Chapter 14

Privacy in Adolescence

Pamela J. Wisniewski, Jessica Vitak, and Heidi Hartikainen

Abstract Late adolescence represents an important life stage where children are becoming more independent and autonomous from their parents but are not quite old enough to go out on their own. Teenagers are also avid users of mobile devices and social media and actively use their smartphones to connect with friends and share their lives. Much of the research looking at teen technology use has employed a risk-centric approach; in other words, it takes the view that teens are putting themselves at risk by sharing personal information online, so the privacy-oriented solutions typically involve parental monitoring or technology restrictions. In this chapter, we review the research on teens, technology use, and privacy and discuss why such risk-centric models may be problematic to teens' maturation. Instead, we argue that—much like it was for prior generations—risk-taking is a learning process critical to becoming a young adult and that teens do think about their privacy online, albeit in different ways than their adult counterparts. We offer design heuristics for developing tools for teens that allow for appropriate levels of risk-taking while protecting their privacy and ensuring their safety.

14.1 Introduction

The impact social and mobile communication technologies have on young people cannot be understated. Networked communication technologies are an ever-present force in the lives of nearly all teenagers; according to Pew Research, 95% of teens

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P. J. Wisniewski (✉)

Department of Computer Science, University of Central Florida, Orlando, FL, USA

e-mail: pamwis@ucf.edu

J. Vitak

College of Information Studies, University of Maryland, College Park, MD, USA

e-mail: jvitak@umd.edu

H. Hartikainen

Faculty of Information Technology and Electrical Engineering, University of Oulu, Oulu, Finland

e-mail: heidi.hartikainen@oulu.fi

ages 13–17 in the United States have access to smartphones, 89% go online multiple times a day—with 45% reporting near-constant connectivity [1]—and 71% use more than one social media platform [2]. Over half of teens in the United States have developed new friendships, flirted, and/or expressed romantic interest in someone through social media platforms like Instagram [3]. Common Sense Media [4, 5] reports that teens spend more than 7 h a day using screens, and the largest proportion of this time is spent on smartphones. As the Internet has become increasingly mobile and ubiquitous, teens no longer distinguish between “online” and “offline” spaces.

When describing teens and their prolific use of technology, the phrase “digital natives” [6] is often used to reference those who have grown up with modern technologies and particularly high-speed Internet access. However, this framing often incorrectly presupposes that everyone born in the twenty-first century is digitally literate and otherwise competent at technical activities, such as setting up an online account or changing privacy settings on a phone.

Hargittai [7] was one of the first scholars to note that the assumption that younger generations are inherently tech savvy is inaccurate and that web skills are not universal across all young people who use the Internet frequently. Her research showed that higher socioeconomic status, race (white or Asian), gender (male), and parental education are associated with higher levels of web skills. Hargittai suggests that most teens are more like “digital *naïves*”—they are naïve especially when it comes to “the critical knowledge to engage productively with networked situations, including the ability to control how personal information flows and how to look for and interpret accessible information” [8, p. 180]. Indeed, Common Sense Media [5] found that teens and younger children (ages 10–18) possess poor digital literacy when it comes to assessing whether a piece of information is real or fake, with 31% reporting they shared a news story in the last 6 months that they later found out was untrue.

More broadly, society has also made numerous assumptions about teens and their digital privacy. For example, the assumption that teens are at extreme risk online because of their poor information disclosure decisions is prevalent in the literature (e.g., [9, 10]) and suggests that teens’ lack of privacy awareness leads to serious harms, ranging from inappropriate consumer data collection to online sexual predation. Wisniewski [11] cautions that this narrative may be potentially counter-productive because it victim-blames teens for not being able to make complex privacy decisions that research has consistently shown are equally difficult for adults [12, 13]. Sonia Livingstone, a leading expert in child online safety, also argues that there is little evidence that online risks present more harm than the risks teens typically encounter offline [14]; therefore, we should be careful to not treat online risks as an epidemic that plagues our youth.

In this chapter, we unpack and scrutinize some of the assumptions regarding teens, disclosure, and privacy and evaluate whether they hold up based on empirical research with teens. In the next section, we introduce digital privacy in relation to adolescence, which is a unique and important stage of human development. Next, we show how privacy research with teens presents some unique and paradoxical challenges—between trying to give teens the privacy and autonomy they need as they transition into adulthood and using surveillance tactics to keep them safe from

online risks. Then, we present recent empirical research on networked privacy and teens. We conclude this chapter with actionable guidelines for designing systems that support the privacy and online safety of adolescents.

14.1.1 The Developmental Stage of Adolescence

Section Highlights

- **Adolescence is a unique developmental life stage** where teens transition between childhood and emerging adulthood, **distancing themselves from their parents**.
- Teenage years are characterized by increased **sociality** and **peer pressure**, the need for more **autonomy** and **privacy**, as well as heightened **risk-seeking** behaviors.
- These key changes during adolescents often lead to **conflict between parents and teens**.

This chapter addresses the important—and often volatile—developmental stage of adolescence, which is characterized as between the ages of 10 and 19 by the World Health Organization [15]. However, within the digital privacy literature in the United States, the age range for adolescence is often bounded between the ages of 13 and 17 [16]. This is due, in part, to the Children’s Online Privacy Protection Act (COPPA) [17], which legally protects children under the age of 13 from unfair or deceptive collection, use, and/or disclosure of their personal information by online service providers, while age 18 is the legal definition for adulthood.

During adolescence, teens are both highly social and more risk-seeking than younger children [18]; they need independence to individuate themselves from their parents [19, 20] but are less capable than adults at managing online risks without some guidance [21]. In short, adolescence is a time of great change and conflict, both physically and mentally. As Dahl [22] notes, “by adolescence, individuals have matured beyond the frailties of childhood, but have not yet begun any of the declines of adult aging” (p. 3). The high school and college years are viewed as particularly transitional periods of adolescence—what Arnett [23] has termed “emerging adulthood”—when attitudes and beliefs are maturing and teens become less dependent on their parents. In transitioning away from dependence on their parents, teens become more reliant on and influenced by their peers during this time; peer influence peaks at age 14; after that, teens start building resistance to peer influences [24].

During adolescence, many teens experiment with “risky” behaviors, including sex, drinking, and smoking, and these behaviors are sometimes perpetuated through more intense peer pressure [25]. Such behaviors often create tension in families, as teens become more secretive [26], and parents are forced to balance their concerns for their teens’ safety with trusting their teens with more autonomy as they transition to young adults [27]. Some level of risk-taking and autonomy-seeking is a natural and necessary part of adolescence [28]. In fact, preventing such experiences may

stunt developmental growth as teens strive to separate themselves from their parents to become well-adjusted and independent adults [18, 19, 29]. In the next section, we explain how the introduction of information and communication technologies have added to the challenges, tensions, and conflicts that arise for teens, and between teens and parents, during the unique transitional period of adolescence.

14.1.2 Adolescence as a “Privacy Paradox”

Section Highlights

- Teens’ **online disclosure behavior** is often framed as **paradoxical or problematic**, putting them at greater risk for **online dangers**. Yet, adults face many of the same privacy challenges as teens.
- **Adults send conflicting messages to teens about their online privacy**. Parents may tell them to be more **private** so that they can be **safe** online and then use **privacy-invasive parental controls** to ensure their online safety.
- In order to design tools that **meet teens’ privacy needs**, we need to draw from **evidence-based research**, rather than the **paternal instinct** to shield teens from all online risks.

The “privacy paradox” (as defined in Chap. X) typically describes the discrepancy between Internet users’ high levels of stated privacy concerns versus their copious online disclosures [12, 30–34]. Yet, when Barnes [9] first coined the term in 2005, she specifically referred to the online dangers (i.e., sexual predators) *teens* faced because of their over-willingness to share personal information via social media; this behavior of public over-sharing was framed as paradoxical because it conflicted with teens’ desire to protect their publicly posted private thoughts from their parents—a primary source of safety and protection—rather than from complete strangers.

From a developmental perspective, however, this behavior is far from paradoxical; a teen’s need for autonomy from their parents is directly related to their need for privacy and respect [35]. Steeves and Regan [36] explain that young people place great social value on their online privacy and want policies that are fair and negotiable. The use of online surveillance—especially by parents [37]—can undermine trust and hinder relationship building. This is counterproductive since trust is also a critical factor in adolescents’ relationship with their parents [38], where some level of monitoring and information disclosure by teens is necessary, so that parents can ensure their teen is safe from online dangers [39].

At a societal level, the trade-offs between surveillance, privacy, and safety are both controversial and complex [40, 41]. For example, in the United States, most people value their civil liberties and their right to privacy over the government’s right to protect them from threats to their personal safety [42]. Yet, as adults, we do not afford the same level of privacy and personal agency to our youth, especially when trying to protect teens from online risks [43]. The “privacy as risk prevention” approach to online safety has resulted in privacy-invasive tools that allow parents

to monitor and restrict their teens' online behaviors [44–46], which exacerbate the privacy tensions between parents and teens [47–51].

Furthermore, such paternalistic, restrictive, and privacy-invasive approaches to online safety have been shown to be ineffective in protecting teens from online risks, harming the trust relationship between parents and teens, and can even limit potential opportunities youth garner by engaging with others online [50, 52–55]. This fear-based approach to privacy protection of teens has led to a new privacy paradox for adolescents [43]: On one hand, adults tell teens that they need to care about their online privacy to stay safe; on the other hand, as designers and parents, we develop and use surveillance technologies that take teens' privacy away for the sake of their online safety.

To disentangle and resolve this paradox of modern adolescent online privacy, we argue that practitioners, researchers, and parents should turn to evidence-based research conducted with teens to understand how we can (1) move away from authoritarian and paternalistic models of privacy protection for teens to more resilience-based perspectives [56], (2) develop tools for teens that ensure their safety in a way that respects their privacy, (3) allow teens to engage online in ways that help them build skills and resilience related to online risks they might encounter, and (4) account for teens' developmental needs as they transition through the uniquely tumultuous period of adolescence.

14.2 Teens and Networked Privacy: Empirical Evidence

Section Highlights

- **Teens value their online privacy** and have **unique strategies** for how they manage it.
- Sometimes, teens feel **peer pressure** to make online disclosures, even when they are concerned about privacy.
- Teens' **strategies are often different** than how **adults** manage online privacy, and we need to be careful **not to make false assumptions** about **teens and privacy**.

Marwick and Boyd's [57] foundational work with teens provides pivotal insights into how teens negotiate their "networked privacy" on social media. The term "networked privacy" refers to the notion that individuals lack full control over how, when, and what personal information is shared about them online. Instead, privacy is collectively managed by individuals and others who co-own that information (cf. Sandra Petronio's Communication Privacy Management (CPM) theory [58] in Chap. 2), including service providers like Facebook and Google. Marwick and Boyd's [57] interviews with teens dispelled the myth that teens do not care about their online privacy; instead, teens go to great lengths to "be *in* public without always *being* public" (p. 1052). While teens might share frequently, this does not mean that what they share is meant for a wide audience [57].

In her book, *It's Complicated: The Social Lives of Networked Teens* [8], Boyd uncovers a range of strategies teens employ online to ensure that content can be seen by their intended audience while remaining hidden or uninterpretable by others. For example, Boyd describes a teen girl who posts song lyrics to her Facebook page. By themselves, the lyrics appear innocuous, and her mother will not worry, but her close friends immediately know the ulterior meaning—she was upset. Boyd refers to this practice as “social steganography,” or hiding a message in plain sight.

Boyd's ethnographic findings are supported through large-scale studies conducted by Pew Research. Through surveys and focus groups, Madden et al. [59] found that while teens share a lot of information through social media platforms, they also take steps to manage their identity and protect sensitive information, including deleting and de-tagging content, deleting friends, deactivating their profile, using inside jokes, and using fake names and/or profile information. Privacy concerns among teens also fuel the popularity of Snapchat among this age group [1] because shared content is usually only available for a short period of time before they become inaccessible. Privacy concerns are also linked to the increasing use of “fake” social media profiles like “Finstas,” where—compared to their “real” accounts—teens share less curated content with closer friends [60].

Taken together, this work confirms the central role social media plays in the modern lives of teens and highlights the interplay between sociality and privacy. The assumption that teens lack the ability to make calculated privacy decisions online has been debunked; teens do take protective measures against online risks and value their privacy, but they also value the social benefits of engaging online [8, 55, 61–63]. And even when teens are concerned about their privacy, they still report feeling pressured to make online disclosures to friends [64].

In the sections below, we discuss more recent empirical research on adolescents as it relates to their online privacy and safety. First, we explore privacy boundaries between parents and teens when negotiating technology use in the home. Then, we focus on teens themselves to show how they exhibit a markedly different privacy calculus than adults; they treat “risk as a learning process” [24], taking protective measures to recover once disclosures have escalated to the point of potentially harmful interactions. Next, we show how different parental mediation strategies (i.e., preventative versus reactive [65]) influence teen social media privacy behaviors. Finally, we conclude this section of the chapter with a discussion on the irrevocable, yet complex, relationship between privacy and online safety for teens.

14.2.1 Privacy Turbulence Within Families

Section Highlights

- **Technology** provides new ways for **parents to monitor teens**.
- **Parental surveillance** of teens' online behaviors **causes tensions** within families, as teens desire **autonomy** and **privacy** from their parents.

- Existing tools for **monitoring teens online** are heavily focused on **parental control**, using **authoritarian restriction** and **privacy-invasive monitoring** that negate the developmental needs of teens.
- More tools need to be developed that support **teen self-regulation**, as well as **collaborative practices** and **open communication** within families.

As noted earlier, the teen years represent an important transitional time for parent-child interactions. Adults and teenagers have strongly differing attitudes about many of the most popular apps and platforms, which can aggravate existing tensions about technology use within families. Parents may struggle to use technology themselves and to understand how and why their teenage children use it so frequently [48, 51]. Communication technologies provide new ways for parents and children to connect, as well as new ways for parents to monitor their children's online and offline behaviors. While this increased connection may help ease parental concerns, it also creates new sources of turbulence within families [66]. According to Cranor and colleagues' [51] interview study with parents and teens, teens tend to view digital spaces as "personal and private," while parents regard content shared online as "uncontrollable" and prefer to monitor or restrict it.

Parents' rules about technology use—including when teens can use technology, what content they can access, and what controls they must turn over to parents—may create tension in parent-child relationships, especially as teens approach adulthood and seek greater autonomy. According to Yardi and Bruckman [50], teens—who often have greater knowledge and skills (compared to their parents) in applying technology workarounds—may rebel against their parents' rules and engage in riskier behaviors to avoid technology constraints.

Wisniewski et al.'s [45] feature analysis of 75 commercially available parental control apps found that these tools often share fine-grained details about teenagers' smartphone use, including websites visited, calls made, texts sent (including the actual content of the message), and GPS location with parents. For example, parents may require their teen to install a monitoring app on their smartphone or use tools like "Find My Phone" to share up-to-the-minute location data with parents. Parents also may use one of the many car applications that lets them set maximum speeds and stereo volume, as well as create a perimeter zone, which notifies them if the child leaves that zone [67].

Parents often feel caught between competing desires: They recognize the need to trust and respect their children's emerging autonomy, but at the same time, they seek to preserve their teens' physical safety and emotional well-being [52, 68]. Meanwhile, teens—and especially older teens—unequivocally prefer a level of trust and privacy from their parents, rather than technologies that act to monitor and restrict their online activities. For example, Ghosh et al. [37] analyzed 736 online reviews posted by teens and younger children about parental control apps available on Google Play; 76% of the reviews gave the apps a single star rating. Children strongly disliked these apps because they were overly restrictive, invasive of their personal privacy, and negatively impacted their relationships with their parents.

Fig. 14.1 Wisniewski et al.'s [45] teen online safety strategies framework

In light of this, we call for a paradigm shift toward family online safety apps that respect teens' privacy, help teens self-regulate their own online behaviors, and improve communication between teens and parents. In one example of this, Wisniewski et al. [45] proposed the Teen Online Safety Strategies (TOSS) framework (Fig. 14.1) to balance tensions between parental control and teen self-regulation. In this framework, **parental control strategies** for online safety include monitoring, restriction, and active mediation [69, 70]. These strategies were based primarily on Valkenburg et al.'s [71] foundational work, which created scales assessing three styles of parental television mediation. They have since widely been adapted for use in the context of online parental mediation [69, 72–74].

The teen self-regulation strategies were drawn from the adolescent developmental psychology literature, which considers self-regulation a “resiliency factor” [75] that protects teens from offline risks by modulating emotions and behaviors through monitoring, inhibition, and self-evaluation [76–78]. **Teen self-regulation strategies** include self-monitoring, impulse control, and risk-coping. In order for teens to effectively self-regulate their online behaviors, they must be aware of their own actions through self-observation (i.e., self-monitoring) [77, 79]. Impulse control aids in self-regulation by inhibiting one's short-term desires in favor of positive long-term consequences [80]. Risk-coping is a component of self-regulation that occurs after one encounters a stressful situation, which involves addressing the problem in a way that mitigates harm [76, 81]. It is largely influenced by teens' self-appraisals of online risk based on their frequency of Internet use, risk experiences, and observed peers' risk experiences [65, 82, 83]. The TOSS framework makes an explicit association between active parental mediation and teen risk-coping [45].

A number of researchers have called for new solutions that move away from parental control toward promoting positive parent-teen relationships and teen self-regulation of their online behaviors (e.g., [44, 46, 52, 55, 84, 85]). Human-computer interaction (HCI) researchers [85–88] have been at the forefront of this research, conceptualizing more collaborative technologies that engage parents with

their children in digital rule-setting. For example, Ko et al. [87] developed a prototype called “FamiLync” that used participatory parental mediation; parents and teens engaged in co-learning activities around digital media use. This approach increased the shared understanding of smartphone use, fostered positive parent-teen relationships, and encouraged active participation in use-limiting activities, which significantly reduced overall smartphone usage [87]. Schiano and Burg [44] recently challenged interaction designers to reconceptualize parental control technologies as “collaborative self-regulation training tools” to help teach teens how to moderate their media use. Yet few, if any, technologies have been developed to help teens self-regulate and manage online privacy and/or safety risks in a meaningful way [45].

14.2.2 Risk as a Learning Process and the Suppressive Effect of Restrictive Parental Mediation During Adolescence

Section Highlights

- **Teens make privacy decisions differently than adults.** They experiment with online disclosures and **take protective measures retroactively** once their privacy concern has been triggered.
- **Parents** take both **preventative** and **reactive measures** to protect their teens online. Yet more **authoritarian measures** can have a **suppressive effect** by limiting teens’ online disclosures and risk-coping skills.
- It may be beneficial to **give teens some leeway to make mistakes, learn from them, and be able to recover.**

To evaluate how teens think about and manage their privacy on social media, as well as how different parental mediation strategies affect this privacy regulation process, Wisniewski and colleagues [65, 82] conducted a secondary analysis of Pew Research dataset including teen and parent survey responses. In the first study, Jia et al. [82] compared the widely accepted concern-centric model of information privacy based on “Antecedents→Privacy Concerns→Outcomes” (or “APCO”)¹ to a newly proposed “risk-centric” model of information privacy developed for teens. They confirmed that the risk-centric model was a better representation of how teens made privacy disclosure decisions on social media than the concern-centric model. Instead of privacy concerns driving teens’ information disclosures or privacy protective behaviors, teens demonstrated what looked more like a risk escalation process (**Fig. 14.2** in red) in which teens first make online disclosures that render them more susceptible to experiences of risky online interactions. In turn, these risky experiences are associated with higher levels of privacy concerns, leading to privacy-preserving behaviors (e.g., advice-seeking) and remedy/corrective risk-coping behaviors (e.g., deleting content, blocking another user, deactivating their account).

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¹ The APCO model was developed within the Information Systems (IS) field (see Chap. 3) and is typically applied to adult populations.

Fig. 14.2 Wisniewski et al.'s [65] preventative vs. reactive model of parental mediation

In a follow-up study, Wisniewski et al. [65] used the same dataset to determine how two different parental mediation strategies (direct intervention versus active parental mediation) affected this risk-taking process. *Direct intervention* included restrictive practices, such as using parental controls and changing the teen's privacy settings for them, while *active mediation* focused more on talking to teens about what they post online or commenting on their posts. They found (**Fig. 14.2**) that direct parental intervention reduced teens' overall information disclosures and privacy protective actions, while it was positively associated with advice-seeking. In contrast, active mediation was positively associated with more remedy/corrective or privacy protection behaviors.

In other words, direct parental intervention served as a preventative approach to privacy protection, while active mediation was more of a reactive approach, where parents engaged with teens to discuss what they are doing online and helped them recover if they did some mistakes online. When parents employed direct intervention without active mediation, this seemed to have the most suppressive effect on how frequently teens used social media and the diversity of their connections.

So while it may be possible that teens who have parents who directly intervene on the behalf of their online privacy are more discerning about the types of connections they make—in addition to reducing any possibly risky interaction online—this strategy may also reduce positive online interactions or even encourage teens to circumvent parental supervision by interacting with others more covertly through other means or platforms that are less visible to their parents.

Harkening back to the developmental perspective on adolescence and risk-taking, these findings suggest that focusing only on shielding teens online may inhibit them from learning how to make appropriate online disclosures, learn from their own mistakes, and recover once they have encountered a privacy violation that makes them feel threatened.

14.3 Designing Sociotechnical Systems to Support Adolescence

Section Highlights

- The Internet, social media, and mobile technologies provide **both benefits and risks** to teens.
- To optimize the benefits, we must be careful **not to overly protect teens by shielding them from all risks** because these experiences help teens mature into adults.
- We need to consider the **developmental needs of teens** when we design **privacy mechanisms** for their **online safety**.

As discussed in this chapter, adolescent online safety plays a central role in adolescent privacy research. Social and mobile technologies facilitate new opportunities for teens: they can benefit from online interactions that allow them to explore their self-identities, seek social support, and search for new information [53, 89]. However, these technologies may also amplify some existing risks.

The Crimes Against Children Research Center [90] reports that one in four youth in the United States has experienced unwanted exposure to Internet pornography, one in nine has been a victim of online harassment, and one in 11 reports receiving unwanted sexual solicitations online. The rates of depressive symptoms, self-harm, and teen suicide in the United States have increased with the rise in adolescent digital media use [91, 92]; while some researchers suggest that new technologies play a critical role in these negative trends [1, 93], others have shown these claims to be overstated [94, 95].

Teens themselves are ambivalent about the effect the Internet and social media has had on their lives: about a quarter feel that social media has had mostly a negative impact on their lives, 31% think it has a mostly positive effect, and 45% are neutral [1].

Our limited knowledge about what teens are doing online, concern for the personal information they are disclosing to others, and inability to protect them from harm fosters a sense of fear and constrains our ability to design privacy and safety mechanisms for online platforms that are developmentally appropriate for empowering adolescents in a way that they become risk resilient. As Boyd aptly put it in her book:

As a society, we often spend so much time worrying about young people that we fail to account for how our paternalism and protectionism hinders teens' ability to become informed, thoughtful, and engaged adults. [8, p. 28]

It is clear there is a sociotechnical gap between what we know about healthy adolescent development and the current systems designed to support adolescent privacy and online safety. The current paradigm for keeping teens safe online focuses heavily on paternalistic approaches that increase parental control through authoritarian and privacy-invasive parental features that monitor and restrict a teen's online activities [45, 96–98]. Such solutions have repeatedly been shown to be ineffective, and even detrimental, to the trust relationship between teens and parents [37, 48, 52, 72, 99]. Additionally, there is little evidence that these technologies actually keep teens safe online and, more importantly, may hinder teens from learning important online safety skills and effectively managing online risks on their own [56, 96].

A more active approach, including talking to the teens about what they do online, sharing activities with them, and offering help, is linked to lower risk and harm, as well as more developed online skills [100], yet we are not currently designing tools to facilitate this process. Therefore, in the next section, we conclude this chapter with actionable guidelines for supporting online privacy and safety from an evidence-based and developmental perspective that is appropriate for the unique life stage of adolescence.

14.4 Design Guidelines for Privacy and Risk-Taking During Adolescence

Section Highlights

- A **user-centered approach** to online privacy and safety considers the needs and desire of **teens as key stakeholders**.
- Online privacy and safety tools for teens should be **developmentally appropriate** for allowing them to engage in **appropriate levels of risk**.
- Systems should **reward positive behavior** and **raise risk awareness** so that teens can become **good digital citizens** and learn how to take **privacy-preserving actions** to ensure their own online safety.
- There are **trade-offs** when designing for **adolescent privacy, parental control, online safety, and trust**.
- The key to **privacy design for adolescence** is helping **families negotiate online boundaries** and balance these tensions.

Drawing from the evidence-based research presented in this chapter, we provide the following privacy design heuristics for adolescence.

Take a “User-Centered” Approach to Adolescent Privacy and Online Safety

First, we should refrain from fear-based and paternalistic privacy narratives about adolescents, their digital privacy, and their online safety. When we make decisions based on fear and protectionism, we take a stronger and more authoritarian stance than we would when taking a more rational and evidence-based approach.

Further, when we design for parents without considering the needs of teens as key stakeholders in the design of technologies they will ultimately use, we are failing to take a user-centered approach to privacy design [101]. Therefore, it is important to first identify biases and assumptions about teens that are being used to design systems for them and to scrutinize these assumptions for validity.

Instead of designing for “parental control,” we should design solutions that encourage teens to reflect on and self-regulate their own behaviors. Engaging teens directly as end users of online safety apps may empower them by giving them more agency and choice, thereby increasing their sense of personal autonomy and control. We should leverage user-centered techniques to better understand what safety and privacy features teens would actually find useful. Instead of assuming that teens are inherently risk seekers, a more nuanced approach would be to work with teens (e.g., through participatory design or other approaches) and ask them in what ways they feel that they need to be kept safe and then provide features teens find personally beneficial.

Some Risk Is Essential for Teen Developmental Growth We should design for features that help parents engage in conversations with their teens about their online risk-taking and risk-coping behaviors instead of concentrating on blocking all exposure to online risk. Parents should provide room for teens to make mistakes and recover from them, as this helps teens build resilience [43]. In cases where teens’ perceptions of what is considered risky online behavior conflict with their parents’ perception, it would be helpful to provide functionality that gives teens the possibility to negotiate the course of action with their parents [52].

For instance, instead of parental controls that unequivocally restrict teens from taking certain actions online (e.g., visiting a potentially risky website), teens might first be warned of the potential risk and be given the option to override the warning, and the software could involve the parent if the situation escalates. Allowing teens this kind of agency and choice would acknowledge that adolescence is characterized by a growing need for independence from parents but at the same time signal to teens that their parents trust them to make good decisions.

Design for Reward Instead of Punishment We should design for online environments that encourage and reward teens for positive and pro-social behavior, rather than punishing them for perceived rule violations. Wisniewski et al.’s [49, 63] diary study with parents and teens found that teens often do not tell their parents about their online risk experiences because they are concerned that their parents will punish them and/or make the situation worse.

Instead, we should consider promoting open, honest, and nonjudgmental family communication about online safety, supporting teens in a way that helps them cope with and recover from privacy violations and online risk exposure. Further, parental control software could also leverage positive reinforcement more effectively. For instance, the Screen Time Companion app² offers a “reward time system” that allows teens to get extra time if they meet certain criteria specified by their parents.

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² <https://screentimelabs.com/>

Reward systems are more contextualized restraints because they provide positive reinforcement and allow teens to earn privileges, as well as their parents' trust [43].

Design for Raising Risk Awareness, Which Encourages a Protective Response from Teens When teens make online disclosures that lead to risky online interactions and increased privacy concerns, this also leads to increased privacy-preserving behaviors as well as remedy/corrective risk-coping behaviors [82]. Therefore, we should find ways to raise risk awareness through “teachable moments [102],” which has been validated as a more effective approach within educational psychology research. Havighurst's book (1953) on *Human Development and Education* explains developmental tasks must be learned at the right time so that learning can be most effective. For example, raising the risk awareness of teens in the context of a risky interaction (e.g., taking and sending an explicit photo) may be more effective than using generic warnings about appropriate sharing outside the context of that risky interaction. Therefore, we should design warning systems that make privacy risks more apparent to teens in order to enhance their privacy awareness, teach, and encourage appropriate risk-coping behaviors [102]. In this way, parental monitoring software could be transformed into online safety software to teach teens about how to manage their online interactions with others.

Design for Safety with Privacy and Trust in Mind We should consider designing features that facilitate building trust and respect teens' privacy. Most research shows teens value their privacy while interacting with others online [61, 62, 103, 104]. Teen's need for privacy is directly tied to their need for autonomy and respect [35]. In the case of families, trust is a critical factor in an adolescent's relationship with their parents [38]. Parental trust is based on knowledge of their children's past and present behavior, and information disclosure from teens is necessary for “knowing” as a form of “trusting” [39]. Inversely, trust is also tightly coupled with privacy for adolescents, where “trusting” is a form of giving a teen the space and autonomy to not disclose information [35]. Some degree of trust is needed to promote independence in teens [51]. In the context of adolescent online safety, parents have to balance their children's growing independence with their own concerns for safety [48]. Ultimately, all parents will have to rely on their teens behaving responsibly even when parents do not know where exactly they are or what they do; that is, parents just have to trust their teens' good intentions, knowing that there is a possible risk for them behaving in an unwanted way [39]. While some control may be necessary, instead of risking losing their teen's trust by restricting or monitoring their technology use, parents should strive to build trusting relationships with their teens so that teens can both earn that trust and learn to self-regulate their own online behaviors into emerging adulthood [52]. Designing with privacy and trust in mind could include creating online safety apps that give parents helpful meta-level information regarding teens' online activities instead of full disclosure of what teens do online [45, 52, 96].

For example, software could provide parents with only a summary of who their teen is engaging with via their mobile device and how often, as opposed to disclosing the content of the conversations. Features such as this would contribute to

maintaining a trusting relationship between family members: Parents would know when there is something to worry about, and teens would know that their parents care and have some understanding of what the teens do online and who they interact with, but teens would not need to feel like they are being spied on [55].

Support Families in Online Boundary Negotiation Privacy turbulence in families often occurs when teens do not feel like they have agency or when rules are miscommunicated, seem arbitrary, or seem overly restrictive [58]. Therefore, we should design systems that allow families to jointly negotiate and set boundaries related to technology use and renegotiate them when needed. Supporting this kind of open communication within families will help teens understand why specific rules exist, are likely to reduce uncertainty, and increase the likelihood that teens come to their parents with problems. In turn, it will help parents be less fearful about the online risks the Internet presents to their teens so that parents and teens feel empowered to leverage technology in beneficial ways. For instance, it would be beneficial to design evidence-based instructive media to educate parents and teens on digital privacy and online safety that includes how to help teens resolve privacy violations and negative online situations that *may* occur or *after* they have occurred. This approach would be analogous to providing comprehensive sex education, as opposed to abstinence-only approaches that have proven ineffective [105].

We might also reframe online safety and behaviors as joint family responsibilities, making teens and parents accountable to one another [49]. For example, accountability software detects and notifies adult peers of lapses of pornography addiction [106]. Perhaps a similar system could detect teen risk-seeking behaviors, prompt parents to inquire, encourage teens to ask their parents for advice, and even “nudge” [107] teens to change their behaviors. To close the loop, designers might also build mechanisms to keep parents accountable to teens for upholding the same moral character, teaching teens to “do as I do” instead of “as I say,” emphasizing joint accountability over strict and unidirectional parental oversight. Overall, we believe these guidelines will help families reduce privacy turbulence by establishing open communication and negotiation concerning shared rules and boundaries. It would help teens build resilience to online risks while respecting teens’ need for privacy, autonomy, and control.

14.5 Summary

Teen life in the twenty-first century is both very similar to and very different from that of their parents. While teens still push for autonomy and freedom to experiment and take risks, much of their behaviors are now captured on friends’ smartphones, shared on social media, and archived on search engines. Much of the research and media attention on teens’ technology use has focused on the risks and negative outcomes of this more public performance of adolescence, with the primary solution being more technology to closely monitor teens’ behaviors. In this chapter,

we argue that technology designers must push beyond authoritative approach to parenting teens in the digital age and instead recognize the importance of risk-taking during this life stage and focus on more teen-centric design solutions that encourage reflection and discussion rather than surveillance and restriction.

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