

Family Communication: Examining the Differing Perceptions of Parents and Teens Regarding Online Safety Communication

TARA L. RUTKOWSKI, University of Central Florida, USA

HEIDI HARTIKAINEN, University of Central Florida, USA and University of Oulu, Finland

KRISTEN E. RICHARDS, James Madison University, USA

PAMELA J. WISNIEWSKI, University of Central Florida, USA

The opportunity for online engagement increases possible exposure to potentially risky behaviors for teens, which may have significant negative consequences. Effective family communication about online safety can help reduce the risky adolescent behavior and limit the consequences after it occurs. Our paper contributes a theory of communication factors that positively influence teen and parent perception of communication about online safety and provides design implications based on those findings. While previous work identified gaps in family communication regarding online safety, our study quantitatively identified the factors that significantly contribute to parents' and teens' differing perceptions. We analyzed data from a survey of 215 teen-parent pairs through a cross-sectional design and examined the factors that contribute to increased family communication about online safety. For parents, active mediation, technical monitoring, and a perceived positive affect of the teen were associated with higher levels of family communication. Our results were similar for teens, except that the teen's online safety concern and parental monitoring were also positively associated with increased family communication, while restrictive mediation was associated with lower levels of family communication. Many existing designs for online safety support a restrictive approach, despite teens not wanting technical restrictions. A key implication of our findings is that teens view active mediation and monitoring positively in respect to family communication. Contrary to mainstream narratives, this finding suggests that teens value parental involvement and do not desire complete independence online. By examining specific mechanisms which can hinder or improve family communication between parents and teens regarding online safety, we recommend solutions that give teens an active role in their online safety and facilitate effective family communication through cooperation between both parties, rather than technologies that promote parental restriction.

CCS Concepts: • **Human-centered computing** → Collaborative and social computing → Empirical studies in collaborative and social computing • **Security and Privacy** → Human and societal aspects of security and privacy → Social aspects of security and privacy

KEYWORDS: Adolescence, Teens, Online Safety, Family Communication

ACM Reference format:

Tara L. Rutkowski, Heidi Hartikainen, Kirsten E. Richards, Pamela J. Wisniewski. 2021. Family Communication: Examining the Differing Perceptions of Parents and Teens Regarding Online Safety Communication. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 5, CSCW2, Article 373 (October 2021), 26 pages, <https://doi.org/10.1145/3479517>

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Permissions@acm.org.

Copyright © ACM 2021 2573-0142/2021/October - Art373 \$15.00

<https://doi.org/10.1145/3479517>

1 INTRODUCTION

The teenage years represent an important transitional time for parent-child interactions as teens approach adulthood: Teens' attitudes and beliefs mature and they become less dependent on their parents [2]. In general, adolescence is characterized by heightened risk-taking [39] and increased independence [5,48]. Online environments magnify teenager's opportunities to engage in risky behavior [43]. Adolescents are less capable than adults at managing online risks without guidance [10] and so parents may be concerned about potential online threats or harm teens may experience online [43]. Effective communication between parents and teens is an important protective factor for risky adolescent behavior [3,25,29]. However, parental rules about technology use— when teens can use technology, what content they can access, and what controls parents enforce—may create tension in parent-child relationships. When mediating teen's online activities, parents often experience tension in balancing an adolescents' need for autonomy and seeking to preserve their safety and well-being [12,19]. Teens prefer trust and respect for their privacy from parents, over technology that restricts or monitors their online activities [16]. Family communication is vital to teen online safety. By discovering patterns in how a) teen online risk exposure, b) online safety concern, c) parental mediation strategies, and d) teen's positive and negative affect influence teens and parents' perception of their communication about online safety, we contribute to an improved understanding of teen and parent interactions that support the creation of effective solutions to protect teen safety online in the future. In our paper we address the following research questions:

- **RQ1:** Is there a difference between how teens and parents view family communication around the teen's online safety?
- **RQ2:** What factors contribute to how teens and parents view their family communication around the teen's online safety?

To address the research questions, we analyzed data from a cross-sectional survey of 215 adolescents (aged 13-17) and their parents. We performed a paired t-test to determine if there was differences between how teens and parents rate their communication (**RQ1**). We developed two linear regression models, one for the teen data and one for the parent data, to explore factors contributing to how teens and parents perceive their communication about online safety (**RQ2**). We applied a block approach to the linear regression models to examine the effects of each variable group on the model. We also evaluated gender, age, income, and risk exposure (Block 1), online safety concern (Block 2), parental mediation strategies (Block 3), and teen's positive and negative affect schedule (PANAS) (Block 4). We chose to control the inclusion of independent variables in the models block by block, in order to obtain coefficients and statistics for specific blocks.

The paired t-tests indicated that teens perceived a significantly higher frequency of family communication than parents reported. These differences were further explored in the regression models to evaluate the factors associated with this significant difference. In the regression models, we found the only variables significant for both parents' and the teens' perceptions of family communication were parental mediation and positive affect schedule. Parental mediation is further understood as active, restrictive, monitoring, or technical monitoring. Active parental mediation of internet use describes activities like discussing internet use with the teen and offering help. The more parents engage in active mediation, the more both teens and parents feel like they communicate about online safety. An example of monitoring would be parents checking teen's messages or friends on social media. Monitoring is positively associated with both parent and teen perceptions of family communication but is only statistically significant for teens. Parents believe

that using technical monitoring such as parental control software increases family communication, while teens reported no statistically significant effect. Interestingly, teen perception of restrictive parental approaches significantly lowered teen perceptions of family communication, with no significant effect in either direction for the parents. For both parents and teens, we found that their perceptions of the teens' positive affect over the last two months also was positively associated with their views on family communication and that teens saw a significant rise in communication. Teen perspectives of risk also strongly influences their views of family communication – the more concerned a teen was about risk, the more positively they viewed family communication.

Our research reveals interesting differences in how teens and parents view communication surrounding online safety and what factors contribute to those differences. Understanding teen and parent's views of communication around online safety opens new pathways for research and practice. It provides the CSCW community, designers, and families with valuable practical knowledge on how to develop future online safety solutions that consider the complex issues of conflicting perceptions between teens and parents to design systems that enhance family communication. Our study uniquely explores the factors contributing to teen and parent views on family online safety communication using quantitative analyses, an underutilized approach in the CSCW literature, to both confirm and expand our current knowledge of family dynamics around adolescent online safety and risks.

Next, we will present related work concerning family communication, teen online risk exposure, online safety concern, parental mediation, and teen positive and negative affect as well as related hypotheses. This is followed by our data collection and analysis methods and results in the form of descriptive statistics and linear regression models. We will finish the paper by discussing the importance of our findings to both research and design, presenting conclusions, and offering paths for future research.

2. RELATED WORK AND HYPOTHESES

Adolescent safety, online mediation, privacy, and situational based awareness technologies are of great interest to CSCW communities [1,6,38,43]. In this section, we highlight key research on family communication and its relationship with risk exposure, online safety concerns, parental mediation of teens' online activities, and teen psychological outcomes.

2.1 Family Communication, Online Risk Exposure, and Safety Concern

Family communication is a process whereby family members negotiate and define their relationships [31]. Positive communication enables better family functioning by helping family members share their evolving needs and preferences [4]. The importance of family communication to adolescent development is instrumental in positive outcomes for teens in many different aspects of life, especially risky adolescent behavior.

Constant online activity is commonplace for many adolescents [29] and teen online activities are becoming more and more inaccessible to parental oversight [26]. Previous research has shown that more Internet use facilitates increased digital literacy and safety skills [27]. According to the EU Kids Online research carried out in 25 European countries, most European 11- to 16-year-olds have online safety skills such as knowing how to block messages from people they did not want to contact and finding safety advice online [26]. In addition, around half of them can change the privacy settings of their social media accounts, block websites, and judge the quality of a website [26]. However, there might be a discrepancy between parent and adolescent views of adolescent online

safety skills: Hartikainen et al. (2017) surveyed 141 children and 163 parents and found that children have a significantly more positive opinion of their safety skills than their parents [20]. Interestingly, the study also found that children were also significantly more confident that their parents know what they do online compared to their parents were [20]. Furthermore, Blackwell et al. (2016) found that parents underestimate their teens technological engagement [6].

Adolescents' skills related to online behavior develop differently [40] and their developing moral judgment affects their actions [43]. They mature at different rates, are exposed to very different experiences, and respond differently to different parental mediation strategies [43]. As adolescents may be less capable than adults at managing online risks without guidance [10], it is understandable that adults are concerned – worrying that the things adolescents might be exposed to online may be harmful [43]. It should be noted, however, that just because there is a risk that something bad might happen, does not mean it will [18]. According to the previously mentioned EU Kids Online study, most European teens and pre-teens have not been bothered by something experienced on the Internet. For example, seeing sexual images and receiving sexts online is relatively common, but generally not experienced as being very harmful from the teen's point of view [26]. Wisniewski et al. (2016) found similar results that teens did not intentionally seek out online risk experiences, and 87% of the encountered risks were low to medium risk severity [46]. They also discovered that when teens encountered online risk events, most teens often took measures to resolve the issues, or the issues were so insignificant that the teen did not deem it necessary to do so [46]. In contrast, being bullied online is quite uncommon but is more likely to upset children, however, there is a discrepancy when it comes to parent and teen perceptions of the frequency of teen online risk experiences [20]. Based on these empirical findings, we anticipate that:

- **H1:** For parents and teens, teen online risk exposure is negatively associated with family communication
- **H2:** For parents and teens, online safety concern is positively associated with family communication

2.2 Family Communication and Parental Mediation of Online Safety

Threats adolescents face online are usually divided into content threats (i.e. pornographic or violent material), contact risks (i.e. being cyberbullied or groomed), or conduct threats (i.e. cyberbullying others) [23]. Information security threats (i.e. malware, phishing, or data theft or loss) can be included in the categorization [18]. The goal of many parents is to help maximize online opportunities to minimize the risk of harm that online threat pose [21]. For example, adults fear adolescents might experience psychological harm when encountering inappropriate online content [9]. Parental mediation of adolescent online safety includes protecting children from harm, giving them tools to cope with potentially harmful things they encounter online and ensuring that they are not making bad decisions that might have severe consequences [43]. Parental mediation requires a balance between protecting children and teaching them how to cope with the fact that sometimes engaging online can be detrimental [43]. Parents are often encouraged to protect their children, as proactive parents are viewed as “good” parents [9]. Parental mediation of online safety can be divided into 1) **Active mediation** of adolescent Internet use. For example, talking to the teens about what they do online, sharing activities and guiding and offering help. 2) **Restrictive mediation** of adolescent internet use such as making rules about what teens may and may not do online. 3) **Parental monitoring** of teen internet use, such as checking up on what teens are doing online, checking the messages on teens' instant messaging accounts or their profiles on social media. [21].

In addition, parental mediation may include 4) **Technical mediation** of teen internet use through technologies that attempt to prevent risk [18,44] for example by filtering or restricting use [21].

A wealth of research has demonstrated that parental mediation strategies are associated with adolescent online safety (e.g., [9,21,39,40].), suggesting that parents are one of the most important factors in promoting adolescent online safety; however, parents may be unaware of children's technology use [18]. They may struggle to set rules and boundaries [47]. Even if the parents want more transparency in their children's use of the Internet and mobile devices, they might also find it difficult due to unfamiliarity with the technology [47]. Reduced digital skills of parents have been linked to restrictive or indulgent approaches, while adults with better digital skills are more likely to monitor and actively mediate children's online activities [43]. Parents with reduced digital skills are also less likely to communicate to their teen concerning internet use [16]. Restrictive mediation in general reduces children's exposure to online risks, but also to reduce their online opportunities and skills [14]. Furthermore, as previously indicated, teens dislike technologies that restrict or monitor their internet use [16]. Solutions for technical monitoring do not seem to take this into consideration as the majority of parental control apps favor restricting or monitoring [42]. Monitoring adolescent Internet use is sometimes recommended, but there are concerns as to whether it is ethically acceptable [30]. Active mediation through engaging in communication with adolescents concerning their internet use is encouraged because it is linked to lower risk and harm of children while encouraging more online activities and skills [14]. Based on these empirical findings we anticipate:

- **H3:** For parents and teens, active mediation is positively associated with family communication
- **H4:** For parents and teens, restrictive mediation is negatively associated with family communication
- **H5:** For parents and teens, monitoring is positively associated with family communication
- **H6:** For parents and teens, technical monitoring is negatively associated with family communication

2.3 Family Communication and Adolescent Mental Health: Positive and Negative Affect

Parent-teen communication is profoundly correlated with teen mental health. Kernis et al. (2008) studied 174 pre-adolescent children to evaluate how self-esteem stability and level related to their perceptions of parent-child communication [22]. Children with low or unstable self-esteem frequently reported that the father was critical, psychologically controlling and less likely to show approval or acknowledge children's positive behaviors [22]. Also exploring teen mental health, Liu (2003) studied 454 children to determine the association between parental communication and adolescent symptoms and found that a higher level of parental care and a low level of parental indifference were associated with lower depression scores [25]. Adolescent perceptions of positive parent communication regarding themselves, their world, and their future were also negatively associated with depression, while negative communication increased depressive symptoms [25]. Bosch et al. (2012) studied 275 university students to understand how family communication patterns, identity styles, and positive and negative affect interact with each other [7]. The results suggest that identity style may represent one mechanism by which the effects of family communication patterns affect psychosocial outcomes (perceived social support and positive and negative affect) in young adults [7]. These studies support the importance of conversation and communication for improved psychosocial outcomes during the transition to adulthood.

Teen mental health is particularly important to understand, as it is also associated directly with negative outcomes for risky behavior. Previous research provided insight into the connection between teen positive and negative affect and risk-taking behavior. Negative affect is particularly powerful in explaining negative risk-taking behavior [11]. Curry et al. (2006) conducted a survey study with 290 14-20 year-olds to examine the relationship among anger and depressive symptoms, risk perception, self-restraint, and risk behavior and found that anger and perception of risk directly predicted risk behavior and that depressive symptoms indirectly affected risk behavior through perceptions of risk [11]. Positive parental communication was associated with improved outcomes for youth regarding potentially risky behavior, such as drug and alcohol use and sexual behavior. Ennett et al. (2001) found that rules and discipline communication predicted the escalation of adolescent substance abuse [15]. Aspy et al. (2007) quantitative study of parental communication and teen sexual behavior revealed that adolescents are less likely to initiate sexual intercourse if their parents discussed right and wrong, the importance of setting rules, being able to say no, and delaying sexual activity and family communication influenced important adolescent decisions such as birth control use and the number of sexual partners [3]. Some types of family communication do not lessen sexual experience in teens. Nikken & de Graaf (2014) found that restrictive parental mediation of media resulted in somewhat more sexual experience for teen girls [34]. During adolescence, the frequency and content of parent-child interactions change and patterns of disclosure, shared experiences, and perceptions of privacy and responsibilities are altered [24]. However, according to Riesch et al. (2006) literature generally agrees that family communication is associated with better outcomes in youth [37]. Online safety literature emphasizes that risk factors like behavioral problems or psychological or social issues make children more vulnerable to harm [29]. Based on these empirical findings, we anticipate:

- **H7:** For parents and teens, perceptions of teen positive affect are positively associated with family communication
- **H8:** For parents and teens, perceptions of teen negative affect are negatively associated with family communication

By formally testing these research hypotheses, our work serves to both validates the qualitative findings from the prior works cited and adds additional insight into the complex, dyadic relationship and differing perceptions of parents and teens regarding their family communication regarding online safety.

3 METHODS

In this section, we address our participant selection and data collection methods, the variables we will be studying, and our data analysis methods. A Qualtrics panel was used to select 215 teen-parent pairs to take a web-based survey. The paired responses provide a unique insight into teen-parent communication around online safety communication using a cross-sectional design. Questions addressed participant perspectives about online safety, parental mediation strategies, teen emotional states using Positive and Negative Affect Scores (PANAS), and demographics. Composite variables were derived from the survey questions and tested for reliability and distinguishability. The variables were then analyzed using a paired t-test to answer **RQ1** and multiple regression block analysis to answer **RQ2**. The paired t-test was used to observe the differences in the perceptions between parents and teens and the multiple regression model provides insight into the variables

that influence teen and parental perception of communication. Participant selection, survey measures, and analysis approaches are described in detail next.

3.1 Participant Selection and Data Collection

After receiving IRB approval for our study, we used a Qualtrics Panel to distribute a cross-sectional survey to a sample of 215 parent and teen pairs residing in the United States. The participating teens were required to be between 13 and 17 years old. Parents or legal guardians who participated in our research were required to be at least 18 years old. We chose to collect data through a Qualtrics Panel as it enabled us to reach a nationally representative sample of our target demographic, filter out low-quality data, and prevent oversampling. Attention screening questions were also included and Qualtrics removed participant pairs that failed the quality checks. Parents first provided consent for themselves and their teens and proceeded to take the survey. After parents finished, they were prompted to leave the room and allow their teen privacy to fill out their section of the survey. Each teen was asked for their consent at the beginning of their survey section. If the teens did not provide consent, they were not permitted to continue the survey and were not included in the sample.

The survey consisted of demographic questions, measures evaluating teen and parent perceptions of their communication about online safety (dependent variable), as well as their concerns about online safety risks, strategies parents use to mediate online safety, and teen emotional state (independent variables). Teens and parents were asked the same questions with slight rewording based on the participant's relational role. For example, concerning monitoring, teens were asked "Do either of your parents sometimes check any of the following things?", while parents were asked, "Do either you or your teen's other parent check any of the following things?". This approach was used throughout the survey except for a question concerning family income which was only asked of parents. Scale items are presented in more detail in **Appendix A**. While the larger survey contained additional measures (e.g., parenting style, strengths and weaknesses questionnaire, coping behaviors), these constructs were held out-of-scope for the empirical analysis presented in this paper based on 1) theoretical rationale when developing our research model, and 2) preliminary statistical analyses that determined non-significant effects of these variables on our dependent variable. The survey did not include open-ended questions. We present the quantitative measures utilized in this study below.

Demographics. Teens and parents identified their sex and age. Parents were asked to select an annual household income range.

Family Communication. To measure parent and teen perceptions concerning parental initiative in communication about online safety, we leveraged Wisniewski et al.'s (2017) pre-validated scale of Family Communication [45], which they adapted from Botvin's LifeSkills Training Questionnaire [8]. We asked the following four questions on a 5-point Likert scale (1 = *Not at All*, 5 = *All of the Time*): 1) initiates meetings to discuss problems or issues the teen might be dealing with online, 2) talks to the teen about family rules about what he/she does online, 3) talks to the teen about how to resist peer pressure to do inappropriate things online, and 4) talks to the teen about how to engage safely with others while online.

Teen Online Risk Exposure. To measure the frequency of how often a teen encountered risks online, we used a composite variable of four questions asking how frequently a teen was subjected to the following events online: 1) Cyberbullying 2) Sexting 3) inappropriate material (such as pornographic, violent, self-harm) 4) Information sharing (personal or sensitive material without the owner's consent). This scale was adapted from Wisniewski et al.'s cross-sectional survey study [44] on adolescent resilience and online risk, where they found that the mean of the results on a 5-point

Likert scale (1 = *Not at all*, 5 = *Almost every day*) provided meaningful insight into teen's online experiences. Questions were limited to teen's experience "within the past year."

Online Safety Concern. To measure online safety concerns regarding teen risk exposure, we also drew from measures developed by Wisniewski et al. [44]. We asked four questions that evaluated how concerned the teens and parents were about the teen experiencing aforementioned online risks. All four items were measured on a 5-point Likert scale (1 = *Not at all*, 5 = *A great deal*).

Parental Mediation of Online Safety. To measure parent and teen perceptions concerning how parents mediate online safety for teens, we used pre-validated constructs from Livingstone, et al. [28]. The measure included 22 questions to evaluate how often the parent engages in: 1) active mediation, such as talking to the teen about what they are doing online, 2) restrictions, such as limiting what kind of information they can share online, 3) monitoring, such as checking the messages in an instant messaging service, and 4) technical monitoring such as using parental control apps. Most items were measured on a 5-point Likert Scale (1 = *Not at All/Never*, 5 = *All of the Time/Always*). Questions about technical monitoring included an 'I don't know' alternative for the teen (1 = *I don't know*, 6 = *All the time*). This additional point on the Likert scale was included to provide insight into teen knowledge of parental choices.

Positive and Negative Affect. To measure parent and teen perceptions concerning the teen's positive and negative affect, we used the Positive and Negative Affect Schedule (PANAS), which is widely used scale in the psychological sciences [41]. The measure included 10 questions to evaluate how 1) Joyful, 2) Sad, 3) Lively, 4) proud, 5) Afraid, 6) Happy, 7) Miserable, 8) Mad, 9) Scared or 10) Cheerful the teen has been feeling over the previous two months. All items were measured using a 5-point Likert scale (1 = *Not at All*, 5 = *Extremely*).

3.2 Data Analysis Approach

In this section, we describe how we prepared our data for analysis. As shown in Table 1, construct validity was first assessed by using Cronbach's alpha [35] to ensure all composite variables met the reliability threshold of 0.7. Next, composite variables were created to test our research hypotheses. The composite variables were created by taking the mean of all items in the subcategory. In **Appendix B**, we include the Pearson bivariate correlations between all the variables. We performed a preliminary analysis to determine the differences between our parent-teen pairs for each of our variables to address whether there is a difference between how teens and parents rank each variable (**RQ1**). These results were used to inform the linear regression models. Requirements and assumptions regression models were considered before analysis. We used IBM SPSS 24 to create two separate stepwise linear regression models, one for parents and one for teens to address **RQ2**. Their perceptions of their family communication concerning online safety were used as the outcome variable while considering sex and age of the parent-teen pairs and income of the household. The regression model was developed stepwise using teen online risk exposure (Block 1), online safety concern (Block 2), parental mediation of online safety (Block 3), and teen Positive and Negative Affect Schedule (Block 4). We chose to control the sequence of inclusion of independent variables in the models, the first block being considered, before the second, and so on, to obtain coefficients and statistics for specific blocks.

4 RESULTS

In this section, we discuss the demographics of the participants, test the construct validity and demographics of the variables we are studying (Family Communication, Teen Online Risk Exposure,

Online Safety Concern, Parental Mediation Strategies, and Positive and Negative Affect). We present results from paired t-tests between the variables to discover the differences in reporting between the teens and parents (RQ1). We describe the hierarchical multiple linear regression to create parent and teen models that clarify the independent variables influencing differences in teen/parent perceptions of communication (RQ2).

4.1 Descriptive Statistics

The majority of the 215 teen-parent pairs were female for both parents (67%) and teens (56.3%). The average income of the participants was between \$60,000 and \$80,000 with 46.6% of our participants falling in the range of \$30,000 to \$80,000. The teens were aged from 13 to 17 with the median age being 15, the parents median age was between 35 and 44. 79.5% of parents reported their teens lived in two-parent households. The ethnic origins were similar between the teens and parents with 70% of parents reporting Caucasian/White, 13% Black, 13% Hispanic, and 4% from other origins.

The composite variables average the Likert Scale questions for each category: Family Communication, Online Risk Exposure, Online Safety Concern, Parental Mediation Strategies, and Positive and Negative Affect. Using Cronbach's alpha, we tested the reliability of all variables. As shown in Table 1, all metrics met the reliability threshold of 0.7 which suggests adequate construct validity. A paired t-test was used to observe differences in the perceptions between teens and their parents (Table 1). Based on the results from this test, we found that teens reported a significantly higher frequency of family communication concerning their safety online compared to their parents. Parents were overall more concerned about online risks than their teens as they reported higher frequency of risk exposure and a higher amount of safety concern than their teens. For parental mediation, parents reported a significantly higher frequency of active mediation and monitoring than their teens, while their teens reported higher frequency of restrictive and technical monitoring strategies. Neither parents nor teens reported significantly different reports for the teen's positive or negative affect schedule over the past week. Overall, parents are more concerned about online risks than teens, while teens view their parents as more engaged around online safety

Table 1. Reliability Metrics and Descriptive Statistics (P=Parent, T=Teen)

	Cronbach's α		Mean		St. Dev		Skewness		Kurtosis		t-test
	P	T	P	T	P	T	P	T	P	T	
Family Communication	0.87	0.89	3.45	3.6	0.93	0.93	-0.62	-0.55	0.19	0.02	-0.15**
Online Risk Exposure	0.87	0.94	2.38	1.76	1.53	1.1	0.96	1.54	0.17	1.19	0.62***
Online Safety Concern	0.95	0.95	2.93	2.32	1.41	1.34	0.05	0.68	-1.44	-0.92	0.62***
Parental Mediation											
Active	0.91	0.74	3.78	3.05	0.82	0.71	-0.48	0.03	0.18	-0.04	0.73***
Restrictive	0.86	0.87	3.39	3.49	0.86	1.00	-0.57	-0.56	-0.1	-0.3	-0.1*
Monitoring	0.92	0.93	3.28	3.05	1.10	1.11	-0.29	-0.04	-0.77	-0.82	0.23***
Tech Monitoring	0.94	0.95	2.52	3.18	1.29	1.48	0.42	0.27	-0.98	-1.11	-0.66***
PANAS											
Positive	0.88	0.89	3.8	3.76	0.67	0.93	-3.06	-0.34	0.22	-0.21	0.05
Negative	0.92	0.92	1.67	1.63	0.82	0.75	1.55	1.77	1.86	2.93	0.05

Note: p * <= .05, ** <= .01, *** <= .001

communication than their parents believe they are. These findings apply to teens and parents as a group and to the majority of individual pairs. Teens that are more concerned about their online risk exposure than their peers have parents who are also more concerned about risks compared to parents in general.

4.2 Parent-Teen Models

To better understand the differences between parents and teens, and the independent variables influencing their perceptions, we created two separate stepwise linear regression models. One model uses the parent’s ranking of family communication about online safety. The second model describes the teen’s ranking of family communication about online safety (Table 2). Each model illustrates the variables that influence teen and parent perception and provides insight into the differences between parent and teen perceptions.

Teen Model: We created a regression model using variables as reported by the teens to explore the effect on teen’s perception of how much they believe their parents communicate about online safety (Table 2). This regression model was statistically significant with $F(12, 202) = 18.548, p < .000$ explaining 42.8% of the variance in the dependent variable. Teen concerns about online risks, perception of parents engaging in active, restrictive, and monitoring mediation, and teen positive affect are significant in our model ($p > 0.05$). All variables except restrictive parental mediation positively influenced a teen’s perception of parental communication while restrictive mediation negatively influenced it. With each unit increase in online risk concerns caused family

Table 2. Hierarchical Regression Models

	DV = Teen Family Communication				DV = Parent Family Communication			
	Block 1	Block 2	Block 3	Block 4	Block 1	Block 2	Block 3	Block 4
R²	0.04	0.124	0.418	0.459	0.025	0.181	0.615	0.622
Adj R²	0.012	0.094	0.387	0.424	-0.003	0.154	0.594	0.598
Variables								
Gender								
Parent	-0.006	0.042	0.114	0.086	-0.164	-0.083	0.004	0.008
Teen	-0.119	-0.044	-0.04	-0.034	-0.138	-0.091	-0.112	-0.096
Age								
Parent	0.012	0.011	0.009	0.008	-0.002	0.000	0.002	0.002
Teen	-0.006	-0.036	0.012	0.026	-0.032	-0.044	-0.013	-0.008
Income	0.000	0.001	0.001	0.001	-0.001	-0.001	-0.001	-0.001
Online Risk Exposure	0.145	-0.021	-0.038	-0.033	-0.029	-0.058	-0.035	-0.047
Online Safety Concern		0.247***	0.122*	0.106*		0.265***	0.066**	0.059
Parental Mediation								
Active			0.27***	0.204**			0.551***	0.526***
Restrictive			-0.157**	-0.186***			0.012	0.004
Monitoring			0.382***	0.357***			0.152	0.146
Tech Monitoring			0.006	-0.004			0.125**	0.124**
PANAS								
Positive				0.279***				0.122*
Negative				0.043				0.072

Note: p * <= .05, ** <= .01, *** <= .001

communication to increase by 0.106 points. Each unit increase in active parental mediation, teen score in online safety communication increased by 0.204, each unit increase in restrictive mediation resulted in a 0.186-point decrease in perceived family communication, and each unit increase in parental monitoring of internet use resulted in a 0.357-point increase for family communication. With each unit increase in positive affect, teen score in online safety communication increased by 0.279 points. No other variables in this model were significant.

Parent Model: We created a regression model using variables as reported by the parents to explore their effect on parents’ perception of the frequency they communicate with their teens about online safety (Table 2). This regression equation was statistically significant with $F(12,202) = 34.412, p < .000$, and explaining 59.8% of the variance in the dependent variable. Active mediation of teens' online safety, using technical monitoring, and a parent’s perception on their teen’s positive affect positively influenced a parent’s perception concerning how much they see themselves engaging in communicating with their teen about online safety ($p < .05$). With each unit increase in active mediation, parents score in online safety communication increased by 0.526 points, each unit increase in technical monitoring results in a 0.124-point increase in online safety communication, and each unit increase in positive affect results in a 0.122-point increase in online safety communication. Parents' concerns about the online risks teens face became a non-significant factor for the parental model with the addition of the PANAS scores (Block 4). None of the demographic variables were found to be significant in this model.

In our models, we found no significance with online risk exposure and family communication which suggests a lack of support for H1. There was a significant positive relationship between family communication and online safety concern in the teen model which supports H2, but this relationship became insignificant in the parent model after the addition of PANAS scores, therefore, only being partially supported. Both parents and teens found a positive relationship between active mediation, supporting H3. In the teen model, there was also a negative relationship with restrictive mediation (H4) and a positive relationship with monitoring (H5); however, neither H4 nor H5 were supported in the parent model as it did not find those significant relationships. While the parent model found a significant relationship with technical monitoring, it was positive which was opposite than expected. The teen model did not find any significant relationship, which shows a lack of support for H6. Neither model found a significant relationship with technical monitoring which implies a lack of support for H6. Both parent and teen models found that perceptions of teen positive affect was positively correlated with family communication which supports H7; however, we found no significance with perceptions of teen negative affect in either model for H8. Table 3 summarizes the results in relation to our hypotheses.

Table 3. Summary of Hypothesis Testing Results

Hypotheses	Teen Model	Parent Model
H1: Online Risk Exposure ↔ Family Communication (-)	Not Supported	Not Supported
H2: Online Safety Concern ↔ Family Communication (+)	Supported	Partially Supported
H3: Active Mediation ↔ Family Communication (+)	Supported	Supported
H4: Restrictive Mediation ↔ Family Communication (-)	Supported	Not Supported
H5: Monitoring ↔ Family Communication (+)	Supported	Not Supported
H6: Technical Monitoring ↔ Family Communication (-)	Not Supported	Not Supported
H7: Teen Positive Affect ↔ Family Communication (+)	Supported	Supported
H8: Teen Negative Affect ↔ Family Communication (-)	Not Supported	Not Supported

5 DISCUSSION

In this section, we discuss the implications of our findings. We also contextualize the novel contributions of our work in relation to existing literature. We move on to offer implications for design of future online safety solutions and finally discuss the limitations of our work and paths for future research.

5.1 A Disconnect Between How Parents and Teens View Family Communication About Online Safety (RQ1).

In addition to differences in perceptions about communication about online safety, we found disconnects between parent and teen rankings of concern of teen online risk exposure, actual teen risk experiences, and perceptions of parental mediation strategies (**Table 1**). Our finding that there is a disconnect between parents' and teens' regarding their perceptions of online safety and family communication (**RQ1**) are not necessarily new. However, our results serve both to confirm qualitative findings from prior literature as well as additional nuance beyond these studies. For instance, Blackwell et al. [6] found that parents felt that they actively mediated their teens' technology use, while teens just heard "no." Similarly, we found that parents in our study reported significantly higher active mediation and monitoring, than their teens, while teens reported significantly higher levels of restriction (a.k.a. "saying no"). Our results also mirror Pew Research's previous finding that parents tend to be more concerned about online threats than their teens [36]. In these cases, our study is useful in that it replicates and validates prior work to build upon the growing body of evidence that teens and parents are stakeholders representing differing perspectives that can inevitably lead to value tensions and challenges when designing new technologies for promoting adolescent online safety.

Yet, there were ways in which our findings differed from prior work, which contribute new knowledge to the field. For example, Wisniewski et al. [45], found differing perceptions between parents and teens regarding family communication but this effect was in the *opposite* direction as our results. In our study, teens (not parents) reported significantly higher levels of family communication. This discrepancy may be because we asked participants to report on family communication in the context of a cross-sectional survey rather than a weekly diary study. Similarly, parents in our study reported significantly higher levels of risk exposure than their teens, which contrasts with Wisniewski et al.'s [46] weekly reports from parents and teens regarding episodic online risks. These conflicting findings suggests that the patterns of online safety communication within families are not firmly settled and that they may vary drastically based on the timeframe (e.g., in general, the past year, weekly, or daily) in which they are studied. Therefore, a key implication is that more work in this space is warranted to disentangle family dynamics around online safety communication, possibly through more fine-grained studies, such as daily diaries that capture the in-situ experiences of parents and teens over a longer period of time and during important stages of life transitions (e.g., from childhood to adolescence). In short, there is more that can be studied in terms of the complex dyadic relationship between parents and teens regarding online safety, risks, and their communication regarding these topics. Our work lays a foundation for this important research agenda by quantitatively validating and contrasting with the results found in prior literature, as well as highlighting where parents and teens agree.

By providing additional evidence that teen and parent perceptions around online safety and risks, as well as family communication, differ significantly, the next logical step is to examine how we might help close the disconnect between teens and their parents. Teen's perception of risk may differ from their parents for a variety of reasons. Risk perception and judgement change over

adolescence and early adulthood and teens are still developing their ability to accurately make risk judgements [11,20] or parents may be overly risk adverse [9]. Furthermore, teens might be more confident in their own skills to navigate the online environment as their parents are [20]. While previous research found parents are very worried about online risks for teens, the likelihood of a child experiencing a risk is minimal according to previous research and children are more confident about their technical skills than their parents believe they are [10,20,26,43]. For instance, Schoenebeck, et. al. (2016) found that young adults sometimes find their past online behavior on Facebook embarrassing and adjust their behavior into adulthood [38]. More studies that examine the online safety skills of teens, as well as their actual online risk experiences could be useful in determining whether parents are overly concerned, or teens are overly indifferent regarding their online experiences. More empirical research is needed to better understand risk and harm in the construct of teen experiences online and maturing teen perspectives over time. Longitudinal studies, spanning years rather than weeks or months that explore the cumulative effects of online experiences as well as whether teen perceptions of their adolescent experiences change over time would be of value in further understanding the protective factor of family communication for teens.

5.2 Differing Factors That Contribute to Family Communication (RQ2).

As already established, good family communication protects adolescents from other types of risk (e.g., [4,15,24,25]), so there is great value in understanding how to communicate better with teens as they traverse challenging and potentially dangerous online opportunities. Yet, different factors effect parent-teen perceptions of family communication about online safety (RQ2), and we found that these factors often varied between parents and teens (as shown in **Table 3**). Overall, parent and teen models were consistent in identifying online safety concern, active mediation, and teen positive affect as factors that were positively associated with family communication. Thus, an emphasis can be placed on these factors in future studies that want to create effective interventions for improving family communication. This may include online safety and awareness campaigns, parenting workshops, and/or teen mental health and well-being workshops. In contrast, teens (not parents) felt that restrictive mediation was negatively associated with family communication, while monitoring was positively associated with family communication. Parents (not teens) felt that technical monitoring of their teens' online activities was positively associated with family communication. These mixed findings pinpoint tensions that will inevitably lead to tensions in the design process for creating family online safety interventions and/or technologies. Yet, an important point to make is that parents and teens never conflicted in their opinions to the point that we saw statistical significance in opposite directions. This gives us hope that the disconnects between parents and teens can be reconciled.

The teenage years are an important transitional period in which teens gain independence and strive for autonomy from their parents [5,48]. Ghosh et al. (2018) found that teens place a premium on independence, privacy, and trust and do not prefer restrictive mediation and monitoring, while parents value safety above all else [16]. However, our results paint a slightly different picture of teens. Teens in our study felt that parental monitoring contributed to increased family communication regarding online safety and agreed with parents that active mediation also enhanced communication with their parents. Therefore, our study challenges the narrative that teens want to just be left to their own devices online. Monitoring was not significant for parents, so they may be unaware that teens view monitoring to positively affect family communication. Previous work has not studied monitoring as a positive aspect of teen and parent communication

around online safety. Additional work is needed to explore monitoring in additional depth. Ghosh et al. (2018) also implies that technical monitoring is seen as negative to teens [16], while our study found parents view technical monitoring to have a positive effect on their perceived family communication with their teens about online safety. To some extent, we believe that this points to an important conundrum between parents and teens. It may be that parents adopt the use of parental control apps in hope to actively mediate and monitor their teens' online activities, but teens view these apps as a form of restrictive mediation (similar to Wisniewski et al.'s value-sensitive analysis of parental control apps features [42]). As such, this leads to important implications for design that need to be addressed in the next generation of family online safety apps to alleviate these tensions in a way that supports positive family communication regarding online safety and risks.

5.3 Implications for Design

Based on our results, we find that teen's perceptions of family communication are positively associated with their concerns about their online safety, active and monitoring mediation styles, and their positive emotional state, while restrictive mediation was negatively associated with their views on family communication. Teens have also demonstrated their need for privacy and independence [17,19], this can be seen in the growing use of "Finstas", or fake Instagrams, [13,32] and VPNs [49]. Both Finstas and VPNs technologies teens use to overcome restrictive parental control apps to increase their privacy and autonomy. Without proper family communication about online safety, teens could use these privacy-preserving technologies in harmful ways. Prior work also investigated the ethical constructs of restrictive and technical monitoring strategies finding that while restriction and technical monitoring may reduce online risk exposure, they also limit access to opportunities, freedom, and transparency [12,18,38]. To enhance family communication and to allow parents to ensure teens are safely navigating the online space, we suggest future online safety solutions allow teens a more active role in their online safety and communication with their parents, rather than relying on restriction. Research demonstrated the importance of "good parents" to be proactive and take measure to protect their children [9]. While restrictive mediation strategies lower online risk exposure, also limited a child's ability to gain crucial skills and opportunities [14]. Our research found that both active and monitoring mediation strategies were successful in helping parents and teens have discussions on online safety, restrictive mediation strategies negatively affected a teen's experience without affecting the parents' views (**Table 2**). Previous research also suggests teens dislike technical monitoring [16]. Designing solutions that allowing a teen to take a more active role in their online safety will improve family communication.

Design solutions should strive to achieve the very difficult task supporting active mediation and monitoring and strive to encourage family communication directly. Restrictive mediation harms a teen's view of family communication while also failing to increase a parent's perception of family communication. Currently, solutions for teen online safety favor restrictive technologies which lower risk exposure but also reduce the ability for a child to develop crucial skills and opportunities [14,30]. Technical restriction or rule-based restrictions are easier to implement in the design of technologies to support teen safety, but they are not the best choice to support family communication about teen safety. Design solutions may wish to consider teen emotional state based on future findings of the relationship between online safety communication and PANAS. Ackerman (2000) challenged the CSCW community to rise to the challenge of bridging the divide between social requirements and technological feasibility [1]. Design for active mediation and monitoring for teen safety provides just such as challenge in the current context of teen online engagement.

Technical monitoring and restrictive designs are the easy solution. Designing technologies that will encourage improved parent and teen communication will be much more difficult, but potentially far more impactful and positive [1,19]. Technology which supports parental involvement in ways teens view as positive may very well have profound impact on improved family communication and teen safety online. Monitoring, but not technical monitoring, was viewed positively by teens. Thus, developing new designs that support parental awareness and teen and parental communication – without increasing restriction could have positive implications for teens.

Family communication is vital in reducing a teen's predisposition to risky behaviors [3,25,29]; therefore, we believe it is imperative that designers promote family communication via their solutions instead of discouraging it. As our study shows, restrictive mediation causes a decline in teen's perceptions of communication. Therefore, we stress the importance of creating design solutions that do not directly restrict teens online but instead promote transparency, teen involvement and teen-parent communication. The solutions should emphasize trust and allow both teens and parents to take an active role in maintaining online safety [19]. Rather than simply blocking potentially inappropriate sites, parents could indicate what online content they view as inappropriate for teens (e.g. porn, self-harm, graphic violence). Any time a teen visits a website with content that is flagged, the teen might receive message saying the content is flagged and for what reason to help the teen gain an improved understanding of their online safety and potentially risky behavior. After informing the teen of the risks, the teen could choose to either stop viewing the content or continue with the knowledge that the parent will be informed of their decision. This type of design could encourage active communication and monitoring, rather than restrictive approaches. It is crucial that parent teen interaction be a transparent process so the teen knows exactly what the parent can and cannot view. The report sent to the parent should not include specific details, but only a brief description to allow the parent to bring up the topic in conversation. This design allows the teen to act with increasing autonomy while encouraging teens and parents to have meaningful and positive interactions around their online communication.

5.4 Limitations and Future Research

Despite the unique dyadic nature of the data set, certain limitations were encountered within our sampling frame. The data collection skewed towards female participants, both for teens, but even more strongly for parents. Therefore, findings for parents may be more representative of the view of female parents compared to male parents. Examining differences in family communication related to gender and communication norms could provide additional insights, although we did not find that gender was a significant factor in our model. Other limitations of our study design include that during our survey we requested parents to leave the room while their teens filled out the survey; however, there was no guarantee that the parents left. As such, some response bias on the part of teens may have been present in the data. Additionally, our survey did not include open-ended questions to give parents and teens the opportunity to expound on the rationale behind their responses. On one hand, the robust quantitative design of our study is part of the unique contributions of this work as most of the SIGCHI and CSCW research in the space of technology mediation within families has been qualitative in nature. On the other hand, future work should consider employing mixed method approaches that combine both quantitative measures and qualitative insights to triangulate and add nuance to our results.

While the survey represents a static moment, the adolescent experience is dynamic and shaped both within the parent-teen relationship and subject to external influences both interpersonal and

event related. Due to the correlative nature of the data set, it is not possible to determine which variables might influence outcomes for families. We recommend a longitudinal study to evaluate the interplay of risk, family communication styles and teen emotional states over time. Such a study would allow for greater understanding of how the variables interact over time and influence each other. A longitudinal study would be particularly impactful because of the developmental nature of adolescence. We noted that parent and teen risk perceptions moved in tandem with each other. While we did not find any demographic variables, such as age and gender, to positively affect our model, teen perceptions of risk may be subject to change over time as their ability to judge risk matures. The ability to measure changes in perception of risk, emotional state of teens, and teen and parent perceptions of family communication would provide great insight for future research.

Finally, further research is needed to design specific tools that will mitigate teen online risk while supporting autonomy and family communication. The paired approach of parent teen pairs in this study yielded unique insight. A future study designed around participatory design or heuristic interaction design with parent-teen participants may reveal novel insight into parent-teen interaction and into designs that would support increased active family communication. Previous research supports the idea that children acknowledge and accept safety needs and parental controls [33]. The children redesigning mobile monitoring applications emphasized family communication and teaching risk mitigation strategies [33]. Further research is needed to understand design implications specific to adolescence. Our study suggests that family communication will continue to be an important aspect of these designs, while restrictive approaches will be minimized.

6 CONCLUSION

It is vital that the CSCW community provide teens and parents with technologies that support active mediation for family communication about online safety. Yet, we found that teens and parents experience family communication about online safety differently. Our findings revealed that parents and teens agree in many areas. Both parents and teens find active parental mediation important in maintaining healthy family communication. Our study reveals a positive teen perspective of active and monitoring provides insight into how teens would prefer their parents communicate about online risks. Our cross-sectional study provides insight into the factors which are most highly correlated with positive perceptions of family communication in online safety for parents and teens, both in relationship to each other and individually. Positive emotions during adolescence may be either the antecedent or the outcome of improved family communication. In either case, our study shows that emotional state and active engagement are strongly correlated with family communication about online safety. Teens online concerns also are positively associated with communication and restrictive mediation strategies decrease their perception of communication. This paper provided an empirically driven argument for developing online safety solutions that allow teens to have an active role in their online safety and encouraging active parent-teen communication and trust. Technology solutions that balance honoring teen's developing autonomy, encourage active mediation on the part of parents, and privacy is a challenging goal, but one that the CSCW community is uniquely equipped to address.

ACKNOWLEDGMENTS

This research is partially supported by the U.S. National Science Foundation under grant IIS-1844881 and by the William T. Grant Foundation grant #187941. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the research sponsors.

A SCALE ITEMS FOR MODEL CONSTRUCTS [Parent | Teen]

A.1 Family Communication about Online Safety

Please select the most accurate response based on your / personal experience:

1. [I | My parent] initiate family meetings to discuss problems or issues [my teen | I] might be dealing with online
2. [I | My parent] talk to [my teen | me] about family rules about what [they | I] do online
3. [I | My parent] talk to [my teen | me] about how to resist peer pressure to do inappropriate things online
4. [I | My parent] talk to [my teen | I] about how to engage safely with others online

A.2 Online Safety Concern

Please indicate how concerned you are about [your teen | yourself] encountering the following online:

1. Online interactions between [your teen | you] and others that involved someone treating another person in a mean or hurtful way, making rude or threatening comments, spreading untrue rumors, harassing, or otherwise trying to cyberbully another person.
2. Online interactions between [your teen | you] and others that involved exchanging sexual messages (i.e. Sexting), sexually suggestive text-based messages or revealing/naked photos or arranging to meet someone first met online for an offline romantic encounter.
3. [Your teen | You] viewing online content that could be considered pornographic, excessively violent, promoting illegal or morally deviant behavior, promoting self-harm (such as eating disorders, cutting, or suicide), or other online content that is generally deemed inappropriate for teens.
4. Online interactions between [your teen | you] and others that involved sharing personal or sensitive information either without the owner's consent or that otherwise breached someone's personal privacy.

A.3 Online Safety Risk Exposure

Based on [your knowledge of your teen's | your] experiences within the past year, please indicate how frequently [your teen | you] were subjected to:

1. Online interactions between [your teen | you] and others that involved someone treating another person in a mean or hurtful way, making rude or threatening comments, spreading untrue rumors, harassing, or otherwise trying to cyberbully another person.
2. Online interactions between [your teen | you] and others that involved exchanging sexual messages (i.e. Sexting), sexually suggestive text-based messages or revealing/naked photos, or arranging to meet someone first met online for an offline romantic encounter.
3. [Your teen | You] viewing online content that could be considered pornographic, excessively violent, promoting illegal or morally deviant behavior, promoting self-harm (such as eating disorders, cutting, or suicide), or other online content that is generally deemed inappropriate for teens.
4. Online interactions between [your teen | you] and others that involved sharing personal or sensitive information either without the owner's consent or that otherwise breached someone's personal privacy.

A.4 Active Meditation of Teen Online Safety

Do [you or your teen's other parent | your parents] currently do any of the following activities with [your teen | you]:

1. Talk to [your teen | you] about what [he/she| you] does on the Internet
2. Explain why some websites are good or bad
3. Suggest ways to use the Internet safely
4. Suggest ways to behave towards other people online
5. Help [your teen | you] when something bothers [him/her | you] on the Internet

A.5 Restrictive Meditation of Teen Online Safety

Please specify the extent to which [you or your teen's other parent | your parents] restrict [your teen | you] from the following activities:

1. Give out personal information to others on the Internet
2. Upload photos, videos or music to share with others
3. Download music or films on the Internet
4. Have [his or her | your] own social networking profile
5. Have [his or her | your] own cell phone
6. Use instant messaging

A.6 Monitoring Teen Online Safety

Do [you or your teen's other parent | your parents] check any of the following things:

1. Websites [your teen | you] visited based on [his or her | your] Internet browsing history
2. [Your teen's | Your] profile on a social network or online community
3. Friends or contacts [your teen | you] adds to [his or her | your] social networking profile
4. Messages in [your teen's | your] email or instant messaging account
5. Text or photo messages [your teen | you] sends/receives on [his or her | your] phone
6. The apps [your teen | you] installs or uses on [his or her | your] phone

A.7 Technical Monitoring Teen Online Safety

How often do [you | your parent] do the following activities?

1. Use parental control technologies to block or filter some types of websites [your teen | you] visits
2. Use parental control technologies to keep track of the websites [your teen | you] visits
3. Use a service or contract that limits the time [your teen | you] spends on the Internet
4. Use parental control technologies to monitor [your teen's | your] text or photo messaging activities from [his or her | your] cell phone
5. Use parental control technologies to monitor what apps [your teen | you] installs or uses on [his or her | your] cell phone

A.8 Teen Positive Affect

Below are a number of words that describe various feelings and emotions. Read each item and then indicate how often [you believe your teen | you] have been feeling over the past two weeks:

1. Joyful
2. Lively
3. Proud
4. Happy
5. Cheerful

A.9 Teen Negative Affect

Below are a number of words that describe various feelings and emotions. Read each item and then indicate how often [you believe your teen | you] have been feeling over the past two weeks:

1. Sad
2. Afraid
3. Miserable
4. Mad
5. Scared

B CORRELATIONS MATRIX OF ALL MODEL VARIABLES

N= 215 in all cases	Family Communication		PANAS				Online Safety Concern			Teen Online Risk Exposure			Active			Restrict			Monitoring			Tech Monitoring		
	Parent		Positive		Negative		P			P			P			P			P			P		
	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T		
Family Communication	P	1.000																						
	T	0.678***	1.000																					
PANAS	P	0.300***	0.287***	1.000																				
	T	0.561***	0.359***	0.780***	1.000																			
Positive	P	0.103	0.026	-0.233***	-0.207**	1.000																		
	T	0.083	0.029	-0.251***	-0.212**	0.863***	1.000																	
Negative	P	0.400***	0.285***	0.099	0.108	0.268***	0.252***	1.000																
	T	0.399***	0.330***	0.074	0.117	0.385***	0.365***	0.596***	1.000															
Online Safety Concern	P	-0.044	-0.024	-0.025	-0.021	0.398***	0.335***	0.133	0.251***	1.000														
	T	0.238***	0.153*	-0.097	0.027	0.562***	0.542***	0.360***	0.542***	0.409***	1.000													
Teen Online Risk Exposure	P	0.723***	0.652***	0.335***	0.412***	0.003	0.045	0.365***	0.387***	-0.086	0.137*	1.000												
	T	0.340***	0.340***	0.305***	0.274***	-0.109	-0.063	0.095	0.123	-0.095	-0.045	0.418***	1.000											
Active	P	0.015	-0.101	0.087	0.147*	0.126	0.168*	0.116	0.102	0.302***	0.338***	0.012	0.001	1.000										
	T	-0.092	-0.212***	0.062	0.060	0.104	0.118	0.074	0.024	0.249***	0.218***	-0.089	-0.115	0.777***	1.000									
Restrict	P	0.652***	0.514***	0.250***	0.252***	0.106	0.102	0.395***	0.352***	0.064	0.276***	0.450***	0.211**	0.068	0.015	1.000								
	T	0.577***	0.547***	0.157*	0.213**	0.157*	0.143*	0.285***	0.365***	0.093	0.356***	0.514***	0.194**	0.036	-0.048	0.753***	1.000							
Monitoring	P	0.540***	0.447***	0.100	0.139*	0.253***	0.243***	0.302***	0.422***	0.167*	0.391***	0.450***	0.205**	0.006	0.668***	0.641***	1.000							
	T	0.420***	0.396***	0.088	0.145*	0.278***	0.278***	0.244***	0.370***	0.199**	0.386***	0.356***	0.126	-0.017	-0.142*	0.530***	0.641***	0.530***	1.000					
Parental Mediation Strategies	P																							
	T																							

REFERENCES

- [1] Mark S. Ackerman. 2000. The intellectual challenge of CSCW: the gap between social requirements and technical feasibility. *Human-Computer Interaction* 15, 2: 179–203. https://doi.org/10.1207/S15327051HCI1523_5
- [2] Jeffrey Jensen Arnett. 2012. New Horizons in Research on Emerging and Young Adulthood. In *Early Adulthood in a Family Context*, Alan Booth, Susan L. Brown, Nancy S. Landale, Wendy D. Manning and Susan M. McHale (eds.). Springer, New York, NY, 231–244. https://doi.org/10.1007/978-1-4614-1436-0_15
- [3] Cheryl B. Aspy, Sara K. Vesely, Roy F. Oman, Sharon Rodine, LaDonna Marshall, and Ken McLeroy. 2007. Parental communication and youth sexual behaviour. *Journal of Adolescence* 30, 3: 449–466. <https://doi.org/10.1016/j.adolescence.2006.04.007>
- [4] Judith Baer. 1999. The effects of family structure and SES on family processes in early adolescence. *Journal of Adolescence* 22, 3: 341–354. <https://doi.org/10.1006/jado.1999.0226>
- [5] Diana Baumrind. 2005. Patterns of parental authority and adolescent autonomy. *New Directions for Child and Adolescent Development* 2005, 108: 61–69. <https://doi.org/10.1002/cd.128>
- [6] Lindsay Blackwell, Emma Gardiner, and Sarita Schoenebeck. 2016. Managing Expectations: Technology Tensions among Parents and Teens. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing - CSCW '16*, 1388–1399. <https://doi.org/10.1145/2818048.2819928>
- [7] Leslie A. Bosch, Chris Segrin, and Melissa A. Curran. 2012. Identity Style During the Transition to Adulthood: The Role of Family Communication Patterns, Perceived Support, and Affect. *Identity* 12, 4: 275–295. <https://doi.org/10.1080/15283488.2012.716379>
- [8] Botvin. 2007. LifeSkills Training Questionnaire. LifeSkills Training. Retrieved April 8, 2021 from <https://www.lifeskillstraining.com/hs-teacher-activities-unit6/>
- [9] Danah Boyd and Eszter Hargittai. 2013. Connected and concerned: Variation in parents' online safety concerns. *Policy & Internet* 5, 3: 245–269. <https://doi.org/10.1002/1944-2866.POI332>
- [10] L. D. Cohn, S. Macfarlane, C. Yanez, and W. K. Imai. 1995. Risk-perception: differences between adolescents and adults. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association* 14, 3: 217–222. <https://doi.org/10.1037//0278-6133.14.3.217>
- [11] Laura A. Curry and Lise M. Youngblade. 2006. Negative affect, risk perception, and adolescent risk behavior. *Journal of Applied Developmental Psychology* 27, 5: 468–485. <https://doi.org/10.1016/j.appdev.2006.06.001>
- [12] Alexei Czeskis, Ivayla Dermendjieva, Hussein Yapit, Alan Borning, Batya Friedman, Brian Gill, and Tadayoshi Kohno. Parenting from the pocket | Proceedings of the Sixth Symposium on Usable Privacy and Security. Retrieved October 12, 2020 from <https://dl.acm.org/doi/10.1145/1837110.1837130>
- [13] Sofia Dewar, Schinria Islam, Elizabeth Resor, and Niloufar Salehi. 2019. Finsta: Creating “Fake” Spaces for Authentic Performance. In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems (CHI EA '19)*, 1–6. <https://doi.org/10.1145/3290607.3313033>
- [14] Andrea Duerager and Sonia Livingstone. 2012. How can parents support children's internet safety?
- [15] Susan T. Ennett, Karl E. Bauman, Vangie A. Foshee, Michael Pemberton, and Katherine A. Hicks. 2001. Parent-Child Communication About Adolescent Tobacco and Alcohol Use: What Do Parents Say and Does It Affect Youth Behavior? *Journal of Marriage and Family* 63, 1: 48–62. <https://doi.org/10.1111/j.1741-3737.2001.00048.x>
- [16] Arup Kumar Ghosh, Karla Badillo-Urquiola, Shion Guha, Joseph J. LaViola Jr, and Pamela J. Wisniewski. 2018. Safety vs. Surveillance: What Children Have to Say about Mobile Apps for Parental Control. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*, 1–14. <https://doi.org/10.1145/3173574.3173698>
- [17] Arup Kumar Ghosh, Karla Badillo-Urquiola, Mary Beth Rosson, Heng Xu, John M. Carroll, and Pamela J. Wisniewski. 2018. A Matter of Control or Safety? Examining Parental Use of Technical Monitoring Apps on Teens' Mobile Devices. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*, 1–14. <https://doi.org/10.1145/3173574.3173768>
- [18] Heidi Hartikainen, Netta Iivari, and Marianne Kinnula. 2015. Children and Web 2.0: What They Do, What We Fear, and What Is Done to Make Them Safe. In *Nordic Contributions in IS Research*, Harri Oinas-Kukkonen, Netta Iivari, Kari Kuutti, Anssi Öörni and Mikko Rajanen (eds.). Springer International Publishing, Cham, 30–43. https://doi.org/10.1007/978-3-319-21783-3_3
- [19] Heidi Hartikainen, Netta Iivari, and Marianne Kinnula. 2016. Should We Design for Control, Trust or Involvement? A Discourses Survey about Children's Online Safety. In *Proceedings of the The 15th International Conference on Interaction Design and Children (IDC '16)*, 367–378. <https://doi.org/10.1145/2930674.2930680>
- [20] Heidi Hartikainen, Marianne Kinnula, Netta Iivari, and Dorina Rajanen. 2017. Finding common ground: comparing children's and parents' views on children's online safety. In *Proceedings of the 31st British Computer Society Human Computer Interaction Conference (HCI '17)*, 1–12. <https://doi.org/10.14236/ewic/HCI2017.43>

- [21] Uwe Hasebrink, Anke Görzig, Leslie Haddon, Veronika Kalmus, and Sonia Livingstone. 2011. Patterns of risk and safety online: in-depth analyses from the EU Kids Online survey of 9- to 16-year-olds and their parents in 25 European countries. Retrieved April 13, 2020 from <http://www.eukidsonline.net/>
- [22] Michael H. Kernis, Anita C. Brown, and Gene H. Brody. 2008. Fragile Self-Esteem in Children and Its Associations With Perceived Patterns of Parent-Child Communication. *Journal of Personality* 68, 2: 225–252. <https://doi.org/10.1111/1467-6494.00096>
- [23] Lucyna Kirwil. 2009. Parental Mediation Of Children’s Internet Use In Different European Countries. *Journal of Children and Media* 3, 4: 394–409. <https://doi.org/10.1080/17482790903233440>
- [24] Brett Laursen and W. Andrew Collins. 2004. Parent-child communication during adolescence. In *Handbook of family communication*. Lawrence Erlbaum Associates Publishers, Mahwah, NJ, US, 333–348.
- [25] Yih-Lan Liu. 2003. Parent-child interaction and children’s depression: the relationships between Parent-Child interaction and children’s depressive symptoms in Taiwan. *Journal of Adolescence* 26, 4: 447–457. [https://doi.org/10.1016/S0140-1971\(03\)00029-0](https://doi.org/10.1016/S0140-1971(03)00029-0)
- [26] Sonia Livingstone. 2009. *Children and the internet: great expectations, challenging realities*. Polity Press, Oxford, UK. Retrieved October 12, 2020 from <http://www.polity.co.uk/>
- [27] Sonia Livingstone, Leslie Haddon, Anke Goerzig, and Kjartan Ólafsson. 2011. *Risks and Safety on the Internet: The Perspective of European Children*. Full FINDINGS.
- [28] Sonia Livingstone, Leslie Haddon, and Anke Görzig. 2012. *Children, risk and safety on the internet: research and policy challenges in comparative perspective*. Policy Press, Bristol. Retrieved February 27, 2020 from <http://www.policypress.co.uk>
- [29] Sonia Livingstone and Peter K. Smith. 2014. Annual Research Review: Harms experienced by child users of online and mobile technologies: the nature, prevalence and management of sexual and aggressive risks in the digital age. *Journal of Child Psychology and Psychiatry* 55, 6: 635–654. <https://doi.org/10.1111/jcpp.12197>
- [30] Emmanouil Magkos, E. Kleisiari, Panagiotis Chanias, and Viktor Giannakouris-Salalidis. 2014. Parental Control and Children’s Internet Safety: The Good, the Bad and the Ugly. *ICIL* 2014, 18.
- [31] EE. MCCOBY. 1983. Socialization in the context of the family: Parent-child interaction. *Handbook of Child Psychology* 4: 1–101.
- [32] Kyle Aaron McGregor and Joanna Li. 2019. 73. Fake Instagrams For Real Conversation: A Thematic Analysis of The Hidden Social Media Life of Teenagers. *Journal of Adolescent Health* 64, 2: S39–S40. <https://doi.org/10.1016/j.jadohealth.2018.10.088>
- [33] Brenna McNally, Priya Kumar, Chelsea Hordatt, Matthew Louis Mauriello, Shalmali Naik, Leyla Norooz, Alazandra Shorter, Evan Golub, and Allison Druin. 2018. Co-designing Mobile Online Safety Applications with Children. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI ’18*, 1–9. <https://doi.org/10.1145/3173574.3174097>
- [34] Peter Nikken and Hanneke de Graaf. 2013. Reciprocal relationships between friends’ and parental mediation of adolescents’ media use and their sexual attitudes and behavior. *Journal of Youth and Adolescence* 42, 11: 1696–1707. <https://doi.org/10.1007/s10964-012-9873-5>
- [35] Jum C. Nunnally and Jum C. Nunnally. 1978. *Psychometric Theory*. McGraw-Hill.
- [36] 1615 L. St NW, Suite 800 Washington, and DC 20036 USA 202-419-4300 | Main 202-857-8562 | Fax 202-419-4372 | Media Inquiries. 2013. *Teens, Social Media, and Privacy*. Pew Research Center: Internet, Science & Tech. Retrieved April 8, 2021 from <https://www.pewresearch.org/internet/2013/05/21/teens-social-media-and-privacy/>
- [37] Susan K. Riesch, Lori S. Anderson, and Heather A. Krueger. 2006. Parent-Child Communication Processes: Preventing Children’s Health-Risk Behavior. *Journal for Specialists in Pediatric Nursing* 11, 1: 41–56. <https://doi.org/10.1111/j.1744-6155.2006.00042.x>
- [38] Sarita Schoenebeck, Nicole B. Ellison, Lindsay Blackwell, Joseph B. Bayer, and Emily B. Falk. 2016. Playful Backstalking and Serious Impression Management: How Young Adults Reflect on their Past Identities on Facebook. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing (CSCW ’16)*, 1475–1487. <https://doi.org/10.1145/2818048.2819923>
- [39] Laurence Steinberg. *Risk Taking in Adolescence: What Changes, and Why? - STEINBERG - 2004 - Annals of the New York Academy of Sciences* - Wiley Online Library. Retrieved October 12, 2020 from <https://nyaspubs.onlinelibrary.wiley.com/doi/abs/10.1196/annals.1308.005>
- [40] S Tuominen. 2013. Toiminnallisuutta nettikasvatukseen. In *Lapset netissä - Puheenvuoroja lasten ja nuorten netin käytöstä ja riskeistä*. Mediakasvatusseura, Helsinki.
- [41] David Watson, Lee Anna Clark, and Auke Tellegen. 1988. Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology* 54, 6: 1063–1070. <https://doi.org/10.1037/0022-3514.54.6.1063>

- [42] Pamela Wisniewski, Arup Kumar Ghosh, Heng Xu, Mary Beth Rosson, and John M. Carroll. 2017. Parental Control vs. Teen Self-Regulation: Is there a middle ground for mobile online safety? In Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing, 51–69. <https://doi.org/10.1145/2998181.2998352>
- [43] Pamela J. Wisniewski, Heng Xu, Mary Beth Rosson, and John M. Carroll. 2014. Adolescent online safety: the “moral” of the story. In Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing (CSCW '14), 1258–1271. <https://doi.org/10.1145/2531602.2531696>
- [44] Pamela Wisniewski, Haiyan Jia, Na Wang, Saijing Zheng, Heng Xu, Mary Beth Rosson, and John M. Carroll. 2015. Resilience Mitigates the Negative Effects of Adolescent Internet Addiction and Online Risk Exposure. In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI '15), 4029–4038. <https://doi.org/10.1145/2702123.2702240>
- [45] Pamela Wisniewski, Heng Xu, Mary Beth Rosson, and John M. Carroll. 2017. Parents Just Don't Understand: Why Teens Don't Talk to Parents about Their Online Risk Experiences. In Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing (CSCW '17), 523–540. <https://doi.org/10.1145/2998181.2998236>
- [46] Pamela Wisniewski, Heng Xu, Mary Beth Rosson, Daniel F. Perkins, and John M. Carroll. 2016. Dear Diary: Teens Reflect on Their Weekly Online Risk Experiences. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, 3919–3930. <https://doi.org/10.1145/2858036.2858317>
- [47] Sarita Yardi and Amy Bruckman. 2011. Social and technical challenges in parenting teens' social media use. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '11), 3237–3246. <https://doi.org/10.1145/1978942.1979422>
- [48] James Youniss and Jacqueline Smollar. Adolescent Relations with Mothers, Fathers and Friends. Retrieved October 12, 2020 from <https://press.uchicago.edu/ucp/books/book/chicago/A/bo92802630.html>
- [49] 2018. What's a VPN? Ask Your Teenager (They're Probably Using One). Your Teen Magazine. Retrieved April 7, 2021 from <https://yourteenmag.com/technology/using-virtual-private-networks>

Received October 2020, revised April 2021; accepted May 2021.