Conducting Risky Research with Teens: Co-designing for the Ethical Treatment and Protection of Adolescents

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The methods in which we study the online experiences of adolescents should be evidence-based and informed by youth. This is especially true when studying sensitive topics, such as the online risk behaviors of minors. We directly engaged 20 adolescents (ages 12-18) in the co-design of two different research methodologies (i.e., diary studies and analyzing social media trace data) for conducting adolescent online safety research. We also interviewed 13 of their parents to understand their perspectives. Overall, 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. Teens' feared getting in trouble. Participants emphasized the importance of developing a trusting relationship with the researcher to overcome these concerns. 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. Our research delves into important ethical considerations for conducting risk-focused research with adolescents and uncovers the critical need for designing risk-based research for youth protection. We provide researchers with heuristic guidelines for conducting ethical research with vulnerable populations (i.e., adolescents) and keeping participants safe while doing so.

1 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

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diary studies with adolescents to understand how they manage chronic illnesses [41], analyzed digital trace data to gain insight on how adolescents seek support for their online sexual risk experiences [63], engaged with teens through asynchronous online communities to design technologies to support mental health [7], and co-designed technology-based interventions with teens to help reduce their stress levels [8]. 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 [49,50,85]), 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 [48,76].

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., [47,49,83]). HCI researchers have engaged with adolescents to discuss and design for important online safety issues, such as cyberbullying [2], online sexual solicitations [63], and adolescent sexual health in the Digital Age [87]. 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. [76] 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 [10] and paper mock-ups [77]) 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.

2   RELATED WORK

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.

2.1   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" [60], 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., [46,64,65,73]). 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 [48]; therefore, these individuals

require special care and protection when involving them in research [76]. For example, Bell and Leong [6] 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. [76] 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 [62] 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 [1,62] 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. [89] 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 [21], maintaining confidentiality of teens' data [27], and protecting youth from harm or abuse [37]. 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 [54] 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 [58], sexual predation [18], and other forms of sexual abuse [69], including sextortion [86] and human trafficking [74]. 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 [14]; 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 [80].

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 [40]. 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.

2.2 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., [9,45,90]). Early work by Yardi et al. [90] 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. [9] 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 [2] 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. [49,83–85] 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 [5,22], app-based feature analyses [82], qualitative analyses of app reviews [33] surveys [32,34,67], design-based activities [4], to the development of new design-patterns for promoting adolescent online safety through active parental mediation and trust [35].

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 [3,52,59]. In 2020, Masaki et al. [47] 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. [61] 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. [91] 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.

2.3 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.

2.3.1 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 [51]. 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 [55]) important events long after they occur [51]. 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 [68], sexual risks [28], chronic illnesses [41], and acute mental health issues [16]. For example, Czyz et al. [16] 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 [44], researchers have also begun to leverage mobile technologies to engage adolescents in EMA diary research. Garcia et al. [31] developed a text messaging EMA diary system and found that it was a promising way to engage with adolescents. Similarly, Comulada et al. [15] 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 [88]. 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.

2.3.2   Collecting and Analyzing Social Media Trace Data.   In a comprehensive review of the literature on adolescent risk behaviors and online safety, Pinter et al. [61] 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 [63]. Weinstein et al. [78] 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. [63] 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 [26,36].

Yet, this approach is not without limitations. Fiesler et al. [24,25] 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 [24]. 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 [24,25]. 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 [63,78], 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 [2,7] 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.

3 METHODS

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

3.1 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 [10], storyboarding [77], and back-and-forth discussions. Co-design approaches are commonly used within the HCI literature, particularly when working with youth as end users [20]; 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 [56]. Our study is situated at the intersection of the ideation and design stages; therefore, we chose to use journaling [10] and storyboarding [77] techniques as our tools for probing, understanding, and generating design ideas from our teen participants. According to Brandt et al. [10], 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 [77]. 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.

3.2 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.
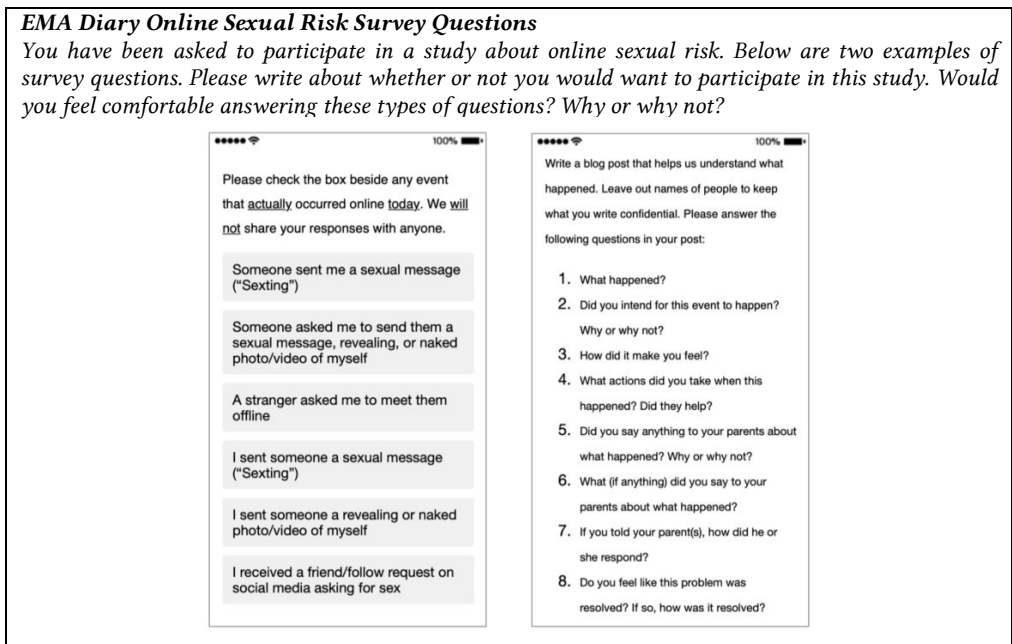

EMA Diary Online Sexual Risk Survey Questions
You have been asked to participate in a study about online sexual risk. Below are two examples of survey questions. Please write about whether or not you would want to participate in this study. Would you feel comfortable answering these types of questions?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

Fig. 1. 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 (**Fig. 1**) 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).
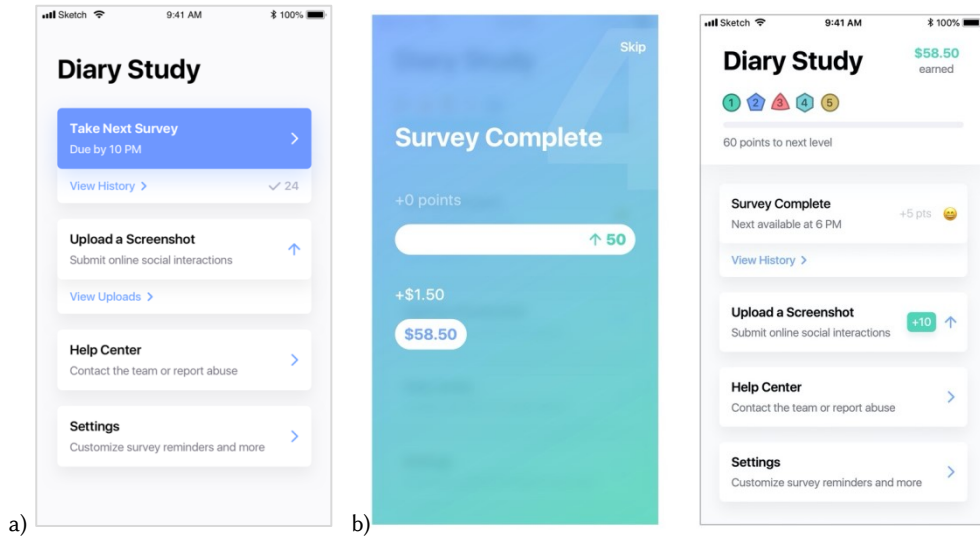

Fig. 2. Storyboards presented to adolescent participants: a) Baseline dashboard, b) "Gamified" dashboard.

For the final exercise, we presented a storyboard with three mocked-up screens of an EMA diary mobile app (**Fig. 2**). 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 (**Fig. 2b**) 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.

3.3 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 (**Fig. 1**, right). We then asked parents a series of questions (**Table 1**) 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 1. Sample interview questions for 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?

3.4 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 [11], 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 2**. 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 2**. 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 4** 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 2. Final Codebook for Thematic Analysis.

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)
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.

3.5 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 3. 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 3**, 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.

4 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.

4.1 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).

4.1.1   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 [93].

> *"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.

4.1.2. 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.

4.1.3. 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.

4.2 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 4. 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)
	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)

4.3 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 4** (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 (**Fig. 2b**), 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.
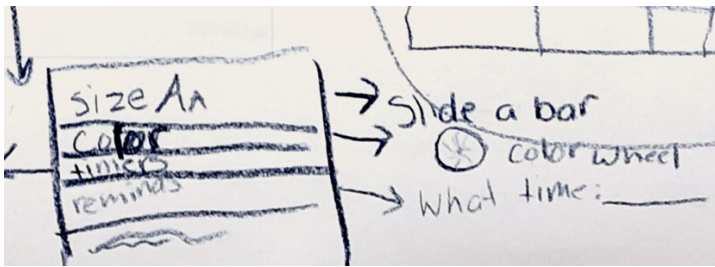
Fig. 3. Adolescent's app font and color customization design. User can adjust the font size using a slider and font color using a color wheel. (T3, Female age 12)

4.3.1. 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 (**Fig. 3**). 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 [70]) 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 (**Fig. 4**). 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).
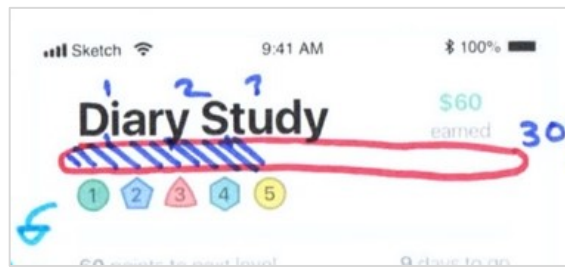
Fig. 4. Adolescents' "Power Bar" progress indicator. As teens progress through the study, the blue stripes fill the red region. (S5: T6, Male age 18; T7, Female age 16; T8, Male age 16)

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.

4.3.2. 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 (**Fig. 5a**). 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
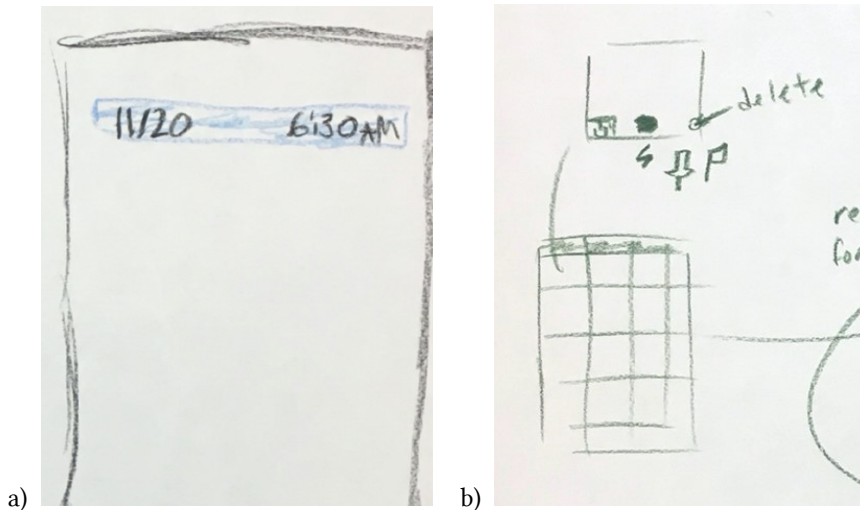

Fig. 5. Adolescents' Review Submissions designs.
a) Review survey responses feature (T2, Male age 14)   b) Delete screenshot feature (T16, Male age 16)

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 (**Fig. 5b**). 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 (**Fig. 6a**). 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*
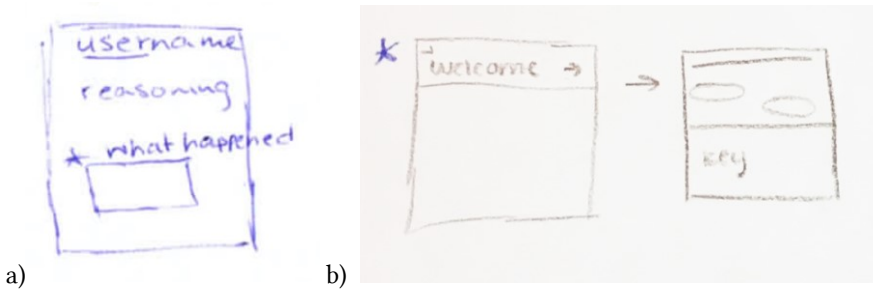
a)   b)

Fig. 6. Adolescents' Resolution Tool designs.
a) Report form (T18, Female age 17)   b) Live help chat (S6: T9, T10, T11, Females age 17)

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 (**Fig. 6b**). 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

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.

5 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).

5.1 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 [6]. Beneficence is one of the three basic ethical principles for conducting human subjects research from the Belmont Report [17], 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. [76] 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 [76]. For instance, we might create easy-to-understand infographics [42] or a "zine" (i.e., magazine) [29] to present the important findings and implications of a study back to participants. When engaged in public scholarship [23] 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" [38] 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" [39], rather than staying in our safe ivory towers.

5.2 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) [30], 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 [17]. 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 [66]. 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) [57]. 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.

5.3 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 [43]; especially due to the perceived power imbalance between the teens and researchers [62]. 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 [62]. 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 [94] and UW [95] 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. [92] 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 [12]. Engaging teens in participatory design [71] and participatory action research [39] 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.

5.4 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. [40] 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 [19]. 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 [53]. 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 A**) 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 [14], 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 [13]). 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 [57]. 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.

5.5 Heuristic Guidelines for Conducting Risky Research with Adolescents

Based on our findings, we provide the following heuristic guidelines 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.

- *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 (Appendix A.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 (Appendix A.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 A.6, A.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 A.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.

5.6 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 [75], 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.

5.6.1. 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.

5.6.2. Give Teens More Control. Adolescence is marked by increased autonomy-seeking [93]; 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 [72]. 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.

5.6.3. 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 [96] 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 A.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.

5.7 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 [26] 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 [5] 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.

6 CONCLUSIONS

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.

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A   ADOLESCENT RISK MITIGATION PLAN

A.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.

A.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]).

☐ **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].

A.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.*

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

A.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.
- ☐ **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.

A.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.

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

☐ **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:

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):

A.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

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[11] https://www.thetrevorproject.org/get-help-now/
[12] https://suicidepreventionlifeline.org/
[13] https://www.childhelp.org/hotline/
[14] https://www.justice.gov/olc/opinion/duty-report-suspected-child-abuse-under-42-usc-13031

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.

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

A.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

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

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).

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.

A.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.

Check here, if this applies to your study

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

[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

☐   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).

A.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.

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