training case managers on how to use the information they are collecting through their mandated tasks with their own human discretion [142].

Second, we should design new **technology solutions to support and encourage communication** between case managers, foster parents, and foster youth. While efforts have been made to encourage positive trusting relationship building between foster care providers and foster youth [35,36], these technologies and programs still implement a more top-down approach. They implement restrictions from the perspective of case managers and foster parents, overlooking the values of foster youth. Therefore, researchers and designers should be more intentional about including foster youth in the research and design process of new technology solutions.

Lastly, rather than using individualized case plans that can result in foster parents and case managers inconsistently managing adolescent technology use, policies can be made to **normalize the types of access** to technology youth in foster care have. For example, Florida already has state-level policies that promote community-based care lead agencies to provide foster care caregivers and contracted agencies training on encouraging normalcy among foster youth [194]. These types of policies can be modified to include guidelines for managing technology. Further, technologies could be designed to **educate and train foster youth** on managing online risk situations. These solutions would promote self-regulation strategies, which prior research has found to be more effective than parental control [71,74,166].

CHAPTER 4: THE ROLE OF FOSTER PARENTS IN THE ONLINE SAFETY OF FOSTER YOUTH

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In this chapter, we investigate the challenges foster parents face in regard to their foster teens' technology use. Based on the foster parents' reports, we also identify the different types and severity of risks foster teens face online.

Introduction

Foster parents play a critical role in our society. They strengthen our communities by providing a stable (and sometimes permanent) home to the over 400,000 children that are placed into foster care each year [195]. These children often enter foster homes after having experienced tremendous amounts of trauma, including neglect, physical abuse, sexual abuse, parental substance abuse, behavioral problems, incarceration, and more [47]. These difficult circumstances present several challenges for foster parents as they are charged with attending to the behavioral and psychological well-being of their foster children [22]. Furthermore, foster parents are challenged by lack of support from the foster care agency and with having to manage relationships with the biological family [68,101]. Yet, as seen in Chapter 2, there has been little empirical research in the space of foster families, adolescent online safety, and technology mediation in the home [7]. To better understand the role of technology within foster families, we pose the following research

questions to examine how foster parents mediate technology use of their foster teens (ages 13-17) in the home:

RQ1: *According to parents, what types of risks do foster youth encounter online?*

RQ2: *How do foster parents attempt to mediate these online risks? Are these strategies effective?*

RQ3: *What are the unique challenges associated with parental mediation of technology use in the home for foster families?*

To answer these questions, we conducted semi-structured interviews with 29 U.S. foster parents of 42 teens (ages 13-17). We used qualitative approaches to analyze the interview transcripts and found that most parents fostered teens who had engaged in highly risky online behaviors that facilitated emotional and physical harm (e.g., sex trafficking). Our results also revealed considerable differences between foster families and conventional families in terms of online risks and technology restriction in the home. Foster parents who had high-risk teens and were inexperienced with technology themselves were most likely to revoke access to technology in the home. Parents with more technology expertise were more likely to leverage parental control software to monitor technology use. In all cases, foster parents struggled with mediating technology use in a way that ensured the online safety of their foster teens. We elucidate on these struggles and the online risks teens encountered while under the care of their foster parent. Through this research, we urge researchers to consider the unique needs of foster families when designing new technologies for keeping foster teens safe from online risks.

Background

We situate our research at the intersection of technology mediation, adolescent online safety, and foster families.

Mediating Technology Use within Families

The HCI community has generated a growing body of literature on family dynamics and technology use. For instance, research within the SIGCHI community has studied parental mediation in regards to teen technology use within the context of families (c.f., [15,31,88,178]). Hiniker et al. [88] found that parents find it challenging to enforce more contextual rules instead of restricting certain technologies at certain times. They also found that parents and children shared similar expectations about technology use (e.g., no phones at the dinner table). Blackwell et al. [15] reinforce these findings and recommend open dialogue as an effective strategy for parents and teens to understand their mutual expectations of technology use. Their research also aligns with Hartikainen et al., who recommend building trust as a way to facilitate a parent's ability to empower teens to make good decisions [82].

Beyond the HCI community, effective parental mediation [95,105] is one of the most commonly cited approaches for reducing teen online risk exposure throughout the adolescent online safety literature. Parental mediation can be categorized into the broad categories: active mediation (parent-teen conversations about technology use), restrictive mediation (rules and restricts on technology use), and co-use (parental presence during the teen's technology use) [106]. Yet, recent research on adolescent online safety advocates for a paradigm shift from restrictive, parental control to more resilient, youth empowering strategies (e.g., [49,71,169,170]). For

example, Wisniewski et al. found that most of the risks encountered by teens are unintentional and that teens are often able to effectively cope with them without the help of their parents [170]. Others have also tried empowering teens to address online safety through design [5]. Much of this research, however, has largely focused on white, high-income, highly educated, involved parents and families. Thus, it may not be generalizable to other populations of families and teens.

Several SIGCHI researchers have more recently recognized the importance of studying how racial and socio-economic differences influence the online needs and behaviors of different families. For example, Pina et al.'s [130] recent work with Latino families revealed that family values and access to different levels of resources influence intergenerational information seeking behaviors online. DiSalvo et al.'s [39] research with African American families found that lower-SES families struggle to access online computer science learning tools, despite having access to them, because of parents' perceived technical skill, concerns with face saving, and their methods of acquiring information. Similarly, Stevens et al.'s [149] work cautions that providing disadvantaged communities more technology access can actually amplify negative social interactions and reduce the equity of benefits. Therefore, we add to a growing an important body of literature on technology mediation and use within diverse families.

Online Safety for Vulnerable Youth

Prior research has highlighted that certain sociocultural factors can make some youth more vulnerable to online risks than others [103,129,178]. For example, Yardi's and Bruckman's [178] work with families of color found that teens with low socioeconomic status are given more independence with their technology devices. Pater et al. [129] found that racial minority, low-

income urban teens commonly experience sexting, cyberbullying, and self-harm. More recent literature has focused on the advantages and disadvantages of technology access for teens in foster care [7,35,36], noting that owning a smartphone enhances foster youth's self-esteem and sense of individuality; however, it does not investigate the influence technology may have on the behaviors of foster teens [7]. In chapter 2, we highlighted the need for more research investigating online safety for teens in foster care and encourage this action by providing avenues for future research. We answer this call by making the following unique research contributions:

- An in-depth analysis of the challenges of mediating technology use for teens within the unique context of foster families.
- Novel insights as to the use of technology restriction as a means to mitigate risks foster teens encounter on and offline.
- Implications for education, policy, and technology solutions that promote effective parental mediation of teen technology use within the context of foster families.

In the next section, we describe our methods.

Interview Study Design

We recruited parents who were 18 years-old or older and had foster teens (between the ages of 13-17) in their home within the past five years. Fostering situations ranged from teens within the U.S. child welfare system to orphans who were fostered or adopted through international hosting programs. We designed a semi-structured interview script similar to the caseworker study but focusing more on the dyadic relationship between the foster parents and the youth. This included questions based on similar interview studies conducted with parents regarding mediation

strategies of technology use, technology access, privacy, and online safety of teens (e.g., [15,31,49]). Our questions were organized as follows:

- **Background:** Participants' motivations, personal experience as a foster parent, and the teen(s) that they have brought into their homes.
- **Potential Challenges:** Whether participants felt like fostering teens presented any unique challenges compared to younger children, and if these challenges have changed over time. Whether parents received training to meet these challenges.
- **Technology Access in the Home:** What technologies teens used on a daily basis (e.g., social media apps). These questions were inspired by Livingstone et al.'s work on digital inclusion related to children and the digital divide [104].
- **Parental Mediation Strategies:** Informed by Blackwell et al. [15] and Erickson et al. [49], the actions the participants took to monitor the use of technology (and particularly smartphone use) in the home. Whether or not and how teens in their home discussed their online activities with them.
- **Relationship between Technology Access and Parenting:** Concerns participants may have about technology use in the home, and how they managed tensions between privacy and online safety. We leveraged Cranor et al.'s work on parents' and teens' perspectives on digital privacy [31].
- **Online Risks:** We asked participants if they were aware of any online risks (e.g., cyberbullying, sexual solicitations, exposure to explicit content [169,170]) teens may have encountered online.

- **Blue Sky Visioning** [156]**:** We asked participants what type of support or new technologies could make their lives easier in terms of protecting foster teens from online risks.

During the interview, we asked follow-up questions to clarify interesting discussion points that came up in the conversation. At the end of the interview, participants completed a paper-based demographics survey that included questions about their age, sex, highest education level, current employment status, household income, and ethnicity.

Data Collection and Recruitment

We conducted interviews over the phone to accommodate the busy schedules of the foster parents. Upon scheduling the interview, we emailed participants an IRB approved informed consent form to review. Prior to the interview, we asked participants whether they had any questions and obtained their verbal consent to participate in an audio-recorded interview.

Recruiting foster parents of teens proved to be a hard-to-reach target population; therefore, the researchers invested a considerable amount of time building relationships with local and national foster agencies across the U.S. Recruitment efforts began June 2016, and the last interview was conducted March 2018. We contacted over 100 child welfare organizations within the foster care community by word-of-mouth, in-person, via social media, by phone, and through email. The foster care organizations distributed a recruitment flyer to potential participants, who were then asked to contact the first author if they were interested in participating in the study. We incentivized participation with a $20 Amazon gift card distributed to the participant via email upon completion of the interview. We conducted a total of 29 interviews (P7 and P15 were removed from our analysis due to the selection criteria not being met). The average length of the interviews

was 51 min, ranging from 25 min to 1 hour and 52 min. All interviews were transcribed for later analysis. We transcribed a total of 25 hours and 27 minutes of recorded audio.

Qualitative Data Analysis Approach

We used multiple qualitative approaches to analyze the interview transcripts. First, we conducted a content analysis [47] to understand the convergence and variance across the participants' responses for each question. During this analysis, we took note of key dimensions that appeared to influence key outcomes and used these dimensions for a structured data analysis. They included: 1) **Risk Level:** The severity of the types of risks their foster teens experienced online, 2) **Parental Mediation Strategies:** The predominant approach each participant took to mediate these online risks, and 3) **Technology Expertise:** The level of self-reported and demonstrated knowledge the parent had with technology. The codebook included three **risk levels** (*no*, *typical*, and *high*). No risk was defined as the parent being unaware or not reporting any online risk experiences of the teen(s) in their home. Typical risks were based on Wisniewski et al.'s [170] operationalization of "low" and "medium" level risks typical teens encountered in their diary study (e.g., explicit content and interacting with strangers online). We coded high risk scenarios based on situations that posed imminent risk to the teens' safety or emotional well-being (e.g., sexting, contact with unsafe individuals), which is consistent with prior work [170].

We classified **parental mediation strategies** into six different categories based on our data and online parental mediation strategies previously addressed in the literature (e.g., [43,105,167,169]). Definitions for each of these codes are included in Table 3. **Technology expertise** was coded (*low* or *high*) based on stated experience and the experience level actually

demonstrated by the participants during the interview. The first author coded all the interview transcripts, and the last author reviewed the consistency of the codes iteratively throughout the data analysis phase. Our codebook is summarized in Table 3.

Table 3. Structured codebook for foster parent interviews.

Dimension	Code	Definition	Exemplar
Online Risk	No risks	Parents unaware or not reporting any online risk experiences	*"No, we didn't have any experience with that, not directly."*
	Typical risks	"Low" and "medium" level risks typical teens encounter frequently (e.g., explicit content) [38]	*"I know he's watching fights, videos of fights, on social media"*
	High risks	Situations that posed imminent risk to the teens' safety or emotional well-being (e.g., sexting, porn addiction, and contact with unsafe individuals) [38]	*"She would meet a guy online that she's never even met before and within hours would be sending completely naked pictures."*
Parental Mediation Strategies ***(Ordered from most to least restrictive)***	Restriction	When a parent revoked technology access to the point of non-use [10].	*"Like I said, I unplugged it, take it away and changed the passcode and everything."*
	Parental control	Surveillance of a teen's online activities using parental control software [15]	*"One of those restrictions is set up from Disney company, and the other is set up through Verizon."*
	Monitoring tech	Passive surveillance in which a parent manually checked the teens mobile devices or web history [27]	*"The only thing I do is try to look over his shoulder, every once in a while."*
	House rules	Placing rules and limits to the teen's technology use [20]	*"As far as the phone time goes, there's no phones near bedtime during weekdays."*
	Active mediation	When the foster parent and teen have conversations regarding the teen's online behaviors or activities [27]	*"We talk about why, we talk about what they're looking at."*
Technology Expertise	High Tech	Parents demonstrated more advance understandings of technology	*"I have Snapchat, I have Instagram, I have Facebook, I have... all of it to keep myself up to date and to know what to do with it."*
	Low Tech	Parents demonstrated little to no knowledge about technology	*"I'm not really tech savvy so I don't really know how to monitor things"*

Of the 29 parents interviewed, they had a total of 42 foster teens as shown in Table 2. Since risk level varied by teen, we chose the parent-teen dyad as our level of analysis. Thus, foster parents

who reported having multiple teens in their home could appear in more than one dyad. While the technology expertise was held constant for a given parent, we allowed risk level and parental mediation strategy to be different based on the teen. However, after coding our interview data, we found that parental mediation strategies did not change. We applied codes mutually exclusively; for instance, technology expertise was coded as a binary of low or high, and risk type was assigned based on the highest severity risk reported for a given teen. The parental mediation strategy codes reflected the primary strategy employed by each parent for each teen. If a parent applied multiple strategies equally, then we coded for the most restrictive strategy. The codes that were applied to each parent-teen dyad are shown in Table 2.

After our structured analysis, we conducted a grounded, thematic analysis [151] of emergent themes that were unique to the context of foster parenting teens. This analysis followed Braun and Clarke's [19] six-phase framework, where the first and last authors familiarized themselves with the interviews and generated the initial codebook. The first author coded the interviews based on these codes (allowing for new codes to emerge), and all authors formed a consensus around the codes to present the following themes: 1) foster families face unique challenges related to online safety and mediating technology use in the home and 2) parents are desperate for better solutions for keeping their foster teens safe online and offline.

Findings

We present our findings by first describing characteristics of the foster parents in our study. Then, we discuss the major findings from our structured analysis, followed by our emerging themes.

Participant Profiles

Most of our participants were female (N=26) with three who identified as male. Similar to most research in family studies [15], our sample had a bias toward mothers as the primary caregiver. Foster parents in our sample provided a wide range of foster placements, including traditional care (level 1), short-term "respite" care, therapeutic care (youth with significant mental or behavioral health challenges), foster-to-adopt (there is a possibility of adopting the child), adoptive (the parent fostered and then adopted the child), and collaborative/independent living (programs to increase basic life skills for transitions to adulthood).

Twenty-three participants identified as white or Caucasian; other participants identified as black/African American (3), multi-ethnic (1), and two participants preferred not to answer (one did not to answer any of the demographic questions). Most of our participants (12) were under the age of 40, nine were between 40-49, five were between 50-59, two were over 60. Most participants had a bachelor's degree (11), while others had a master's degree (7), professional degree (5), some college (3), or high school diploma (2). Participants worked full-time (20), part-time (3), were retired (3), or unemployed (2). Participants also lived in a variety of states: Florida (7), North Carolina (5), Maine (3), Connecticut (1), Georgia (1), Indiana (1), Kansas (1), Michigan (1), New Jersey (1), New York (1), Tennessee (1), and Washington (1); four participants preferred not to disclose.

Table 4. Foster parents and foster teens profiles.

Foster Parent	Foster Placement Type	Gender	Total Time Fostering/ since Adoption	# Teens	Gender	Risk Level	Parental Mediation Strategy	Tech Expertise
P01	Therapeutic	F	7 years	2	F, F	H, H	Restriction	Low
P02	Independent	F	11 years	1	F	H	Monitoring Tech	Low
P03	Respite	F	5 years	1	F	H	Restriction	Low

Foster Parent	Foster Placement Type	Gender	Total Time Fostering/ since Adoption	# Teens	Gender	Risk Level	Parental Mediation Strategy	Tech Expertise
P04	Renewing License	F	9 years	3	F, F, F	H, H, H	Restriction	Low
P05	Host/Adoptive	F	3 years	1	F	H	Restriction	High
P06	Foster-to-Adopt	F	3 months	1	F	H	House Rules	Low
P08	Therapeutic	F	8 years	1	M	T	Parental Control	High
P09	Therapeutic	F	9 years	2	M, F	N, H	Monitoring Tech	Low
P10*	Respite	F	1 year	1	F	N	House Rules	Low
P11	Respite	F	15 years	1	M	H	Monitoring Tech	Low
P12*	Respite	M	1 year	1	F	N	House Rules	Low
P13	Adoptive	F	15 years	1	M	H	Restriction	Low
P14	Adoptive	F	9 years	1	M	T	Restriction	Low
P16	Level 1	F	11 years	3	F, F, F	H, H, T	Monitoring Tech	High
P17	Adoptive	F	3 years	2	M, M	T, T	Active Mediation	High
P18	Adoptive	F	6 years	2	F, F	H, N	Parental Control	High
P19	Level 1	F	7 months	1	F	T	House Rules	Low
P20	Adoptive	F	4 years	2	M, F	T, T	Parental Control	Low
P21	Foster/Adoptive	F	4 years	2	F, F	T, T	House Rules	Low
P22	Level 1	F	2 months	1	M	T	Monitoring Tech	Low
P23	Therapeutic	F	2.5 years	1	M	H	Monitoring Tech	Low
P24	Adoptive	M	1.5 years	1	M	T	Parental Control	High
P25	Respite	F	15 years	2	M, M	T, N	Active Mediation	Low
P26	Collaborative	F	16 years	2	F, F	H, H	Monitoring Tech	Low
P27	Respite/Adoptive	F	7 years	2	F, M	H, N	House Rules	High
P28	Level 1	F	7 years	2	M, M	H, H	Monitoring Tech	High
P29	Therapeutic	F	6 years	1	F	H	Parental Control	High
P30	Foster-to-Adopt	M	2 years	1	F	H	Restriction	High
P31	Respite	F	3 years	1	F	N	House Rules	Low

*Foster parents are a married couple, so this foster teen is counted twice; N = 43 parent-teen dyads

Table 4 provides additional details about each foster parent. We provide the codes from our structured qualitative analysis for how we classified teen risk level (respectively ordered with

teen gender), primary parental mediation strategy, and the level of technology expertise of each participant. In Figure 1, a Sankey diagram illustrates the relationships between structured codes as map value flows [143]. The three vertical bars represent the number of parent-teen dyads that were classified based on teen risk level (left), parental mediation strategy (middle), and the technology expertise of the foster parent (right), respectively. Overall, we had a larger representation of high-risk teens (23/43 = 53%) with parents who employed either passive technology monitoring (44%) or restriction (39%) and exhibited a low level of technology expertise (61%).

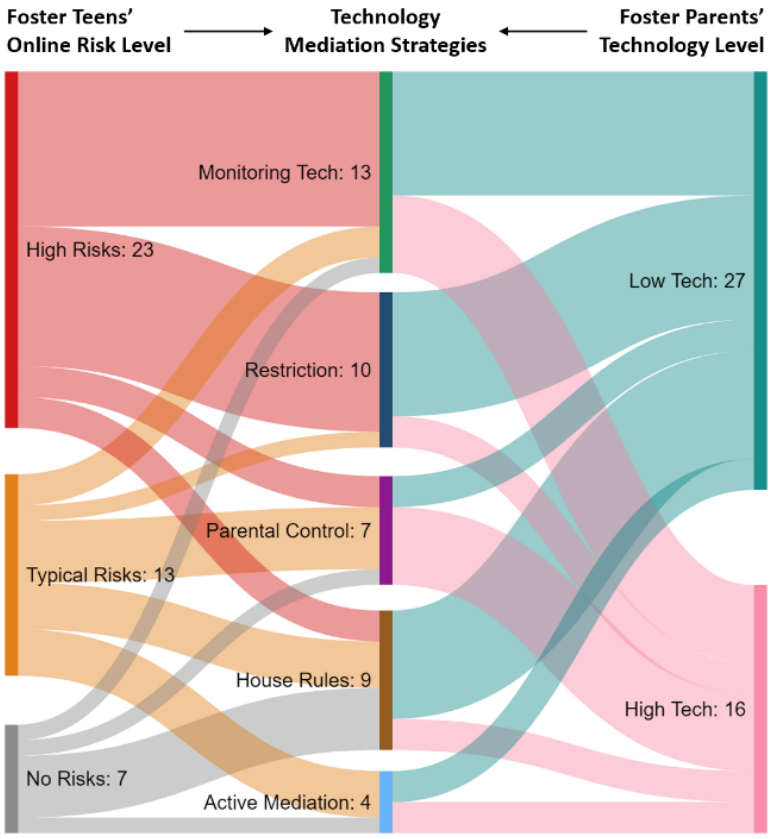

Figure 4. Sankey Visualization of Parent Profiles

Reading from left to right, the Sankey diagram in

Figure 4 shows the relationship between teen risk level and parental mediation strategy. For example, most foster parents of high-risk teens either used restriction or monitoring technology in the home as their primary mediation strategy. Reading from right to left, the Sankey diagram illustrates the relationship between the level of technology expertise of the parent and their chosen parental mediation strategy. For example, "high-tech" parents were more likely to use parental control software, while "low-tech" parents were more likely to use restriction and house rules. Our results suggest that mediation strategy is shaped by both risk level and parental technical understanding. In the sections that follow, we describe these dimensions and relationships in more depth, focusing first on foster parents who had teens that experienced high-risk online situations, followed by teens who experienced typical online risks, and those for which foster parents did not report any knowledge of past or current online risk experiences.

Mediating Technology for High-Risk Teens

Over half (53%) of the foster teens had experienced online risks that placed the teens in imminent danger. Based on the foster parents' accounts, 91% of these risks could be classified as conduct and contact-related risks [102] as the teens initiated an interaction and/or online behavior with an unsafe person (e.g., abusive parent, adult stranger, etc.). The most common risks reported were sexual in nature, such as teens sending naked pictures of themselves to others. In many cases, foster parents pinpointed mobile smartphones as the medium in which these interactions occurred. A couple of these interactions occurred with boyfriends or girlfriends, but the majority of foster teens engaged in sexual exchanges with strangers, specifically girls engaging in explicit

conversations with older men. For example, P26 found one of her 16-year old foster daughters sexting with multiple men:

> *"It was butt sex. It was on her social media… and there were those men masturbating. At one time, one of the persons she was talking to asked her what turned her on and she sent him naked pictures of a 10-year-old girl, she said that this is what turns me on."*-P26 Foster Mother from Indiana

The quote above suggests that the girl was sexting with men and demonstrating highly provocative behavior, possibly indicative of past sexual abuse. In many cases, online sexual exchanges led to physical harm. Seven of the foster parents shared stories about foster teens who used technology as a means to run away (or "elope") from home, which then resulted in traumatic consequences, such as rape and sex trafficking.

> *"I have a child in care who was constantly eloping and during her elopement she got involved in sex trafficking. Where she was held up in a home and raped multiple times by multiple persons. By her own admission she was being leased out to various men. Who, if she had access to a phone, she still would be contacting this person."*-P01 Foster Mother from Florida

Another common theme was that teens used technology to contact unsafe people from their past. Many of the teens had court orders or case plans that restricted contact with biological family members, previous foster families, or other individuals that were abusive to the teen in the past. One foster parent explained that such interactions would "re-traumatize" the teen, making teens noticeably regress after contact occurred.

> *"She had accused her adoptive father of sexually abusing her, and she still persisted and wanted to have conversations with this man…court order stipulated that she was not supposed to have contact with this man without supervision."*-P01 Foster Mother from Florida

Two foster parents reported substance abuse and pornography addictions that were facilitated through technology use. This behavior was more typical of boys. For instance, P28 son

was addicted to drugs. As a result, she did not allow him to have a cell phone because it would provide easier access:

> *"Because of the substance abuse issue, because obviously it would make it a lot easier for them to communicate with folks in order to obtain marijuana or anything else."-P28 Foster Mother from North Carolina*

The quote above gives one example (through the use of restriction) of how teens' online risk experiences influenced how foster parents mediated technology use in the home. Overall, we found strong evidence that foster parents believed that technology access facilitated high-risk behaviors both online and offline. In the sub-sections that follow, we describe the range of strategies (from most to least prevalent in our sample) foster parents used to protect high-risk teens from online dangers.

Monitoring Technology Use in the Home

Most (43%) of the parents of high-risk teens monitored technology use by manually checking the foster teens' devices or looking over their shoulders. P26, as well as others, asked for her teens' device passwords, so she could conduct random checks. There was often no warning for the device checks, but she typically performed the check whenever she felt concerned that her teens were behaving inappropriately online.

> *"Yes, I'm supposed to have their passwords and I'm also supposed to check their phones. There's no set time or amount of time in-between checking, it's mainly if I feel there's something going on."*-P26 Foster Mother from Indiana

Like P26, who emphasized the phrase "supposed to," many parents admitted that this strategy was not fool-proof and that they did not do it on a regular basis. Others expressed dissatisfaction with this approach because teens refused to give them access to monitor devices or because the teens would make fake accounts.

> *"[Monitoring] It's hard unless they accept you as a friend on Facebook or unless they ask you to join or give you their information so you can see and monitor what they are doing, you don't know what they are up to."*-P16 Foster Mother from North Carolina

We also found that manually monitoring devices in the home was more typical of parents who lacked the technical expertise to do so using more automated approaches. This was often because they did not know about available parental control technologies to monitor what their teens were doing online:

> *"I don't know a whole lot about it [parental control software]… I would rather have them mad at me for checking their phone than be dead, or hurt, or laid."*-P26 Foster Mother from Indiana

However, irrespective of risk level, the proportion of "low-tech" parents (8/27 = 30%) versus the proportion of "high-tech" parents (5/16 = 31%) who manually monitored technology in the home was similar.

Restricting Technology Access

Nine parents of high-risk foster teens felt like they had to resort to restriction, where they revoked access to technology and did not allow the teens to have or use internet-enabled devices in the home. Frequently, these foster parents restricted the use of handheld personal devices, such as smartphones and tablets. Typically, restriction occurred as a result of teens experiencing high-risk situations online:

> *"So, from that [elopement] I took my tablet away from her, and she never got to use it again."*-P03 Respite Foster Mother

Some parents went as far as restricting mobile phone access of their teens' friends when they came to the parents' homes:

> *"She's had friends who absolutely won't come over to her house because we make them give us their phones. We tell the parents right off the bat too…'Hey we have a strict NO policy on phones.'"*-P30 Foster Father from Florida

These parents often felt they had to restrict their teens' technology use, rather than use a different strategy like monitoring, because it was the only way they could completely control the teen's use of technology.

> *"Here's the thing I can't control if she goes out and creates a new password or new profile, you know what I mean."*-P05 Foster Mother from Georgia

Similar to those who manually monitored their teens, however, these parents felt restriction was also an ineffective strategy to mediating their teens' technology use. This was because the teens would find other means for getting access to technology. P04 said her teens were not allowed to use technology in her home, but they often snuck in devices without her knowledge.

> *"They still sneak in my house and I don't know until I physically go to their room and heard them talking on the phone, and if they heard me coming then you know they'll hide it."*-P04 Foster Mother state undisclosed

Overall, we saw a trend where 30% (8/27) of "low-tech" parents restricted technology access in the home, but only 13% (2/16) of "high-tech" parents used this mediation strategy. This was often because many parents were unaware of the availability of parental control software, so they preferred to remove technology from the equation altogether.

> *"I didn't know they had those stuff [parental control software]. Like I said, I'm not a computer pro. I have the computer I may use one or two things on the computer, but I am not gonna say I'm a computer pro."*-P04 Foster Mother state undisclosed

Next, we present parents who knew about parental control software and chose this strategy to mediate technology use.

Using Parental Control Software

Two parents of high-risk teens used parental control software, which allows them to monitor their teens' devices by restricting specific content, enforcing time limits, and supervising online activities [74]. Similarly, three parents of "typical-risk" and one parent of a "no-risk" teen also used this strategy, which we discussed later. For high-risk teens, P18 installed a parental control app on her daughter's phone after her daughter posted naked pictures of herself online:

> *"We had an app called 'MamaBear'…It's an app where we can see what she likes on Instagram, or who liked her stuff. We get an alert when she posts to Instagram or YouTube or any of those outlets."*-P18 Adoptive Mother from Maine

In contrast, P29 used her router to filter content. Her foster daughter "owned" her own phone, so she did not have access to install parental control software directly on her teens' device.

> *"We would restrict those types of things from our actual browser. So, they could get on Wi-Fi, but different sites would be blocked at certain times of the day."*-P29 Therapeutic Host Mother from Florida

Irrespective of risk-level, "high-tech" parents were more likely (5/16 = 31%) than "low-tech" parents (2/27 = 7%) to use parental control software to mediate technology use in the home. One of the reasons these parents used parental control software was because they wanted to take a preventative approach. P18 was able to download the software onto her teen's phone to proactively monitor any new high-risk behaviors exhibited by her daughter.

> *"I think that's why my overall philosophy in life is to be responsive, not reactive. To be proactive rather than reactive… not because we don't trust you, but because it's for safety"*-P18 Adoptive Mother from Maine

These parents noted that parental control software could not guarantee that their teens would not have repeated high-risk online incidents, but it made them feel more confident that they would be aware of these situations if they did reoccur.

Implementing House Rules

Finally, two parents of high-risk teens used house rules as the primary method for mediating their teens' technology use in the home. House rules were generally verbal limitations placed on technology by parents. A key point is that these parents did not mention monitoring technology use other than setting these house rules to limit use. For example, P27 would have her foster daughter leave her door open while she was Skyping and turn in her phone at bedtime.

> *"She gave me her phone before she went to bed, so that I knew she wasn't texting all night."*-P27 Foster Mother from New Jersey

However, P27 still had issues with her daughter messaging with her boyfriend inappropriately and using her cell phone to contact that boyfriend to take her out of the home without her foster mother's consent. A main concern of parents was that teens often did not follow the house rules that they set. When teens did not follow the house rules, the consequence was often to use restriction instead:

> *"If she was really out of control I knew how to switch passwords and things like that… so, taking that away from her was like taking away her arm so that wasn't taken very well. But I really didn't do that to her very much."*-P06 Foster Mother state undisclosed

Overall, 26% (7/27) of "low-tech" parents used house rules as their primary mediation strategy, while only 13% (2/16) of "high-tech" parents chose this approach. For the most part, parents who used house rules were fairly hands-off when their teens did have access to their devices in the home. In the next section, we compare and contrast trends we found for foster parents of high-risk teens with parents who reported low to medium levels of online risks encountered by their teens.

Teens Experiencing Typical Online Risks

Ten parents reported that their 13 teens had experienced low to medium-level risks online [170]. Many of the risks reported involved *content risks* [102], which meant the information or material the teen was interacting with was considered unsuitable or inappropriate for adolescents. Some of the typical risks these teens encountered were consuming inappropriate or explicit online content, such as pornography or violent material. While these risks may still be harmful, they were not considered high risks, because they did not pose imminent danger to the teen or were not to the point of being described as addictive behaviors.

> *"There was some pornography. Mainly, you know, looking at things. Not engaging in anything, just viewing."*-P20 Adoptive Mother from Maine

There were also a few reports about teens friending strangers on social media but not having any face-to-face or inappropriate online interactions:

> *"I was like 'who is this person?' 'I don't know but they liked my photo,' so that was her criteria for including them in on her friends list."*-P16 Foster Mother from North Carolina

Generally, the foster parents did not feel like these online risks were overly problematic. In comparison to parents of high-risk teens, these parents tended to be less restrictive and were more actively engaged in their teen's technology use. While parents of high-risk teens most commonly used technology monitoring (10/23 = 44%) and restriction (9/23 = 39%), the most common parental mediation strategy for these parents was the use of parental control software (4/13 = 31%), followed by house rules (3/13 = 23%), and active mediation (3/13 = 23%). In many instances, when parents of typical-risk teens utilized the same strategies as high-risk teen parents, they noted similar benefits and limitations. For instance, a few foster parents used parental control

software of their teens' phones. Most found this method useful; however, P08 noted how teens had a way of circumventing the technology.

P19 and P21 implemented house rules. However, P21 admitted that she was lenient with her rules, setting them, but not always enforcing them. P16 and P22 used technology monitoring, but they did not find this method very effective, mostly because they were inconsistent doing it. Only P14 restricted her foster son's tablet after she caught him using it inappropriately. Two parents of three teens, out of 13 who encountered typical online risks, used active mediation as their primary parenting approach. In contrast, we did not observe any parents of the 23 high-risk teens in our sample using active mediation. Therefore, we describe this parental mediation strategy in more depth in the next section.

Actively Mediating Online Risks

Two parents used active mediation by having conversations with their teens about the benefits and consequences of their online behaviors, as well as expectations for appropriate use. P17, an adoptive mother of her foster teens, said that she ties to understand the underlying cause of the problem:

> *"We talk about why, we talk about what they're looking at… we try to work on the inside and work on what's going on in their lives. Which is particularly challenging… but I've had good trust in the relationships."*-P17 Adoptive Mother from Michigan

P25 talked to her foster son about appropriate use in terms of his behavior being a reflection on their family.

> *"It's been appropriate use, such as you know you represent the us in our family, so you can't post any like provocative pictures or drug related things"*-P25 Respite Foster Mother

P25 not only talked with her foster son, she also talked with his biological parents to ensure everyone understood what video games he was allowed to play. In both cases, these parents used language and behaviors that showed that they were purposefully trying to integrate the teens into their families. In this way, these teens were being treated more like "typical" teens. Next, we discuss families where foster parents were unaware of the online risks their teens were experiencing online.

When Risks Are Unknown

Seven parents reported that their six teens had not experienced any type of online risks, at least to their knowledge. These parents used house rules (3), monitoring technology (1), active mediation (1), and parental control software (1). Two of these foster parents were a married couple parenting the same foster daughter. Even though the foster parents were interviewed separately, there was a high level of consistency between their interviews. Both said that they used house rules to set limits on when their foster daughter used her cell phone. Otherwise, they did not monitor her technology use in other ways.

> *"The only rule that gets followed, pretty much everyday around here, is that at bedtime her phone is not allowed in her room at all."*-P10 Respite Foster Mother from North Carolina

Neither reported any online risks of which they were aware, and her father (P12) confirmed, "*that's about it as far as monitoring goes."* Therefore, P12 said he was unaware of any online risks encountered by his daughter online:

> *"As far as I know, most of her phone use is talking to family and listening to music on YouTube or playing a game. So as far as I know, there hasn't been anything."*-P12 Foster Father from North Carolina

However, as P31 reflected, foster parents probably do not know many of the risks their teens are encountering online, especially when they do not actively monitor technology use, making it difficult for them to answer our interview questions accurately:

> *"The frightening thing about all of this, is that, how many parents or foster parents don't know the answer to these questions. And I feel like we should know, we should know those answers, right? Like we should know what our kids are doing and who they're contacting and what's been done, and we honestly don't know the answer."*-P31 Respite Foster Mother from Washington

Next, we present the emergent themes from our thematic analysis on the unique challenges related to mediating technology use within foster families.

Emerging Themes for Foster Families

We present two emerging themes from the foster parent reports. First, the unique challenges they face as foster parents and their urge for finding solutions to these challenges.

The Unique Challenges of Foster Families

A consensus shared by most of the foster parents was that their teens experienced severe abuse and trauma that made them more vulnerable to online risks than typical teens. Being removed from their biological family often came with a sense of rejection and the need for acceptance and love. Foster parents explained that this rejection often manifested as "attachment disorders" and feelings of "distrust" towards adults. This also created a disconnect between the foster teen and their foster parent, ultimately causing the teens to seek attention elsewhere.

> *"Even if somebody does care about them, that's a feeling they've never had because they feel very disconnected."*-P5 Adoptive Mother from Georgia

These attention-seeking behaviors also manifested as "mixed-maturity levels," which were described by parents as knowing too much for their age (e.g., overly sexualized), but also being emotionally stunted and demonstrating childlike behaviors.

> *"I can just tell my gut like she's over-sexualized and she has been exposed to more than what I realized, more than what the DSS realizes."*-P16 Foster Mother from North Carolina

> *"Kids that have or are in foster care and have had tough lives and frequently have behaviors that younger kids might."*-P12 Foster Father from North Carolina

Meanwhile, participants also felt that they faced unique challenges as foster parents. Many parents expressed frustration that they could not effectively mediate technology use in the home because their teens did not accept their authority as their parents:

> *"They'll tell you, you're not my parent, you can't do anything for me, and it's my cellphone don't touch it."*-P04 Foster Mother state undisclosed

This led to a sense of desperation in many of our interviews as parents sincerely wanted to protect and care for the foster teens who were part of their families.

<u>Foster Parents were Desperate for Solutions</u>

A strong, emergent theme across many of our interviews was that foster parents did not know what else they could do to protect their teens from online risks. In some cases, this manifested as defensiveness and a sense of hopelessness:

> *"They've already seen everything and done everything, so what am I supposed to do?"*-P11 Respite Foster Mother from Florida

In other cases, foster parents explained that they already had so many other things to worry about offline, that it was just too much to also have to worry about what they were doing online.

> *"There's so many other things that we're trying to work through and focus on, and that's not always a topic of conversation...like medical issues…Getting jobs. Going to school is definitely one of them. Friends and drama that completely debilitated her… There's so*

> *many things that we're on her about, that you kind of feel like you have to choose your battles. And so that's not one of the battles."*-P21 Foster and Adoptive Mother from Florida

When we asked parents to tell us what they thought would help them mediate technology use in the home more effectively (i.e., Blue Sky Visioning [156]), they gave a wide range of responses. Quite a few participants suggested parental control software to help them prevent high-risk online behaviors, such as sexting:

> *"If you try to post a picture of nudity, that it's immediately like, 'this picture contains nudity.' Or something to shut that down from sending it"*-P09 Therapeutic foster mother from North Carolina

Some parents thought it would be useful if this technology came standard on the teens' devices:

> *"You don't have to download an app to monitor, I think these things should come standard and activated, where if they go to a website that is viewed as a potential risk, that it just shuts down the device right away, or cut it off, or refuse to connect to the website."*-P08 Foster Mother, state undisclosed

We noted that these parents wanted restrictive technologies to identify risky content and behaviors to shut them down. Yet, other parents were less interested in technological solutions; they wanted more resources, such as "best practices" for mediating technology use.

> *"Maybe resources that are available, if kids exhibit certain kinds of behavior, then, maybe try this, or try this. I think that would be helpful."*-P21 Foster mother from Florida

Considering foster parents' technology expertise, "low-tech" foster parents tended to ask for educational resources and parental control features that already exist on the market. In contrast, "high-tech" parents suggested specific features, such as nudity detection that would prevent the teen from sending inappropriate pictures to others. All in all, foster parents consistently told us that they needed more help and support to keep their teens safe online.

Discussion

In this section, we discuss the implications of our findings in comparison to prior work, the limitations of our work, and future research directions.

The Paradox of Privacy vs. Online Safety

One of the questions we asked foster parents was whether they felt online safety versus respecting the teens' privacy was more important and why. We asked this question because Cranor et al.'s earlier work [31] found that most (biological) parents felt that teens' cell phones were considered their private devices. In contrast, the majority (over 75%) of foster parents in our study said that online safety, not privacy, was of utmost importance. This was often because foster parents could get in serious trouble if they did not take a protective role in the home:

> *"I've been placed in a parental role by the state, by you know by the court and that's part of what a parent is supposed to do, is like, help protect the child."*-P27 Respite and Adoptive Foster Mother from Connecticut

The "privacy paradox" we identified here was that while the foster parents said they would choose online safety over privacy, they were often ineffective at achieving either. Teens simply refused to give up their privacy (even more so than compared to the practical obscurity parents typically face with teens [15]). Teens hid their online activities, and in some cases, even their devices from their foster parents. The lack of trust between foster parents and teens led to even more impenetrable privacy boundaries than what other researchers have found in research with conventional families (c.f., [15,31,49,88]). As a result, many foster parents had to restrict access to technology in the home altogether. This caused even more conflict because it prevented foster parents from being able to form a trust relationship with their teens, which made it even harder for them to be actively engaged in more positive forms of digital parenting. Revoking access also

negated giving foster teens a "sense of normalcy" in our highly digital culture. Five parents explicitly mentioned "normalcy," while discussing the challenges around mediating technology use in their home:

> *"The agency likes to say that it is 'normalcy,' to have the child have all of these electronics and have access like a normal child. However, the children that we get in care, more often than most, did not have a normal upbringing like your child or your siblings or yourself would have had."*-P1, Foster Mother from Florida

In many cases, making sure the foster teen was safe had to come first over granting access to technology. In the next section, we frame this dilemma as a new "Digital Divide" for foster youth.

A New Digital Divide

Our work contributes a new perspective regarding foster youth and technology access [38,104,138]. Researchers have found that less than 21% of urban foster teens own a computer, compared to 90% of teens across the U.S. [184]. Researchers have labeled this inequality as the "Digital Divide," a disparity between those who have more access to technology and those who have less, typically due to cultural or socio-economic factors [56]. However, what we found is that foster parents in our interview study intentionally restricted access to technology in the home to protect their teens from online and offline risks, not due to socio-economic reasons. This is a novel insight that has not yet been highlighted in the digital divide literature and should be considered when studying the potentially negative (and positive) consequences associated with foster youths' lack of technology access. Prior research has found that restricted technology access reduces digital literacy [56], and limits the ability for foster teens to develop healthy social relationships [58], perform well in school [184], and, in the future, achieve job placement and financial security

once they "age out" of the system [55]. Yet, many foster parents in our study believed that revoking access was the only way to keep their foster teens safe. Therefore, addressing the issue of adolescent online safety for foster youth is a critical problem that, if solved, could also improve other important life trajectories for foster youth.

Implications for Practice and Design

Our research calls for new solutions that take into consideration the unique challenges and needs of foster parents. We propose several approaches (educational, policy, and technical) for addressing these challenges. First, we found that parental mediation strategies were often influenced by the level of technology expertise of the foster parent. Therefore, this calls for training and educational programs to teach foster parents about the latest technology trends and about effective digital parenting practices [196]. This would empower foster parents by giving them the prerequisite knowledge they need to protect their teens from online risks, either by using parental control software or active mediation to teach their teens how to use technology safely.

Enacting new policies that give foster parents more authority to use an array of possibilities to mediate technology use in the home may alleviate this problem. Federal, state, and agency-level policies that promote "reasonable and prudent" standards for "normalcy" [185], need to be updated to address the intricacies of digital parenting. For example, it could be considered reasonable and prudent for foster youth to have digital devices that are approved by the foster agency with an explicit statement that foster parents have the right and obligation to set limits and monitor technology use when necessary. Conversations regarding the management of digital devices and online presence of the teen could also be included within the case plan.

Another opportunity would be to design parental control software that is uniquely tailored to foster families. Traditional parental control software has been found to be overly restrictive and privacy invasive [71], harming the trust relationship between parents and teens [74]. Instead, we could re-imagine online safety software that empowers and teaches teens, affording more personal privacy, while safeguarding them against the most harmful online risks, such as online sexual predation [197].

Limitations and Future Research

There are several limitations to our study that present opportunities for future research. First, we were unable to incorporate the perspective of foster teens in this interview study due to the legal complexities of needing a court order to conduct research with wards of the state [198]. We hope to overcome this hurdle in our future research. Second, we cannot infer causality; the interviews with foster parents implied that restriction was a result of high-risk teen activity. However, parents did not change their mediation strategies based on the different online risk experiences of the teens in their home. Therefore, future research should further explore the relationship between teen risk activity and parental mediation strategies to disentangle this dynamic.

Third, our sample was diverse in terms of the types of foster placements; however, our it was still biased toward white, educated, middle to high income women. Consequently, we found a pattern where lower income, less educated participants tended to also be classified as “low-tech” parents with “high-risk” teens, who were more likely to use restriction and house rules to mediate technology use. Therefore, some of the challenges uncovered in our study may be amplified for

lower-income and less educated foster parents. This pattern is consistent with Livingstone et al.'s [106] research, which found that low-income parents are more likely to use restrictive instead of instructive mediation in the home. Given that most foster families receive public assistance and are 200% below the poverty line [126], we urge researchers to commit more resources to work with socio-economically disadvantaged and diverse foster families. In attempts to address this limitation, we plan to expand the focus of our EMA diary study (Chapter 5) to at-risk youth (e.g., socially disadvantaged and foster youth). In addition, based on the reports of foster parents, the foster youth mostly experienced online sexual risks. Therefore, our results highlight the need to study sexual risks in more depth. In our subsequent studies (Ch. 4 and 5), we focused on identifying protective factors and technology designs that can help foster youth navigate online sexual risks.

Finally, we reflect on and acknowledge our own deficit-based framing [182], where we attempt to catalog risk to ameliorate the problem of online safety for foster youth. This type of "risk discourse" often creates a sense of moral panic, overshadowing positive outcomes of youth, such as how youth themselves understand and mediate risks [159]. In Chapters 4 and 5, we are committed to taking more strength-based approaches that focus on positive factors that can help improve the lives and online safety of foster youth.

Conclusion: A Crisis That Must Be Addressed

Our research confirms that online safety is a challenging issue within foster families. Unlike prior work, such as Wisniewski et al.'s research with conventional families [168–170], which found that only 12% of the online risks reported by parents and teens were high-risk [170], the majority (53%) of foster teens in our sample were considered high-risk. Many of these teens

endured extreme trauma associated with their online activities, including rape and sex trafficking. Similarly, while conventional parents used restriction infrequently (4%) [169], foster parents in our study used this mediation quite often (23% of the time) with their foster teens. Unlike Blackwell et al. [15], who found that teens in her study only "heard no" from their parents, many of the foster parents in our study, indeed, "said no" to their foster teens. These are just a few of the noticeable differences between our research and other studies that have examined how parents mediate technology use in traditional family settings (e.g., [15,31,49,88].)

Through this research, we realized that foster parents, not just foster youth, are marginalized individuals that need our attention and support. They are often marginalized by the system, as well as their teens, who do not accept them as their parents. Yet, a common theme when we have presented preliminary versions of this work is that parents of teens (some who are researchers) frequently question the validity of studying adolescent online safety in the specific context of foster families. These individuals often relate to our research based on their personal experience with their own teens. While we agree that conventional families share many of the same struggles as foster families, we want to caution against downplaying the struggles of foster parents as this could potentially re-marginalize an already vulnerable population that is in need of immediate resources.

Examining the Mesosystem: A Comparative Analysis of the Challenges Caseworkers and Foster Parents Face to Address Teen Online Safety

According to Bronfenbrenner's Social Ecological Systems framework, the meso-system encompasses the interactions between microsystems. In this case, that would be the interactions between the case managers and foster parents. In Chapters 3 and 4, we uncovered interesting

complexities related to how case managers and foster parents handle foster youth's technology use and online interactions. We further examined these complexities by focusing on the interactions between case managers and foster parents. In comparing the results, we uncovered several tensions between case managers and foster parents (Figure 5).

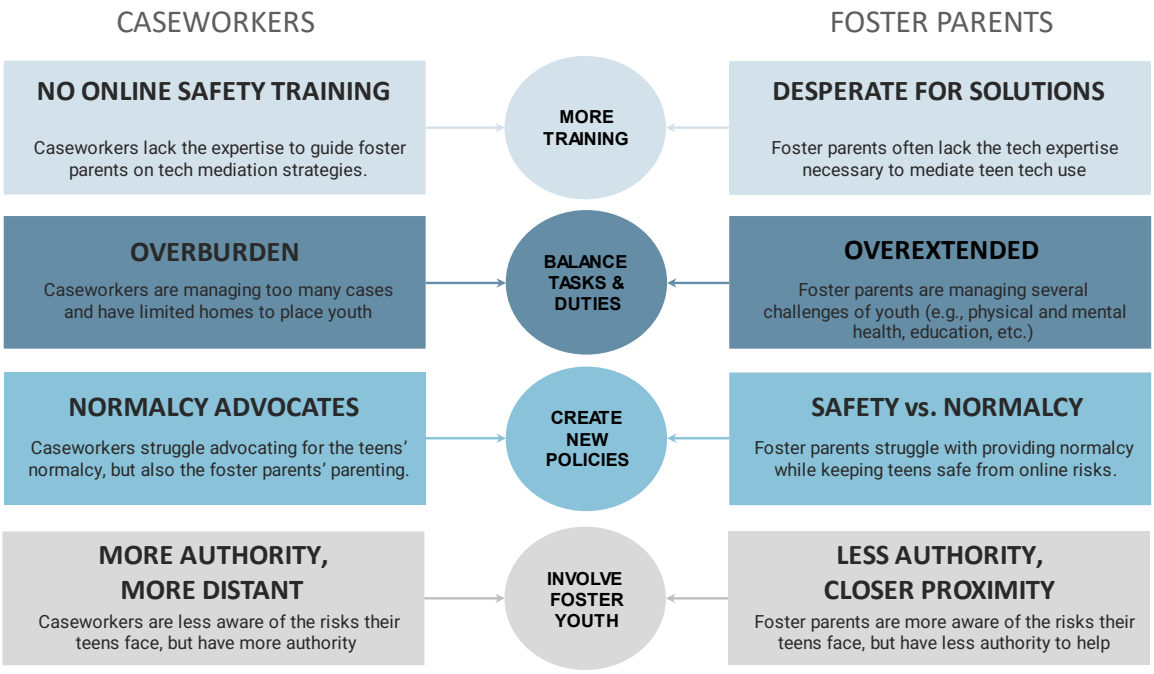

Figure 5. Meso-system level Tensions between Caseworkers and Foster Parents

First, case managers said they mostly receive training on managing victims of sex trafficking, but do not get much support on more general online safety situations. Similarly, foster parents had limited technology knowledge to effectively mediate teen technology use which often led to overwhelming feelings of desperation, because they do not receive the appropriate guidance from caseworkers. Unfortunately, this is a result of foster agencies not providing caseworkers with comprehensive online safety trainings.

Also, both caseworkers and foster parents are overburdened with challenges that force them to put online safety concerns as a low priority. For example, case managers are juggling large caseloads that prevent them from providing more individualized support, while foster parents are dealing with intense psychological, behavioral, and emotional challenges. This tension may be a result of inefficient or non-existent sociotechnical systems for supporting case managers and foster parents in their daily tasks.

There is also a tension between caseworkers pushing for normalcy, and foster parents juggling this with teens' safety. Case managers want to ensure foster youth are engaging in developmentally appropriate activities, but also want to make sure foster parents are parenting aptly. Yet, foster parents are not prepared to manage online risks situations and feel that revoking technology access is the only way to keep their foster youth safe from online risks.

Finally, our results indicate that while caseworkers have more authority and responsibility over the child's case and wellbeing, they are more distant to the teen's actual experiences. Caseworkers described youth experiences more generally than foster parents did. Foster parents seemed to be much more aware of their youth's interactions and experiences but felt that they did not have enough authority and preparation to manage these situations effectively. Policies at the agency and state levels should address these tensions. We provide recommendations for addressing each of these meso-systemic tensions in the next section.

Actions Towards Alleviating Case Managers' and Foster Parents' Value Tensions

Our findings highlight that even though both case managers and foster parents recognized that technology is a mediator of many of the high risks foster youth encounter, online safety is not

a priority. To address this tension and the associated challenges we provide the following recommendations:

First, **develop online safety training** for both case managers and foster parents. To ensure case managers are prepared to support foster families in online safety situations, they must receive training focused on online risks beyond sex trafficking. This includes training in technology mediation strategies and/or topics related to how technologies used by teens (e.g., social media) work. Foster parents should also receive training on how to balance the foster youths' privacy and safety. Foster parents should be given foundational technology knowledge that can help them mediate the teens' technology use. These trainings could also be provided together to foster communication among the case managers and foster parents. They could also create support groups for discussing topics or challenges they face related to the training they received.

Second, **create policies at the state level** that can support case managers and foster parents in mediating foster youth's technology use. For example, state agencies could administer standard devices to foster youth. These devices could also be monitored at the state level, similar to how school districts issue students technology devices (e.g., chrome books) for homework or school work. However, this raises another point—the method of monitoring should be tailored to the needs and values of foster families. Research has confirmed that traditional parental control software and monitoring strategies are ineffective [74,169]. Furthermore, both case managers and foster parents are overburdened with responsibilities. Instead, we can redesign these systems to account for a more social ecological approach to monitoring; where the power is balanced between stakeholders, monitoring occurs at the mesosystem level, and foster youth are empowered to make their own decisions and learn from them.

Lastly, we must **involve foster youth in the designs of systems** that are intended to protect them. Much of the evidence from case managers and foster parents focuses on the negative experiences foster youth have online. There were rarely discussions on the benefits technology can provide to foster youth. By including foster youth perspectives, we can better understand the reality of the interactions they have online. We can also design technologies to support these more tangible experiences.

The key take-away from this comparison, is that foster parents are closer to understanding the lived experience of the teens than caseworkers. The closer in relationship to the teen in the social ecological framework, the more detailed and personal the experiences get. For this reason, this motivates the need to include foster youth as key stakeholders in order to truly understand the online daily experiences of foster youth. In the next chapter, we discuss how researchers should engage with youth on sensitive topics.

CHAPTER 5: CO-DESIGNING FOR THE ETHICAL TREATMENT AND PROTECTION OF ADOLESCENTS

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In this chapter, we investigate best practices for engaging youth in research about their online risky experiences.

Introduction

The Human-Computer Interaction (HCI) and Computer Supported Cooperative Work (CSCW) research communities are increasingly committed to conducting high-quality and impactful research that improves the lives of youth. Within the last year, HCI researchers have conducted diary studies with adolescents to understand how they manage chronic illnesses [89], analyzed digital trace data to gain insight on how adolescents seek support for their online sexual risk experiences [133], engaged with teens through asynchronous online communities to design technologies to support mental health [13], and co-designed technology-based interventions with teens to help reduce their stress levels [14]. A commonality among such studies is that they often must grapple with difficult ethical issues around conducting research on sensitive topics, such as adolescent mental health and risk experiences (e.g., sexual solicitations, cyberbullying [112,113,170]), because these are the issues that are relevant to modern-day youth. Yet, adolescents are minors, and thus, considered a vulnerable population for which we should take great care to protect when engaging them in research [111,160].

Adolescent online safety and risk behavior is a prevalent concern within our society and a topic that is of interest to the HCI community (c.f., [110,112,168]). HCI researchers have engaged with adolescents to discuss and design for important online safety issues, such as cyberbullying [5], online sexual solicitations [133], and adolescent sexual health in the Digital Age [174]. These studies show the growing importance and prevalence of conducting research with adolescents to explore their online risk behaviors. They also demonstrate the immediate need for meta research on ethical practices for engaging in this type of high-risk, high-reward research. Recently, Walker et al. [160] developed heuristic guidelines for conducting research with vulnerable populations, including youth. In their framework, they encouraged researchers to ask important questions throughout the entire research process, including before a research study begins, to consider the needs and vulnerabilities of marginalized research participants. For instance, prior to conducting research with a vulnerable population, one should inquire, "Have you asked the vulnerable community what their needs or interests are related to this research?" (p. 34). In our work, we apply this heuristic framework to the context of conducting sensitive research with adolescents regarding their online risk experiences. Because parents are also stakeholders in research involving minors, we also sought to understand their perspectives. Through this research, we answer the following research questions:

RQ1: *What are the perspectives of teens and parents regarding the teen's participation in research related to adolescent online risk behaviors?*

RQ2: *What types of data are teens and parents willing to share with researchers when studying this topic?*

RQ3: *What design-based considerations should be made for systems used to collect data and engage teens in research about their online risk behaviors?*

To answer these questions, we worked directly with 20 adolescents (ages 12-18) and 13 of their parents to get their feedback on two different research methodologies (i.e., diary studies and analyzing social media trace data) for conducting research related to adolescent online risk behaviors. For teens, we employed two different co-design techniques (i.e., journaling [18] and paper mock-ups [161]) to elicit their ideas as the primary stakeholder or "user" in these types of studies. For parents, we conducted semi-structured interviews that covered similar topics to the exercises used for teens but were more focused on their role as secondary stakeholders.

Through a thematic qualitative analysis, we found that both teens and their parents expressed a general willingness to be part of such research because it was a personally relevant topic for the teens, and they felt their participation could benefit society. Parents recognized the prevalence of the problem and wanted to raise their teens' awareness of online risks (RQ1). Yet, participants also had several concerns that needed to be addressed prior to the teen's participation, which fell under the themes of: 1) privacy and control over the teen's data, and 2) risk mitigation for youth protection. Teens and parents wanted the researchers to be transparent about the risks and benefits of the research. Teens did not want to get in trouble or get their friends in trouble due to their participation. Parents wanted the ability to better assess the potential harm to their teens prior to their consent, including legal concerns (e.g., child pornography, sexting). Both requested help resources (e.g., hotlines) and direct assistance from the research team in the case the teen encountered serious online risks during the study.

In terms of the data teens and parents were willing to share with researchers (RQ2), they preferred the Ecological Momentary Assessment (EMA) diary study approach over the direct collection of social media trace data. The rationale was that this approach gave teens more control over what data they were sharing with researchers and when it would be shared. In general, participants were highly concerned over privacy and preferred if social media data could be shared selectively, allowing teens to choose which data to share and which to remove. In co-designing research tools to support such goals (RQ3), teens designed features that made the study more engaging and personalized, gave them more control over the data they shared, and provided easily accessible information about the study and resources for seeking help.

In this paper, we identify user-centered design considerations for conducting ethical, engaging, and technically-sound research with teens regarding their online risk behaviors. Our research contributes to the adolescent online safety literature by engaging with teens and their parents to inform the design of research studies that pose greater than minimal risk to minors and collect sensitive data from them. Importantly, we go beyond recommendations for research ethics to providing recommendations for the protection and safety of youth. We provide design-based recommendations for research tools used to engage teens in research about important and sensitive topics that are relevant and meaningful to them. Additionally, we do so in a way that is relatively uncommon: by working directly with adolescents and their parents to inform the design of the study mechanisms and the research methodology itself. By balancing the joint perspectives of adolescents and their parents, we aim to address the needs of both the primary and secondary stakeholders involved in adolescent research. Thus, our research contributes to the formation of

heuristic guidelines for conducting impactful, ethical, and beneficial research with adolescents both within and beyond the HCI community.

Background

We synthesize the literature on ethical practices for conducting research with vulnerable populations (e.g., adolescents) and the methods currently employed in adolescents' online safety research. Then, we introduce two methodological approaches that served as example scenarios for our study: 1) Ecological Momentary Assessment (EMA) diary studies and 2) collecting and analyzing teens' social media trace data.

Considerations for Conducting Research with Adolescents

HCI is an extremely diverse and relatively applied field, where we employ a myriad of empirical research methods, or "ways of knowing" [127], to make sense of user data and understand important social computing phenomenon across a wide variety of contexts. As such, *research on research methods* in HCI is a meta-level topic that is well-represented within the SIGCHI community (c.f., [108,134,135,153]). Yet, additional considerations are required when involving vulnerable populations in research. Vulnerable populations include individuals who are marginalized and/or have less power than those in the majority [111]; therefore, these individuals require special care and protection when involving them in research [160]. For example, Bell and Leong [11] recently worked with young adults with early onset dementia to co-design the research approach and tools appropriate for engaging with this demographic of vulnerable participants in research. They found that being respectful of the participants' time, being flexible in the study design, being mindful of participants' varying abilities, understanding the complexities of the

challenges that come with dementia, and building trust with participants were important considerations when working with this population. Such considerations are important to understand when conducting research with vulnerable populations that have special needs. Therefore, this paper contributes to the growing body of HCI meta-research by engaging directly with adolescents and their parents to support and encourage ethical, meaningful, well-executed, and technically sound research with and for vulnerable populations.

To ensure that these considerations are taken into account, Walker et al. [160] developed heuristic guidelines for researchers that highlighted ways to assess the costs versus benefits of research involving marginalized populations. The heuristics focused on considering the participants' needs and interests before a study, the power differentials and data collection concerns during a study, and participant privacy when disseminating results after a study. While these guidelines are useful when studying vulnerable populations, we are interested in contextualizing these heuristics to the specific context of conducting research with adolescents.

Within the HCI community, Peyton and Poole [132] identified adolescents (ages 13-17) as an understudied and vulnerable population within the HCI community. They identified several challenges researchers face when working with adolescents. For example, teens are in an in-between developmental stage (neither kids nor adults), which puts them in a more vulnerable position by law [4,132] and creates power imbalances between the researchers and adolescent participants. As such, they recommend novel techniques for engaging adolescents in research, including observational ethnographic videography and video collages, that gave youth more control over how they presented themselves to researchers and reduced the power imbalance typical of face-to-face user studies. Yardi et al. [176] also emphasized the importance of involving

teens in research, especially those in marginalized groups (e.g., teens with less privileges and finances). Researchers outside of the HCI community have also identified ethical challenges regarding youth's involvement in research. For example, researchers face challenges such as providing understandable information to teens for consent [46], maintaining confidentiality of teens' data [59], and protecting youth from harm or abuse [77]. These studies motivate our work; however, rather than relying on lessons learned by researchers, our work identifies best practices for conducting research with adolescents based on their own suggestions.

An additional layer of complexity, which was not addressed in these prior works, is that we specifically study risk behaviors that can put an already vulnerable population at greater risk. For example, sexting (e.g., sending digital nudes) as a minor can have severe legal consequences [117] and poses potential harm to the teen engaging in this online risk behavior. Online sexual interactions have been linked to an increased likelihood of offline sexual encounters [124], sexual predation [40], and other forms of sexual abuse [146], including sextortion [173] and human trafficking [154]. As such, asking adolescents to share their online sexual risk experiences with researchers is an important and relevant area of research, but it can also put them at greater risk. Researchers as educators are considered mandated child abuse reporters [27]; therefore, we must report any imminent risks posed to a minor to the proper authorities. In this particular case, participating in research on adolescent online safety and risks could, therefore, implicate child welfare and/or the police, depending on the severity of the risk [163].

The complexities of risk-focused research must be considered prior to conducting such research with adolescents as the end goal is to benefit, rather than harm, youth. This difficult problem has been broached within clinical fields in the past, such as in the field of pediatric

nursing. For example, Hern et al. examined different methodological approaches for studying substance abuse among adolescents and emphasized that researchers need to be cognizant of the unique developmental needs of adolescents and the challenges when studying sensitive topics that involve risk [87]. Yet, many of the considerations and approaches mentioned in this research are specific to offline risks and health-related contexts. With the advent of internet-enabled technologies and the use of personal smart devices, many of the considerations and approaches mentioned may not be applicable to the methods and approaches to study online risk behavior in HCI contexts. Therefore, additional research is warranted to understand risk-based research with adolescents in the Digital Age. Next, we synthesize the literature on adolescent online safety with a focus on the research methods utilized in these studies.

Conducting Research on Adolescent Online Safety and Risks

Adolescents' use of technology has been widely studied in relation to family dynamics and parental mediation in the home (e.g., [15,107,177]). Early work by Yardi et al. [177] found that parents' lack of experience with technology made it more difficult for parents to mediate their teens' social media use and caused tensions between balancing parental authority and teen autonomy. Subsequent research by Blackwell et al. [15] also found inconsistencies between parents' and teens' expectations of technology use. For example, teens felt that parents only focused on restricting technology rather than the opportunities technology provides. While these works have tangentially touched on the topic of adolescent online risk behavior, much of this work is more focused on technology mediation and rule-setting in the home, as well as the tensions digital media causes within families.

Within the broader context of teens, families, and technology use, the topic of adolescent online safety and risks has become an established research area within the SIGCHI communities. In 2016, Ashktorab and Vitak [5] were one of the first research teams to employ participatory design to conceptualize cyberbullying interventions with teens. They emphasized the importance of including teens as design partners when designing solutions for addressing cyberbullying risks. Around the same time, Wisniewski et al. [112,168–170] conducted a two-month web-based diary study with parents and teens to understand the weekly online risk experiences of adolescents. This work led to a body of subsequent research by Wisniewski and her colleagues on adolescent online risk behavior that called for a more teen-centric and resilience-based approaches to adolescent online safety (c.f., [49,77]). These researchers have since employed several empirical methods to study adolescent online risk behavior, ranging from interviews [10,48], app-based feature analyses [166], qualitative analyses of app reviews [71] surveys [71,73,140], design-based activities [9], to the development of new design-patterns for promoting adolescent online safety through active parental mediation and trust [75].

Quite a few HCI researchers have since joined in the efforts to understand the online risk behaviors of youth and move towards designing technologies that aim to protect teens and younger children. For instance, researchers have employed participatory design and co-design techniques with younger children (under 13) to generate new ideas for online safety features and tools [8,115,125]. In 2020, Masaki et al. [110] surveyed over 29 thousand adolescents to evaluate different nudge-based interventions designed to help adolescents avoid privacy and safety threats on social networking sites. They found that nudges can influence adolescents' choices towards privacy and safety, especially in scenarios where they have contradictory opinions about the

choice. These recent works demonstrate how SIGCHI researchers are moving beyond formative evaluations of users' needs to designing intervention-based solutions for promoting adolescent online safety. Yet, Pinter et al. [131] called for researchers to explore new empirical methods that that go beyond self-reports to document teens' "in-situ" and unfiltered online risk experiences. To this end, Yarosh et al. [179] performed a content analysis of youth-generated content on YouTube and Vine to show how teens' risk-taking behaviors change according to the platform, where they found that teens were more likely to post risky content on Vine. While analyzing teen's publicly available content, they recognized several ethical challenges such as getting permission, removing identifiable features and protecting youth from unanticipated risks. In 2020, Razi et al. conducted a thematic analysis of over 4 thousand posts by adolescents on an online peer support platform to understand their support seeking behaviors for online sexual experiences. They acknowledged the considerations for protecting youth when analyzing sensitive digital trace data (e.g., ensuring de-identification and anonymity of posts). As highlighted in these studies, analyzing digital trace data from teens presents new opportunities to develop deeper insights into the digital lives of youth but also poses new ethical challenges. Therefore, as HCI researchers embarking on novel approaches for studying adolescent online safety and risks, we must reflect on how to conduct such cutting-edge research responsibly.

Developing New Approaches for Conducting Online Safety Research with Teens

We must iterate and improve upon the ways in which we engage teens in research. In this paper, we chose two methodological approaches for conducting adolescent online safety research with teens that we used as example scenarios in our study: 1) EMA diary studies, and 2) analyzing

social media trace data provided by teens. We give an overview of each of these approaches and contextualize them to research on adolescent online safety and risks.

Ecological Momentary Assessment Diary Studies

An EMA diary study is a methodological approach that researchers use to collect thoughts, feelings, and behaviors of participants in their everyday lives [114]. Given the "momentary" and "in-situ" nature of EMA reporting, this technique provides more accurate measurements than those of traditional assessments (e.g., interviews) that rely on participants to recall (leading to recall bias [118]) important events long after they occur [114]. Due to the strengths of this approach, EMA diary studies have been successfully used to study sensitive issues and risk behaviors that teens encounter in their daily lives, including substance use [144], sexual risks [60], chronic illnesses [89], and acute mental health issues [33]. For example, Czyz et al. [33] examined suicidal thoughts and suicidal attempts among adolescents after psychiatric hospitalization. They found that significantly more teens reported thoughts of suicide using daily diaries and were more likely to disclose thoughts of suicide via EMA compared to traditional assessments. Given the prevalent use of smartphones among adolescents [94], researchers have also begun to leverage mobile technologies to engage adolescents in EMA diary research. Garcia et al. [66] developed a text messaging EMA diary system and found that it was a promising way to engage with adolescents. Similarly, Comulada et al. [30] conducted a text messaging-based EMA diary study regarding substance abuse among youth. They found a high level of compliance when outpatient adolescents were asked to complete cellphone-based reports, as these devices were already embedded in their daily routines. Wray et al. deployed an Android smartphone app to conduct an EMA diary study

about high-risk sexual events amongst men who have sex with men [175]. They saw a higher response rate through the EMA diary mobile app in comparison to other approaches (e.g., text-messaging and web-based approaches).

Building upon this prior work, we wanted to examine whether daily EMA diaries administered via a smartphone app could potentially be a more engaging and effective way to conduct online safety research with teens. For instance, a smartphone app could provide enhanced features for data sharing, such as the ability to upload photos and/or screenshots in addition to survey-based responses. Therefore, we introduce and iterate upon this approach with teens to understand whether EMA diary studies via smartphone apps are a viable approach for conducting adolescent online safety research. Next, we discuss the possibility of collecting and analyzing social media trace data as an alternative approach.

Collecting and Analyzing Social Media Trace Data

In a comprehensive review of the literature on adolescent risk behaviors and online safety, Pinter et al. [131] found that most of the research in this area relied solely on cross-sectional surveys, where teens self-reported their online risk experiences. As such, they encouraged researchers to diversify their methods by unobtrusively collecting digital trace data (e.g., publicly scraped social media data) that is indicative of teens' actual online risk behaviors. Analyzing social media trace data allows researchers to pull information (such as publicly available social media posts) without requiring much or any active participation from users [133]. Weinstein et al. [162] used adolescents' digital trace data to identify key digital stressors for teens online. Relying on authentic accounts from social media trace data, they found evidence on digital stressors for teens

such as harassment, humiliation, and impersonation. Similarly, Razi et al. [133] leveraged this technique when analyzing posts made by adolescents regarding their online sexual risk experiences on a mental health peer support platform. By doing so, the researchers were able to get an unfiltered view of the lived online sexual experiences of teens and a deeper understanding of peer support-seeking behaviors. Overall, studying teens' social media trace data may help reduce recall bias, add validity to risk self-reports, and provide context to risky interactions, enabling researchers to get a deeper understanding of teens' online behaviors [57,76].

Yet, this approach is not without limitations. Fiesler et al. [53,54] have shed light on the ethical implications of studying digital communities in the age of big data. They found that Twitter users are generally unaware that their publicly shared Tweets could be used for research purposes and felt strongly that such data should not be used without the users' consent [53]. As such, the SIGCHI community continues to grapple with ethical issues around data ethics for non-human subjects' research that involves user data and has yet to converge on social norms around the use of social media trace data in research [53,54]. Given this controversy, we contrived a novel design where teens would assent (with parental consent) to donate their social media data for the purpose of studying adolescent online risk experiences. In such cases, teens could download their social media data file and share this file directly with researchers. Unlike prior research studies that collect and analyze publicly available social media trace data [133,162], this approach would allow researchers to access teens' private social media data, including direct messages with their friends. This approach is provocative as it exposes teens' private social media lives to the scrutiny of researchers. Therefore, we presented this approach as a second scenario to elicit feedback from

participants on whether this approach to engage adolescents in online safety research would be plausible.

In summary, we build upon and make unique contributions to this adolescent online safety and risk literature in two ways: First, we worked directly with teens and their parents to understand how these two research methodologies should be carried out when conducting research on online risks (e.g., sexual experiences). While prior work [5,13] has used co-design as a technique to solicit feedback and give teens a voice in the design of online safety interventions that benefit them, we leveraged this approach to give teens a voice in the design of adolescent online safety research. In the next section, we describe our study design.

Methods

Below, we provide an overview of our study, describe our methods, provide details regarding our data analysis approach, and explain our recruitment strategy.

Study Overview

The goal of our research was to work directly with teens and parents to elicit their feedback and insights on using EMA diary studies and the collection and analysis of teens' social media trace data as methodological approaches for studying adolescent online risk behavior. To do this, we took an integrative approach by utilizing direct engagement and participation of teens through one-on-one interviews and focus group sessions that included co-design exercises that solicited design feedback and facilitated idea generation through journaling [18], storyboarding [161], and back-and-forth discussions. Co-design approaches are commonly used within the HCI literature, particularly when working with youth as end users [42]; however, these techniques are less

commonly seen in the design of research. Co-design techniques vary based on the stage of the design process, ranging from contextual inquiry (ideation stage), collaborative prototyping (design stage), to iterative redesign of an existing system [119]. Our study is situated at the intersection of the ideation and design stages; therefore, we chose to use journaling [18] and storyboarding [161] techniques as our tools for probing, understanding, and generating design ideas from our teen participants. According to Brandt et al. [18], journaling is a useful technique for allowing participants to explain their thoughts through writing or drawing to understand their experience. This technique is especially useful for investigating highly sensitive topics, where it might be uncomfortable or even inappropriate to have youth discuss the subject matter amongst one another. Topics such as teens' online sexual risk experiences are highly personal and sensitive matters that we did not think teens would feel comfortable discussing with other teens (that they did not know) or the researchers. Therefore, journaling was used to elicit feedback about the types of questions teens would feel comfortable answering in an EMA diary study and how they would feel about sharing their social media data with researchers. Storyboarding, on the other hand, allows a co-design team to iterate on an initial design by collaboratively generating new design ideas and improvements [161]. We used storyboarding to elicit ideas for the design of an EMA diary app.

Given that parents are not considered the primary stakeholders (or "user") in adolescent online safety research, we chose to conduct separate, semi-structured interviews with parents. By combining adolescent co-design with parental interviews, we were able to better understand their shared and contrasting opinions regarding the proposed research methodologies, as well as challenge our underlying assumptions about conducting research with adolescents. Below, we describe the adolescent co-design sessions and parent interviews in more detail.

Adolescent Co-Design Sessions

We engaged with 20 adolescents (ages 12-18) across 13 co-design sessions. Each teen participated in only one session. During each co-design session, adolescents completed three separate co-design exercises with the researchers: 1) journaling their thoughts about questions regarding their online sexual experiences, 2) journaling their thoughts about sharing their social media data with researchers, and 3) storyboarding a mock-up of a mobile EMA diary app to iterate on the initial design and come up with new features. At the end of each session, participants completed a demographic survey, which included gender, age, educational level, and ethnicity, as well as the employment status and income of the parents. Each session lasted approximately 1.5 hours. We held both individual and group sessions because of scheduling conflicts and availability; however, this also gave us the ability to assess which environment (either individual or group) was more conducive to eliciting meaningful ideas from participants. We found that group sessions facilitated more ideas overall; yet, there was often one person who tended to dominate the conversation. Considering this, individual sessions were more helpful in making sure that each participant's voice was heard. Therefore, we found that group sessions that leveraged both individual (i.e., journaling) and group (i.e., storyboarding with group discussion) co-design techniques worked well, in that they allowed all individuals to have their voices heard but also fostered group discussion. Individual sessions were audio-recorded, and group sessions were video-recorded to better determine which participants were speaking for later transcriptions. Parental consent was obtained for adolescents under the age of eighteen and adolescents also gave their verbal assent to participate in the study. In the paragraph below, we describe each co-design exercise in more detail.

EMA Diary Online Sexual Risk Survey Questions

You have been asked to participate in a study about online sexual risk. Below are two examples of survey questions. Please write about whether or not you would want to participate in this study. Would you feel comfortable answering these types of questions? Why or why not?

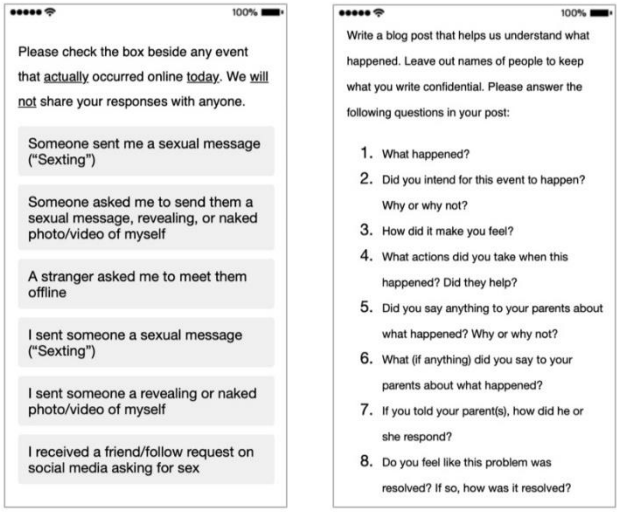


Figure 6. Journaling Exercise Scenario: examples of closed- and open-ended response survey questions in a study about adolescents' online sexual risks. Adolescents evaluated both questions, while parents evaluated the question on the right.

In the first 15-minute exercise, the adolescents were given a scenario in which they were asked to consider themselves as participants in an EMA diary study about online sexual risk experiences. The scenario (Figure 6) presented two examples of survey questions that would elicit sensitive information about online sexual experiences. Instead of answering these questions for themselves, participants were individually asked to write down whether they would be comfortable answering these questions and why. The second 15-minute exercise presented a scenario that asked adolescents to individually answer questions about sharing social media data with researchers (e.g., "What data would you be willing to share?", "What type of data would you not be comfortable sharing?", "Would you feel comfortable sharing your username and password with the

researcher?"). At the end of the 30 minutes of journaling, participants shared their answers with the group (if they felt comfortable doing so).

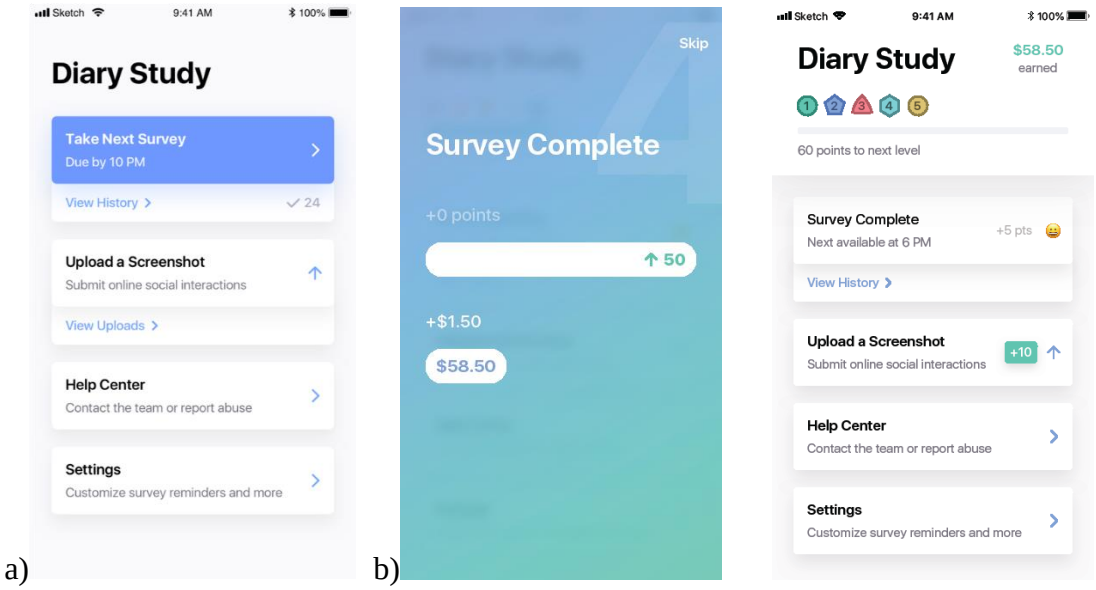


Figure 7. Storyboards presented to adolescent participants: a) Baseline dashboard, b) "Gamified" dashboard.

For the final exercise, we presented a storyboard with three mocked-up screens of an EMA diary mobile app (Figure 7). Adolescent co-designers and researchers evaluated the mock-up designs together, and the teens added their own ideas. This approach promoted idea generation among teens and allowed us to collect rich, illustrative feedback from the teens. We began the exercise by explaining the purpose of the mobile app and presenting participants the first storyboard (Fig. 2a) which included a dashboard with four options: "Take Next Survey," "Upload a Screenshot," "Help Center," and "Settings." We asked participants to mark up the storyboard, denoting things they liked, disliked, and adding their own design ideas. To facilitate understanding and collaborative co-design with the participants, we asked several questions about daily surveys (e.g., "Should the survey have more multiple-choice or open-ended questions?") and the potential

functionality of different mobile app features (e.g., “What would be displayed when tapping Upload a Screenshot?”).

After the participants finished expressing their thoughts and design ideas for the first storyboard, we presented them with the second storyboard (Figure 7b) that included potential incentive structures. This second storyboard was designed to prompt adolescents to think about how they would want to be incentivized and motivated to participate in an EMA diary study. One of the screens in this storyboard was a gamified [79] version of the dashboard included in the first storyboard, while the second screen was an example of points and earnings displayed after completing a daily survey. Again, the participants were asked to mark up the storyboard with their design ideas and we asked questions to elicit ideas and guide the discussion (e.g., “How could teens be encouraged to take the surveys?”). After this scenario was completed by the adolescents, their session was concluded. Next, we describe the parent interviews.

Parent Interview Sessions

We conducted semi-structured interviews with 13 parents to understand their opinions about their children’s potential participation in future studies investigating online risk behaviors. Parents’ interviews were conducted in a separate room while their teens completed the co-design exercises. We began the interview by giving parents a brief explanation of the purpose of the interview. We then presented the parents the following scenario: “*Your teen has indicated that they have encountered an online sexual risk situation. Your teen is asked to answer the following questions about the situation that happened”* along with the same subset of online sexual risk questions that adolescents saw during their journaling exercise (Figure 6, right). We then asked

parents a series of questions (Table 5) to understand their perspectives about their teens participating in similar studies regarding their online risk behavior. Interviews lasted approximately 30 minutes to 1 hour.

Table 5. Sample interview questions for foster parents.

Semi-Structured Interview Questions for Parents
Would you let your teen participate in this type of study? Why or why not?
What would make you feel comfortable to allow your teen to enroll in this type of study?
Have you or your child ever participated in a daily diary research study before?
What information should we include in an informed consent?
What type of incentive would be appropriate to give a teen for participating in this type of research?
What type of data would you allow your teen to share with us? For example, photo/video, comments, messages, stories, profile info?
How would you feel about your teen giving the researcher usernames and passwords in order to get their data?
What actions would you like the researcher to take if the teen reported an online sexual risky situation in the app? In this case, should you be immediately notified by the researcher?

Data Analysis Approach

Data collection included researcher observational notes, audio/video recordings from the participants' sessions, and scanned copies of the adolescents' design artifacts. After each session, debriefing notes were created by the research team, which included the session goals, participants' demographic information, initial findings, comments, journal responses, and design ideas. Audio and video recordings were transcribed verbatim. To address each of our research questions, we performed thematic qualitative analyses [20], where we first read thoroughly through the transcriptions multiple times, making notes of ideas and generating initial codes. We then refined our codes by grouping them conceptually into themes to generate our final codebooks. To answer RQ1, we conducted a thematic analysis based on the adolescent journaling exercise and the transcripts of the teen and parent sessions, which resulted in three key themes presented in Table

6. Our first theme included the **motivations for participation**, or why teens and parents would be willing (or willing to consent) to be part of the research. The themes related to RQ2 are also presented in Table 6. To answer RQ3, we then conducted a thematic analysis on the adolescents' design preferences (i.e., likes, dislikes, and new design ideas) of the app features from the storyboarding exercise as shown in Table 8 located within our results. The qualitative analyses were conducted jointly by the second and third authors of this paper with feedback solicited from all co-authors.

Table 6. Final codebook for adolescent co-design sessions and parent interviews.

Themes	Codes (T/P)	Exemplars
Adolescents' and Parents' Perspectives (RQ1)		
Motivations for Participation	**Personal Experience** (Teens)	"*I would participate in a study like this especially since I happen to be online a lot.*" –T15, Male age 17
	Contribute to Society (Teens)	"*I would participate so that my answers or case could help someone else and prevent the same accident.*" –T6, Male age 18
	Prevalent Problem (Parents)	"*I think given the amount of information they face. I think 14 maybe is an age they begin to see the information that is sexual related."* –P7, Mother age under 40 (M, 14-year-old teen)
	Raise Awareness (Parents)	"*There are younger kids who are at risk, sometimes more at risk because they are not aware of the things that are happening*." –P13, Mother age 40-49 (F, 13-year-old teen)
Privacy and Disclosure Concerns	**Teens' Identities** (Teens/Parents)	"*This is a very sensitive area because again leaving digital footprints… can you do it anonymous?*" –P5, Mother age 50-59 (F, 14-year-old teen)
	Others' Identities (Teens)	"*I would probably not reveal things that I sent. I might send stuff I received.*" –T5, Male age 15
	Getting in Trouble (Teens)	"*Maybe wouldn't want to like, send that screenshot. You'd probably just like, hide that from the others.*" –T17, Male age 12
	Data Misuse (Parents)	"*I just feel insecure about having an outside source being able to … somehow get data that you weren't supposed to see*." –P4, Mother age 50-59 (M, 15-year-old teen)
	Trust (Teens/Parents)	"*Honestly, I don't trust like, researchers, Internet in general.*" –T11, Female age 17
Risk Mitigation and Youth Protection	**Risk Reporting** (Teens/Parents)	"*Like you guys (researchers) would be able to see it and like, if you had to report it then you could.*" –T19, Male age 14
	Help Resources (Teens/Parents)	"*If they need help have a number and they can call that number if they need help.*" –T5, Male age 15
	Assess Harm to Teen (Parents)	"*I think given the subject matter I think it would be conducive for the parent to know what's going to be asked.*" –P1, Father age 50-59 (M, 15-year-old teen)

Themes	Codes (T/P)	Exemplars
Adolescents' and Parents' Data Considerations (RQ2)		
Data Collection Approach	**Active vs. Passive** (Teens/Parents)	"*Upload data yourself; so user can keep track & feel in control of their submissions.*" –T7, Female age 16
	Review Data (Teens)	"*It will show you what you're about to upload. In case there's one wrong, just deselect that and then click 'Confirm.*'" –T17, Male age 12
Data Types	**Open vs. Close-ended Questions** (Teens)	*"Multiple-choice sounds good, but maybe...if there were another option that you could type your own answer if you had to be specific, that would also be good."* –T4, Female age 16
	Photos (Teens/Parents)	"*Because of the nature of the study … I would say all of it, all access to all media*" –P6, Mother age 40-49 (F, 15-year-old teen)
	Social Media Credentials (Teens/Parents)	"*No, because—that I would object to … it's always a risk when you give someone your password*." –P11, Father age 50-59 (F, 17-year-old teen)

The two coders met daily during the data coding process and iteratively discussed the data to form a consensus on the codes and themes. The thematic analysis of features was completed by the second author with feedback from all co-authors. Next, we describe how we recruited teen and parent participants for our study.

Participant Recruitment and Demographics

Study sessions occurred at our university's campus in lab space dedicated to user research. In all cases, parents were interviewed separately from their teens. Some parents were unavailable for interviews but consented for their teens to participate in the study. In total, we held 13 co-design sessions with 20 teens and interviewed 13 parents. Eight researchers were involved in facilitating sessions. The second author facilitated most of the adolescent co-design sessions, and the third author facilitated most of the parent interviews. Participant recruitment began in May 2019 and concluded in November 2019. We recruited a total of 33 participants (20 adolescents and 13 parents).

Table 7. Teen and parent participants' demographic information.

Session ID	Adolescent Session				Parent Session			
	ID	Age	Sex	Ethnicity	ID	Age	Sex	Ethnicity
S1	T1	15	M	White/Caucasian	P1	50-59	M	White/Caucasian
S2	T2	14	M	Hispanic/Latino	P2	<40	F	Hispanic/Latino
	T3	12	F	Hispanic/Latino				
S3	T4	16	F	White/Caucasian	P3	50-59	F	White/Caucasian
S4	T5	15	M	White/Caucasian	P4	50-59	F	White/Caucasian
S5	T6	18	M	Asian/Pacific Islander	-	-	-	-
	T7	16	F	Black/African American				
	T8	16	M	Hispanic/Latino				
S6	T9	17	F	Multiethnic/Other	-	-	-	-
	T10	17	F	White/Caucasian				
	T11	17	F	Asian/Pacific Islander				
S7	T12	14	F	Asian/Pacific Islander	P5	50-59	F	Asian/Pacific Islander
S8	T13	15	F	Black/African American	P6	40-49	F	Black/African American
	T14	14	M	Asian/Pacific Islander	P7	<40	F	Asian/Pacific Islander
S9	T15	17	M	Multiethnic/Other	P8	50-59	F	White/Caucasian
	T16	16	M	White/Caucasian	P9	40-49	F	White/Caucasian
S10	T17	12	M	White/Caucasian and Hispanic/Latino	P10	60-69	M	Hispanic/Latino
S11	T18	17	F	Black/African American	P11	50-59	M	Black/African American
S12	T19	14	M	Hispanic/Latino	P12	40-49	F	Hispanic/Latino
S13	T20	13	F	Hispanic/Latino	P13	40-49	F	Hispanic/Latino

Participants are shown in Table 7, where teens are displayed on the same row as their parent, and each row sharing a Session ID are participants within the same group. Before recruiting participants, we obtained Institutional Review Board (IRB) approval to conduct our study. We recruited participants by distributing recruitment flyers via email and social media. We also reached out to youth educators (e.g., coaches, teachers, etc.) and existing connections at youth-serving organizations. Additionally, we asked participants who completed our study to refer other individuals that were potentially interested and eligible to participate. Each participant was compensated with a $15 Amazon.com gift card ($30 total per parent-teen pair).

We had a diverse sample of adolescents with participants identifying as White/Caucasian (25%), Hispanic/Latino (25%), Asian/Pacific Islander (20%), Black/African American (15%), and Multi-ethnic/Other (15%). Adolescent participants (ages 12-18) had equal gender representations (N=10), and parents mostly identified as females (77%, N=10). Most adolescents were between 15 and 17 years of age (60%, N=16), with a mean age of 15.5 and a standard deviation of 1.74 years. Parents were between the ages of 40 and 69. Six adolescents participated without a parent, and one parent (P2) participated with two of her children (T2, T3). Seven parents reported having a household income over $100,000, while four parents had a household income between $50,000-79,999, one between $80-99,999, and another between $30,000-49,999. Apart from two college freshmen, most teen participants were in middle and high school, ranging from 7th to 12th grades with most students in 9th (20%) and 11th grades (25%). Next, we present our findings.

Findings

In our results, we use illustrative quotes from participants to describe the themes that emerged from our qualitative data, where each quote is identified by the participant's ID (i.e., T=Teen; P=Parent) and age. For parents' quotes, we included the gender and age information about their teens (i.e., "F, 15-year-old teen"). Adolescent design artifacts are also included.

Adolescents' and Parents' Perspectives on Research on Risky Behaviors (RQ1)

Study sessions occurred at our university's campus in lab space dedicated to user research. In all cases, parents were interviewed separately from their teens. Some parents were unavailable for interviews but consented for their teens to participate in the study. In total, we held 13 co-design sessions with 20 teens and interviewed 13 parents. Eight researchers were involved in facilitating sessions. The second author facilitated most of the adolescent co-design sessions, and the third author facilitated most of the parent interviews. Participant recruitment began in May 2019 and concluded in November 2019. We recruited a total of 33 participants (20 adolescents and 13 parents).

Willingness for Teens' to Participate in Adolescent Online Risk Research

Both the majority of teens (75%, N=15) and parents (92%, N=12) gave reasons why they would consider participating (or allowing their teens to participate) in research that focused on studying teen risky online behavior. For instance, many teens (50%, N=10) felt that participating in this type of research study would give them the opportunity to share about their **personal experiences** and how they felt about these risky experiences. For example, T3 said that having the

opportunity to give more details about a specific situation could allow teens to tell researchers the truth about what they experience online, rather than researchers making assumptions.

"Yes, because they can know how you felt about the situation. Also, so they know you're not lying." –T3, Female age 12

For this reason, T3 preferred answering open-ended rather than close-ended questions about her online risk experiences. Similarly, other teens also wanted the opportunity to share their thoughts and feelings with the researchers and saw this as an added benefit of such studies. Open-ended responses gave teens opportunities for self-expression and self-reflection, which are important developmental milestones during the period of adolescence [181].

"*It gives you, kind of like, an opportunity to … describe, like, 'Oh,' like, 'this happened today,' or, 'This is how I felt when someone said this,' or, you know?"* –T13, Female age 15

Teens (25%, N=5) also felt that their participation could **contribute to society** and help others. They felt that experiences that they encountered could be learning opportunities for others when presented with similar situations. Through their participation, they hoped for changes in policy that could help "*prevent the same accident"* (T6) from happening to others. These teens considered it of utmost importance for the study to have an end goal, meaning it would have a positive and direct influence on teens' online experiences.

Similarly, most parents (92%, N=12) indicated that they would agree to consent for their teens to participate in research related to their online risky behaviors. Many of these parents (54%, N=7) felt that online sexual risks are an extremely **prevalent problem** in today's technology-centric world and that their teens are often exposed to these types of risks. For this reason, they considered this research important and hoped for improvement in online safety through their teen's

participation. They wanted researchers to find ways to help their children and provide solutions for mitigating these risks:

"I'm seeing more and more sexual depictions on games and without the proper warnings. The reality of it, as I said before, they are being exposed more and more to what is defined as a sexual risky situation." –P6, Mother age 40-49 (F, 15-year-old teen)

Through the study, parents (31%, N=4) also wanted their teens to be **more risk aware** of their online behaviors and the risks they encounter. They thought that by participating in this type of research, teens would have the opportunity to build awareness. Teens could learn about age-appropriate behaviors or the difference between "*right and wrong*" online behaviors:

"I want him to actually be more conscious of what he sees online and what is considered okay and what's not considered okay for his age." –P12, Mother age 40-49 (M, 14-year-old teen)

Overall, adolescents and parents were fairly positive about participating in research about online risky behaviors. Teens expressed that having the opportunity to share their experiences, help others, or contribute to studying an important topic would motivate them to participate (or have their teen participate). Parents also hoped to bring about better online safety solutions and risk awareness through their teens' participation in this research. Yet, even though teens and parents were open to participating in this type of research, they all expressed specific concerns that needed to be addressed prior to the teen's participation. In the next sections, we present their main concerns, which centered around privacy concerns and youth protection.

Considerations for Privacy and Disclosures

Teens and their parents voiced several concerns regarding the sensitivity of the research. A common theme among teens (100%, N=20) and parents (77%, N=10) that emerged during the sessions was the concern for preserving teens' privacy and giving them control over how their sensitive data was shared. Teens (85%, N=17) felt that studies on risky online behaviors warranted that they share sensitive information, but researchers should then take measures towards protecting the **teens' identities**. One condition teens (and parents) had for participation was anonymizing the data, that is, removing any identifiable information, such as a teen's "*real life name*" (T7) or usernames from the data set:

"As long as I stay under complete anonymity, then I'd be comfortable sharing any information that was requested by these questions." –T16, Male age 16

Similar to the adolescents, over half of the parents (69%, N=9) also felt that having teens share about their online behaviors and risk experiences was "*kind of a keys to the kingdom type thing,*" (P1) as in they were concerned about researchers having access to their very sensitive personal data. Therefore, they wanted their teens' data to be de-identified before it was shared with the researchers:

"I would hope that you would be okay with either no names or just first names and not entire names … for my child's privacy." –P4, Mother age 50-59 (M, 15-year-old teen)

Even with anonymity addressed, teens (70%, N=14) were concerned with having to share the **identities of others**. This was particularly true among female participants, as this was a unanimous concern across all female participants (N=10). For instance, they mentioned a feature on Snapchat that notifies users when someone takes a screenshot of their content. Teens feared

they would be questioned by the other users if they were to take a screenshot, especially if they were having a private conversation (e.g., sexting) with them.

"I think Snapchat shouldn't be included, only because most people … wouldn't do it just because they wouldn't want to put themselves in that situation where it's like, 'Why did you screenshot our conversation?'" –T9, Female age 17

Furthermore, many teens (50%, N=10) did not want to share anything *"too personal*," (T14) or risky with the researchers. Interestingly, this concern was expressed most frequently by male participants (N=9). They feared being exposed by the researchers or others who may have access to their information and, as such, felt the study would put them in a vulnerable position that may lead to them **getting in trouble**. Some teens (35%, N=7) felt particularly uncomfortable sharing information about their friends because they did not want to get friends in trouble. They did not want to damage the relationships they had with these people by taking part in research. However, they were less concerned about sharing information about strangers. For instance, they were comfortable sharing that a stranger had sent them sexual content, but they were not comfortable sharing their intentional sexual experiences (e.g., purposefully sending sexual content to someone else).

"If they're my friend I don't want to expose them. If I don't know them it's fine." –T3, Female age 12

Parents (38%, N=5) also wanted to ensure that there would not be any **misuse of data** and that the data collected by the researchers aligned with the study's purpose. They did not want the data to be shared in unexpected ways.

"What specifically are you looking for? And with the understanding … you're not going to be doing anything else … with that data." –P1, Father age 50-59 (M, 15-year-old teen)

Much of the fear teens had of getting in trouble was a result of not **trusting the researcher**. Many of the teens (30%, N=6) did not feel comfortable sending information to someone they had not previously met before ("*a random researcher*" (T5)), nor someone in which they did not have a trusting relationship. However, teens (10%, N=2) expressed that, if they did trust the researcher, they would feel more comfortable sharing their sensitive data with them.

"These screenshots will probably go to the researchers, right? To look? So, it depends on how—if you trust them enough with your information." –T9, Female age 12

Parents (38%, N=5) also emphasized the importance of building trust between the researcher and teen participant. These parents even acknowledged the fact that their teens do not share much of their personal online experiences with them and, therefore, may not feel comfortable sharing it with a researcher. Trust would provide the teen assurance that their information would be kept safe. For instance, one mother suggested that the researcher share personal information with the teen to create trust:

"Maybe if you gave him a little information about you like a little biography. Like 'I'm a student' or you know, something like that. Because then I think that creates trust… Might give them a little more a surety." –P3, Mother age 50-59 (F, 16-year-old teen)

Overall, adolescents and parents were concerned that studies investigating teens' risky behaviors may create privacy issues for the teen and others. Therefore, teens and parents suggested only collecting de-identified data and establishing a trusting relationship between the researcher

and teen participants. Next, we present the concerns adolescents and their parents had regarding mitigating the potential risks that may be encountered during the study.

Mitigating Online Risks Encountered during the Study

Participants acknowledged that the teens would be sharing risky experiences about threatening situations online, such as cyberbullying or sexual solicitations. Therefore, they felt it was important to help mitigate these risks and ensure the teens' wellbeing during the study.

Specifically, teens (45%, N=9) wanted the study to include a **risk reporting tool** that either contacted the researcher or reported the situation to the authorities. Some teens felt that this would be a useful mechanism for "*bust[ing] pedophiles*" (T16) or catching other harmful people:

"It would be for the better good, you wouldn't feel bad or pressured, you just let it out, and get help and send the dude to jail." –T17, Male age 12

Some teens (25%, N=5) stated that they would submit a report to the researcher with a message or screenshot that included the details of the situation. They felt that the researchers were in a position of authority in which they could help the teen overcome the problem without the involvement of their parents or law enforcement. Therefore, they would rather rely on the researchers' judgement for reporting a risky online interaction to the authorities:

"How about it goes to the researcher and the researcher sort of decides, not decides but like yeah in a way decides if it should be reported or not." –T6, Male age 18

Some teens (20%, N=4), however, did not feel the researcher had the expertise to help them. They preferred to get help from others. Some teens believed that, unlike the researcher, clinicians had the professional skills to "*calm [people] down*" (T5) in a distressing situation:

"Yeah but [the researcher] isn't like the psychologist, you know?" –T6, Male age 18

Others preferred reporting directly to the social media platform, where they encountered the risk, as they believed these platforms had more authority in acting against harmful situations. In the case of life-threatening risks, teens said they would consider involving legal authorities, such as the police:

"Like if someone's threatening you, like…telling you to kill yourself over and over again, then that'd be something you could report. Like, someone who has like, access to like the police." –T19, Male age 14

If teens encountered online risks, none of the teens mentioned that they would want the situation to be reported to their parents. In contrast, most parents (85%, N=11) felt that the researchers should report to parents in situations where teens were in harm's way. Parents explained that teens would not tell their parents directly about the situation, but it was the researcher's responsibility to notify them. They wanted to know when their teens were making poor decisions that exposed them to online risks:

"I guess if my teen was responding in a way that you felt exposed them to risk… then yeah, I would hope you would tell me because maybe her judgment isn't as good." –P3, Mother age 50-59 (F, 16-year-old teen)

Some parents (15%, N=2) though were okay with not knowing about online risks that did not put the teens in physical danger. They only wanted to be notified of the more serious threats to their safety. Yet, they also acknowledged that if their teens knew parents were being informed about their online behaviors, the teens might alter their responses or opt not to share sensitive information that they wouldn't want their parent to see:

"I'm pretty sure if my daughter knew that I'm going to read everything word for word, she would modify her responses." –P11, Father age 50-59 (F, 17-year-old teen)

Overall, parents just wanted to know what the researcher's plan was when an online risk was encountered and how this information would be shared.

"If a child reveals something in here that's risky or dangerous, what do you guys do with that information?" –P13, Mother age 40-49 (F, 13-year-old teen)

Teens (25%, N=5) wanted the researchers to provide **help resources** during the study that could help them navigate these online risks, without their parents. For example, they wanted researchers to provide information about crisis hotlines and help centers:

"If it's like, serious abuse or something, then it might [go to] the Suicide Prevention hotline or something like that." –T11, Female age 17

Through these insights from teens, we realized that teens saw the research as more than just a study on their online risk behaviors. They saw it as a potential way to get help and resources regarding these difficult situations.

A couple of parents (15%, N=2) expressed that they wanted these resources to be made available to their teens throughout the study. They wanted to make sure that their teens were being taken care of, and that the researchers cared about their wellbeing:

"They encountered a situation and let's say they said 'we were fearful to tell our parents' that you guys are not just going to let them, like leave them hanging out there." –P11, Father age 50-59 (F, 17-year-old teen)

All parents (100%, N=13) scrutinized the proposed research studies to **assess the potential harm to their teen**. For instance, they wanted to know the nature of the questions (and, in some

cases, the exact wording) that would be asked during the EMA diary study regarding online sexual risks. The word "sex" obviously raised a red flag for parents, so they needed to know exactly what was being asked of their teens to determine if the teen was mature enough to participate in the study and/or be subjected to that line of questioning. Some parents were concerned about the appropriateness of the question given the age of their child, while other parents were uncomfortable since they did not know how their teens would respond:

"I don't know what he's going to say. So, I don't know how detailed he would get, it would make me feel uncomfortable for him to do a survey like this." –P4, Mother age 50-59 (M, 15-year-old teen)

Other parents were less concerned about the sexual nature of the questions but knowing them in advance would give them a better idea of the degree of sensitivity of the study.

A couple of parents (15%, N=2) wanted information about how the researchers would manage the legal implications of the risks involved. For example, whether researchers would report risky situations to the police. Reporting protocols would need to be clearly stated at the beginning of the study in the informed consent document:

"That's going to be one of those other things that would have to be spelled out in the disclaimers… because it would basically be up to the person's interpretation reading it to decide, you know, 'Oh, this is not good. I should tell a law enforcement officer.'" –P1, Father age 50-59 (M, 15-year-old teen)

Overall, teens and parents were concerned about the safety and wellbeing of teens participating in studies about online risk behaviors. They felt that researchers had the responsibility to provide resources to teens and consider the legalities of working with youth and their sensitive

data. In the next section, we present adolescents' and parents' considerations regarding the types of data that teens might share with researchers in a study on adolescents' online risk behaviors.

Considerations for Data Shared with Researchers (RQ2)

Teens understood that their participation in the research would be voluntary, so this gave them more of a sense of control over what they would and would not share with the researchers. Both adolescents and parents stated their preferences regarding what kinds of sensitive data they would or would not be comfortable sharing with researchers. For instance, both teens (65%, N=13) and parents (54%, N=7) indicated that they would rather share teens' sensitive information actively (i.e., by manually uploading) than have this data collected passively (i.e., by automatically being collected using a research tool). They preferred allowing teens to decide what data to submit to the researcher and what data to not disclose. By doing this, teens would exercise greater control over their personal data. For instance, teens (20%, N=4) preferred being able to **review their data**, knowing what social media data would be shared before the researchers received it. These teens wanted to be able to choose which data to keep and which data to discard before submission:

"*I would do it myself, the automatic one would select randoms for study [sic] I maybe wouldn't want to show*." –T17, Male age 12

On the other hand, some teens (30%, N=6) indicated that they would rather have their data automatically shared with the researcher. They felt that automatic collection would be **easier**, as they did not need to worry about any sort of selection process. They also expressed that manually going through their data would be too time-consuming.

"*Automatically by researcher, I have a busy schedule and don't really have time to upload it myself*." –T20, Female age 13

Parents (23%, N=3) expressed similar opinions regarding the benefits of automatic collection, namely that it would be easier for teens to not have to worry about manual uploads. They stated that their teens "*won't want to do it*" (P4) and that "*they get lazy*" (P4). However, although this process was simpler, they also were not comfortable allowing their teens to hand over all their social media data without some say in the process.

"*I'm not quite sure that I would feel comfortable. I'd have to know the process a little more in depth*." –P4, Mother age 50-59 (M, 15-year-old teen)

Adolescents (65%, N=13) preferred to be asked a variety of both **open and closed-ended questions** regarding their online risk behaviors. They liked the simplicity of closed-ended multiple-choice questions, as they would not be as time-consuming as open-ended, essay-style questions. However, they also liked how open-ended questions would allow them to express their thoughts and describe the online situations they encountered in full detail:

"But some people like to explain like their situation. So maybe have like a—at least an option to submit up a paragraph or an essay." –T15, Male age 17

Both adolescents (70%, N=14) and parents (77%, N=10) stated that they would be willing to share teens' **photos** (including screenshots) with the researchers. Teens had some reservations submitting images containing certain content (*4.2.2. Considerations for Privacy and Disclosures*) but generally did not oppose the mechanism of submitting photos relevant to online risk behavior studies. Parents, too, expressed that they would allow the researchers to collect their teens' photos, recognizing how this data would be relevant to the research.

"*Yeah, I would submit [Instagram messages as a screenshot]. Like, I definitely tell like my best friends about it. So I'd submit it here.*" –T12, Female age 14

However, both teens (80%, N=16) and parents (54%, N=7) strongly indicated that they would not share the **social media credentials**, or the username and password, of the teen's social media account(s) with the researcher, mostly due to privacy and security concerns. Teens expressed did not want researchers "*seeing everything or having access to everything on [their] account*" (T11). Parents explained that they taught their teens to not share their passwords with anyone, so they would be concerned if someone (even a researcher) would request this. They also pointed out that teens often use the same password for multiple online accounts, and therefore, having access to one password might allow researchers access to accounts that were not agreed to.

"*Why do you need it? … I do not know if the teen is going to give it to you, honesty, you know. … Most likely they won't because they are taught that way.*" –P5, Mother age 50-59 (F, 14-year-old teen)

Overall, teens (65%, N=13) and parents (77%, N=10) tended to prefer the EMA diary method over sharing social media trace data. Although data scraping seemed easier and less time-consuming, adolescents and parents voiced concerns with this process of data collection, especially since we asked if they would be willing to share account credentials. On the other hand, EMA diaries function as self-report research tools, which allow the participant to choose when and what they submit. This process was more conducive to retaining full control over participant data, and therefore, teens and parents expressed a greater sense of security using these types of tools. Furthermore, one of the teens' motivations to participate in this type of research was being able to express their thoughts and describe their experience in detail, which aligned better with the goals

of EMA diary studies. In summary, teens and parents wanted teens to have control over their data and be able to choose which data was collected by the researcher; yet, they wanted the process to be easy to perform, and not be too time-consuming. In the next section, we present the features that teens storyboarded for the EMA diary app.

Table 8. Adolescents' feature ideas.

Category	Feature	Description	Participants
Engagement *N=20, 100% of participants*	**Appearance Settings** (*N=15,* 75%)	Customize background, font, colors, and layout	15 Adolescents (T1, T2, T3, T4, T5, T6, T7, T8, T12, T13, T15, T16, T17, T19, T20)
	Incentives (*N=15,* 75%)	Receive prizes, gift cards, or coupons for completing surveys or uploading screenshots	15 Adolescents (T1, T2, T3, T5, T6, T9, T10, T11, T12, T14, T15, T16, T17, T18, T20)
	Progress Indicator (*N=11,* 55%)	View your progress in the study (i.e. progress bar, or an item that evolves over time)	11 Adolescents (T6, T7, T8, T10, T11, T12, T13, T14, T16, T19, T20)
	Reminders (*N=7,* 35%)	Indicate the need to complete a survey, if a survey is missed, or if adolescent is not on track	7 Adolescents (T1, T2, T6, T7, T8, T17, T20)
	Profile (*N=5,* 25%)	View account information or upload a profile photo	5 Adolescents (T6, T7, T8, T12, T13)
Control *N=18, 90% of participants*	**Review Shared Data** (*N=13,* 65%)	View/edit responses to surveys taken, confirm screenshots before submitting, or delete previously uploaded screenshots	13 Adolescents (T2, T4, T6, T9, T10, T11, T13, T15, T16, T17, T18, T19, T20)
	Personalized Surveys (*N=8,* 40%)	Take surveys tailored to the participant or have an option to give answers not listed.	8 Adolescents (T2, T3, T4, T13, T14, T15, T16, T19)

Category	Feature	Description	Participants
	Custom Survey Time (*N=7*, 35%)	Take the survey at a custom time or at any time within the day	7 Adolescents (T5, T7, T8, T11, T13, T14, T17)
Help Resources *N=13, 65% of participants*	**Resolution Tool** (*N=8*, 40%)	Send a message or call someone to resolve issues or situations	8 Adolescents (T5, T6, T7, T8, T11, T13, T19, T20)
	App Guide (*N=6*, 30%)	View tutorials or instructions and get help with using the app	6 Adolescents (T2, T3, T6, T13, T17, T19)
	About/FAQ (*N=5*, 25%)	View information about the purpose of the study	5 Adolescents (T6, T7, T8, T15, T16)

EMA Daily Diary Mobile App Features Designed by Adolescents (RQ3)

During the storyboarding co-design sessions, teens expressed their likes, dislikes, and gave new ideas for features that they would find useful for sharing sensitive information about their online risk experiences through an EMA diary app. We conceptually grouped their design-based ideas into three themes (i.e., Engagement, Control, and Help Resources) with 11 unique features associated with these themes as shown in Table 8 (previous page). All teen participants (100%, N=20) gave suggestions for making the app more engaging, including ways in which to incentivize participation and personalize the app. Yet, the intensity of this theme was inflated given our initial storyboard (Figure 7b), leading them to design features for incentivizing participation. Most teens (90%, N=18) also suggested features that facilitated control over their data and study interactions. More than half of the teens (65%, N=13) wanted features that assisted them when needed and provided important and relevant information about the study. We present these themes based on the prominence in which they emerged in our data.

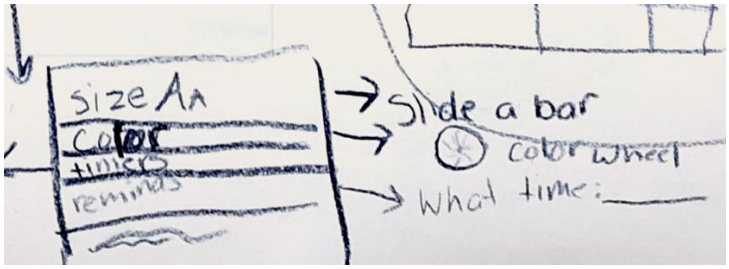


Figure 8. Adolescent's app font and color customization design. User can adjust the font size using a slider and font color using a color wheel. (T3, Female age 12)

Engagement Features

All 20 teen co-designers came up with features that they thought would motivate and encourage their participation. Most adolescents (75%, N=15) designed an *Appearance Settings feature* in which they could change the backgrounds, fonts, colors, and layout of the EMA diary app. For example, one adolescent suggested implementing a slider to adjust the size of the font and designed the ability to choose the font color or background color of the interface on a color wheel (Figure 8). This adolescent expressed the concern that the white background of the app could be too bright on the eyes if participants are using it at night, and so proposed that participants could instead choose darker colors using this design.

Most teen co-designers (75%, N=15) also came up with *Incentive features,* in which users would earn gift cards, prizes, or coupons for completing study tasks. Six of the teens indicated that they did not care as much about progress-driven engagement (e.g., progress bars) and expressed that receiving some form of incentive or compensation was enough to motivate them to participate.

"What would be cool is if they did like $5 gift cards like I see in some apps." –T1, age 15

Some adolescents (30%, N=6) proposed adding bonuses (e.g., extra items earned through additional effort) for completing a certain amount of study tasks. Their ideas for bonuses included

earning extra points or money. For example, one teen suggested receiving bonus points for submitting two surveys on a given day. Some adolescents (25%, N=5) also suggested adding streaks (like in Snapchat [147]) for completing several daily tasks in a row. A streak would be displayed as a number in the app that increments each time a task was completed (such as submitting a survey), without skipping any of these tasks. Skipping tasks would result in the streak being reset to zero. There was often overlap between bonuses and streaks features, such as maintaining a streak resulting in earning bonus points.

"And then, this helps you, there's also a daily bonus. So, them taking two surveys, maybe you could have a bonus thing right there? So, you can also have a streak. Them sort of taking the surveys in consecutive days and then them getting something else. So, like 5 days streak gives them that many points." –T6, age 18

More than half of the adolescent co-designers (55%, N=11) came up with some form of *Progress Indicator feature*. Most adolescents in this group designed a progress bar (Figure 9). This bar would "fill up" as the participant progressed through the study, either by completing study tasks (such as submitting surveys or screenshots) or simply over time (in which the bar would fill up by the same amount each day).

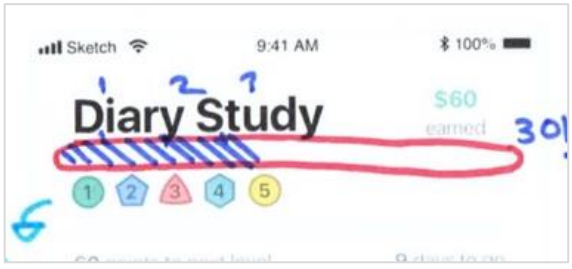


Figure 9. Adolescents' "Power Bar" progress indicator. As teens progress through the study, the blue stripes fill the red region. (S5: T6, Male age 18; T7, Female age 16; T8, Male age 16)

Another form of progress indicator proposed was a countdown. One version of this idea was to display the number of days remaining in the study, which would count down to zero as the days passed. However, one adolescent suggested that the countdown would display the number of days remaining until receiving a reward, and that participants would need to visit the app each day until the countdown was complete to receive it.

Some teens (10%, N=2) came up with a way to indicate progress through items that evolved over time or as the participant completed study tasks. This is very similar to the idea of progress bars, in which the user can get a visual of the progress being made. However, these design elements tended to be pictorial, giving them a storytelling component and an interactive feel, more so than a standard progress bar might.

"Khan Academy does it like you have a thing and you can upgrade the thing. So, like I have a cute little baby dragon and the more I do Khan Academy it can be like a medium dragon. So, my water drinking app it's like a plant and the more water I drink like, the bigger the plant grows, and when I don't drink water, the plant dies. So, like…this. Something with progression." –T12, age 14

Some co-designers (35%, N=7) came up with a *Reminders feature*, in which users would be notified if they needed to complete a survey, if they missed a survey, or if they were otherwise not on-track with the study. Some adolescents suggested that these reminders would be present in the app's interface, such as displaying a list of surveys that were not taken by the teen. Others suggested that these reminders should be implemented as push notifications to the user's device. A few of the adolescents (15%, N=3) who suggested these ideas indicated that reminders in the

form of push notifications were all they needed to stay engaged and motivated to complete study tasks.

"Give me push notifications and I'm all over it because ... I can't look at a phone without like, all the notifications gone. I can't look at that little red dot. It's annoying. Can't have it." – T16, age 16

A quarter of the adolescents (25%, N=5) also expressed an interest in a *Profile feature* in which teens would create a user account or profile to make the app more personal. This included a section of the app that would display the teen's name, photo, login information, demographic information, or any rewards earned throughout the study.

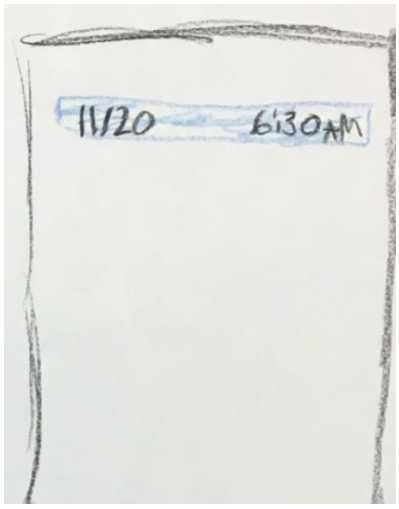
Overall, we found there were a variety of approaches adolescents came up with for features regarding engagement in the study. Adolescents indicated they wanted customization features and would be motivated if given some incentive. They shared that they would also be motivated to participate if they were shown their progress throughout the study. Some adolescents expressed reminders to participate would be helpful, and a few co-designers thought that a profile would keep teens more engaged. Next, we describe features that adolescents created to give them more control over their data and study interactions.

Control Features

Most teen co-designers (90%, N=18) designed features that would give them greater control over their data and content submitted to the researchers, as well as their interactions in the study. More than half (65%, N=13) of the co-designers designed a feature that would allow them to review survey responses and screenshots after submitting them (*Review Submissions feature)*.

To review survey responses, adolescents designed a list, where each item in the list corresponded to one of the surveys the user had submitted, often including the date and time of the submission (Figure 10a). Some teens (10%, N=2) suggested that, if multiple surveys were taken in one day, that these surveys be collapsed into a group. Tapping the group would expand the list and tapping a survey in the list would allow teens to review their answers. Some teens also wanted the ability to change their responses later, after submitting the survey, perhaps if their opinions or thoughts on a particular subject changed, if there was an error in their initial response, or if teens had new information to add.

"*If you click on this, it can show you your surveys and see like what you thought about that, and then any possible changes you can make.*" –T18, Female age 17

a) 

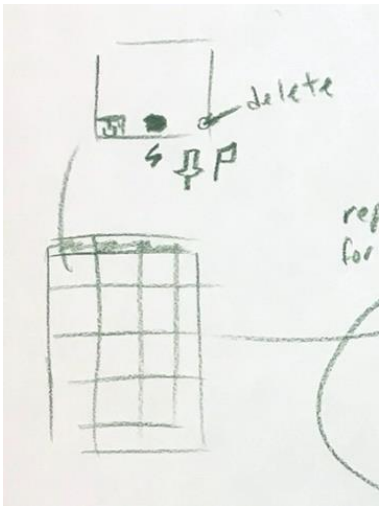
b) 

Figure 10. Adolescents' Review Submissions designs a) Review survey responses feature (T2, Male age 14) b) Delete screenshot feature (T16, Male age 16).

Co-designers (20%, N=4) also designed for the ability to review screenshots before submitting them to the researcher, such as having a dialog box appear before submitting, displaying the screenshot the adolescent chose and asking them to confirm the submission (e.g., 'Are you sure you want to upload this screenshot?'). For example, one co-designer explained that

this feature would be useful if you are selecting and uploading multiple screenshots all at once, as they wanted to review and remove any screenshots they might have selected by mistake, before completing the submission. Some co-designers (50%, N=10) wanted the ability to review their screenshots after submitting them, like the feature where teens could review their survey submissions. These co-designers suggested that screenshots be laid out in a grid, such as typically found in photo management applications (Figure 10b). Tapping a screenshot in the grid opens it to fill the screen. Co-designers also expressed that they would want the ability to delete screenshots after submitting them, such as embarrassing or accidental uploads that they did not wish for the researcher to see.

Many co-designers (40%, N=8) wanted the surveys to be personalized in some way (*Personalized Surveys feature).* For example, one co-designer wanted to be able to choose their interests from a list, and the surveys would then be automatically tailored to their interests. Another co-designer wanted surveys to change automatically based on their social media usage. Some of our co-designers (25%, N=5) wanted to have the option to enter their own responses, if not listed in a multiple-choice survey question, such as an "Other" option with a text box for additional text. One teen suggested adding a commenting feature to survey submissions, so that if they had some additional thoughts or clarifications to give to the researcher, they could add these after completing the survey:

"So now I think that you should put a thing where you have a bunch of comments and you write them down and then you send it to the research team." –T8, Male age 16

Furthermore, some of the co-designers (35%, N=7) wanted to take daily surveys at any time of day that they chose (*Custom Survey Time feature).* Some co-designers suggested the ability

to customize the time that the survey became available each day, or for how long it would stay available. For example, teens who had school and afterschool activities might be more available in the early morning or late evening and could set their survey time preference to whatever was most convenient to them. Other co-designers suggested that, instead of having a set time period to take the survey, that the survey should always be available to take, at any time, giving teens more flexibility and avoiding the need to manually set a time preference.

"*Maybe you can give an option of morning or night because some kids like to sleep early and then wake up in the morning and do their homework and things. Because I know some people wake up at like four o'clock, and they do their work, but they go to bed at like eight o'clock at night.*" –T14, Male age 14

Overall, we found that teen co-designers wanted control over their data, such as being able to review, modify, and delete items they had submitted. Plus, they wanted the flexibility to be expressive and submit content when and how they liked. This is congruent with teens' concerns regarding the collection of their data, as teens expressed, they wanted control over the data they supply to the researchers. Next, we describe help features adolescents created to receive assistance throughout the study.

4.3.3. Help Resources. Most teen co-designers (65%, N=13) created features that would assist them with difficult situations, understanding the purpose and goals of the study, and using the app. Many of these adolescents (40%, N=8) designed a *Resolution Tool feature* to help with situations that teens might not be able to resolve on their own. One idea these co-designers came up with was a reporting tool that they could use to report any online risks encountered, including sexual risks and abuse. For example, one co-designer designed this tool as a form that teens would

fill out and submit (Figure 11a). Adolescents expressed that they would report such incidents to someone they trust, which often was someone other than the researchers:

"I would just put information you're sending is to a counselor, a counselor who would respond back very quickly and give you an answer or a resolution or if it's really bad to like the authorities. … Probably like things you need help with like asking for help. I like giving them a story telling them what's going on." –T5, age 15

These co-designers (40%, N=8) also wanted a way to contact the researchers or (more often) relevant help agencies for mental health support. For instance, one co-designer envisioned a 'live help chat' feature in which the teen would be able to send an instant message to the researcher within the app itself (Figure 11b). However, most of our co-designers suggested that phone numbers for these agencies be made available inside the app for teens to use as a resource if needed.

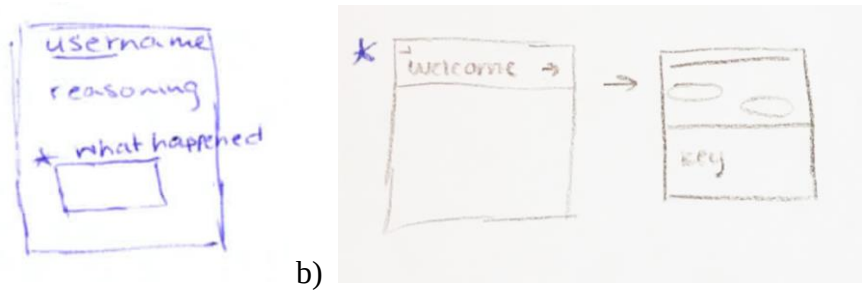
"Someone to … help them calm down with the stress if they have any. …the guys in suicide prevention, those guys are actually used to it. They can actually calm them down in the moment, they can actually say 'okay relax.'" –T5, age 15

Some co-designers (30%, N=6) also envisioned a guide in the form of instructions, tutorials, etc. to help them use the mobile app daily (*App Guide feature*). Instead of contacting someone (such as the researcher) for help, this feature would give teens the necessary resources to figure out how to use the app on their own.

"*It'd just show like, maybe like a button that says, help me or whatever, and then a list of all the instructions or like, what each button does like, clicking the take next survey button, or uploading a screenshot*." –T19, age 14

Finally, some co-designers (25%, N=5) designed an "about page" or list of frequently asked questions (FAQ's) to reference further information about the study they would be participating in, such as the purpose of the study, the research goals, or what kinds of data the researchers are interested in (*About/FAQ feature*). These co-designers wanted to be informed and valued transparency between the researchers and themselves as participants.

"*Oh, you probably have like, kind of like something like the Help Center but I know on like most apps there's like a commonly asked questions page and then somebody unsure about what they want to put in a survey*." –T17, age 16



a) b)

Figure 11. Adolescents' Resolution Tool designs. a) Report form (T18, Female age 17) b) Live help chat (S6: T9, T10, T11, Females age 17).

Overall, we found teens wanted features that would enable them to be successful in the study, but also be able to handle sensitive situations. These include a way to report incidents, contact people that can help them, and get information about the study and app. This need to receive help and the idea for a reporting tool is consistent with our results regarding teens' and parents' desires for teens to receive assistance and resources during the study. Next, we discuss the implications of our findings.

Discussion

In this section, we first discuss the implications of our findings in relation to existing ethical principles for human subjects' research. Then, we present recommendations that move beyond research ethics to relationship-building and youth protection. Lastly, we provide heuristic guidelines and design implications for conducting impactful and engaging research with adolescents on sensitive topics (e.g., their online risk behaviors).

Ensuring the Beneficence of Adolescent Online Safety Research

We uncovered that adolescents and their parents had differing motivations and concerns when it came to the teens' participation in research studies involving their online risk behaviors (RQ1). For adolescents, being able to share their personal experiences with researchers to make a positive societal impact was important to them. Teens wanted the research to lead to real-world change in policies and in the design of social media platforms they used on a regular basis. For parents, they felt that the research was important because it addressed a prevalent problem that they did not know how to solve on their own. Additionally, parents also hoped that having their teens participate in this type of research would raise their teens' risk awareness; thus, keeping them safer online. In this way, both teens and parents carefully weighed the benefits versus the risks of participating in adolescent online safety research. Should these benefits be realized, teens and parents felt that participation would be worthwhile.

This finding invokes the concept of "beneficence," which means maximizing the benefits and minimizing the risks of participating in research, while protecting the participants from harm [5]. Beneficence is one of the three basic ethical principles for conducting human subjects research

from the Belmont Report [37], which was written in 1979 by the National Commission on Protection of Human Subjects in Biomedical and Behavioral Research to protect human subjects in clinical trials and human subject research studies. A key ethical implication is that researchers need to clearly understand the value propositions of our participants, so that their cost-benefit analysis of engaging in research yields a net benefit to them. For this reason, Walker et al. [160] encouraged researchers to start by asking their participants what their needs or interests were related to the research. Yet, an important and critical step of their cyclical heuristic framework was to then report back to the community in an accessible way the research findings and outcomes [160]. For instance, we might create easy-to-understand infographics [90] or a "zine" (i.e., magazine) [62] to present the important findings and implications of a study back to participants. When engaged in public scholarship [52] and presenting the findings to broader audiences, instead of informally collecting anecdotes that make the researcher feel good, we could explicitly ask for written feedback from the audience that could then be shared back to our participants. That way, teens will know they made a meaningful impact on other youth and their families. Based on the motivations stated by parents, researchers could aspire to become "scholar activists" [80] by offering free online safety training to adolescents who participated in their past research studies; thereby, raising their risk awareness and giving actionable recommendations towards keeping teens safer online. A key take-away is that to engage adolescents in risky research, we must become more than objective data harvesters and actively engage with the vulnerable community that we aim to protect through our research. Because of its relevance to society, adolescent online safety researchers are called to do participatory action research, which directly benefits the communities we work with "by doing" [85], rather than staying in our safe ivory towers.

Protecting the Private Disclosures and Data of Teen Participants

Our results also surfaced privacy and disclosure concerns (RQ1) that must be addressed prior to engaging teens in research on sensitive topics around their online risk behaviors. Both parents and teens felt more comfortable with teens sharing de-identified information, while teens also expressed concerns about sharing the networked data of their friends. Most of the teens in our study were open to answering questions regarding highly sensitive topics, such as their online sexual risk experiences, and even willing to share their personal social media data with researchers, but only under the condition that they or their friends would not get in trouble by them doing so. When probing teens and parents about the nature of data they would be willing for the teen to share (RQ2), we found that teens wanted complete control over how their data was shared and what data would be shared with researchers. For instance, teens wanted to review and approve of any data being shared with researchers prior to it being shared. In other words, teens wanted the researchers to respect their autonomy to make sensitive disclosures about their online risk behaviors but to keep those disclosures confidential, especially from their parents. In contrast, parents often expressed their desire for the researchers to notify them when the teen made sensitive disclosures during the study that put them at risk.

Given the inherent power differential between parents and teens, these findings surface an important value tension between key stakeholders (i.e., adolescents and parents) in adolescent online safety research. That is, an adolescent's desire to maintain their privacy from their parent during the study versus the parent's desire to keep their child safe. To address this potential conflict, we draw from Value Sensitive Design (VSD) [64], a framework for considering the values of different stakeholders when designing systems, which is used widely within the HCI research

community. The goal of VSD is to design sociotechnical systems (which can include systems-based user research) that consider and respect the underlying human values of not only the direct users (in our case adolescents) but also those of the indirect stakeholders (e.g., parents). Therefore, VSD is useful for identifying value tensions and negotiating ways to resolve them. In this case, researchers must decide if and under what conditions they will disclose a teen's sensitive information to the person who consented to their participation in the study, and under what conditions they will withhold information from them.

This conundrum also relates to the Belmont Report's ethical principle of "respect of persons," which acknowledges the autonomy of individuals and the need to protect those with diminished autonomy [37]. On one hand, we need to respect the autonomy of adolescents and acknowledge that many prefer to keep details of their online lives secret from their parents as this is a developmentally normal characteristic of adolescence [139]. On the other hand, adolescents are minors. This could be addressed by making an explicit statement in the informed consent (signed by parents) that the teens' data will not be shared with parents, or if shared, under what (limited) conditions. Parents would then have to decide if these conditions of the study preclude their teen from participation. Other ways to protect teens' sensitive disclosures could include obtaining a National Institute of Health's (NIH) Certificate of Confidentiality, which protects participants' data from being disclosed to outsiders without parental consent (e.g., in cases of legal subpoenas), with a few exceptions (such as federal laws requiring evidence of child abuse) [122]. This finding also surfaced an important ethical and legal implication of adolescent risk research. When is it our responsibility to protect the private disclosures made by teen participants versus our duty to report? In the following sections, we discuss the importance of building trusting

relationships with teens and how this goal must be carefully balanced with ensuring their safety and protection.

Building Rapport and Trusting Relationships with Teens

Teens and parents both emphasized the importance of building a trusting relationship between the teen and the researcher to address their privacy and disclosure concerns. Teens feared getting in trouble or exposing themselves or their friends by sharing their risk experiences. This fear was rooted in their lack of trust with the researchers. Parents also felt that trust was necessary to assure that the teens' sensitive information would be kept safe. However, building trusting relationships is difficult and requires time [91]; especially due to the perceived power imbalance between the teens and researchers [132]. Therefore, this is why Peyton and Poole emphasized the importance of cultivating comforting environments through casual conversations, humor, acknowledging teens' opinions, and ensuring them that there are no wrong answers [132]. Further, when studying risk behaviors that uncover the vulnerabilities of youth, researchers should position themselves as relatable partners instead of authoritative figures by sharing some of their own vulnerabilities and experiences. For instance, researchers could share their personal backgrounds (e.g., relatable experiences from their youth) and their motivations for conducting the research to show teens how much they care about their wellbeing. Researchers should also use verbal assurances to convey that the teens' experiences will not be judged, and their sole intention is to help them.

In addition to building trust, researchers should also consider ways in which they can actively reduce the power imbalance between themselves and youth by treating teens as equal

partners in the research. For instance, Kidsteam researchers at UMD [199] and UW [200] have accomplished this goal by creating an intergenerational co-design program, where youth and researchers work together to design interactive systems for youth. Yip et al. [180] emphasized "building relationships" as an essential part of this endeavor, which creates long-term and equitable partnerships with youth becoming part of the research team. We recommend that this approach also be taken when working with adolescents to study and give them a voice in the design of systems that affect their online safety. Further, we encourage researchers studying risk behaviors to engage teens not only as co-designers, but also as "co-researchers," who have an active role in shaping the goals, design, and outcomes of research [25]. Engaging teens in participatory design [148] and participatory action research [85] will ensure that their goal to make a beneficial contribution to society is actualized. In this way, researchers maximize the benefits of the research for teens by giving them a role that is both generative and empowering. Part of building trusting relationships is relinquishing power to promote equality.

Finally, to build trusting relationships, we must also be honest with teens about what we can and cannot do to protect their interests. For instance, we can assure them that all measures for safeguarding their sensitive disclosures and privacy, such as de-identifying their data, will be taken. However, we cannot promise that we will never disclose their information to outside parties. Therefore, researchers need to clearly disclose their status as mandated child abuse reporters and make sure teens understand in what cases (e.g., imminent risks, federal laws against child pornography) we might have to violate their confidence. In the next section, we discuss these considerations for youth protection in more detail.

Moving Beyond Ethical Research to Risk Mitigation for Youth Protection

A key finding that became apparent through our study was that risk-based research with adolescents requires more than considering how to conduct ethical human subjects' research. Because risk-based research often poses more than minimal risks to adolescent participants, youth welfare and protection becomes a paramount concern. While Hern et al. [87] highlighted the need to create developmentally appropriate survey instruments and protocols that protect adolescents when addressing sensitive topics around risk, we went a step further by asking teens and parents their specific concerns around these issues. For instance, one revelation from our study was that some teens wanted the researchers to help them deal with risky situations they encountered online, rather than remaining a distant and objective party. However, there are serious implications of taking such an active role that could potentially undermine the integrity of the study and put youth in harm's way. First, from a scientific perspective, intervening in the phenomenon being studied could affect the overall outcomes of the research [41]. For this reason, some adolescent online safety researchers have gone as far as taking steps to avoid invoking their mandate reporting status by conducting research only in states that do not require mandatory reporting by researchers [116]. Second, as researchers, we may not be clinically equipped or have the time to meaningfully help teens navigate these risky situations. But, if teens are relying on us to do so, this misalignment in expectations may cause a false sense of security and put teens at even greater risk. Therefore, despite our best intentions, it is important that researchers explicitly explain to adolescents and their parents that participation in risk-related research studies should not be considered a form of risk mitigation.

To address this concern and others towards the protection of youth, we created a detailed Risk Mitigation Plan (RMP; APPENDIX E: ADOLESCENT RISK MITIGATION PLAN (STUDY 3)) for risk-based studies with adolescents. Researchers may cite this paper and use our RMP template to inform the design of their own studies. This document provides ethical considerations for youth protection, as well as addressing the legalities involved in risk-based research with adolescents, providing mental health resources, and clear data protection and privacy policies. For instance, we recommend that all research team members take trainings on youth protection and mental health first aid. The research team should also consider consulting or adding a clinical professional as a team member, who can provide counseling and crisis resolution, if needed. The RMP incorporates a list of relevant help resources and psychological services that provide mental health assistance or crisis intervention to youth. Such resources should always be available to participants throughout the entire study.

We also include procedures for reporting instances of suspected child abuse or neglect [27], as well as a protocol for reporting child pornography to the proper authorities. Statements of informed consent and study prompts should include clear warnings informing teens of the legal implications of sharing child pornography (i.e., any nudity of a minor [26]). The RMP also provides additional procedures for concerns on data protection and privacy, such as anonymizing a participant's sensitive data by removing all personally identifiable information. The RMP also contains recommendations on obtaining a Certificate of Confidentiality from the National Institute for Health [122]. In summary, this risk mitigation plan incorporates considerations that go beyond the conventional ethics of human subjects' research to ensure youth protection when conducting research of sensitive topics involving risk behavior.

Heuristic Guidelines for Conducting Risky Research with Adolescents

Based on our findings, we provide the following heuristic guidelines (see Figure 12) for conducting research with adolescents on sensitive topics that involve risk behavior. We include parents in these guidelines as secondary stakeholders in adolescent online safety research but take a teen-centric stance that the needs and protection of adolescents should be prioritized over that of parents.

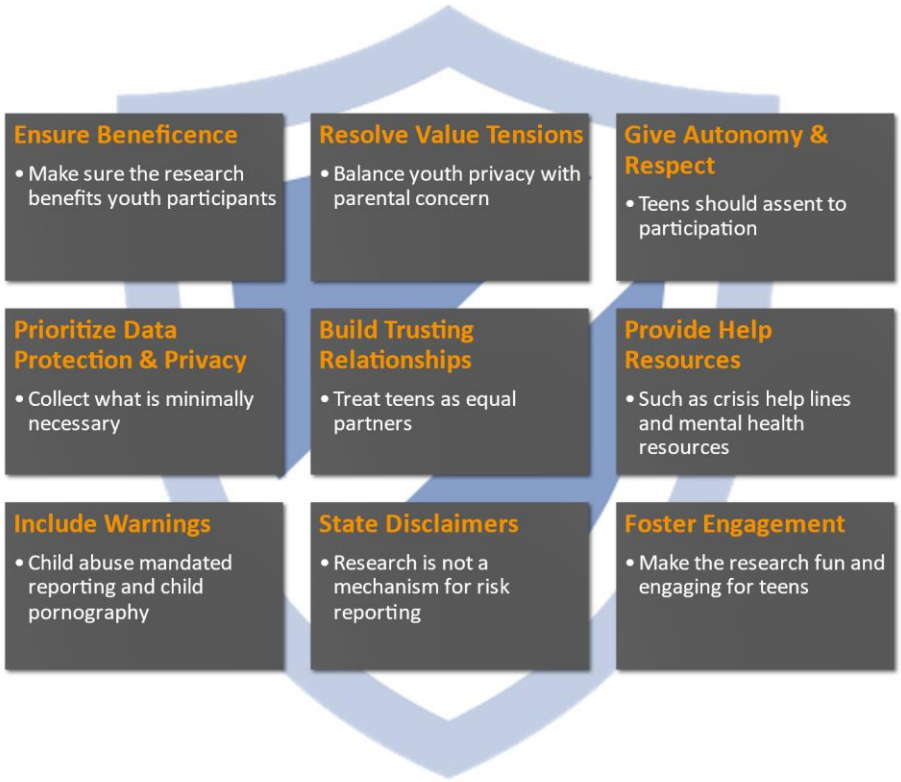


Figure 12. Best practices for youth protection.

- ***Ensure Beneficence**:* Ask teens and parents what motivations they have for participating in the research. Then, make sure that these motivations are translated into actionable outcomes that directly benefit them.
- ***Resolve Value Tensions**:* Identify the value tensions (e.g., confidentiality of teen's data regarding parent) that exist between teens and parents. Then, clearly articulate how these tensions will be resolved in the statement of informed consent, so that both stakeholders have clear expectations about how potential conflicts will be handled.
- ***Give Autonomy and Respect**:* Make sure teens give their explicit assent to participate in the study (APPENDEX E: B.3) and to share their data with researchers. Give teens as much control as possible over how, when, and what types of personal data they share with researchers (APPENDEX E: B.8).
- ***Prioritize Data Protection and Privacy**:* Prioritize teens' privacy by collecting only de-identified data when possible. Ensure teens' data is encrypted, securely stored, and reviewed by as few people as possible. Determine data sharing procedures prior to data collection and disclose these procedures in the informed consent.
- ***Build Trusting Relationships**:* Invest time in building trusting relationships with adolescent participants. Create a setting of equal partnership with the teens, giving them the opportunity to shape the research. Be honest about what you as a researcher can or cannot guarantee.
- ***Provide Help Resources**:* Provide teens with a list of resources for mental health support and risk mitigation while they are engaged in the study. This may include support hotlines. Remind teens that their wellbeing is of utmost importance.

- ***Include Warnings:*** Clearly state any legal obligations (e.g., child mandated abuse reporting) and/or warnings (e.g., child pornography) in the informed consent and on screens where teens may invoke these obligations or violate these warnings (APPENDIX E.6, E.7). Use red bold text to ensure that important warnings are not overlooked.
- ***State Disclaimers***: In the informed consent, clearly state that participation in the research study should NOT be considered as a means for risk reporting. Let teens and parents know that data will not be monitored in real-time; therefore, all emergencies should be reported to the proper authorities (APPENDIX E.6).
- ***Foster Engagement****:* Design research tools that are interactive and engaging for teens, so that they can enjoy being part of the research.

Next, we will discuss the implications for design as they relate to the systems that support these heuristic guidelines for conducting risky research with teens.

Implications for Design

Now that we have covered implications for research, we will turn briefly to implications for the design of technologies that support research. As HCI researchers, technology often mediates the interactions we have with our research participants. Especially in the time of COVID-19 [158], research studies are often conducted virtually with little or no face-to-face contact with our participants. Therefore, it is important to design our research tools in a way that optimizes for teen engagement, control, trust, and safety.

Make the Study Engaging for Teens.

As HCI researchers, we often focus on designing interventions that meet users' needs [89], however, we rarely focus on designing research tools to meet participants' needs. Therefore, research protocols (e.g., surveys, prompts) are often boring, minimalistic, and optimized for scientific inquiry. Yet, when working with teens, researchers should strive to make the interactive features of their study engaging for their participants. Previous research suggested allowing participants to experiment with different mediums to identify the most appropriate and engaging research tool for them to use [15]. For example, teens preferred using native apps installed on their smartphone over text messaging or web-based interfaces [79]. We found that teens want features that keep their attention, like progress bars, reminders, and countdowns. For example, researchers may want to indicate the number of days remaining in a longitudinal study, the number of tasks left to complete in cross-sectional studies, or some combination of these and/or other milestones. Likewise, researchers should indicate the incentives that participants earn during the study and tie these incentives to the study progress. Finally, researchers may want to invest the additional time to include customizable features (e.g., dark mode, profiles) that teens can use to personalize the interface. These touches may seem like unnecessary bells and whistles, but they are more aligned with the level of interactivity teens are used to experiencing in the technologies they use every day. Thus, we need to meet these expectations to keep teens engaged.

Give Teens More Control.

Adolescence is marked by increased autonomy-seeking [181]; thus, control is a key element that should be considered in the design of systems that support teen research. Systems

should provide control and not burden the users regarding timing, privacy, accessibility, and other features [152]. For instance, data collection tools should empower teens by letting them decide what data to share (or remove) and to review any data before it is shared with the researcher. In surveys, open-ended questions should be used to supplement close-ended responses, so that teens can tell their whole stories to feel heard. Teens should also be given the flexibility to customize how and when they interact with the research tool; for example, the time of EMA diary reports should be flexible enough to accommodate a teen's schedule. Even though giving up some control may have implications for the research (e.g., quality control), the added benefit of making our participants feel respected and empowered during research is worth it.

Provide Helpful Resources.

Finally, researchers should consider providing assistance and external help resources to adolescents when they are engaged in the research. This includes resources that either provide information about the research study (e.g., FAQ's), the app interface, or help them to resolve and/or report sensitive issues. Such reporting features may include nationwide hotlines that are appropriate to the study topic (e.g., the National Sexual Assault Hotline [201] for sexual risk studies), ways to contact the proper authorities, if necessary, and ways to contact the researchers. The latter could be done through text messages, email, or an in-app messaging feature, so participants are not abruptly taken from the app. Moreover, providing resources for mental health support and counseling (**APPENDIX E.5**) is also important for studies involving youth and online risks. Additional resources could be made available to assist adolescents with using the research tool, such as video tutorials or instructions.

Limitations and Future Work

While our study paves the way towards cohesive guidelines for conducting risky, yet impactful, ethical, and beneficial research with adolescents, we also recognize several limitations of our study. First, the willingness of teens and parents to participate in two hypothetical research studies should not be taken literally. We acknowledge that social desirability effects [57] may have swayed their responses; therefore, we focused instead on participants' underlying motivations and concerns, which are more generalizable. Second, the insights we gained from this study were based on participants' assessments of two specific methodological approaches: 1) an EMA diary study on online sexual risks, and 2) a study where the teen donates their social media trace data for the purpose of research. While it was necessary to make the examples for the study tasks tangible enough for participants to provide their feedback and form ideas, we acknowledge that some of the feedback and ideas were specific to these scenarios (e.g., sharing social media credentials with researchers). Therefore, this may have constrained us from garnering additional insights that would have emerged had we used other methodological approaches. Third, even though adolescents are generally considered a vulnerable population due to their status as minors, many of the teen participants in our study likely came from privileged backgrounds with highly engaged parents. Therefore, our results should not be generalized to populations that have experienced extreme marginalization due to their intersectional identities or lived experiences (e.g., LGBTQ youth, those who have experienced abuse, or struggle with mental illness). Finally, while our findings show several differences between demographics, our sample is too small to generalize to all teens. Therefore, researchers should consider future research studies with larger sample sizes to confirm our findings and examine differences in perspectives between different subpopulations of teens.

To overcome the limitations of our study in future research, we encourage other researchers to apply and validate whether and how these considerations should be implemented within their own research and study populations. By iterating on our heuristic guidelines for research and implications for design, we can work as a community to converge around best practices for conducting high-impact and beneficial research that involves more than minimal risk to adolescents but can also disproportionally benefit particularly vulnerable and/or marginalized communities. For example, Badillo-Urquiola et al.'s [10] work regarding the online safety of foster youth highlights the immediate need for more HCI research that engages with vulnerable youth in ways that directly benefit them. Therefore, future research should not shy away from working with at-risk and/or marginalized adolescents, even if these populations of youth present even greater challenges that must be overcome. The end goal is to conduct research that serves the greater good; therefore, some risk will likely be involved to reap meaningful benefits.

Conclusion

We developed heuristic guidelines and a risk mitigation plan that move beyond existing ethical principles to consider youth protection for risk-related research. Further, researchers must consider the tools they use for collecting teens' sensitive information and optimize them for the target audience. Therefore, we provide implications for designing technologies that engage adolescent participants by providing them control over their data and support for navigating risk experiences. We urge other HCI researchers investigating sensitive topics with teens that involve more than minimal risk to prioritize the wellbeing of adolescent participants and use this paper as a resource to ensure the protection of youth. Conducting risk-based research with adolescents often

warrants teens to disclose highly sensitive information that may pose significant ethical challenges (e.g., legal liability concerns) for researchers. Consequently, researchers often hesitate to take on such high-risk research, despite its importance and value in improving the lives of youth. As HCI researchers, we have the responsibility to do no harm, but we have the equal responsibility to benefit the vulnerable populations we aim to serve. Further, while this paper is specific to adolescents, there is potential for our overall findings to translate to research with other marginalized or vulnerable populations, who may feel or be at risk when participating in research, but still desire to benefit society through their participation.

CHAPTER 6: ONGOING RESEARCH—"30 DAYS" EMA MOBILE DIARY STUDY

Citation: Badillo-Urquiola, K., Antoine, C., Nisenbaum, A., Shea, Z., and Wisniewski, P. (2022) "30 Days:" An EMA Diary Mobile App & Web Tool.

We implemented the feedback of the teens and parents from chapter 5 (study 3) to build a custom ecological momentary assessment (EMA) mobile diary app called "30 Days" that is more engaging for teens. We are using this app to investigate the online daily experiences of youth in foster care. In this chapter, we present our ongoing EMA diary study.

Introduction

Experience sampling, also known as ecological momentary assessments (EMAs) or a diary study method, is a frequently used longitudinal research method within the HCI community that involves collecting observations of participants' daily thoughts, feelings, behaviors, and/or environment over time [114]. Diary studies are an effective method for collecting contextualized data by allowing research participants to report on their conditions close in time to their experiences. Their contextual and "in-situ" nature helps diminish recall bias [118], which, in contrast, may be found in more traditional methodologies (e.g., interviews) [114]. Due to the strengths of this approach, much of the CHI and broader HCI community has frequently used this methodology to investigate several psychological and social-related topics such as posttraumatic stress syndrome [29], suicidal ideation [32], sexual activity [86,141], and substance use [123]. Building upon this prior work, we conducted a study (chapter 5) in which we examined whether daily EMA diaries administered via a smartphone app could potentially be a more engaging and effective way to conduct online safety research with teens. Based on our results, we developed the

"30 Days" EMA mobile app and web tool as a potential research tool for academic researchers. The following sections describe our tool and development process.

Gaps within Existing Mobile Diary Apps

While preparing to conduct a 30-day EMA diary study regarding the online experiences of adolescents, we decided that a mobile application would be the best way for teens to interact with the study, since they are likely already using their mobile devices for most, if not all, of their internet usage [3]. Our main goals were to allow teens to submit daily surveys, submit screenshots of their online interactions, receive help resources, and keep track of their progress and monetary earnings to incentivize the study.

Most pre-existing mobile diary applications that we found were either focused on providing customer discovery data to companies (i.e., not tailored to academic research studies) or used in clinical research settings for assessments or trials. Yet, those we found for academic research, were focused on more physical, environmental studies, and had capabilities that we did not need, such as tracking location, weather, light, noise, and physical activity. Furthermore, these applications were missing features that were essential to our study, such as tracking incentives, behavioral phone data, or communication between researchers and participants. Given this, we decided to create our own, custom mobile application to meet all our needs. We also developed a web application for researchers to keep track of the study and manage participants' progress.

"30 Days" Research Tool Design

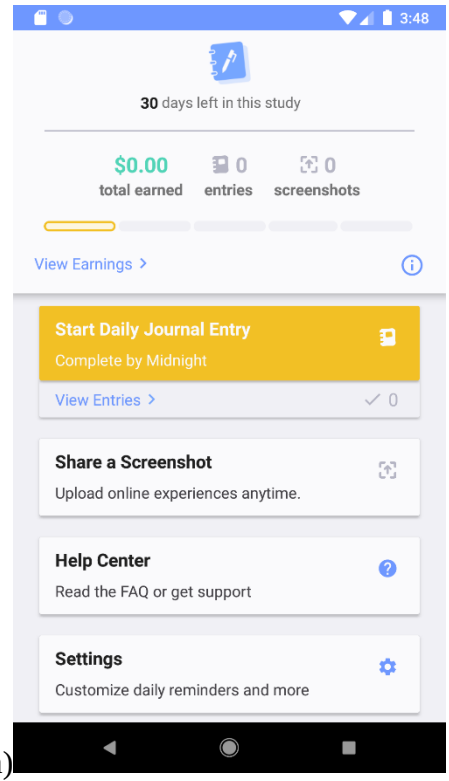
Our EMA diary study research tool consists of two applications: 1) a cross-platform (Android and iOS) mobile app that participants use to submit data, and 2) a web app that

researchers use to manage these participants and their data. The next subsections provide information about the main features of these apps.

Mobile App (For Participants)

Upon installation of the app, the participant is asked to sign in with their email and a temporary password (provided by the research team via email). They are then asked to enter their own password to replace the temporary one. Next, they are given the option to enter a 4-digit passcode to lock the app. This serves as form of authentication, without the need to sign into the app with an email and password every time it is used.

Next, the participant is asked to grant the researchers access to their device data and usage. On Android, this data includes a list of all apps installed on their device (the app manifest), the time they spend using each app, and the total time they spend using the device (screen time). On iOS, this data includes a list of some installed applications (due to technical limitations) and total screen time. To collect screen time data on iOS, participants must set location access to Always, allowing the app to continuously run in the background. However, no location data is collected. This device data will be collected from participants when granting access and each time they submit a diary entry.

a) 

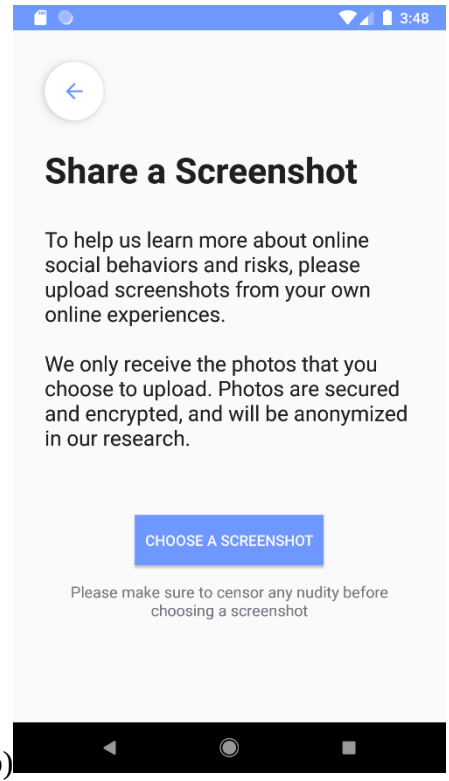
b) 

Figure 13. Screenshots of "30 Days" Mobile App a) Dashboard and b) Share a Screenshot Feature

Main Mobile App Features

Dashboard: At the dashboard (Figure 13a), participants can see their study progress and the amount of money they have earned. They can also submit diary entries (daily journal entries), submit images (screenshots), view their daily journal entry and screenshot submission history, access the help center, and customize app settings.

Daily Journal: Once per day, any time from 2:00 PM to midnight, participants are prompted to fill out a Qualtrics survey about the online interactions and experiences they had during the day. Upon completion of the survey, the participant is redirected to the dashboard and their device data is uploaded.

Earnings: Participants can view a breakdown of the money they have earned throughout the study, which describes where the money is coming from. This 30-day study is split into 6 "periods" of 5 days each. For every journal entry that is approved by the researcher, the participant will receive $1.50. If all 5 entries within a period are approved, the participant receives a $5 bonus. If one or more screenshots are submitted within a period, the participant receives a $5 bonus. Submitting multiple screenshots will not result in multiple bonuses. A total of $17.50 can be earned each period, meaning a participant can earn a total of $105 from participating in the study.

Share a Screenshot: Participants have the option to upload a screenshot (Figure 13b) of their online interactions at any point during the study, as many times as they like. However, they are encouraged to upload at least one screenshot every five days. After selecting a screenshot, participants must enter a text description before submitting.

History: Once a participant has submitted a daily journal entry or screenshot, they can view their submission history for either. This includes when an item was submitted, the submission status (missed, submitted, accepted, or rejected) and when the status was updated, and an optional message from the researcher regarding the submission.

Help Center: The Help Center includes frequently asked questions about the study and the mobile app. These explain several potential concerns, such as what type of data the app collects, why the study is being conducted, and how money is earned. The Help Center also lets participants contact the research team and the National Sexual Assault Hotline for proper support throughout the study, directly from the app.

Settings: In Settings, participants can set the time of their daily journal reminder. By doing so, they will receive a push notification every day at the specified time, reminding them to

complete their journal entry for the day. They can also enable, disable, or change their 4-digit passcode used to lock the app, or they can sign out of the app.

Web App (For Researchers)

When visiting the web app, researchers are asked to sign in with the email and password assigned to them ahead of time. After logging in, they are brought to a dashboard (Figure 14) where they can get an overview of study activity, manage participants, manage submissions, and sign out.

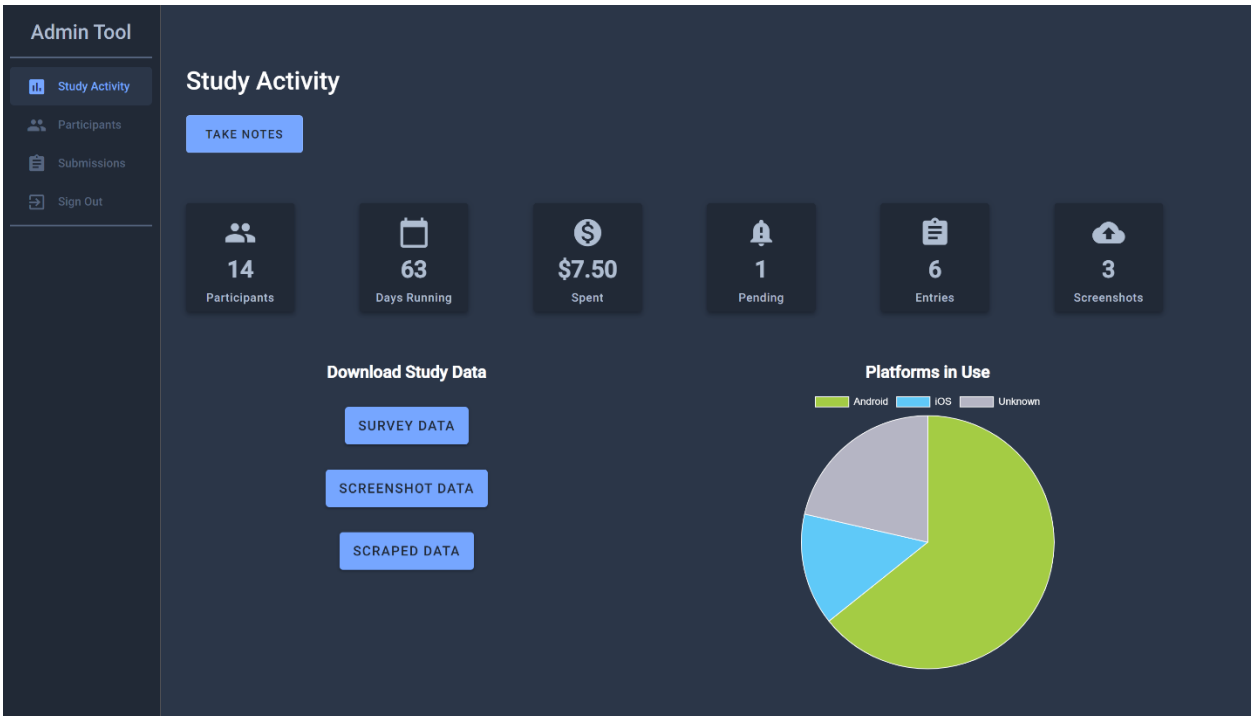


Figure 14. Screenshot of "30 Days" Web App Dashboard

Main Web App Features

Study Activity: Researchers can see how many participants are in the study, how many days the study has been running, the combined amount of money all participants have earned, the

number of submissions pending review, the total number of journal entries submitted, and the total number of screenshots submitted. They can also see the distribution of Android and iOS users in a pie chart, and download data related to the study for later analysis, including Qualtrics survey (daily journal entry) data, screenshots and associated data, and device usage data collected from participants. Furthermore, they can leave a number of notes on the study for later reference.

Participants: Researchers can see actively enrolled participants, participants who were invited but have not started the study, and participants withdrawn from the study. They can add a new participant by entering their email, age, gender, and race. At this point, the participant will receive an email with a temporary password to log into the mobile app. Researchers can resend the email or remove the user from the study. Participants appear as inactive until they sign in for the first time, at which point they appear as active. Researchers can also view a participant's profile, which includes their email, demographic information, operating system (Android or iOS), how many days until they complete the study, the money they have earned, and the number of journal entries and screenshots they have submitted. They can also see a list of the participant's submissions, and view, approve, or reject each one. Furthermore, they can leave their own notes on a participant for later reference.

Submissions: Researchers can also see a list of all participants' submissions, and view, approve, or reject each one. Viewing a journal entry will show the responses in Qualtrics and viewing a screenshot will show the image. When approving or rejecting a submission, the researcher can enter a text message to explain to the participant the reason for the decision. They can also leave their own notes on a submission for later reference.

Technical Implementation of the EMA Diary App

The following subsections discuss the technologies we used to create each application.

AWS Background

Our mobile and web applications shared a backend, built using Amazon Web Services (AWS). We used AWS Cognito User Pools to store users' account information, such as passwords, privately from the researcher. We used AWS Relational Database Service (RDS) to host a password-protected MySQL database instance that stored other user information (such as survey completion state) and connected this information to the Cognito user accounts. We created AES-256 server-side encrypted AWS Simple Storage Service (S3) buckets to store files containing sensitive information (such as user screenshots and device usage data). We created a REST API with AWS API Gateway, in which endpoints executed AWS Lambda functions. These functions both modified the data in our RDS database instance and uploaded data to our S3 buckets, and served as the means of connecting Cognito user accounts to the RDS database instance. We used AWS EventBridge to schedule daily journal reminders and trigger a Lambda function that sends push notifications to Android via Google Firebase. We used AWS Key Management Service to encrypt environment variables in Lambda functions to achieve at-rest and in-transit encryption on sensitive information, such as database passwords. We used a virtual private cloud (VPC) to further protect the RDS database so that only our Lambda functions and a single AWS Elastic Compute Cloud instance (used for database maintenance) had access.

Client Applications

The web application was built using Angular.js. We used AWS Amplify to host the application and automatically configure user accounts for each researcher. Both the Android and iOS applications were built natively. The Android app was developed using Android Studio 3.5.1 and written in the Java programming language. The iOS app was developed using Xcode 11.0 and written in the Swift programming language. Upon account creation and first-time login, users were prompted to grant access to the data on their phone. The Android app used UsageStatsHelper, PackageManager, and UsageEvents to collect the daily screen time, the app manifest, and how long each app was used in a daily context. The iOS app used location services, NotificationCenter, and the canOpenURL function to collect the daily screen time and a list of installed social media apps. The client app architecture uses our REST API to modify and display data from the backend. When the user makes a submission, views personal data, etc., their identification is verified using API Gateway Authorizers and any data is uploaded to the appropriate table, using the user ID generated by AWS Cognito upon account creation as a primary key.

EMA Diary Study Overview

This study has two separate phases: 1) a Youth and Online Relationships Survey (YORS) and 2) the "30 Days" EMA mobile diary study. We describe the procedure for both phases in the following subsections.

Phase 1: YORS

A web-based pre-enrollment survey was widely distributed to youth (ages 12-15) for initial analysis and to aid in the recruitment of the desired target population of foster youth for the EMA

diary study. Before completing the survey, electronic parental consent was requested from the proper legal guardian and assent from the teens. The total duration of the survey was approximately 30 minutes. Using the social ecological perspective of adolescent resilience, we identified several pre-validated measures to help us investigate the digital opportunities and online risks youth encounter online (see Figure 15 for a list of constructs). Once the responses were verified, participation received a $10 Amazon gift card code for their participation and asked to provide their name and email to be invited to phase 2 of the study.

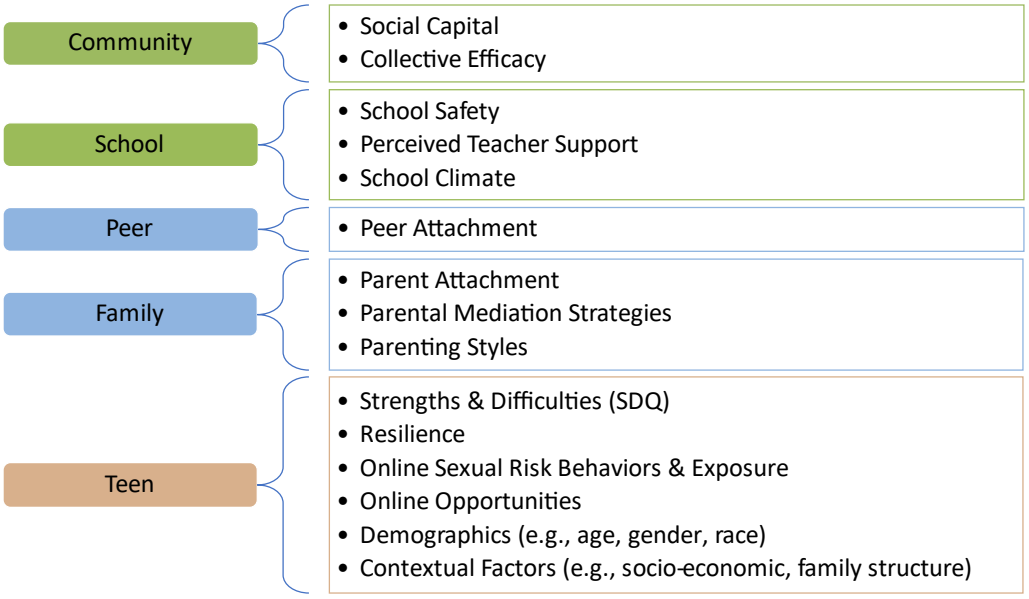


Figure 15. Operationalizing EMA survey measures

Phase 2: "30 Days" Mobile Diary Study

After completing phase 1, eligible participants were invited to participate in the EMA mobile diary study. Before initiating the diary study, participants were required to attend a virtual online meeting with the primary investigator. The purpose of this meeting was to complete the

consent and assent process, introduce the teen to the study, and provide training on how to use the "30 Days" diary app. Similar to Dr. Wisniewski's previous web-based, weekly diary study [168–170], we integrated surveys using the Qualtrics platform to collect youth self-report data. A short, five-minute survey was completed by the teen at the end of the day for 30 continuous days. We collected both open-ended and closed response perceptual data (condensed from YORS). Based on whether a teen experienced an online sexual interaction, they were asked to share with us additional details about the incident. Teens were also able to submit separate entries throughout the day with screenshots of situations. Behavioral data was also collected and included the manifest of apps installed on the mobile smartphone, phone-level privacy settings, and usage metrics (e.g., screen time, app usage). At the end of the 30 days, a post-survey assessment will also be administered. Participation was incentivized with up to a $125 Amazon gift card based on level of participation ($1.50 per diary entry, a $10 weekly bonus if all 5 diary entries were completed and of good quality, and $10 upon completion of the post).

Expected Outcomes

Diary methods are well-suited for understanding complex, event contingent family processes that occur in the context of daily life and are not as constrained by the methodological limitations of cross-sectional studies, such as recall bias and causal ambiguity [70,99]. Our study will be the first to investigate digital opportunities and risks within the social ecological perspective of adolescent resilience and capture micro-level social processes that unfold on a daily basis to understand how at-risk youth engage in risky online sexual behaviors and manage (or succumb to) online sexual predation risks. The results from this study will inform more broadly

areas of need within the social ecological perspective of adolescent resilience (family, peer, school, and community), where programs, practices, and policies can be enhanced to support at-risk youth by reducing digital inequality and mitigating high-risk outcomes.

CHAPTER 7: CONTRIBUTIONS & FUTURE RESEARCH

In this chapter, we provide a summary of the key findings and implications from my entire dissertation. We also summarize the overall contributions of this dissertation research and provide future directions for our research.

Summary of Key Findings & Implications

This dissertation focused on providing insights and evidence into how the online safety and well-being of foster youth is managed among different actors within foster youth's social ecological systems of support. This is a summary of what we found:

RQ1 – Study 1: *(a) What are the most prevalent risks encountered online by youth in foster care, according to caseworkers? (b) What types of trainings are provided to caseworkers to manage these situations? (c) How do caseworkers work with foster families to address online safety concerns?*

In chapter 3, we answered RQ1 by interviewing 31 child welfare workers over the age of 18 that had managed a case with a foster teen between 13-17 years old within the last 5 years. We found that case managers were most concerned about sexual risks, especially related to sex trafficking. However, they were not well aware of risks as they spoke more generally about the teens' experiences. Case managers also shared that their trainings are heavily focused on sex trafficking and crisis intervention. They receive little to no training on online safety, and what they do receive is typically focused on sex trafficking. This limited knowledge coupled with the challenges of being overextended with responsibilities forces case managers to put online safety as a secondary priority. Therefore, to help relieve these tensions we recommend solutions related

to training, technology, and policy. For example, mandate trainings on online safety for child welfare workers, design new technology solutions to support and encourage communication between case managers, foster parents, and foster youth, normalize the types of access to technology youth in foster care have, and educate and train foster youth on managing online risk situations. These solutions aim to challenge the foster care system to develop more bottom-up approaches, rather than the traditional top-down approach it employs, to create more balanced responsibilities among stakeholders.

RQ2 – Study 2: *(a) How do foster parents mediate technology use of foster teens in their home, and (b) what are the unique challenges they face while doing so?*

In chapter 4, we answered RQ2 by interviewing a total of 29 foster parents that reported on 43 teens. Foster parents had to be 18 years-old older and had foster a teen between 13-17 years old within the last 5 years. We found that most teens experienced high risks and most of the parents that implemented restriction were those of high-risk teens. They were also mostly considered low-tech parents (having limited knowledge of technology). The overall finding was that even though most parents emphasized online safety over privacy, we found a paradox in that they were ineffective at achieving either one. This caused a tension between providing technology as a way to maintain a sense of normalcy versus restricting the technology to keep them safe from online risk. To help ease these tensions, we propose foster care agencies develop enhanced training and educational programs to teach foster parents about the latest technology trends and about effective digital parenting practices. Federal, state, and agency-level policies that promote "reasonable and prudent" standards for "normalcy" [185], need to be updated to address the intricacies of digital

parenting. Finally, researchers and developers should design parental control software that is uniquely tailored to foster families.

RQ3 – Study 3: *(a) What are the perspectives of teens and parents regarding the teen's participation in research related to adolescent online risk behaviors, (b) What types of data are teens and parents willing to share with researchers when studying this topic, and (c) What design-based considerations should be made for systems used to collect data and engage teens in research about their online risk behaviors?*

In chapter 5, we answered RQ3 by working with a diverse group of 20 adolescents across 13 co-design sessions and conducting semi-structured interviews with 13 parents. A major finding throughout our study was that risk-based research with teen requires more than just considering how to conduct ethical human subjects' research. Teens wanted researchers to help them deal with risky situations they encountered online, rather than remaining an objective party. However, there are serious implications in taking such an active role. First, from a scientific perspective, intervening in the phenomenon being studied could affect the overall outcomes of the research. Second, most researchers are not clinically trained to handle these types of situations. We are also mandate reporters, so there may be times when we must disclose a teens' information to a 3rd party. Finally, researchers do not have the extra time to meaningfully help teens navigate these risk situations. To help researchers balance these tensions and protect the participating youth in their study, we created heuristic guidelines for conducting research with adolescents on sensitive topics that involve risk behaviors. We used these guidelines to create an Adolescent Risk Mitigation Plan for U.S.-based researchers which can be found in APPENDIX E: ADOLESCENT RISK MITIGATION PLAN (STUDY 3).

Overall Contributions of Dissertation Research

In accordance with Wobbrock and Kientz's 7 Research Contribution types in HCI [171], this dissertation research makes several different types of contributions to the field of Human-Computer Interaction. First, we make a *survey* research contribution by conducting a structured literature review and synthesizing previous research in adolescent online safety and technology use for foster youth. This review revealed three major areas for further research, which guided the study designs of this dissertation. Secondly, we make *empirical* research contributions by providing deeper knowledge into how adolescent online safety is addressed by different foster care system stakeholders based on observations gathered through interviews. Study 1 provides insights into the challenges caseworkers have in managing legal responsibilities and protecting teens from online risks. And Study 2 providing insights into the use of technology restriction to mitigate teen online risks within foster families. Finally, we also contribute through *artifact* research. Study 3 produce design-based recommendations for research tools that can engage teen in important sensitive topics that are meaningful for them. My study also produced a risk mitigation document and custom EMA mobile app for other U.S. based researchers to use. Table 9 summarizes the contributions of this dissertation.

Table 9. Overall contributions of dissertation research.

Study	Type	Contributions
Literature Review	Survey	• **Synthesized interdisciplinary literature** related to the online safety of foster youth and identified **avenues for new research** related to the online safety of foster teens, effective strategies for supporting foster parents in mediating technology use, and design-based interventions for promoting online safety.
Study 1	Empirical	• In-depth analysis of the challenges caseworkers encounter in **managing their legal responsibilities while protecting foster youth** from online risks.

Study	Type	Contributions
		• Novel insights into the **social ecological supports systems** of foster youth in relation to their online safety • Recommend **areas within the social ecological model** of adolescent resilience where **programs**, **practices**, and **policies can be enhanced**.
Study 2	Empirical	• In-depth analysis of the **challenges of mediating foster youth's technology use** within the context of foster families. • Novel insights as to the **use of technology restriction to mitigate risks foster teens** encounter on and offline. • **Implications for education**, **policy**, and **technology solutions** that promote effective parental mediation of teen technology use within the context of foster families.
Study 3	Artifact	• **Design based recommendations** for research tools used to engage teens in research about important and sensitive topics that are relevant and meaningful to them. • Developed **heuristic guidelines** for conducting risky research with vulnerable populations. • A **risk mitigation document** for U.S.-based researchers conducting sensitive research with vulnerable populations. • A **custom-built EMA diary study research tool** for investigating online interactions, behaviors, and other dimensions of the internet.

Limitations & Future Research

This dissertation provides a strong foundation to studying online safety for teens in the foster care system. Yet, it does not include the direct participation of youth in foster care. To successfully address the challenge of adolescent online safety within the foster care system, we need the voices of foster youth. Therefore, my ongoing and future research focus on including foster youth participants. For future research, we plan to conduct a participatory design study with foster youth ages 13-17 to design technology-based interventions that can help them navigate unwanted online risk experiences. This research will not only provide novel design patterns for

the online safety of foster youth, but it will also give them a stronger voice in the design of technologies that not only protect them but can also directly benefit them.

APPENDIX A: UCF INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL FOR STUDIES 1 & 2

UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

EXEMPTION DETERMINATION

July 16, 2020

Dear Karla Badillo-Urquiola:

On 7/16/2020, the IRB determined the following submission to be human subjects research that is exempt from regulation:

Type of Review:	Modification / Update, Exempt Category 2
Title:	Understanding the Challenges Related to Online Safety for Teens in the Foster Care System
Investigator:	Karla Badillo-Urquiola
IRB ID:	MOD00001129
Funding:	Name: William T. Grant Fdn
Grant ID:	None
Documents Reviewed:	None

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please submit a modification request to the IRB. Guidance on submitting Modifications and Administrative Check-in are detailed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

Due to the COVID-19 pandemic, all research involving face-to-face interaction that could not be done via a different mechanism such as phone, Skype, Zoom, etc. was halted on April 10, 2020 because of the increased risk to the researchers and subjects. A task force worked with the Institutional Review Board and its staff to develop a tailored approach to restarting this kind of research. The new process was announced June 23, 2020. For more information on conducting human subjects research during COVID-19, see https://corona.research.ucf.edu/human-subjects-research/.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Adrienne Showman
Designated Reviewer

APPENDIX B: FOSTER PARENT SEMI-STRUCTURED INTERVIEW SCRIPT (STUDY 1)

Thank you for volunteering to participate in this study. Before we start, can I ask one questions to confirm that you are eligible to participate in this study?

1. *Are you or have you been a foster parent to a teen within the last 5 years?*

If yes, great! You are eligible to participate in this study. First, I want to provide a document of informed consent. This document explains the purpose of this study, your rights, and your responsibilities as a participant.

If you agree with the informed consent, we can begin the interview. I am going to start audio-recording your interview now. . .

Background Questions

1. How long have you been a foster parent?
2. Why did you first decide to become a foster parent?
3. What is the age range of children you have fostered in the past?
4. Are you currently fostering any children? If so, please describe.
5. Do you typically prefer to foster younger or older children? Why?
6. How many teens have you fostered over the years? Please describe in more detail the teens you have foster over the past 15 years.
7. When you foster a teen, how long do they usually live with you?

Challenges

8. Are there any unique challenges to foster teens compared to younger children? If so, please describe the two most prominent challenges.
9. Do you feel like these challenges have changed at all since you first started fostering teens? If so, please explain.
10. Do you receive any kind of training in order to be prepared to meet these challenges? If so, please describe.

Technology Challenges

11. Can you please describe what technologies the teens who are fostered in your household have access to on a daily basis? For examples:
    a. Desktop computer or laptop?
    b. Cell phone or smart phone?

c. Tablet or handheld device?
d. Fast-speed Internet?

12. What do you do (if anything) to monitor the technology use of the teens in your home?
13. What do you do (if anything) to monitor the use of mobile technologies by the teens in your home?
14. How do you feel the introduction of Internet-based technologies, such as social media, have changed your responsibilities as a foster parent of teens?
15. Are you concerned about what the teens in your home are doing online?
16. Would you say you are a fairly strict parent or more laid back when it comes to mediating what the teens in your household do online. Can you explain giving an example?
17. What kind of household rules do you have about technology use in your home?
18. What social media apps do the teens in your home currently use?
19. Do the teens that you foster come to you to discuss what they do online? If so, what kinds of things do they talk about?
20. Have you encountered any problematic situations due to teen technology use? If so, can you please describe in detail?
21. Have any of the teens you fostered been involved in any risky situations online while under your care?
    a. For example, have they experienced online harassment or cyberbullying?
    b. Have they engaged in sexting or received sexual solicitations?
    c. Have they been exposed or intentionally sought out inappropriate online content?
    d. Have they been a victim of some kind of information privacy breach?

    If so (for any of the above), please explain.
22. Do you use any kind of parental monitoring technologies?
    e. If so, what do you use?
    f. If not, why not?
23. Do you feel like it is your responsible to make sure teens in your household are safe from online risks or do you feel it is more important to respect their online privacy? Why do you lean this way?

24. Does your caseworker or any other foster agency employees provide any assistance in terms of suggesting parental monitoring technologies you can use to monitor what your teens do online?
25. Do you feel like teens in the foster system experience more or less online risks than typical teens? Why or why not?

Future

26. What would make your life easier in terms of being confident that the teens in your household are safe from online risks?
27. What kinds of features would you like to see in a new technology designed to protect teens from online risks?
28. If these features existed, do you think you would use these technologies? Why or why not?

APPENDIX C: CASEWORKER SEMI-STRUCTURED INTERVIEW SCRIPT (STUDY 2)

Thank you for volunteering to participate in this study. Before we start, can I ask one questions to confirm that you are eligible to participate in this study?

1. *Are you or have you been a child welfare worker within the last 5 years for a teen (ages 13-17) in foster care?*

If yes, great! You are eligible to participate in this study. First, I want to provide a document of informed consent. This document explains the purpose of this study, your rights, and your responsibilities as a participant.

If you agree with the informed consent, we can begin the interview. I am going to start audio-recording your interview now. . .

Semi-structured Interview Questions for Case Workers

Background Questions

1. How long have you been a child welfare worker?
2. Why did you first decide to become a child welfare worker?
3. What is the age range of the children in the cases you've managed in the past?
4. How many cases with teens have you managed over the years? Please describe in more detail the teens you have managed over the past 5 years.
5. Do you currently have any cases of teens in foster care? If so, please describe your three most prominent cases.
6. For how long typically are these types of cases your responsibility?
7. Do you typically prefer to manage cases of younger or older foster care children? Why?
8. What are your responsibilities as a child welfare worker with regards to foster teens?

Challenges

9. Are there any unique challenges to managing cases of foster teens compared to younger children? If so, please describe the two most prominent challenges.
10. Do you feel like these challenges have changed at all since you first started working as a child welfare worker? If so, please explain.
11. Do you receive any kind of training in order to be prepared to meet these challenges? If so, please describe.

Technology Challenges

12. Thinking about what you know about your teen cases, can you please describe any technology devices the teens have access to on a daily basis? For example:
    a. Desktop computer or laptop?
    b. Cell phone or smart phone?
    c. Tablet or handheld device?

d. Fast-speed Internet?

13. How do you feel the introduction of Internet-based technologies, such as social media, have changed your responsibilities as a child welfare worker?
14. Again, thinking about the tech use of your teen cases, have any of them ever spoken to you about information they have found online, or people they have spoken with online about their situations or lives?
15. Do the foster teens come to you to discuss what they do online? If so, what kinds of things do they talk about?
16. Thinking about your foster teen cases, have any of them been involved in any risky situations online while in the foster care system?

    g. For example, have they experienced online harassment or cyberbullying?

    h. Have they engaged in sexting or received sexual solicitations?

    i. Have they been exposed or intentionally sought out inappropriate online content?

    j. Have they been a victim of some kind of information privacy breach?

    If so (for any of the above), please explain.
17. Thinking about the risky situations your foster teens have encountered, which of these online risks do you consider the biggest challenge?
18. How do you currently find out if a teen is experiencing these types of online risks?
19. What are the limitations of this approach?
20. *(Briefly introduce the technology idea)* As part of our research we plan to improve risk detection algorithms for the purpose of adolescent online safety. Our goal will be to more accurately detect when teens encounter online sexual risks, harassment, and mental health related risks on social media platforms.

    a. Do you believe this would be a more accurate way to assess online risks?

    b. What would be some of the benefits of this approach?

    c. What do you see as some of the potential drawbacks?

    d. Who would be a key decision-maker in implementing a risk assessment tool like this?

Technology Training

21. Does your supervising organization or any other foster agency employees provide any assistance in terms of suggesting parental monitoring technologies that can used to monitor what the teens do online?

    a. If so, which ones?

    b. If not, why not?

22. Do you receive any training regarding online safety for foster teens?
23. Do you feel like it is your responsibility to make sure the teens in the cases you manage are safe from online risks? Why or Why not?
24. What are your perceptions of fostered teens' ability to manage their safety and risks of online use? How about their privacy?
25. Do you feel like teens in the foster system experience more or less online risks than typical teens? Why or why not?

Systems of Support

26. Are there any technical systems of support in place for managing your cases? If so, please describe them in detail.
27. Are there any systems of support than help manage the child's history and placement information? If so, please describe in detail.
    a. Who has access to this system?

Future

28. What would make your life easier in terms of being confident that teens in foster care are safe from online risks?
29. What kinds of features would you like to see in a new technology designed to protect teens in foster care from online risks?
30. If these features existed, do you think you would recommend the use of these technologies? Why or why not?

APPENDIX D: UCF IRB APPROVAL FOR STUDY 3

UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
FWA00000351
IRB00001138Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

APPROVAL

February 25, 2019

Dear Karla Badillo-Urquiola:

On 2/25/2019, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title:	Co-designing an EMA Diary Study Mobile App with Teens and their Parents
Investigator:	Karla Badillo-Urquiola
IRB ID:	STUDY00000199
Funding:	Name: William T. Grant Foundation
Grant ID:	
IND, IDE, or HDE:	None
Documents Reviewed:	• IRB Protocol, Category: IRB Protocol; • Parent Participation Summary, Category: Consent Form; • Parental Consent/Child Assent, Category: Consent Form; • Researcher Script, Category: Interview / Focus Questions; • Storyboard, Category: Test Instruments; • PD Diary Study_Flyer.pdf, Category: Recruitment Materials;

The IRB approved the protocol on 2/25/2019.

In conducting this protocol, you are required to follow the requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

APPENDIX E: ADOLESCENT RISK MITIGATION PLAN (STUDY 3)

E.1 Introduction

This document is a guide created for researchers who are conducting user studies with adolescents (ages 13-17) and/or their families to mitigate the potential risks associated with studying adolescent risk behaviors in online contexts. This Risk Mitigation Plan (RMP) should accompany Institutional Review Board (IRB) research protocols that are determined to involve more than minimal risks to adolescents. This document is most relevant to researchers at academic institutions located in the United States.

Important Note: We are providing this template as a resource for researchers, but we ask that any use or modification of this template include a citation to this paper.

E.2 Required Training by Research Team Members

Prior to conducting a study that involves teens (ages 13-17), research team members will be required to complete relevant trainings. *Check the boxes based on the design of your study and the unique needs of your participants*:

- ☐ **CITI Training:** IRB requires all research team members to complete the Human Subjects Research (Group 2. Social / Behavioral Research Investigators and Key Personnel) CITI Training[1] prior to interacting with human research subjects.
- ☐ **Responsible Conduct of Research (RCR) Training:** For National Science Foundation (NSF) funded projects, research team members must also complete RCR training[2].
- ☐ **Youth Protection Training:** All researchers conducting research with minors under the age of 18 may complete training for youth protection (e.g., trainings on youth protection offered by universities or youth-serving organizations[3]).
- ☐ **Identifying and Reporting Child Abuse and Neglect:** For any studies involving a minor that have the potential for identifying child abuse and neglect, the research team members may complete a course on identifying and reporting child abuse (e.g., trainings offered by U.S. Department of Health & Human Services[4]).
- ☐ **Youth Suicide Prevention:** For studies that involve research on self-harm and/or suicide of a minor, researchers may also want to complete training on suicide prevention (e.g., trainings offered by the Jason Foundation[5]).

[1] https://about.citiprogram.org/en/series/human-subjects-research-hsr/
[2] https://about.citiprogram.org/en/series/responsible-conduct-of-research-rcr/
[3] https://www.scouting.org/training/youth-protection/
[4] https://www.childwelfare.gov/topics/can/identifying/training/
[5] https://learn.jasonfoundation.com/courses/module-5/

- **Mental Health First Aid Training:** For studies with minors under the age of 18 involving mental health related risks, researchers may complete an 8-hour course on Mental Health First Aid[6].

E.3 Additional Research Team Members

In some cases, a clinical professional or student with experience in clinical practice may be needed to support the research team and study participants. These individuals may need to consult on the study design or be physically/on-call during the study sessions. In these cases, these additional research team members will need to meet the following criteria (*check all that apply*):

- **Clinical Credit Hours: _____** (*Number of hours*)
- **De-escalation Training:** Requires completion of counseling courses that include dispute resolution and/or de-escalation in the syllabus (these courses may be provided as part of Mental Health First Aid[7] training or Crisis Intervention Team (CIT) training programs with NAMI[8], for example).
- **Other Required Experience and/or Training:** *Add any additional required experience for additional research team member here*.

E.4 Informed Consent/Assent Process for Adolescent Participants

Studies involving minors under the age of 18 require parental consent. However, we strongly encourage researchers to also obtain the minor's assent, regardless of if it is required by their IRB. For young adult participants over the age of 18, an adult consent form can be signed. In this section, we provide a list of the different consent/assent procedures.

Check all the consent/assent procedures that are most suitable to your study design.

- **Parental Informed Consent Form:** Relevant HRP form (according to the university's IRB) for parents to provide consent for minors (under 18).
    - **Online Consent:** Online web-based consent forms will be provided to participants.
        - **Parental e-signature:** Ask parents to provide e-signature.
    - **In-person/paper-based Consent:** A hard copy of the consent forms will be provided to the participants, which will be filled out in the presence of a researcher.
        - **Parental signature:** Ask parents to provide written signature.
- **Ensuring Teen Assent Independence:** Ask parents to allow teens to complete their assent form without parental oversight.

[6] https://www.mentalhealthfirstaid.org/
[7] https://www.mentalhealthfirstaid.org/
[8] https://www.nami.org/Home

- **Teen Assent Form (under the age of 18):** Separate assent form for minors (under 18), following the same format as the parental consent.
    - **Teen/Young Adult Signature:** Ask teens/young adults to provide paper-based signature or electronic signature.
- **Young Adult Assent Form (over the age of 18):** Relevant HRP form (according to the university's IRB) for young adult participants (over 18).
    - **Teen/Young Adult Signature:** Ask teens/young adults to provide paper-based signature or electronic signature.

E.5 Providing Resources for Mental Health Support

Below, we provide a list of mental health resources that may be used to support the wellbeing of participants. *Check all the resources that are most suitable to your study context*:

- **Mental Health Resources:** For studies involving mental health related questions or risks, Mental Health Resources for Adolescents and Young Adults[9] may be provided.
- **Crisis Intervention Resources:** For studies that may need crisis resolution or de-escalation, the following resources may be provided:
    - **Crisis Text Line[10]:** To connect with a Crisis Counselor, who can calm texters through active listening and collaborative problem solving.
    - **Trevor Lifeline[11]:** For crisis intervention and suicide prevention.
- **Suicide Prevention Resources:** For studies that involve participants answering questions regarding suicide or self-harm, the following resources may be provided:
    - **National Suicide Prevention Lifeline[12]:** For free and confidential support for people in distress, prevention and crisis resources.
- **Child Abuse Hotline:** For studies in which may child abuse of minors (under 18) may be suspected, the following hotline resources should be provided:
    - **ChildHelp National Abuse Hotline[13]:** For assistance regarding reporting child abuse and neglect.
- **State-based Resources:** Based on the location of the study, researchers may include state-based resources for crisis resolution, reporting child abuse, or getting mental health support.

  Add any additional resources here:

[9] https://www.adolescenthealth.org/Resources/Clinical-Care-Resources/Mental-Health/

[10] https://www.crisistextline.org/

[11] https://www.thetrevorproject.org/get-help-now/

[12] https://suicidepreventionlifeline.org/

[13] https://www.childhelp.org/hotline/

These resources will be provided to participants in the following manner (*Check all that apply)*:

- ☐ Via the statement of informed consent/assent
- ☐ Via a Frequently Asked Questions (FAQ) webpage
- ☐ Via the webpage header (available for quick reference at all times)
- ☐ Print outs for in-person studies
- ☐ Other (please explain):

E.6 Mandated Child Abuse Reporting

The following section covers the protocol for mandated child abuse reporting. The following section is in accordance with Federal Law Section 13031.42[14]. Laws may vary by state.

Informed Consent Statements

All informed consent documents of studies that require mandated child abuse reporting, should mention in both the protocol and consent forms what constitutes as mandatory reporting and how it will be addressed. Warnings should be present to notify participants as the researcher's role as a mandated child abuse reporter. Disclaimers should also be included to clearly indicate that data collection will not be monitored in real-time. Therefore, the study should not be considered a tool for risk reporting.

- **Warning Example:** "*If data collected from this study strongly indicates that you are at serious risk of physical injury, sexual abuse, mental injury, or physical neglect, we are required by law to report these types of imminent risks to the proper authorities."*
- **Disclaimer Example:** *"The data collected during this study will not be monitored on a daily basis, so this study should not be considered as a form of real-time screening or reporting for teen abuse.*"

Legal Definitions

These definitions are based on [*anonymized for submission*] state law. **Note:** Definitions of mandated reporter, child abuse, child neglect, and reasonable suspicion vary by state.

Mandated Reporter: (a) Any person who knows, or has reasonable cause to suspect, that a child is abused, abandoned, or neglected by a parent, legal custodian, caregiver, or other person responsible for the child's welfare or that a child is in need of supervision and care and has no parent, legal custodian, or responsible adult relative immediately known and available to provide supervision and care. (b) Any person who knows, or who has reasonable cause to suspect, that a child is abused by an adult other than a parent, legal custodian, caregiver, or other person responsible for the child's welfare. (c) Any person who knows, or has reasonable cause to suspect, that a child is the victim of childhood sexual abuse or the victim of a known or suspected juvenile sexual offender.

[14] https://www.justice.gov/olc/opinion/duty-report-suspected-child-abuse-under-42-usc-13031

Child: born, unmarried person less than 18 years old who has not been emancipated by order of the court.

Child Abuse: “Abuse” means any willful act or threatened act that results in any physical, mental, or sexual injury or harm that causes or is likely to cause the child's physical, mental, or emotional health to be significantly impaired. Abuse of a child includes acts or omissions. Corporal discipline of a child by a parent or legal custodian for disciplinary purposes does not in itself constitute abuse when it does not result in harm to the child.

Child Neglect: “Neglect” occurs when a child is deprived of, or is allowed to be deprived of, necessary food, clothing, shelter, or medical treatment or a child is permitted to live in an environment when such deprivation or environment causes the child's physical, mental, or emotional health to be significantly impaired or to be in danger of being significantly impaired.

Reasonable Suspicion: The researcher (reporter) has information that suggests that a child has been hurt or harmed by a parent/person legally responsible for the child. Another experienced mandated reporter would suspect child abuse or neglect if given the same information.

- To determine whether there is reasonable suspicion of child abuse or neglect, the Primary Investigator (PI) will consult with the research team of the study. If all members unanimously decide that the report does not suggest any abuse or imminent risk, the PI will not escalate the issue further. However, the PI will document the issue, discussion, decision, and dates that the issue was raised and closed. In the case that one or more members believe that abuse or imminent risk is possible, the PI will escalate the issue by submitting a report to the proper authorities.

Procedure for Submitting a Report

As mandated reporters, if we have **reasonable suspicion** that a child has been abused, neglected or threatened of harm in the state, we will contact the state hotline to report the incident. The Hotline counselor will determine if the information provided meets legal requirements to accept a report for investigation.

To make a report, we will use the following methods:

- Telephone
- Web Reporting
- Fax (the fax report form can usually be found on the State Hotline website)

Before contacting the state hotline, we will make sure to have as much of the information listed below available. If we are unable to obtain some of the information below, we will still call the Hotline and a counselor will assess the information available to see if it meets statutory criteria to initiate a protective investigation.

- Victim name, possible responsible person, or alleged perpetrator name(s).

- Complete addresses for subjects, including a numbered street address, apartment or lot number, city, state, and zip code and/or directions to their location.
- Telephone numbers, including area code.
- Estimated or actual dates of birth.
- Social Security numbers, if available.
- A brief, yet concise, description of the abuse, neglect, abandonment, or exploitation, including physical, mental or sexual injuries, if any.
- Names of other residents and their relationship to the victim(s), if available.
- A brief description of the victim's disability or infirmity (required for vulnerable adults).
- The relationship of the alleged perpetrator to the victim.

Anyone reporting in good faith shall be immune from any civil or criminal liability.

Procedure for Submitting a Report to Law Enforcement

If we have **reasonable suspicion** that a child has been abused, neglected or threatened of harm by **someone other than the parent** or person responsible for the care, it may be a criminal matter and the police should be called.

Procedure for Submitting a Report to the National Child Abuse Hotline

If we have **reasonable suspicion** that a child **outside the state** has been abused, neglected or threatened of harm, we will contact the Childhelp National Child Abuse Hotline[15]. The Childhelp National Child Abuse Hotline is dedicated to the prevention of child abuse. Serving the U.S. and Canada, the hotline is staffed 24 hours a day, 7 days a week with professional crisis counselors who—through interpreters—provide assistance in over 170 languages. The hotline offers crisis intervention, information, and referrals to thousands of emergency, social service, and support resources. All calls are confidential.

To make a report, we will use one of the following methods:

1. Call or Text 1-800-4-A-CHILD (1-800-422-4453)
2. Use the online live chat option

E.7 Reporting Child Pornography

This section covers our protocol for reporting child pornography in case the study involves uploading files or images/videos from minors. The following section is in accordance with Federal law (USCA Section 2256)[16] which defines child pornography as any visual depiction of sexually explicit conduct involving a minor (anyone less than 18 years old).

[15] https://www.childhelp.org/hotline/
[16] https://www.justice.gov/criminal-ceos/citizens-guide-us-federal-law-child-pornography

Researchers may use implement the following procedures in place to prevent receiving or distribution of child pornography (*Please check all that apply*):

- **Informed Consent/Assent Forms:** In studies where participants are asked to upload photos or videos regarding their online interactions, we directly ask participants to not upload any files that include sexual depiction or nudity of a minor.
- **Instructions to participants:** Before uploading files give them reminders and if applicable instructions to delete any images/videos from their files if they think it might fall under child pornography definition.
- **Reporting Child Pornography:** If a photograph or video is considered to be child pornography and the minor in the photograph or video is identifiable, the following steps will be taken:
    1. We will make sure that the photo or video is not copied, distributed, or shown to anyone else (including any other research team member).
    2. We will file a report on the National Center for Missing & Exploited Children[17] (NCMEC)'s. The report will be forwarded to a law enforcement agency for investigation and action.
    3. In addition to reporting to NCMEC, we will immediately notify local law enforcement and follow the instructions we receive from them.

Note: Federal law[18] requires reporting child pornography, therefore a NIH Certificate of Confidentiality (A.8) will not protect the disclosure of identifiable information in this case. If we are not reasonably able to determine if it is a minor in the image, we will not report it to avoid over-reporting.

E.8 National Institute of Health (NIH) Certificate of Confidentiality

Certificates of Confidentiality[19] (CoCs) protect the privacy of research subjects by prohibiting disclosure of identifiable, sensitive research information to anyone not connected to the research except with the subject's consent or in a few specific situations. Researchers with a CoC may disclose identifiable, sensitive information ONLY in the following circumstances:

1. If required by other Federal, State, or local laws, such as evidence of child abuse or a subject's threatened violence to self or others; or
2. for the purposes of scientific research that is compliant with human subjects' regulations

Researchers with a CoC must ensure that anyone who is conducting research as a sub-awardee or receives a copy of identifiable sensitive information protected by the policy understands they are also subject to the disclosure restrictions.

[17] https://www.missingkids.org/gethelpnow/cybertipline
[18] https://www.justice.gov/criminal-ceos/citizens-guide-us-federal-law-child-pornography
[19] https://grants.nih.gov/policy/humansubjects/coc.htm

Check here, if this applies to your study

- ☐ Due to the sensitive data collected during of our studies, researchers may want to apply for a Certificate of Confidentiality through the National Institute of Health (NIH).

E.9 Plan for Data Sharing and Protection

Researchers may apply the following data protection/sharing and retention policies for studies involving teens' social media/personal data (*Please select all that apply*):

- ☐ **Data De-identification**: All human subjects' data (e.g., surveys, images, videos, and text) will be carefully de-identify prior to publication or public dissemination. For de-identification, all names and usernames, including names of places and people will be removed. Also, any uniquely identifiable information (e.g., description of birthmarks, unusual or rare individual characteristics) will be removed. Disseminated results will include de-identified quotations and images (e.g., participants' faces, unusual or rare characteristics will be edited out).
- ☐ **Data Retention:** Per the university's Data Retention Policy, de-identified data and signed informed consent documents will be stored for a minimum of five years.

For studies that are funded through National Science Foundation (NSF), studies should comply to the Data Management Plan[20] for the grant.

- ☐ **NSF Funded Projects:** All NSF Engineering Directorate Proposals and Awards have a Data Management Plan (DMP) that outlines the required period of data retention. The minimum period for data retention of research data is three years after the conclusion of the award or three years after public release, whichever is later.

This Risk Mitigation Plan Template should ONLY be used as a guide for your study and not be considered an all-inclusive and official document for addressing all the youth protection considerations for your research participants.

[20] https://www.nsf.gov/cise/cise_dmp.jsp

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