How Can Teens Be Reasonable? Reasonable Expectations of Privacy in the Digital Age

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How Can Teens Be Reasonable?
Reasonable Expectations of Privacy in the Digital Age

by

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A DISSERTATION

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The Fourth Amendment only protects against government intrusions into spaces or information that receive a reasonable expectation of privacy—a subjective expectation of privacy that society is willing to recognize as reasonable (Katz v. United States, 1967). Judges are tasked with determining when a reasonable expectation of privacy exists. But as evidenced by justices’ confusion at oral arguments in recent Supreme Court cases, judges do not always fully grasp new technology. The current dissertation aims to guide courts attempting to navigate the new terrain of expectations of privacy in wired communications.

Scholars have expressed concern over the impact the ubiquity of wired communications may have on our expectation of privacy (Leary, 2011). Three studies in the current dissertation examine the role age, experience with wired communications, and developmental decision making play in expectations of privacy. Study 1 compares adolescents’ expectations of privacy to judicial decisions of whether a search violated the Fourth Amendment. Consistent with prior research on lay adults’ expectations (Slobogin & Schumacher, 1993), adolescent participants agree with judges on extreme violations of privacy, but there are significant disagreement about several types of searches.
Study 2 asks participants to evaluate the privacy implications of various searches and examines whether these perceptions vary as a function of age, experience with social networking sites, impulsivity, or sensation seeking. All three categories of variables—age, experience, and developmental decision making—had different effects on privacy concerns.

Finally, Study 3 measures adolescent and young adult participants’ perception of the risk of sharing information online as participants create a profile on a “new” social networking site. Participants do not appear to view the decision to share information as a risk and the amount of information shared publicly was not related to age, experience with social networking sites, or developmental decision making.

The results of the current study can be valuable in understanding how expectations of privacy change over time. As we move our lives increasingly online, the Fourth Amendment must also evolve to continue to protect privacy interests.
Dedication

This dissertation is dedicated to my son, Sam. I’m sure one day you’ll grow up and be embarrassed by this, but I hope at the same time you’re also a little proud of me. It’s all for you, little man.
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How Can Teens Be Reasonable?

Reasonable Expectations of Privacy in the Digital Age

After Portland, Oregon, public officials openly claimed individuals give up all expectation of privacy in garbage placed at the curb for trash pick-up, two journalists set out “to turn the tables on three of [the] esteemed public officials” and “embarked on an unauthorized sightseeing tour of their garbage” (Lydgate & Budnick, 2017). The journalists visited the homes of the local district attorney, police chief, and mayor, and collected items from their garbage, including: a receipt with a complete credit card number, an investment summary, a print-out of a private work-related email, and a newsletter from the Christian conservative organization Focus on the Family. The mayor issued a press release calling the journalists’ actions “potentially illegal” and requested a meeting with the journalists and their attorney. Despite the public officials’ prior stance on the lack of a privacy interest in garbage, they all reacted negatively to being the subject of such a search.

Concerns about privacy are not new. In 1949, George Orwell published a book set in the (then) future year of 1984, depicting a government that constantly monitors its citizens through the use of two-way television screens in homes, screening of written correspondence, and undercover agents acting as normal citizens (Orwell, 1949). We are now more than three decades past the time period in which the book was set, and while not all of the book’s government practices actually are used now, numerous changes in daily life have impacted how much of our lives are on display. From an innocent Christmas toy keeping watch over young children to report their behavior to Santa Clause (Pinto & Nemorin, 2014), to the revelation of a widespread government surveillance
program of citizens’ metadata from cellular phones and internet usage, recent developments have led scholars to express concern over the future of our privacy rights. A counselor to the United States president in 2017 expressed dismay over the ability to surveil individuals through the phones, television sets, and microwaves that all have camera capabilities (Memloi, 2017). Mark Zuckerberg, founder and CEO of one of the most popular social media sites—Facebook—declared there’s a new “social norm” of sharing information with others, and the chief executive of Sun Microsystems—a former computer and software company—famously quipped, “You have zero privacy anyway. Get over it” (Popkin, 2010). Concern over the safety of our information may be well-founded—recently, a journalist and data scientist pretended to be marketing a new product and purchased large datasets of German citizens’ internet browsing habits, and the researchers were able to identify individual browsers to the point they uncovered a local judge’s preference of pornography and the medication used by a German politician (Hern, 2017).

Individuals sometimes exhibit behavior that seems completely contrary to any interest in privacy. In October 2014, thirty-one adolescent students at a middle and high school in Oakland County, Michigan, were investigated on suspicion of manufacturing and distributing child pornography (Russell, 2014). The adolescents under investigation looked very different from the stereotypical image of a child pornographer: middle-aged, White males who amass large collections of photography and videos that can involve hundreds of young children (Sentencing Commission Congressional Report, 2012). In this case, several adolescent girls sent their peers naked photographs of themselves via text message; their peers then forwarded the pictures on to others (Russell, 2014). Such
acts often fall under state and federal child pornography statutes, which criminalize producing or distributing any visual depiction of sexually explicit conduct involving a minor (e.g., 18 U.S.C. § 2251). Many statutes apply even when the producer or distributor of the photographs is the minor depicted.

Oakland County is not the only community facing a so-called “sexting” scandal, where one indecent photo sent between under-aged paramours gets circulated among an entire school. Twenty percent of adolescents age 13-19 report sending or posting on-line nude or semi-nude photographs of themselves (Lounsbury, Mitchell & Finkelhor, 2011). School districts, including Oakland County, have established educational campaigns that try to send the message that “once you hit ‘send,’ you lose control over that image forever” (Russell, 2014). However, there is no evidence adolescents are refraining from sending these explicit text messages after hearing this message. One possible reason is that adolescents have different expectations of privacy and this impacts their behaviors. This difference may be attributable to the development of risk-taking and decision-making capabilities or to a “generation gap” such that teens today view privacy very differently and will continue to do so even when they are adults.

The Fourth Amendment of the United States Constitution protects against unreasonable searches and seizures (U.S. Const., Amend IV). While this Fourth Amendment protection does extend to minors, the nature of that protection can be different than it is for adults (New Jersey v. T.L.O., 1985). Though case law and legal scholars have explored how the Fourth Amendment applies minors in the digital age, social science research can provide valuable insight to how adolescents evaluate their expectations of privacy. Legal scholars have suggested adolescents exhibit lessened
expectations of privacy than do adults (Leary, 2010), but there is little empirical research to support this assumption. Adolescents may differ from adults due to developmental differences in decision making and risk taking or due to generational differences in experiences with and views of privacy invasions. If adolescents are different from adults due to generational differences, expectations of privacy may evolve over time, and evaluations of expectations at one point in time may not be accurate for future generations. Therefore, it is important to examine how expectations of privacy differ with age and what factors have caused any differences.

Chapter 1 of this dissertation examines how evolving expectations of privacy may impact Fourth Amendment jurisprudence. In Chapter 2, the dissertation outlines psychological theories that could be useful to the courts and legal theorists in developing Fourth Amendment jurisprudence, including Steinberg’s Dual Systems Processing Model of Adolescent Risk Taking (2010) and Kahnemann’s (2003) dual processing model of decision making, as models for how adolescents may develop expectations of privacy. This dissertation also discusses legal decision making research that could be useful to provide a framework for how these theories should be applied to expectations of privacy. Chapter 3 describes the findings from three studies that aim to measure the application of psychological theories to adolescents’ expectations of privacy. Finally, Chapter 4 explains what the results of these studies tells us about the future of the Fourth Amendment.
CHAPTER 1: THE CHANGING LANDSCAPE OF THE FOURTH AMENDMENT

The Fourth Amendment of the United States Constitution states that the right to be free from “unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause” (U.S. Const., Amend. IV). While the text of the amendment contemplates a warrant issued upon a showing of probable cause, courts have crafted numerous other instances in which a search will be reasonable, such as searches incident to a lawful arrest (Trupiano v. United States, 1948), searches of things that are in plain view (Hester v. United States, 1924), and searches following a hot pursuit (United States v. Johnson, 2001).

The United States Constitution does not limit its applicability to adults, but neither does it specifically say that it provides rights and protections to minors (Garza, 2010). However, it is not true that “the Bill of Rights is for adults alone” (In re Gault, 1967, pp. 13). Like other constitutionally protected rights, the Fourth Amendment extends to minors. The Fourth Amendment applies both in situations that are common to minors and adults (like in a criminal investigation, People v. Dilworth, 1996) and also in situations that are unique to minors (such as schools, T.L.O. v. New Jersey, 1985). Therefore, it is important to explore adolescents’ rights and how these rights are protected under the law.

The Fourth Amendment Right to Be Free from Searches and Seizures

The Fourth Amendment of the United States protects “the right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures” (U.S. const., amend. IV). State actors, such as police officers, government
officials, and public school teachers, are prohibited from intruding on individuals reasonable expectations of privacy. The first inquiry in any Fourth Amendment challenge of a search is to determine whether a search actually occurred (in other words, whether the person claiming a Fourth Amendment violation has “standing”), and only searches that violate a reasonable expectation of privacy fall within the Fourth Amendment. The United States Supreme Court has formulated a two-prong test to evaluate whether an individual’s reasonable expectation of privacy was violated (Katz v. United States, 1967; Smith v. Maryland, 1979): (1) the individual claiming a violation of his or her Fourth Amendment right must have had a subjective expectation of privacy in the thing or place that was searched, and (2) that expectation of privacy must be one that society is willing to recognize as reasonable. Thus, only searches in which an individual’s actual subjective expectation of privacy was violated, and there is also an objective expectation of privacy, receive Fourth Amendment protection.

In practice, however, courts may ignore claimed subjective expectations (Kerr, 2015). A review of 540 published cases evaluating expectations of privacy decided in 2012 found only 43% of the opinions even mentioned the subjective prong, and even fewer—only 12%—applied the subjective prong to evaluate whether the individual had a subjective expectation of privacy. In contrast, 93% of the opinions mentioned the objective prong and 80% conducted an analysis only of whether a claimed expectation of privacy was objectively reasonable. Thus, it appears courts are not concerned with whether an individual claiming a Fourth Amendment violation had an actual, subjective expectation of privacy, and focus more on whether any expectation of privacy, whether or not it exists, is one society is willing to recognize as reasonable.
The Supreme Court itself appears to have anticipated the irrelevance of the subjective prong, at least in some circumstances. In an early description of the reasonable expectations of privacy test, the Supreme Court opined that analyzing subjective expectations would be inadequate to protect privacy rights “where an individual’s subjective expectations had been ‘conditioned’ by influences alien to well-recognized Fourth Amendment freedoms,” such as where “the Government were suddenly to announce on nationwide television that all homes henceforth would be subject to warrantless entry” (*Smith v. Maryland*, 1979, pg. 740 FN5). At least where the government takes action to undermine subjective expectations, the Supreme Court has foreseen, and in fact encouraged, ignoring subjective expectations.

Perhaps partially due to this clear unimportance of the subjective prong, courts have struggled with applying the reasonable expectations of privacy test. Courts have difficulty with this test, in part, because the test is vague and requires consideration of many factors (Kerr, 2008). Professor Kerr describes four models courts use in determining reasonable expectations of privacy: the probabilistic model, the private facts model, the positive law model, and the policy model. Courts may select one, or multiple models, depending on the nature of the case. The probabilistic model is a descriptive model that examines the likelihood information would become known to others or the government; the lower the likelihood of disclosure, the higher the reasonable expectation of privacy. The private facts model looks at the nature of the information disclosed; if the information that was revealed was particularly private or personal, then there was a reasonable expectation of privacy in that information. This model is frequently utilized by courts examining claimed violations of privacy in new technology. The positive law
model looks to non-Fourth Amendment sources of law, such as property rights, to find a legal source for an expectation of privacy. Under this model, conduct that is prohibited in other areas of the law—violating trespass rights under property law, for example—will violate a reasonable expectation of privacy. The fourth model, the policy model, asks the question of whether the police conduct at issue should be regulated by the Fourth Amendment. This is a normative question that balances whether the search violates civil liberties with whether regulation would unnecessarily restrict police investigations.

According to Professor Kerr (2008), the reasonable expectations of privacy test is not, and should not be, just one test. Instead, courts have various models from which to choose as the case requires. The probabilistic, private facts, and positive law models are all “proxy” models, in which some benchmark—probability of disclosure, nature of the facts, and non-Fourth Amendment law—is used as a proxy for a reasonable expectation of privacy. However, in some situations, all three proxies do not adequately measure expectations, and that is when the policy model is particularly helpful in evaluating Fourth Amendment protections.

One difficulty in applying the reasonable expectations of privacy to a challenged search is the court must identify what state action constitutes the “search” itself for Fourth Amendment practices. In recognition of this, courts have recently turned to the so-called mosaic approach (Kerr, 2012). In this approach, courts analyze a series of police actions over time to create a “mosaic” of surveillance. Though each individual action might not violate a reasonable expectation of privacy, together the collective surveillance does. For example, GPS surveillance of a car over a series of weeks does constitute a Fourth Amendment search even though a shorter segment, say GPS
surveillance of a few hours or a day, might not (United States v. Jones, 2012; United States v. Maynard, 2012).

Searches that violate a reasonable expectation of privacy are allowed under the Fourth Amendment if the official searching has obtained a warrant issued pursuant to probable cause (U.S. Const., amend IV). The Supreme Court has defined probable cause as “where the facts and circumstances within the officers’ knowledge, and of which they have reasonably trustworthy information, are sufficient in themselves to warrant a belief by a man of reasonable caution that a crime is being committed” (Brinegar v. United States, 1949). Additionally, courts have balanced the degree of intrusion into a reasonable expectation of privacy with the needs of the government in searching to craft various other situations in which a search will be reasonable, including exigent circumstances such as hot pursuit (United States v. McConney, 1984; United States v. Johnson, 2001), searches subsequent to a lawful arrest (Trupiano v. United States, 1948), and searches of an automobile where the searcher has probable cause (Pennsylvania v. Labron, 1996).

The Fourth Amendment provides the greatest protections to areas and things that are viewed by society as requiring the most privacy. Thus, individuals in their home receive the greatest protection under the Fourth Amendment, while areas that are traditionally open to the public or for regular intrusions are not as protected. One doctrine courts use to evaluate expectations of privacy, the third party doctrine, examines whether an individual voluntarily provides otherwise-secret information to non-government actors (United States v. Miller, 1976). If so, the individual loses any reasonable expectation of privacy in that property. So, because people willingly share the
phone numbers they are dialing with the phone operator (Smith v. Maryland, 1979), the address they write on the outside of a package with the postal service (Ex Parte Jackson, 1877), and the bank records they provide to their banker in order to conduct their business (United States v. Miller, 1976), people lack any expectation of privacy in this information and the government can obtain that information without violating the Fourth Amendment.

**Empirical Examinations of Expectations of Privacy**

A potential difficulty of the reasonable expectation of privacy test is that reasonable expectations of privacy are evaluated by judges and not by the individuals being searched. This may result in a discrepancy between a searchee’s perceptions of the search and the judge’s perception, either because of personal differences between the judge and the searchee or because the searchee experienced the search in the first person while the judge is evaluating it in the third person.

Slobogin and Schumacher (1993) compared undergraduate students’, law students’, and community members’ expectations of privacy to determinations made by the Supreme Court. Participants evaluated, on a scale of 0 (not at all intrusive) to 100 (extremely intrusive) a brief description of a search from a Fourth Amendment case already evaluated by the Court. In addition, the researchers varied the perspective of the search: participants read one description of each search presented in the first person perspective (e.g., a search of your car), and an additional description of each search presented in the third person (e.g., a search of a car). The researchers also varied whether the context (the underlying reason for the search) was included in the description of the search.
For most of the 50 search scenarios presented, the participants’ ratings of intrusiveness matched the Fourth Amendment protections the Court provided (Slobogin & Schumacher, 1993). For example, participants rated searches such as a forced surgery of a suspect’s shoulder to retrieve a bullet and a search of a suspect’s bedroom as highly intrusive; these are both searches the Supreme Court held unreasonable under the Fourth Amendment. Participants perceived searches like looking in foliage in a public park and shining a flashlight down a dark alley next to someone’s home as not intrusive, and these are both searches the Supreme Court held did not violate the Fourth Amendment. However, there were some key differences between Supreme Court rulings and participants’ ratings of intrusiveness. Participants viewed use of undercover agents and a dog sniff of a vehicle as fairly intrusive, while the Supreme Court has held that these searches do not violate reasonable expectations of privacy. In addition, participants rated searches presented in the first person perspective as more intrusive than those presented in the third person perspective, which the researchers took to demonstrate a “distancing effect” in evaluating expectations of privacy. The researchers theorized that individuals rated first person searches as more intrusive because they felt more personal, and thus felt more intruded upon. This research indicates that individuals may evaluate certain search scenarios differently than do the courts.

Slobogin and Schumacher (1993) identified three aspects of searches that their lay participants used to evaluate intrusiveness: (1) guilt of person searched, (2) dangerousness of suspected activity, and (3) implied consent to the search. Blumenthal, Adya, and Mogle (2009) sought to extend and replicate these findings using a “bottom-up approach” (multidimensional scaling) to determine the underlying constructs lay people
use to evaluate the intrusiveness of the search. Participants in this study were presented with pairs of the same fifty searches Slobogin and Schumacher (1993) used, in addition to a Supreme Court case decided in the interim between the two studies. Participants rated on a scale of 1 (not at all similar) to 7 (extremely similar) they believed the two searches to be (Blumenthal et. al., 2009).

Using this approach, Blumenthal and colleagues (2009) determined lay individual’s use of several factors to evaluate searches. The first factor is whether the search is of a person or of property. The second factor is the perceived level of intrusiveness of the search. Participants also focus on the act that constitutes the search, such as whether the search was merely looking or involved physically manipulating an object. Lastly, to evaluate the search, individuals examine both whether permission was granted and the dangerousness of the suspected criminal activity. These findings supported Slobogin and Schumacher’s (1993) hypothesis that people use guilt, dangerousness, and consent to evaluate the intrusiveness of a search. The fact that laypeople use consent to evaluate the intrusiveness of a search mimics courts’ use of the third-party doctrine to evaluate whether a search occurred: both individuals and courts reason that if someone has voluntarily handed information over to a third party, that person no longer has a reasonable expectation of privacy in that information. Similarly, courts often look to the action of the search itself to help evaluate whether a search occurred. For example, courts are likely to determine a search occurred if a state actor physically manipulated an object, such as by moving a radio to see what was hidden behind it (Arizona v. Hicks, 1987). However, courts, unlike laypeople, do not—or at least
should not—consider whether evidence was found in evaluating whether a search occurred (Rachlinski, Guthrie, & Wistrich, 2011).

Fradella, Morrow, Fischer, and Ireland (2010) identified different “zones” of privacy in Fourth Amendment cases and examined how expectations of privacy differ among the zones. The zones included personal space (further divided into bodily privacy and territorial privacy), informational privacy, and communications privacy. Fradella and colleagues presented participants with twenty-one fact patterns describing searches from Fourth Amendment cases and whether the court had held that the search violated expectations of privacy or not. The fact patterns included searches from each of the different “zones” of privacy the researchers identified. Participants indicated their support with the holding on a scale of 1 (strongly disagree) to 5 (strongly agree).

The participants indicated the highest levels of agreement regarding expectations of privacy for issues involving bodily privacy, such as strip searches, and showed greater expectations of privacy in territorial privacy than what the Supreme Court has previously protected (Fradella et al., 2010). Participants also indicated greater expectations of privacy in informational and communications privacy than what Court rulings protect. For example, 85.5% of participants indicated they disagreed with the Court holding in *United States v. Knotts* (1983) that the Fourth Amendment did not prevent state officials from using a tracking beeper to track the movements of a vehicle. Fradella and colleagues included searches of students in a school setting. Participants (the average age was 23) agreed with cases that upheld invasions of students’ territorial privacy. Participants largely disagreed with a prior Supreme Court ruling holding a school’s drug testing policy did not violate students’ expectations of privacy, indicating participants
believed such policies did violate privacy rights. While lay individuals report similar
level of expectations of privacy that the Supreme Court protects in some court decisions,
there are certain domains or types of privacy that individuals report higher expectations
of privacy than the Court finds.

McCallister (2012) focused on the probable cause requirement of the Fourth
Amendment in asking participants whether they believed police should get a warrant
before attaching a GPS tracking device to a vehicle. Instead of varying the type of
information searched, McCallister asked participants whether their view of the warrant
requirement was different based on the identity of the person being tracked: an individual
suspected of being a drug dealer, an individual suspected of being a serial killer, an
individual suspected of being a terrorist, a convicted felon currently suspected of an
unspecified crime, a person who had never been convicted of a crime but was currently
suspected of an unspecified crime, a convicted felon who was not currently suspected of
any crime, and a person who had never been convicted of a crime and was not currently
suspected of committing any crime (a “true” innocent). Participants supported the
warrant requirement for a GPS tracking device, regardless of the suspected guilt of the
individual being tracked.

Scott-Hayward and colleagues (2015) surveyed American adults for their opinion
on the burden of proof law enforcement should have to have before conducting certain
types of searches of online information: no proof, gut instinct, reasonable suspicion,
probable cause, or never. The majority of participants reported they thought probable
cause should be required for law enforcement to access location tracking data, social
media profiles, cell phones, and email address. Older adults reported more expectations
of privacy in social media posts shared with friends, online purchase history, and online television shows watched than did younger adults, while younger adults reported more privacy expectations in GPS location data than did older adults.

Smith, Madden, and Barton (2016) extended this research and found, consistent with Fradella and colleagues, participants overwhelmingly disapproved of governmental intrusions into territorial spaces without a warrant, even ones the Supreme Court has allowed such as aerial surveillance. Consistent with court holdings in United States v. Jones and Riley v. California, participants disapproved of police tracking suspects with a GPS tracking device or searching a cell phone. And, perhaps helpful to the Court’s upcoming decision in Carpenter v. United States (see below), participants were also disapproving of law enforcement tracking suspects via cell phone tower information.

Overall, the available research indicates discrepancies between judges’ and lay adults’ expectations of privacy, and between lay individuals of different demographics (e.g., law students and non-students). These discrepancies may be especially large when judges evaluate new technology that has become ingrained in daily life.

**Reasonable expectations of privacy and electronic communication devices.**

Advances in technology can create problems for the Supreme Court analyzing reasonable expectations of privacy; the Ninth Circuit recently called electronic communications such as e-mails and text messages a “new frontier in Fourth Amendment jurisprudence” (Quon v. Arch Wireless Operating Co., 2010, pg. 904). The Supreme Court has cautioned against determining reasonable expectations of privacy before technological device’s role in society becomes clear (City of Ontario v. Quon, 2010). As new devices are developed and become popular, courts have to determine what types of searches the Fourth
Amendment protects. In addition, cases often take years to work their way to the Supreme Court, so by the time the Supreme Court evaluates expectations of privacy on a certain device, that type of device may be outdated. For example, the Supreme Court decided a case regarding expectations of privacy in text messaging beepers in 2010, long after beepers first became popular (City of Ontario v. Quon, 2010), and did not decide a case involving cell phones until 2014, forty years after the first mobile phone call was made (Riley v. California, 2014).

Courts often reason by analogy, and try to determine Fourth Amendment protections of electronic communications by comparing them to more traditional types of information. In 1979, the Supreme Court held individuals do not have a reasonable expectation of privacy in phone numbers they dial because they voluntarily share the information with the telephone company (Smith v. Maryland, 1979). The Court compared the issue to one they had decided a few years before in United States v. Miller (1976). In that case, the Court held bank customers do not have a reasonable expectation of privacy in their banking transactions because they voluntarily convey that information to the bank. To the Court, telephone numbers shared with a telephone company were the same as banking information conveyed with the bank. Legal scholars (e.g., Clancy, 2005) attempt to similarly compare electronic communications to different types of information to reason what level of protection the Fourth Amendment provides. For example, Clancy (2005) argues that computers are “closed containers” and, thus, any information stored on the physical hard drive should be protected by the Fourth Amendment. However, computer users may not have reasonable expectations of privacy
in information voluntarily transmitted to third parties, such as the URL of visited websites.

The Supreme Court recently addressed the issue of reasonable expectations of privacy in cellular phones (Riley v. California, 2014; United States v. Wurie, 2014). Both cases involved a search of a suspect’s cell phone shortly after the suspect’s arrest. In general, police can search a suspect incident to their arrest to search for dangerous weapons or evidence of the crime that led to the arrest. Several lower courts had held police can search suspects’ cell phones incident to their arrest, comparing cell phones to other objects that may be hiding a weapon or evidence. The Supreme Court held that officers generally cannot search a suspect’s cell phone incident to arrest without a warrant. Chief Justice Roberts indicated “cell phones differ in both a quantitative and a qualitative sense from other objects that might be kept on an arrestee’s person” (Riley v. California, 2014, pp. 17). The Court noted the data stored on a cell phone cannot itself be used as a weapon to physically endanger an arresting officer; in addition, officers can store a cell phone while they wait for a warrant to prevent suspects from deleting information stored on it. Though the Court did not explicitly address the issue of reasonable expectations of privacy in cellular devices, the opinion indicates the Court recognizes that individuals subjectively feel differently about information stored on their cell phones than they do about other types of information.

One relatively new area for the courts to evaluate is location tracking data. The Supreme Court held attaching a GPS tracking device to a vehicle and tracking the vehicle’s travel on public streets for 28 days was a search in violation of the Fourth Amendment (United States v. Jones, 2012), but law enforcement has many ways of
tracking the location of individuals. Cell site location information (CSLI) uses signals a cell phone “pings” to nearby towers to establish an approximate location, and cell phone companies often store both historical and prospective CSLI (NACDL, 2016). Police officers may subpoena service providers for this information to determine where a suspect was at the time of a crime. Under the Stored Communications Act, 18 U.S.C. Sections 2701-2712, service providers must disclose these types of records when “specific and articulable facts” provide reasonable ground to believe the records are relevant and material to a criminal investigation. The Sixth Circuit distinguished the use of such records from the GPS tracking device analyzed in Jones, because individuals have a lessened expectation of privacy in a third party’s business records and CSLI is not as accurate as GPS tracking so it does not provide as much detail into the individual’s daily life (United States v. Carpenter, 2016). The Fourth (United States v. Graham, 2016) and Eleventh Circuits (United States v. Davis, 2015) reached the same conclusion as the Sixth, determining law enforcement’s use of historical CSLI was not a Fourth Amendment search. The Supreme Court granted certiorari to review Carpenter and will weigh in on this issue in the 2017-2018 term.

At oral arguments in Carpenter, the Justices exhibited varying views on expectations of privacy in the digital age. Justice Elena Kagan noted technology, like the GPS tracking the Court evaluated in United States v. Jones, now allows law enforcement to conduct 24/7 surveillance of individuals with minimal effort (Carpenter v. United States, oral argument at 48). Justice Sonya Sotomayor mused about the ubiquity of cell phones and analogized to the Court’s prior determination that a tracking beeper inside someone’s home was subject to Fourth Amendment protections: “I know people who
take phones into public restrooms. They take them with them everywhere. It’s an appendage now for some people. If it’s not okay to put a beeper into someone’s bedroom, why is it okay to use the signals that phone is using from that person’s bedroom, made accessible to law enforcement without probable cause?” (*Carpenter*, oral argument at 44).

The Court’s newest justice, Justice Gorsuch, appeared to focus on the positive law model of the Fourth Amendment, inquiring about how state law would handle a non-government actor accessing CSLI (*Carpenter*, oral argument at 39). Chief Justice Roberts questioned the applicability of the third party doctrine, in light of his opinion in *Riley* that cell phones hold such a vast multitude of information that, necessarily, must be shared with a third party. To the Chief Justice, *Riley* “emphasized that you really don’t have a choice these days if you want to have a cell phone” (*Carpenter*, oral argument at 80-81).

As recent court cases demonstrate, the use of social media has been on the rise in recent years and presents new challenges for courts evaluating expectations of privacy. The Montana State Supreme Court addressed the issue of reasonable expectations of privacy in a Social Networking Site profile (*Montana v. Windham*, 2015). In this case, an undercover police officer gained access to the defendant’s Facebook profile by pretending to be a 16-year-old girl. Police then sought to use evidence obtained from the defendant’s profile page against him at his trial for charges of child pornography. The Montana Supreme Court found the defendant had both a subjective and objective expectation of privacy in the information he posted on Facebook. The defendant had utilized all of Facebook’s privacy settings to keep others from accessing his information.
without permission. The court compared the defendant’s Facebook profile to a living room: the defendant’s Facebook profile was like a living room where he was hosting a party with friends a family, and private messages were like the defendant pulling a friend into his bedroom and closing the door to have a private conversation. The defendant maintained an expectation of privacy of the events that occurred in his living room even though he invited others inside (like “friending” someone on Facebook), and the defendant’s expectation of privacy is even greater in the private conversation (like the instant message on Facebook) because he took further steps to keep that information private. In addition, the court cited the widespread popularity of Facebook in reasoning that society recognizes the defendant’s expectation of privacy as reasonable. The court pointed out that millions of people use Facebook to keep in touch with family and communicate, therefore people expect the information to remain private. The court found the search was unreasonable.

The United States District Court for the District of Minnesota has also found an expectation of privacy in private messages sent over Social Networking Sites (R.S. v. Minnewaska Area School District, 2012). Here, a school required a student to turn over her Facebook and email passwords after the school learned the student was having sexually explicit conversations with another student while off-campus. The court held that Facebook messages, like emails, are inherently private and thus users have both a subjective and objective expectation of privacy. Thus, without a warrant or other exception to the warrant requirement, the school could not search R.S.’s private messages or emails.
The Delaware Supreme Court recently addressed the issue of whether misplaced trust in a “friend” on a social networking site is protected by the Fourth Amendment \((Everett v. State of Delaware, 2018)\). A Delaware detective created a fake Facebook profile with a fake name, picture, and other information, and used that page to monitor the defendant, Everett. At some point the detective sent Everett a friend request, which the defendant accepted. As a result of that acceptance, the detective had access to all the information Everett posted on his Facebook page, even that information he restricted to his inner circle. One piece of information—a photograph of a handgun on Everett’s nightstand—led to a warrant and Everett’s eventual arrest.

The Delaware court likened Everett’s mistaken trust in accepting the fake profile’s friend request to a defendant providing information to an undercover officer, a situation the Supreme Court determined was not a violation of Fourth Amendment privacy rights in \(Hoffa v. United States\) \((Everett v. State of Delaware, 2018)\). According to the Delaware court, individuals assume the risk that one of their social network friends may be an undercover officer or may share information with law enforcement. Thus, at least in Delaware, users have no reasonable expectation of privacy in information willingly posted to social media and accessed by law enforcement.

A potential concern is that courts are not able to adequately gauge expectations of privacy—either subjective or objective—in electronic communication devices due to a lack of experience with new technology \((Leary, 2015)\). As discussed below, “digital natives” are those who were born into a world constantly connected to the internet and began using electronic communication devices from a young age. The Federal Judicial Center estimated the average age of federal judges as 68 years \(\text{Federal Judicial Center,}\)
2015), and the average age of the current Supreme Court justices according to their
dates on the Supreme Court website is also 68 years. According to recent census
data, the median age of the United States population is less than 38 years old (Cook,
2015)—and a difference of thirty years can mean drastic differences in knowledge of and
experience with electronic devices.

The justices’ questions and comments have highlighted this potential gap between
Supreme Court justices’ and the average person’s understanding of technology. For
example, during oral arguments for a case examining Fourth Amendment interests in an
employer-provided text messaging pager, Chief Justice Roberts questioned: “Maybe
everybody else knows this, but what is the difference between the pager and the email?”
(City of Ontario v. Quon, 2010, oral arguments at 29). The Chief Justice—who is
undiably well-educated—also was unaware text messages are first sent to a service
provider before being sent to the recipient, opining that he thought, “You push a button, it
goes right to the other thing” (Quon, oral arguments at 36). Justice Kennedy also
wondered what happens if a text message is sent at the same time one is received, asking,
“Does it say, ‘Your call is important to us, and we will get back to you?’” (Quon, oral
arguments at 44). Chief Justice Roberts also appeared not to believe an attorney’s
assertion that there are many innocent reasons people would have multiple cell phones at
the same time (Riley v. California, 2014, oral arguments at 50). Justice Kagan has
publicly admitted the justices are “basically clueless when it comes to technology”
(Oremus, 2013). The late Justice Scalia expressed his distaste for social media, calling it
evidence of a “narcissistic society” that people want to put minute details of their life out
there for everyone to see (Senior, 2013).
This lack of experience is particularly concerning because lay people view the information stored on electronic communication devices as very private (Kugler, 2014). Adults in the United States rate searches of content on electronic communication devices, such as the content of emails or text messages, as nearly as intrusive as strip searches and body cavity searches, the type of searches the Supreme Court has found to have full Fourth Amendment protection. In addition, searches of electronic content is rated as more intrusive, more revealing of private information, and more embarrassing than searches of content stored in physical property, such as papers held in a briefcase. This empirical study suggests lay people have privacy expectations in electronic content comparable to their privacy expectations in their personal body, but it remains to be seen whether courts recognize a similar expectation.

**Are We Losing Any Reasonable Expectation of Privacy?**

Many scholars have expressed dissatisfaction with the reasonable expectations of privacy test, even pointing out that under the test “privacy is a legal fiction” (Pearlman & Lee, 2015, pg. 7560). A major criticism of the reasonable expectations of privacy test is that it is inherently circular: legal pronunciations of what reasonable expectations of privacy people hold can impact actual expectations of privacy held by individuals, which in turn impact legal pronunciations of what reasonable expectations of privacy people hold (Kugler, 2017). Legal scholars and Supreme Court justices have expressed concern with this test because, as it is inherently circular, it is a subjective test and does not provide guidance to how to apply it to lower courts. Circularity resulting from application of this test can be either doctrinal—to determine whether someone has a reasonable expectation of privacy, look to whether the legal cases says there is a
reasonable expectation of privacy—or attitudinal, asking whether societal understandings of privacy expectations are affected by legal pronouncements of privacy expectations.

But circularity might not be as big of a problem as some scholars suggest in light of the fact legal decisions determining Fourth Amendment rights are not well-known and, even if they are, do little to change public perceptions (Kugler, 2017). Kugler surveyed American citizens just prior to, immediately after, one year after, and two years after the Supreme Court handed down a decision evaluating reasonable expectations of privacy in cell phones. Perceptions of intrusiveness in searches of cell phones increased directly after the Riley v. California decision, but were comparable to pre-Riley ratings one year and two years later. There was no difference in perceptions of intrusiveness pre- and post-Riley for different types of searches, such as a search of property. Those participants who had heard of the Riley decision had stronger expectations of privacy in their cell phones than did participants who had not heard of the Riley decision, which provides support for the claim Fourth Amendment decisions impact expectations of privacy, but this difference had disappeared one year after the decision. Thus, any impact on expectations of privacy is short lived and likely does not do much to change the course of societal privacy expectations.

Other scholars point to technology eroding expectations of privacy and any meaning to the Fourth Amendment (Leary, 2011). With the rise in popularity of cell phones, email, and the internet, individuals are sharing more and more information with countless others at the touch of a button. Social media sites such as Facebook and Instagram let users post every facet of their lives for others to see, from what they ate for breakfast to the TV shows they are watching after work. Technology has also enabled
government surveillance of individuals: GPS and cell phone towers provide location data, while browsing history and communications can reveal criminal activity. Baxter (2011) theorizes digital natives, those who grew up with technology, never really had privacy so they are not aware of the implications of any further encroachment on their rights.

As Justice Blackmun wrote in 1976, the government can easily eliminate any expectations of privacy by announcing a widespread “Big Brother” type of surveillance program (*Smith v. Maryland*, 1976). As far-fetched as constant surveillance of private activities may seem, something not too far off was revealed in June 2013. A National Security Agency sub-contractor copied thousands of classified documents regarding a national global surveillance scheme (Greenwald, MacAskill & Poira, 2013). One such program, PRISM, allowed the government to access citizens’ Google and Yahoo accounts (Lee, 2013), while other programs included mass data collection of cell phone records such as location tracking data and phone numbers dialed. These leaks were widely reported in both America and abroad and have been cited as an example of a major event that could erode expectations of privacy (Tokson, 2016).

Data on online behavior does show a slight effect of the NSA surveillance programs. Marthews and Tucker (2017) analyzed search terms using Google trends both before and after the revelation of the mass surveillance programs. The researchers compiled a list of sensitive search terms from a variety of sources, including the Department of Homeland Security’s list of suspicious terms (e.g., chemical agent, emergency response, hostage), pilot testing on embarrassing terms (e.g., alcoholics anonymous, debt consolidation, honey boo boo), and Google’s top search terms (e.g., Aaron Hernandez, royal baby, World War Z), and examined data on the frequency of
searches for those terms both before June 2013 and after. Those search terms that were rated as highly likely to get people in trouble with the United States government were searched less frequently after the mass surveillance programs were released, while those terms rated as unlikely to get people in trouble were searched more frequently. This effect was observed in eleven countries outside of the United States. According to Marthews and Tucker, individuals may be deliberately refraining from searching for information due to fear of surveillance and punishment from the government.

A similar chilling effect was observed pre- and post-June 2013 in Wikipedia article visits. Penney (2016) examined the number of monthly visits to Wikipedia articles on topics present on the Department of Homeland Security’s list of suspicious terms the DHS uses to monitor internet activity. Immediately after the NSA surveillance programs were revealed, the sensitive terms exhibited a 30% drop in number of visits. An interrupted time series design tracking monthly visits both prior to and after the reveal demonstrated this drop was due to the leaks: prior to the leaks, the number of monthly views for the sensitive information was trending upwards, while after the leaks the number of monthly views sharply dropped and continued decreasing over time. The same trend was not observed for articles relating to domestic security issues, infrastructure issues, or Wikipedia’s most popular searches.

Preibusch (2015) measured privacy-protecting behaviors both before and after the 2013 leak of government-sponsored NSA surveillance. Preibusch found a slight increase in searches related to NSA, surveillance, and government immediately after the surveillance program was revealed—most likely due to individuals searching for stories related to the leaks—and this increase returned to baseline levels after a short time. The
use of Tor, software that inhibits tracking of information online, increased three weeks after the leaks, but the increase was not sustained over time. Use of privacy options on an internet browser also slightly increased, but again the behavior change did not last long.

Though the empirical data is inconclusive, it does appear government programs may change the actions individuals take to protect their privacy, at least in the short term. The same programs may also affect the expectations of privacy society is willing to recognize as reasonable: if most people voluntarily share information online, and most people know the government keeps track of the information they do share, can any expectation of privacy in online information be reasonable? Due to this concern over technology and government intrusions changing expectations, several scholars have proposed amending or abandoning the reasonable expectation of privacy test.

Some scholars call for a complete abandonment of the reasonable expectation of privacy test in exchange for a normative or regulatory approach. Gardner (2014) would restate the standing requirement for Fourth Amendment searches as whether society should allow law enforcement officers to conduct such a search. This would involve a balancing between the impact of the search conduct on society’s sense of security with the utility of the conduct as a law enforcement technique.

If the aim is to adopt a “technological neutral” approach to the Fourth Amendment, in which the function of the Fourth Amendment stays the same as technology advances, Kerr (2009) proposes a distinction between coding and content information. Kerr argues the reasonable expectation of privacy test is actually a legal fiction because the case law does not, and likely cannot, mirror actual societal
expectations. Instead, Kerr would take a normative approach and decide what types of information we should protect. A coding-content distinction would protect all information that is the “content” of a communication, but the addressing or coding information such as the email address or phone number to which the message is sent is not protected. Kerr sees similarities between this approach and the more traditional approach used for physical property: there is a reasonable expectation of privacy in anything located “inside” physical property (such as property inside of a home), but not in anything that is “outside.”

Of particular concern is the extension of the third party doctrine to information shared online. As discussed above, in the Fourth Amendment context, the third party doctrine holds no reasonable expectation of privacy in information voluntarily shared with others (United States v. Miller, 1976). Thus, much information shared via communications—telephone numbers dialed, addresses written on packages—are not protected by the Fourth Amendment because they are necessarily shared with others to facilitate the communication. The same would hold for information communicated online. All information shared online, from websites visited to emails sent, are shared with third-party Internet Service Providers (ISPs). Similarly, all communications via cellular phones, including text messages, phone numbers dialed, and locations visited, are shared with the cell phone provider.

Justice Sotomayor, in her concurring opinion in United States v. Jones (2012), opined “it may be necessary to reconsider the premise that an individual has no reasonable expectation of privacy in information voluntarily disclosed to third parties” because the third party doctrine “is ill suited to the digital age, in which people reveal a
great deal of information about themselves to third parties in the course of carrying out mundane tasks” (pg. 957). Johnson (2017) argues the third party doctrine is not applicable to internet communications because most people lack a complete understanding of how the service providers are using the information. Bedi (2013) calls for an exception to the third party doctrine for online communications that are part of a “bona fide relationship.” As Bedi points out, courts have protected interpersonal relationships in other legal arenas, such as substantive due process. Though online communications do require disclosure to ISPs, according to Bedi this disclosure should not prevent Fourth Amendment protection because the ISP is not part of the personal relationship and communications are vital to such relationships.

Some scholars attempt to analogize to other Fourth Amendment case law to provide a framework for analyzing electronic communication privacy expectations. Ferguson (2016) would incorporate into the reasonable expectation of privacy test a concept of digital curtilage. Courts have long-recognized a reasonable expectation of privacy in the curtilage of a home, the property immediately adjacent to a home and associated with the “sanctity of a man’s home and the privacies of life” (United States v. Boyd, 1886, pg. 630). Ferguson would have courts also recognize a limited protection for personal data stored on electronic communication devices. This new doctrine would recognize a reasonable expectation of privacy in all stored data and communications that are closely associated with the device, marked as secure from other users, and implicate a personal or family-use interest.

Findlay (2008) compares social networking sites to a home, the type of property that has traditionally received the fullest Fourth Amendment protections. According to
Findlay, social networking profiles are comparable to homes because they generally require specific permission to enter while close friends have open access to everything inside, there are mechanisms in place to protect unwanted intrusions, and people bare the most private, sensitive facts inside. Thus, in Findlay’s view, social networking sites, at least dependent on one’s privacy settings, should receive just as much Fourth Amendment protection as does the interior of a home. In contrast, Pearlman and Lee (2015) argue the internet is nothing like one’s home, but more like valet parking, where you place your prized information into someone else’s hands and you hope you can trust them not to give it away.

Leonetti (2016) suggests courts have a wide latitude in applying the reasonable expectations of privacy test and this latitude has “eviscerated many Fourth Amendment protections” (pg. 6). Instead, Leonetti would have courts look to other sources of law, particularly property principles such as trespass, nuisance, and theft, to determine what types of property should be protected by the Fourth Amendment. This test would primarily revolve around whether an individual has the right to exclude others from the property or from seeing the information, and would empower Congress to create (or destroy) “zones” of protected privacy by enacting statutes that create (or destroy) property interests.

Baxter (2011) argues for a reformulation of the reasonable expectation of privacy test that would abandon the subjective prong and inquire only into the objective reasonableness of the expectation. This objective test, according to Baxter, would ask two questions: (1) whether the individual took steps to limit others’ access to the property or information, and (2) is society prepared to protect the property or information from
government intrusion? This test is very fact-specific, particularly for new electronic communications such as for social media sites, and would require courts to examine details such as the number of “friends” the user has provided access and the use of privacy settings on the profile.

Still other scholars claim changing the doctrine will not do enough to protect privacy. Former Ninth Circuit Chief Judge Kozinski and Nguyen (2011) point out the increasing use of sharing information online does not necessarily mean individuals are willingly giving up privacy, because many people are unaware of how their information is stored and shared. They argue an educational campaign, along with government regulation of information disclosures and courts adapting the reasonable expectation of privacy test, can help protect privacy interests. Leary (2015) calls on Fourth Amendment litigants to provide courts with better evidence of technological capabilities and privacy expectations, and on legislatures to pass laws to protect privacy interests. Kerr (2016) similarly describes legislation and case law as independent and parallel systems that can help protect privacy interests. Scott (2017) expresses concern the Fourth Amendment cannot adequately protect privacy interests and society needs better community oversight to fill the gap.

The concern over the adequacy of the reasonable expectation of privacy test in light of the changing ways we share information is highlighted by an additional struggle of applying the Fourth Amendment to a subset of the population that may have different privacy expectations and may use technology in a very different way than do adults: juveniles.
Juveniles’ Place in the Fourth Amendment

The Supreme Court has yet to address the issue of electronic devices and juveniles. This may be a particularly important issue to address because Millennials (those born in 1980 or after) are the first generation to “grow up” with digital communications. This generation has never experienced a world where digital communications, including cell phones, e-mails, and instant messaging, did not exist. Thus, their expectations of privacy regarding electronic devices may be different than expectations of people who remember a time before such devices. Research discussed above demonstrates adults’ assessment of reasonable expectations of privacy corresponds with courts’ assessment on some types of searches, but not others, and may be affected by awareness of government privacy intrusions. In addition, adults may use certain domains or dimensions, such as intrusiveness or the type of privacy interest involved, to evaluate the search. No known research has examined whether adolescents use the same domains when establishing expectations of privacy.

Juveniles’ right to be free from searches and seizures differ from adults’ in various ways. Courts may view juveniles’ expectations of privacy differently than they do adults’ because courts may expect juveniles to be different; courts may also see the need for governmental intrusion as more important or more justified for juveniles than for adults. In general, juveniles have been afforded the same constitutional rights as adults, except in a few circumstances. The Supreme Court of the United States held the protections in the Constitution for criminal suspects and defendants extend to minors, including the right against self-incrimination and the right to an attorney (In re Gault, 1967). Certain rights are not extended to juveniles, such as the right to be tried by a jury
of their peers, but the rights afford to criminal defendants at the procedural stage of an investigation (the so-called *Miranda* rights and the Fourth Amendment right to be free from searches and seizures) are afforded to minors.

For Fourth Amendment challenges, the Supreme Court uses the same standard to evaluate searches of juveniles as searches of adults: whether the search violated an expectation of privacy that the juvenile actually had (a subjective expectation) and that expectation is one society is willing to recognize as reasonable (objective expectation) (*Lanes v. State of Texas*, 1989). Courts have not been as clear, however, in defining what “society” is relevant in evaluating the objective expectation of privacy.

**Perspectives on Appropriate Policies: Protectionism and Personhood**

Legal scholars (e.g., Gardner & Proffitt Dupre, 2012) recognize that defining juveniles’ rights is particularly difficult because it involves three sets of interests: the juvenile’s, the parent or guardian’s, and the government’s. Two different, and often conflicting, theories may be used in defining adolescent rights: protectionism and personhood (Gardner & Proffitt Dupre, 2012). Courts and policymakers are often inconsistent in using these two theories.

The protectionist theory (Hafen, 1976) emphasizes juveniles’ vulnerability and dependence by highlighting their rights to receive care, affection, and guidance. According to some theorists, the protectionist view recognizes the “political reality” that children must be subject to the discretion of adults (i.e., *protected* by adults) until they reach an age where they have the capacity to make their own decisions (presumably, the age of majority) (Coons, 1985). Coons argues the protectionist theory actually does protect juveniles’ choice because parents and guardians will allow their children to make
decisions to varying degrees as the children get older. Policies that allow children to make choices independent of their parents would conflict with the autonomy of the supervising adults and impinge on the parent’s right to custody and control of their children (Meyer v. Nebraska, 1923). For example, compulsory education laws often require children to attend school until the age of 16; parents can consent to children un-enrolling from school at a younger age in some circumstances, but younger children cannot make this decision without their parental consent (Alabama State Code §16-28-1, 2014).

Protectionist policies expect that allowing parental control will promote children’s liberty (Hafen, 1976). First, most parents have a selfish interest in their children becoming independent so the parent no longer has to care for the child. In addition, more than any other person or entity, parents care for their children and this caring will promote decisions that advance the child’s autonomy. Parents also know more about their children than any other person or entity, and thus will have better knowledge of what will nourish the child’s autonomy. Protectionist theorists advocate for policies that place control in the hands of the child’s parents and of the state acting in loco parentis. Hafen claims that the adolescents lack the capacity to function as mature, independent members of society and thus should enjoy legally protected rights to special treatment. Under this view, parental authority and responsibility are valuable sources of support as minors develop; children require a satisfactory and permanent relationship with their rights. Policies that undermine parental rights to control and raise children may undermine parental responsibility and harm the parent-child relationships. According to
Hafen, then, state policies should enhance parental authority as a way to foster parent-child relationships.

State and federal governments also are charged with the task of safeguarding the welfare of children under protectionist theories (Hafen, 1976). Under the theory of *parens patriae*, the government can interfere to help care for individuals who are unable to care for themselves, including children. Governments often enact policies to protect the welfare of children overall, which may interfere with the parents’ right to choose how to care for their own children. Policies such as minimum age limits for purchasing and using cigarettes and alcohol apply to all minors, and parents can be charged with contributing to the delinquency of a minor for providing prohibited substances to their children (e.g., Florida Statute § 827.04, 2014). However, it should be noted that some states (e.g., N.R.S. § 53-168.06, 2014) allow parents to provide alcohol to their children in private homes.

Thus, policies that are consistent with the protectionist theory place the responsibility for making major decisions in someone other than the child, primarily with the parent but also with the government. The United States Supreme Court has promoted the protectionist theory in cases such as *Meyers v. Nebraska* (1923) that prioritize parental control instead of state decision making. Protectionist policies sometimes only interfere with parental decisions in extreme circumstances. For example, child abuse and neglect statutes (e.g., N.R.S. § 43-247(3) (a), 2010) intervene in the parent-child relationship only where there is a great danger to the child. Other protectionist policies that limit minor’s rights to make decisions while providing parents the ability to provide consent in certain circumstances, such as age of consent laws for marriage, are designed
to help parents protect children from harm while still providing parents freedom to make
decisions regarding their children (Henning, 2011). Still other protectionist policies take
away parental discretion and apply to all minors regardless of whether their parents
would like to consent, such as minor in possession statutes. Protectionism itself, then,
covers a wide range of policies that are not always consistent with one another.

In contrast to the protectionist theory, the personhood theory argues rights to
autonomy should be afforded to juveniles, at least those that have reached adolescence
(Richards, 1980). Personhood theorists identify certain decisions, such as medical
decision making or decisions involving constitutional rights, as so important that they
should not be taken away from juveniles when those juveniles can reason through and
understand the decision. Richards identifies a “moral imperative” to protect capacity for
autonomy that exist in all people. While young children may possess only a “future
interest” in personhood until they develop a capacity for rationality (Morris, 1975),
personhood rights should be recognized in older adolescents that have developed these
capacities. Batey (1982) argues the law should give the same weight to adolescents’
considered choices that it does to the choices of adults. Under this theory, courts should
serve as a mechanism to enable competent adolescents to overturn parental decisions that
the adolescent disagrees with. Adolescence is a transition from childhood to adulthood,
and personhood theorists believe that policies should reflect this transition and respect
adolescents’ decisions that are competent and well-informed.

Personhood theorists highlight developmental research (e.g., Steinberg,
Cauffman, Woolard, Graham, & Banich, 2009) that demonstrates that adolescents do
have some cognitive capacities that compare to adults (discussed below in Part II). At
common criminal law, offenders fourteen and older were presumed fully responsible for their actions, while offenders age seven and younger were conclusively deemed not responsible. However, the age of majority was often set at age twenty-one, which meant that adolescents could be held fully criminally responsible but could not sign a contract, for example. Personhood theorists (e.g., Melton, 1983) focus on research that demonstrates adolescents fifteen and older are not distinguishable from adults for problem-solving activities and vulnerability to social influence. Decisions of older adolescents, according to personhood theorists, should be given the same weight as those of competent adults.

A protectionist theory may view the need for governmental intrusion as overriding any juvenile expectation of privacy; other protectionist theorists may argue that protecting juveniles’ expectations of privacy may be an important interest in itself. Personhood theorists would argue that juveniles, particularly older and more cognitively developed juveniles, should be treated similarly as adults in terms of the Fourth Amendment and their expectations of privacy should be respected. Differences between adolescents and adults have implications for whether a searchee can establish a Fourth Amendment search actually occurred. The next section details how courts apply the Fourth Amendment to juveniles and how many courts struggle with the tension between protecting juveniles while respecting their rights.

As mentioned above, the courts are not clear whether objective expectations of adolescent peers or objective expectations of adults are relevant to the Fourth Amendment reasonable expectations of privacy inquiry. Under a protectionist theory, the relevant society for juveniles would be that of adults: the parents, caregivers, educators,
and lawmakers who are responsible for protecting adolescents and ensuring their safety. On the other hand, a personhood theory would support including adolescents’ objective evaluations of reasonable expectations in the analysis. This would recognize that adolescents, like adults, have the capacity to reason through decisions and this capacity should be respected. However, courts have not adequately addressed this issue, and the question remains whether the “reasonableness” of the search should be evaluated from the perspective of a reasonable adult or a reasonable juvenile.

**Supreme court cases and the struggle with personhood vs. protectionism.**

Policies that follow the personhood theory give adolescents certain rights as long as those adolescents have the cognitive capacity required to make decisions regarding those rights. One example is the mature minor doctrine in abortion law (*Planned Parenthood v. Danforth*, 1976). The United States Supreme Court struck down in *Danforth* a blanket requirement that all minors seeking an abortion obtain parental consent. The Court noted that some minors can reason through the decision independently from their parents, and state interests promoting family unity do not override this ability. The Court stressed the importance of letting the minor make the decision with her physician. The Court has, however, upheld parental consent requirements that allow for a judicial bypass (*Bellotti v. Baird*, 1979). Judicial bypass is a procedure where the minor can go before a court to prove that she either has the capacity to make the decision on her own or that for reasons of abuse or otherwise she cannot go to her parents and the court must determine whether the abortion is in her best interests. The Court reasoned that minor’s constitutional rights cannot be equated with adults for three reasons: “the peculiar vulnerability of children; their inability to make critical decisions in an informed, mature manner; and the
importance of the parental role in child rearing” (pg. 634). However, due to the unique nature of abortion and its consequences, the Court found it inappropriate to give parents an absolute veto of the minor’s decision. The Court reasoned that as the minor’s capacity for reasoning develops, the minor will not need as much adult guidance. This reasoning highlights the Supreme Court’s inconsistency with utilizing the personhood vs. protectionist stance in dealing with minor’s constitutional rights.

Another example of the Supreme Court’s difficulty in evaluating minors’ legal rights is the discrepancy between two decisions that the Supreme Court handed down on the same day: *Fare v. Michael C.* (1979) and *Parham v. J.R.* (1979). *Fare v. Michael C.* involved the ability of a sixteen-year-old suspect to waive his rights to an attorney and to remain silent in a police interrogation. The opinion, authored by Justice Blackmun, highlighted that Michael C. was an older adolescent with significant prior involvement with the police, and thus was able to comprehend the *Miranda* warnings. The Court applied the “totality-of-the-circumstances” test used when evaluating whether adults understood and competently waived their rights in custodial interrogation: considering the individual’s age, experience, education, background, and intelligence, did the individual knowingly and competently waive his rights? The same factors, according to the Court, are relevant when evaluating a juvenile’s waiver of *Miranda* rights. Instead of establishing a bright line rule creating a minimum age at which individuals are capable of waiving their rights, the Court recognized that some juveniles do have the capacity to understand the nature and consequences of waiving their rights. This opinion has been highlighted by legal scholars as exemplifying the personhood theory of adolescent rights (Gardner & Proffitt Dupre, 2012).
Justice Burger authored an opinion that was handed down the same day in *Parham v. J.R.* (1979). In this case, the Supreme Court held that a Georgia policy that allowed parents to voluntarily place their children under the age of 18 in state mental hospitals did not violate the children’s right to due process under the Fourteenth Amendment. Here, the Supreme Court noted that the child’s liberty interest was inextricably linked with the parents’ interest in and obligation for the child’s welfare. In addition, children’s liberty is not the same as adults: children are often already restricted by parental authority. The Court also pointed out that “most children, even in adolescence, simply are not able to make sound judgments concerning many decisions, including their need for medical care and treatment” (pg. 603). Thus, allowing parents to voluntarily institutionalize their children without a formal hearing did not violate their children’s due process rights because the parental and state interest in protecting children outweighed the child’s interest in not being institutionalized.

As *Parham* and *Fare* demonstrate, courts and policymakers may rely more on one theory or the other depending on the decision and political interests at stake. Development of jurisprudence surrounding criminal procedural rights also varies depending on whether the court takes a protectionist or personhood view of adolescents. Fourth Amendment jurisprudence is one area where courts and policies particularly struggle with balancing respect for adolescents’ decisions with protecting the health and welfare of adolescents. In addition, courts decisions may affect how expectations of privacy develop. As discussed below, parenting plays a role in how adolescents conceive their privacy rights; it may be possible widespread government policies, partially shaped by court decisions, may do the same. The next section details Fourth Amendment
policies and case law involving adolescents and how this exemplifies the struggle governing bodies face with dealing with adolescents’ rights.

**Juveniles’ Expectations of Privacy in the Eyes of the Law**

In *New Jersey v. T.L.O.* (1985), the Supreme Court held that the Fourth Amendment protects juveniles from unreasonable searches and seizures by public school officials. Other cases (e.g., *California v. Hodari D.*, 1991) have found the Fourth Amendment protects juveniles in other settings, such as from unreasonable law enforcement searches. Legal scholar Kristin Henning (2011) argues that the Supreme Court has yet to develop a consistent framework for evaluating Fourth Amendment claims made by juveniles. Instead, according to Henning, juvenile’s rights under the Fourth Amendment are evaluated on a case-by-case basis, with courts discussing three main principles: (1) context, (2) capacity, and (3) parental authority. *Context* refers to the situation or area to be searched. Courts have long recognized the scope of Fourth Amendment protection is greater where individuals have greater reasonable expectation of privacy (*Rakas v. Illinois*, 1973); thus, context is an important factors for courts to evaluate when determining what qualifies as a search under the Fourth Amendment. *Capacity* requires an examination of the development and individual abilities of minors. *Parental authority* recognizes that parents have the legal right to control and raise their children, and this must be considered when evaluating Fourth Amendment protections for minors. Parental authority is particularly important when evaluating who has the right to consent to a search. Courts evaluate these three factors (context, capacity, and parental authority), sometimes focusing more on one than the others, when determining what rights juveniles have under the Fourth Amendment.
One context is unique to juveniles: the school setting. Courts have recognized schools stand *in loco parentis* when juveniles attend school, which means schools have the limited power to educate, discipline and protect the children (Blackstone, 1769). Unlike parents, however, public schools can qualify as state actors and are thus constrained by the requirements in the United States Constitution (*New Jersey v. T.L.O.*, 1985). But the Fourth Amendment protects juveniles in schools differently than it does adults in public because of different expectations of privacy and because the state’s interest in promoting safety is greater in a school setting.

Recognizing that the determination of what is a reasonable search requires balancing the need to search with the invasion of privacy, the Supreme Court in *New Jersey v. T.L.O.* (1985) determined the substantial need of teachers and administrators to maintain order in the schools does not require probable cause (the standard of proof required to obtain a warrant to search an adult) before a search of a student. In *New Jersey v. T.L.O.*, two high school freshman were caught smoking in the bathroom. A teacher took the girls to the principal’s office where the assistant vice principal searched T.L.O.’s purse and found evidence that T.L.O. sold marijuana. The Supreme Court held that schools could search students’ property based on a reasonable suspicion that the search will reveal evidence that the student broke either a school rule or a criminal law. The Supreme Court took a middle stance between protectionism and personhood theorists in this opinion by recognizing that schools had a legitimate interest in protecting students and promoting order in schools, but also identifying that students have some degree of reasonable expectations of privacy.
Like all searches by state actors, the school’s search must be justified at its inception and reasonable in its scope. However, in the school setting, a search of a student will ordinarily be justified at its inception when there are “reasonable grounds for suspecting that the search will turn up evidence that the student has violated or is violating either the law or the rules of the school” (*New Jersey v. T.L.O.*, 1985). This differs from the standard for adults in two ways. First, reasonable suspicion requires less evidence of wrongdoing than probable cause (*Terry v. Ohio*, 1968). In addition, students may be searched based on reasonable suspicion that they are violating the rules of the school, while adults can only be searched if there is probable cause that they violated laws.

The Fourth Amendment has been applied to school searches involving drug testing (*Board of Education v. Earls*, 2002), dog sniffs (*B.C. vs. Plumas Unified School Districts*, 1999), and locker searches (*State v. Jones*, 2003). While courts have generally found that a school’s need to promote order and discipline in their school outweighs students’ right to privacy, there are situations where student privacy will prevail. The Supreme Court evaluated whether the Fourth Amendment protected a strip search of a student in *Safford Unified School District v. Redding* (2009). In *Redding*, the school administration suspected a female middle school was providing other students prescription-strength drugs that were forbidden from campus. School officials searched Redding’s belongings and did not find any evidence of drugs; following this, the school officials (both female) required Redding to strip down to her underwear and shake out the bands of her undergarments to reveal any drugs. The school officials did not find any illegal drugs in Redding’s possession. The Court found this search violated Redding’s
Fourth Amendment rights because the level of intrusion exceeded the content of the suspicion. A serious intrusion such as a strip search requires schools to have a reasonable suspicion that the student is a danger to others or that the student is hiding contraband in his or her clothing. Absent this, such as in Redding, the search violates the student’s Fourth Amendment rights.

Outside of the school setting, though, courts have extended to juveniles the same Fourth Amendment protections that are enjoyed by adults (Lanes v. State of Texas, 1989). Lanes involved a seizure of a juvenile from school to obtain his fingerprints. The Texas Supreme Court reasoned that juveniles have the same right to be secure in their person as do adults, and thus any seizure must be supported by probable cause. This means that law enforcement will have to obtain a warrant to legally search a juvenile, or will have to rely on one of the other court-created ways to make a search reasonable. If a search is not justified by reasonable suspicion for schools or probable cause for law enforcement, the officials may resort to obtaining consent from the juvenile to search.

**Capacity and juveniles’ Fourth Amendment rights.** Though courts generally do not discuss the issue of capacity when evaluating reasonable expectations of privacy, capacity is an element courts consider when evaluating consent to search. Evaluating juveniles’ capacity to consent to search is one area where courts struggle with recognizing the capabilities of adolescents (personhood theories) and protecting adolescents from unreasonable intrusions (protectionist theories). Like adults, juveniles have the rights to remain silent and to have an attorney in an interrogation; a corollary of these rights is the right to waive them (Fare v. Michael C., 1979). This means that competent juveniles can waive their rights to an attorney and to remain silent as long as
the waiver is voluntary. The juvenile’s age, experience and education are all factors to consider in the totality of the circumstances, but the juvenile’s age itself does not require a different standard. The United States Supreme Court has allowed minors, particularly adolescents, to make decisions in other circumstances. States must allow for minors seeking an abortion to judicially bypass parental consent requirements by convincing a judge that either the abortion is in the minor’s best interests or that the minor has the capacity to make the decision for herself (Planned Parenthood v. Danforth, 1976). Some states similarly allow mature minors to make other important medical decisions, such as the decision to withdraw from treatment (In re E.G., 1989). In a similar way, courts have ruled juveniles have the ability to waive a right to be free from searches and seizures by providing consent to a search.

Though the United States Supreme Court has never decided a case on the issue, state courts have ruled that children as young as 8 are competent to consent to a search (Lenz v. Winburn, 1995), but other courts have found that ten-year-olds are too young to consent (Bilbrey v. Brown, 1984). Similar to evaluating consent to search by adults, courts take into account the “totality of the circumstances,” and age and individual abilities of the youth are just two of the factors in the analysis. In Bilbrey v. Brown (1984), a school bus driver observed two ten-year-olds exchanging items on the playground and suspected that the children were exchanging drugs. The children were later removed from class and brought to a locker room, where they were strip searched. The school officials claimed that they sought permission from the boys to search them and both boys consented to the search; however, the trial court held as a matter of law that the children were too young to consent to such a search. The trial court reasoned that
the circumstances were so coercive that the children could not have voluntarily waived their rights.

Courts frequently consider coerciveness of the environment when evaluating consent. The Eastern District of Texas court examined the coercive nature of the school setting and found the juvenile’s consent was not voluntarily given (*Jones v. Latexo Independent School District*, 1980). After finding a dog sniff of the plaintiffs was unconstitutional, the court in *Jones* turned to the question of whether the juveniles’ subsequent consent to a search was voluntary. The court identified the targets of the search were “children with limited experience in a threatening situation.” The adolescents (three high school students) were “accustomed to receiving orders and obeying instructions from school officials” and “incapable of exercising unconstrained free will when asked to empty their pockets.” Thus, because juveniles are taught to obey and are frequently threatened with punishment in a school setting, their consent must be evaluated in light of this setting. Despite this lower court decision, the Supreme Court of the United States has never spoken on how to evaluate the totality of the circumstances of consent to search in a school setting.

However, the Supreme Court has reasoned the adolescent’s age and the coercive environment are factors to consider in the *Miranda* warning context (*J.B.D. v. North Carolina*, 2011). Police interrogators must read suspects their *Miranda* rights (i.e., right to remain silent and right to an attorney) whenever suspects are exposed to a custodial interrogation; courts determine whether a suspect is in custody by evaluating the totality of the circumstances (*Miranda v. Arizona*, 1966). The Supreme Court held that the totality of the circumstances test is the same for juvenile suspects interrogated in a school
setting, but that the suspect’s youth and the potentially coercive environment of the school are two important factors in evaluating whether the juvenile is in custody (J.B.D. v. North Carolina, 2011). Thus, it is likely courts will consider both age and coercive school environments when evaluating the voluntariness of adolescents’ consent to search in a school setting.

Taken together, age and coerciveness of the school environment are important factors in evaluating consent to search, and may also have important implications for determining adolescents’ reasonable expectations of privacy. As discussed below, decision-making capacities develop throughout adolescence, and these may play a large role in how adolescents evaluate their privacy rights. In addition, adolescents may view their privacy rights differently in certain environments, such as within the home or at school, where they are accustomed to privacy intrusions by adults. We expect that courts should take these factors into consideration when evaluating both subjective and objective expectations of privacy of adolescents.

**Parental authority and juvenile’s Fourth Amendment rights.** A third factor that is important in evaluating minors’ Fourth Amendment rights is parental authority (Henning, 2011). The Supreme Court has long recognized that parents have a fundamental right in raising their children (Meyers v. Nebraska, 1923; Pierce v. Society of Sisters, 1925). Parents have the authority to make many decisions about children of all ages including education (Meyers v. Nebraska, 1923) and medical and psychological treatment (Parham v. J.R., 1979). According the Supreme Court, “the law’s concept of the family rests on a presumption that parents possess what a child lacks in maturity, experience, and capacity for judgment required for making life’s difficult decisions”
(Parham v. J.R., 1979, pg. 602). As discussed above, protectionist theories of
government regulation of children view government policies as one way to protect
vulnerable individuals from harm. In some situations (such as parental consent to
marriage), the government assumes parents know the needs of their children best, and
parents can “work around” government rules, while other regulations (such as child abuse
and neglect statutes) are designed to protect children from harm from their parents.

The issue of parental authority is complicated when examining what role parents
should play in providing consent to a search of their minor child or their minor child’s
property. The Supreme Court has indicated it does not look toward traditional property
principles when determining privacy interests; instead, courts look to whether the
individual has a reasonable expectation of privacy in the property according to “widely
shared societal expectations” (Illinois v. Rodriguez, 1990, pg. 111). Like the Fourth
Amendment protection of reasonable expectations of privacy in general, ability to
consent to a search also is related to what individuals reasonably expect. Thus,
expectations are important both in determining what searches are unreasonable under the
Fourth Amendment and in evaluating who can provide consent.

The Supreme Court has recognized the family relationship has privacy
implications. In Georgia v. Randolph (2006), the Supreme Court held that if an adult
defendant who is physically present at the scene of the search and objects to the search, a
third party with common authority over the property may not consent to the search.
However, if the adult defendant is not physically present, the third party’s consent will be
valid even if the defendant had earlier objected to the search (Fernandez v. California,
2014). In examining the social expectations of who should have authority to consent to a
search, the Court noted in *Georgia v. Randolph* (2006) that “[u]nless the people living together fall within some recognized hierarchy, like a household of parent and child . . . there is no societal understanding of inferior and superior” (pg. 114). This dicta indicates the Court assumes that parents do have the authority over their children to consent to at least a search of the home, over a child’s objection, but the Court has not yet explicitly held so.

Fourth Amendment jurisprudence relies heavily on reasonable and societal expectations of privacy. While some research indicates lay opinions generally match those of the Court’s, with some notable exceptions (Slobogin & Schumacher, 1993), it is not yet clear how adolescents and their parents view adolescents’ Fourth Amendment rights. Courts often make assumptions regarding minors and consent to search, such as what society expects of adolescents’ privacy rights. Social science research can help inform the three main factors courts consider when evaluating minors’ Fourth Amendment rights: the effect of contexts such as a school setting, adolescents’ capacity to make important decisions, and the role of parental authority (Henning, 2011).
CHAPTER 2: PSYCHOLOGICAL RESEARCH TO INFORM COURTS AND POLICY-MAKERS

Though courts have looked to social science research in other areas of the law (Roper v. Simmons, 2005), courts have not yet relied upon psychological findings in determining reasonable expectations of privacy. Social science theories on decision making and privacy can help policymakers and courts better understand how individuals, including adolescents, evaluate their privacy rights under the Fourth Amendment. These bodies of research include the development of privacy expectations, dual systems processing models of decision making and risk taking, and adolescent legal decision making.

Adolescents’ Expectations of Privacy

Adolescents have a whole world open to them that was not available as recently as twenty years ago—the Internet. “Digital natives” are individuals who have grown up using digital communications and networked technologies (Palfrey & Gasser, 2013); these individuals are more familiar with using computers, sending information online, and living in a virtual “world.” In 2017, the website Commonsense Media detailed seventeen social media websites frequented by teens, including texting apps (GroupMe, Kik, WhatsApp), photo and video-sharing sites (Instagram, Musical.ly), “microblogging” sites (Tumblr, Twitter), livestreaming apps (Houseparty, Live.ly, Live.me, YouNow), “self-destructing” apps (SnapChat, Whisper), and sites with the aim to meet new people (MeetMe, Omegle, Yubo) (Elgersma, 2017). One issue with the influx of social networking sites is how these impact adolescents’ expectations of privacy and willingness to share information with others. Social science research can aid
examinations of how adolescents view their privacy and information management in this new “world.”

Boyd (2014) calls adolescents experts at digital privacy. Because adolescents perceive regulation in their physical lives, they may seek out an alternative “public” space in which to express themselves, and the internet has provided this for them. Adolescents using social media may experience “context collapse,” where their use of social media brings together very different groups of people, such as their family, their school friends, and their work friends, who normally otherwise would not meet. While some content may be appropriate for certain social groups to view, other groups may not approve of the same content. Without a proper knowledge of who has access to their information, adolescents may risk unintentionally exposing information to the wrong people.

Berriman and Thomson (2015) designed a model of adolescent’s conception of digital privacy. This model has two axes: participation and visibility. Participation is the degree to which adolescents feel comfortable having control over and putting information into the digital world, and visibility is the degree to which adolescents make their digital content identifiable.

According to Berriman and Thomson (2015), there are four distinct types of adolescents when it comes to privacy. The incompetent or victim is high in visibility but low in participation. This is the most worrisome type, in Berriman and Thomson’s view, because these adolescents create intimate data but have no control over it; for example, an incompetent or victim adolescent may create risqué photographs and share them with one other person, but lacks control over how those photographs may be circulated. The
second type is a fan or lurker, low in both participation and visibility. The fan takes a more cautious approach to digital content, which can be an active choice an adolescent makes after witnessing the negative effects of sharing information online. The fan may exhibit “stalking” behaviors towards celebrities or well-known peers by following them on multiple social media accounts and frequently checking on posts, but does not make much digital content him or herself. The third type is the geek, who is high in participation but low in visibility. The geek creates original digital content, such as fan fiction or animation, but keeps the content unidentifiable through the use of screen names or anonymous accounts. The geek may be a cultural entrepreneur who wishes his or her content to “go viral” so he or she can make money off of it, but recognizes the dangers of being too identifiable online. The final privacy type is the e-celeb, who is high in both participation and visibility. The e-celeb seeks notoriety through the cultivation of “self as content”—the e-celeb creates original content that is identifiable and able to be linked to his or her real-life persona. The ideal e-celeb is the famous YouTuber, an individual who creates original videos of themselves to be posted on YouTube and gains hundreds, or sometimes millions, of followers. The e-celeb often makes a conscious trade off, willingly giving up anonymity in exchange for an opportunity to be seen.

Adolescents’ online behaviors are often compared to adults; while adults are assumed to be more logical, adolescents are perceived to use social media more often (Whitty, Doodson, Creese & Hodges, 2015). While some research has demonstrated older adults are less knowledgeable about online security than younger users (Grimes, Hough, Mazu, & Signorella, 2010), other research shows adolescents are more willing to take risks with their information, such as by sharing their passwords with others (Whitty
et. al., 2015), and feel more responsible and are more confident in their ability to manage their data online (Miltgen & Peyrat-Guillard, 2014).

Current research on adolescents’ perceptions of online privacy has focused on describing adolescents’ willingness to make information public on the Internet. Christofodies, Muise and Desmarais (2012a) surveyed 256 adolescent Facebook users regarding their information control on Facebook. Adolescents who had more knowledge of Facebook’s privacy protections were more likely to make use of them and control the information that is shared on Facebook. For example, adolescents who were aware of Facebook’s available privacy settings were more likely to have their profile set to private, so that only approved friends could view it. Adolescents express concern over automatic monitoring of content on social media sites such as Facebook (Van Royen, Poels, & Vandebosch, 2016). While adolescents do report they are in favor of automatic monitoring in situations they cannot solve themselves, like when a peer is in danger of hurting him or herself, adolescents also express worry automatic monitoring will limit their freedom online. Also of concern is commercial monitoring of online content; adolescents, especially those with high privacy concern, report skepticism over targeted ads on social media sites (Zarouali, Ponnet, Walrave & Poels, 2017).

In addition, as Social Networking Sites increase in popularity, adolescents may become more cognizant of what types of information are appropriate to be posted online. A study of the once-popular Social Networking Site MySpace found that 85% of youth in 2009 chose to at least partially restrict access to their profile (this number was up from 39.1% in 2006) (Patchin & Hinduja, 2010). Adolescents’ MySpace profiles in 2009 were less likely to include pictures of the profile holder or friends in swimsuits or underwear.
and less likely to provide references to tobacco or alcohol use. This indicates that, as society becomes more accustomed to digital communications and networked technologies, adolescents are becoming savvier to the type of information they place online. Some evidence also indicates adolescents are less willing than adults to share information online; this may be because adolescents are more accustomed to Social Networking Sites and more aware of the negative ramifications of posting information online (Moscardelli & Divine, 2007). Psychological research has only just begun to examine why adolescents choose to place potentially sensitive information online and how this may differ from adults’ reasoning about privacy expectations.

Social media developers have attempted to attract users with the promise of privacy and secrecy. Snapchat, for example, was a social media platform initially marketed as a way to protect your privacy: users could share photo messages with other users, but the photo messages would disappear after a short period of time (Neeves, 2017). But the claims of privacy may have been a false sense of security, as users developed ways to save snaps received from other users, and Snapchat itself admitted it only deletes the messages “most of the time.” Snapchat, like other platforms, is not immune to hacking or other privacy leaks. This platform, and others that aim to enhance the feeling that your information is “safe,” may encourage users to continue sharing information without thinking about the possible ramifications. Future research can explore how privacy protections on social media platforms may change privacy expectations.

Another potential factor in adolescents’ willingness to share information may be perceptions of risk of sharing such information. Evidence demonstrates adolescents do
evaluate the risks and benefits of sharing information online and that this relates to disclosing information online. Adolescents who perceive risks associated with publicly posting identifying information on a Social Networking Site profile are less likely to provide such info (Youn, 2005). Similarly, adolescents who perceive benefits associated with sharing information, such as peer acceptance, are more likely to publicly provide information. Adolescents who report a greater need for popularity and less awareness of the consequences of disclosure are more likely to disclose personally identifying information (Christofides, Muise, & Desmarais, 2012b). Adolescents who were less willing to provide information publicly engaged in coping behaviors such as providing inaccurate or incomplete information (Youn, 2005). There may also be gender differences with willingness to post information online: girls perceive privacy risks to be more severe, while boys are more likely to read unsolicited email and place information online by registering for websites (Youn & Hall, 2008).

Individual differences may play a role in adolescents’ privacy-protecting behaviors. Adolescents use a combination of three strategies to protect the information on-line: limiting the data posted, using privacy settings, and managing their audience (Heriman et. al, 2016). According to Heriman and colleagues, adolescents first decide what content they want to post, then choose their audience and privacy settings. In a study of adolescents 12 to 18 years of age, adolescents who disclose more data online also had more friends than those who disclose less data online. While the researchers hypothesized the opposite finding—theorizing adolescents who post a lot of content would limit their audience due to privacy concerns—they reasoned the link between data disclosed and number of friends could be because users who post more data online are
more attractive to have as friends, so more people seek to add them to their social circle. Additionally, only 5% of the study used customized privacy settings, and users who had been using social media longer used fewer privacy-protecting privacy settings. Again, this was a surprising finding for the researchers, who had assumed users with more experience with social media would be more aware of the dangers of posting public content, and more aware of how to set their privacy settings.

Though research is just beginning to examine adolescents’ privacy concerns online, decades of research has examined how adolescents’ view privacy in their family. As technology and expectations evolve, privacy expectations in the home may be relevant in examining privacy expectations on-line.

**Parenting and Adolescents’ Expectations of Privacy**

Social Domain Theory (Turiel, 1983) proposes individuals make social judgments by evaluating the domain in which the action occurs. Adolescents view parental authority differently when the authority is exercised in different domains: moral, conventional, psychological, personal, and prudential (Smetana, 1988). Domains may also be multifaceted, meaning they involve issues in more than one domain. The moral domain involves issues of fairness, justice, rights, and general welfare. The conventional domain is concerned with arbitrary and agreed-upon behavioral conventions that structure social interactions. In contrast, the psychological domain involves more personal issues and individual discretion. Personal issues are those that only have consequences to the person who is involved (Nucci, 1981), while prudential issues pertain to safety and health (Nucci & Lee, 1993). While some research has identified a shift in adolescence from unilateral parental authority to a more reciprocal relationship (Youniss & Smollar, 1985),
research from a domain perspective focuses on how this shift occurs in some domains but not others.

Smetana and Asquith (1994) examined how adolescents and their parents view parental authority in moral, conventional, personal, prudential, multifaceted (containing multiple domains), and friendship domains. Sixty-eight sixth, eight, and tenth graders, and their parents, evaluated hypothetical parent-child interactions in each of the domains. For each situation, participants indicated whether they thought it was appropriate for the parent to make a rule about such a situation and whether there was an obligation for the parent to make a rule about such a situation. Adolescent participants indicated whether they would feel obligated to obey a parent’s rule in such a situation. Participants also indicated if the wrongness of the child’s act was contingent upon whether or not the parents had previously made a rule forbidding that act and provided justifications for the act’s wrongness or permissibility.

Both adolescent participants and their parents viewed all issues except personal issues (for example, what the child wears to school or with whom the child hangs out) as legitimately subject to parental authority, and most participants stated they thought parents had an obligation to make rules about moral issues, but not personal issues (Smetana & Asquith, 1994). Parent participants viewed all issues as more legitimately subject to parental jurisdiction than adolescent participants. In addition, results indicated there was a shift in views of legitimate parental authority with age. Adolescents in sixth and eighth grades, and their parents, viewed personal issues as more legitimately subject to parental authority than did adolescents in tenth grade and their parents. Sixth graders also saw obedience to personal rules as more obligatory than older participants. It is clear
from research findings that opinions on legitimacy of parental authority vary for different domains, and these views change with the age of the adolescent.

Smetana (1995) examined the relationship between parenting style and views of the legitimacy of parental authority in the various domains in 110 sixth, eighth, and tenth graders and their parents. Participants evaluated the legitimacy of parental authority in each of the domains, reported the parents’ parenting style using the Parental Authority Questionnaire (Buri, 1989), and assessed family conflict and decision making. Adolescents rated their parents as both more permissive and more authoritarian than their parents did, while parents viewed themselves as more authoritative than did adolescents (Smetana, 1995). Parents who were rated as more authoritarian and authoritative judged all domains as more legitimately subject to parental authority and stated parents have more of an obligation to make rules. Parents with different parenting styles also viewed the domains differently. Permissive parents viewed issues that fell within the conventional domain as more like personal issues outside of legitimate parental authority. Authoritative parents maintained clear boundaries between moral, conventional, and personal issues, and gave their adolescent children autonomy over a limited range of personal issues but not over multifaceted, friendship, or prudential issues.

Parental authority differs in the various domains for much younger children as well. Mothers of five- and seven-year-olds also recognize that parental authority should be exercised in some domains but not others (Nucci & Smetana, 1996). Mothers of young children rate moral, conventional and prudential items as issues that the mothers should control, but leave personal items up to the child. Mothers report setting limits on items that cause safety issues, issues of family conventions, and daily routines. In
contrast, mothers let their children make decisions about food, recreational activities, clothes, and playmates. This is one way parents help their children to develop autonomy and competence, even at very young ages.

Conceptions of legitimacy of authority depending on domain have been extended outside the family as well (Smetana & Bitz, 1996). Adolescents view moral, conventional and prudential issues as legitimately subject to teachers’ authority, while personal issues are outside of teachers’ authority. Younger children (fifth graders) judge all types of acts as more legitimately subject to teachers’ authority, while older adolescents are more likely to view personal issues such as with whom to associate as outside the bounds of school authority. Perceptions of legitimacy of school authority may develop parallel to perceptions of parental authority.

A consistent body of research has demonstrated parents and adolescents view the legitimacy of parental authority differently depending on the domain in which the authority is exercised. This may extend to adolescents’ expectations of privacy in on-line communications. Adolescents may use similar domains when creating their expectations of privacy from government actors. For instance, adolescents may view intrusions into certain domains, such as conventional or prudential, as not violating their privacy because these are domains where government actors legitimately have authority. But intrusions into other domains, including personal, may be viewed as more intruding into privacy because adolescents do not view government actors as having authority. In addition to this, adolescents manage the information that they share with their parents in different domains to control what parents know about their behaviors.
Adolescent information management in different domains. Parental monitoring, which involves parents knowing where their children are, who they are with, and what they are doing, is associated with fewer problems in adolescence, especially when the child voluntarily discloses information (Dishion & McMahon, 1998) and becomes even more important as youth spend more time with their peers instead of their parents (Larson, Richards, Moneta, Holmbeck, & Duckett, 1996). Waizenhofer, Buchanan and Jackson-Newsom (2004) differentiated between active and passive parental monitoring. Active monitoring includes actively seeking out information and participating in a child’s activities, while passive monitoring involves letting others come to the parent with information. Active monitoring is associated with better adolescent adjustment and better parent-child relationships.

In general, adolescents are only willing to disclose a moderate amount of information to their parents (Smetana, Villalobos, Tasopoulos-Chan, Gettman, & Campione-Barr, 2009). Adolescents’ willingness to disclose information is related to their beliefs regarding the legitimacy of parental authority (Smetana, Metzger, Gettman, & Campione-Barr, 2006). Adolescents feel more obligated to tell parents information about prudential behaviors and less obligated to tell parents information about personal behaviors. In addition, as adolescents grow older, they rate parents’ authority as less legitimate and were less likely to disclose information in all domains.

Adolescents’ reasons for not disclosing to their parents also differ by domain (Smetana et al., 2009). Adolescents state they do not disclose prudential information when they fear parental disapproval or punishment, but do not disclose peer or multifaceted issues when they view the issues as not causing harm or as personal matters.
One common strategy for minimizing the amount of information parents know is to tell parents some details, but not all of the important information. Adolescents do not report frequently lying to their parents.

Parents’ reactions to their children’s disclosures affect the children’s later disclosures (Tilton-Weaver et al., 2010). A longitudinal study of adolescents ages 13 to 15 found parents’ negative reactions to disclosures were related to adolescents feeling over-controlled and decreased disclosure over time. Youths who reported feeling over-controlled were less likely to disclose as they got older. In addition, adolescents’ clear communication to their mothers and mothers’ receptiveness to that communication in a structured laboratory task were associated with a higher rate reported disclosure than adolescents’ who do not clearly communicate with their mothers or with mothers who do not clearly exhibit receptiveness to that communication (Rote, Smetana, Campione-Barr, Vollalobos & Tasopoulos-Chan, 2012). Parental reactions, then, greatly affect how much information children choose to disclose to their parents.

The summarized research explores how adolescents control what information their parents receive and how this information management differs among domains. Adolescents may similarly manage information online in different ways depending on the domain. Another important consideration is how adolescents react when they perceive invasions of their privacy. Adolescents may feel parents are invading their privacy when the parents know information that the adolescents did not disclose, and this may impact the parent-child relationship.

One challenge facing families is how to manage privacy (Petronio, 2010). Parents must navigate between seeking necessary information from their adolescent children and
allowing them a sense of privacy that is important to their development (Blasi & Milton, 1991). Significant parent-child conflict may occur when adolescents perceive that their parents have violated their privacy. Hawk, Keijzers, Hale and Meeus (2009) interviewed adolescents and their parents over three time periods. Family conflict was related to parental privacy invasions as reported by adolescents. In addition, the research uncovered a reciprocal relationship between perceived privacy invasions and conflict: perceived privacy invasions led to increase reported conflict at later time periods; at the same time, conflict led to later perceived privacy invasions. Similarly, solicitations from parents about information lead to greater perceived privacy invasions (Hawk, Hale, Raaijmakers, & Meeus, 2008). Parental solicitation and parental control may not lead to its desired effect: greater perceived privacy invasion leads to less parental knowledge about the adolescents’ behaviors than prior to the perceived invasion (Hawk et al., 2013).

It is clear from previous research that adolescents’ and parents’ views of legitimacy of authority and adolescents’ disclosures vary by domain. In addition, adolescents view solicitations from their parents as violating their privacy. However, this research on the legitimacy of parental authority and disclosures has not yet been extended to a relatively new and constantly evolving arena: digital communications.

**Parents’ socialization of adolescents’ privacy expectations.** Parents may play an important role in teaching adolescents about privacy risks online. Parents report a higher level of concern with their adolescent child’s privacy online than do adolescents (Fent & Xie, 2014). But parents with a higher reported level of concern tend to have a child who also reports a higher level of concern with privacy than children with parents who report a low level of concern. Because parents’ privacy concerns are correlated with
their children’s privacy concerns, it seems clear that parents play an important role in shaping their children’s online behaviors. Ward (1974) identifies a consumer socialization process by which individuals learn the skills, knowledge, and attitudes that shape their behaviors as a consumer.

Similar to the above discussion about methods for obtaining information about children, parents can mediate with their children’s Internet behaviors either actively (by taking active steps to find out information and to make rules) or passively (by letting others come to them with information). Active mediation directly decreases adolescents’ disclosure of personally identifying information online (Liu, Ang & Lwin, 2013). Active mediation also increases adolescents’ privacy concern, which in turn decreases adolescents’ disclosure of information.

An important aspect of consumer socialization is communications from parents, which can be classified as either socio-oriented communications (those that emphasize deference and obedience to authority) or concept-oriented communications (those that encourage children to develop and express their own views and include reciprocal discussions) (Moscardelli & Devine, 2007). This dichotomy mirrors that of protectionist and personhood legal theories: protectionist theorists might encourage socio-oriented communications to protect children from online dangers, while personhood theorists would support concept-oriented communications that help develop and nurture adolescents’ decision-making capacities and respect the decisions adolescents make.

Concept-oriented communications lead to increased privacy concerns among adolescents, but socio-emotional communications do not impact privacy concerns (Moscardelli & Devine, 2007). In addition, parents can influence their children’s online behaviors.
behaviors by taking steps to mediate their child’s communications online, such as by making rules about the Internet, co-surfing (surfing the Internet with their child) or discussing privacy issues with their children. Parents who engage in discussions with their child about the Internet and co-surf the Internet with their child have adolescent children who have higher levels of concern about their privacy online than those without parents who similarly monitor their child’s online behavior; however, making rules regarding privacy on the Internet was not related to increased privacy concerns among adolescents (Youn, 2008).

Like the two methods for obtaining information about children, parents can mediate with their children’s Internet behaviors either actively (by taking active steps to find out information and to make rules) or passively (by letting others come to them with information). Active mediation directly decreases adolescents’ disclosure of personally identifying information online (Liu, Ang & Lwin, 2013). Active mediation also increases adolescents’ privacy concern, which in turn decreases adolescents’ disclosure of information.

In general, it appears parent-child relationships can help shape expectations of privacy and information management within the family. No known research has examined how these factors may play a role in shaping expectations of privacy and information management outside the family, particularly on the Internet. Research also identifies important factors such as age and perceptions of risk that play a role in privacy protecting behaviors on the Internet. The next section discusses how adolescents’ risk perception and decision-making abilities change with age, and how this may play a role in developing expectations of privacy.
Decision-making Theories and the Fourth Amendment

Fourth Amendment cases and legal discussion often make assumptions about adolescents’ decision-making capabilities. For example, the Eleventh Circuit reasoned that even very young children have a sense of privacy expectations, even if they do not have the same agency over property as adults (Lenz v. Winburn, 1995). However, the Eleventh Circuit did not cite any research or amicus briefs in support of this contention, and relied primarily on the intuition and personal experiences of the judges. An examination of the applicable theories is helpful to determine how adolescents may be evaluating searches and seizures.

Adolescent legal decision making. As discussed in Part I, adolescents have the legal ability to make decisions regarding their legal rights. Psychological research has examined adolescents’ legal decisions, primarily in the area of health care decision, confessions, and attorney-client relationships. Such research provides courts with valuable information on what types of decisions, and under what circumstances, adolescents can adequately reason through decisions.

Adolescent health care decision making. One area where courts and policymakers especially struggle with balancing protectionism and personhood theories is that of adolescent decision making regarding health care decisions. As discussed in Part I, adolescents’ decisions regarding health care are respected in certain situations, including abortion (Bellotti v. Baird, 1979) or (rarely) end-of-life care (In re E.G., 1989). Medical scholars also struggle with balancing policies that protect adolescents from harm by allowing for decisions to be made by parents or other adults with expanding participation in decisions for at least mature adolescents (Piker, 2011). Psychological
research has examined how adolescents reason through these types of decisions and how these decisions differ from those of adults.

One area of interest for both legal and psychological scholars is the competence of adolescents seeking an abortion. Ambuel and Rappaport (1992) interviewed 75 female adolescents seeking a pregnancy test at a medical clinic and evaluated them on measures of cognitive and social decision making. The adolescents ages 16-17 all performed similarly to young adults ages 18-21 from the same population on measures of volition (the degree to which their decision appeared to be voluntary), consideration of consequences, richness (the amount of distinct factors taken into consideration), and overall global quality of reasoning. Adolescents ages 15 and younger, however, expressed a different pattern. Those adolescents 15 and younger who reported considering an abortion performed similarly as older adolescents and young adults, while those adolescents 15 and younger who reported not considering an abortion scored lower than older adolescents and young adults on measures of volition, consideration of consequences, and overall global quality of reasoning. The authors interpreted these results to indicate that adolescents’ do have the cognitive capacity to make decisions regarding abortion, but that certain adolescents may still benefit from consulting with peers and adults.

Individuals must provide informed consent to medical treatment, and research has indicated that adolescents as young as 14 reason through medical decisions similarly as adults (Weithorn & Campbell, 1982). Comparing adolescents to their parents, adolescents may focus more on the immediate effects of treatment and their quality of life, while their parents focus more on long-term impacts (Lipstein, Dodds, Lovell,
Fourteen-year-old participants presented with vignettes involving health care decisions for diseases such as diabetes showed evidence of understanding, rational reasoning, ability to choose, and a reasonable outcome that mirrored that of 18-year-olds and 21-year-olds. Other research (e.g. Koocher & DeMaso, 1990) has also found that around age 14, adolescents are competent to make decisions regarding their medical care; some commentators have argued that this research indicates adolescents ages 14 and older should be more involved in the informed consent process prior to treatment (Schachter, Kleiman, & Harvey, 2005).

A more complicated issue surrounds allowing adolescents to make decisions regarding end-of-life care. At least one state, Illinois, has recognized a “mature minor” exception that allows older adolescents who demonstrate the capacity to reason to make decisions regarding their end-of-life care, including to refuse treatment (In re E.G., 1989). Adolescent cancer survivors generally support allowing adolescents to make decisions regarding pain alleviation and the decision to withdraw from treatment, particularly where adolescents are diagnosed with a terminal disease (Poussett et. al., 2009). Research on actual end-of-life decisions from adolescents is difficult to conduct, but some commentators argue for allowing more adolescent participation in medical decisions in terminal situations, potentially with the aid of an advance care planning document (Wiener et. al., 2008).

Medical decision making is one area where psychological researchers have examined adolescents’ capacity to make decisions. Some policymakers have used this research to create a framework where adolescents are more involved in the decision making process regarding their health care. Similarly, psychological research has
examined how adolescents reason through a different type of important decision: decisions that impact their rights under criminal procedure laws.

**Adolescent decision making and Miranda Rights.** The Supreme Court has recognized the holding in *Miranda* (suspects in custodial interrogation must be informed of their rights) applies to adolescents (*Fare v. Michael C.*, 1979). However, psychological research has examined whether adolescents can properly understand those rights and reason through decisions regarding them. Grisso (1981) demonstrated adolescents fourteen and younger have particularly poor understanding of the core Miranda rights (e.g., the right to remain silent, anything you say will be held against you, the right to an attorney, the right to have an attorney appointed, and the right to stop questioning at any time). Older adolescents, however, comprehended Miranda rights at a level similar to that of adults.

Using a Canadian sample, Abromovitch, Peterson-Badali, and Rohan (1995) found most adolescents did comprehend the right to an attorney and the right to remain silent. Adolescent participants were more likely to say they would invoke the right to counsel than would invoke the right to silence. Adolescents reported they would assert the right to counsel at about the same rate adults did. Adolescents were more likely to request counsel when presented with a vignette in which the character was innocent, while adults were more likely to request counsel when the character was guilty in the vignette. Abromovitch and colleagues hypothesized that these findings are evidence that adults have a better understanding of the role of defense counsel. Older adolescents reported they would request counsel at a similar rate (56%) as adults (60%), but only 44% of young adolescents would assert their right to counsel. While younger adolescents
demonstrate particularly poor understanding and decision making in an interrogation setting, older adolescents’ decisions are more similar to those of adults.

Adolescents may not feel that assertion of their rights is voluntary. Ferguson and Douglas (1970) interviewed 90 fourteen-year-old boys who had recently been adjudicated delinquent. Most participants were aware of their right to remain silent, but 29% reported that they felt like they had to talk to police when arrested. Sixty percent of the participants stated it would harm their case if they remained silent and 74% felt that it would help them if they spoke to the police. Fifty-five percent of the sample reported that the arresting officer told them that talking would help their case. Even if adolescents do comprehend their legal rights, they may not feel that they are free to exercise them.

Researchers have also used vignettes to determine under what circumstances adolescents would confess in an interrogation. Vignette studies present adolescents with a fictional scenario and ask them how they would react in that scenario. More adolescents age 11-13 report they would confess in an interrogation (50%) and accept a plea deal (70%) than adults (20% would confess and 50% would accept the plea) (Grisso et. al., 2003). Younger adolescents in particular report they would react differently in an interrogation scenario while older adolescents would make similar decisions as adults.

Other researchers have interviewed juvenile offenders for reports of how they react in interrogations. Viljoen, Klaver and Roesch (2005) interviewed 152 juvenile offenders in pre-trial detention regarding their recent interrogations. Three-quarters of the juveniles reported that they had been questioned regarding the offense; of these, slightly over half were reported being worried. Only 13% of juvenile offenders reported that they invoked their right to remain silent in their interrogation, and only 7.7% of
juvenile offenders fourteen and younger did so. Fifty-five percent of the juveniles reported confessing to the offense; nine participants (5.9%) reported falsely confessing to the police. Less than 10% of juvenile offenders requested an attorney, and only one in the sample (.9%) reported having counsel present. Fifty-two percent reported they were pleading guilty to the offenses, and sixty-six percent of the total sample reported they would accept a plea bargain if offered.

Research has explored adolescent’s competencies in regards to legal decision making in general. In an examination of 152 juvenile offenders age 11-17, Viljoen and Roesch (2005) found that legal capacities increased with age. Viljoen and Roesch assessed legal capacity using the Fitness Interview Test, Revised Edition (Roesch et. al., 1998) (a semi-structured clinical interview originally designed to measure competency to stand trial in adults) and the Grisso’s Miranda Scales (Grisso, 1998), a series of scales that measure participant’s understanding and comprehension of basic legal rights. Older offenders had higher scores on these legal capacity measures (Viljoen & Roesch, 2005). Cognitive abilities significantly predict legal capabilities, particularly understanding of Miranda rights, appreciation of adjudicative processes, and communication with counsel.

Legal capacities are also related to other individual differences. Intelligence, particularly verbal ability, is related to adjudicative competence and comprehension of Miranda rights (Viljoen & Roesch, 2005). Prior contact with the police is generally not related to better comprehension of legal rights (Grisso, 1997), but prior arrests may be related to appreciation of the right to counsel and adjudicative competency (Viljoen & Roesch, 2005). Contact with an attorney may help to improve various legal capacities regarding interrogation and adjudication. Individuals from low socioeconomic status
backgrounds have lower scores on legal competencies, especially understanding and comprehension of legal rights.

Adolescents are more likely than adults to confess to a crime they did not commit (Redlich & Goodman, 2003). Gross and Shaffer (2012) examined the National Registry of Exonerations and found 11% of adult exonerations involved a false confession, but more than three times that, 38%, of juvenile exonerations involved a false confession. In a laboratory experiment, participants were asked to take the blame for a confederate who had been caught cheating (Pimental, Arndorfer, & Malloy, 2015). While a significant proportion of adult participants signed a false confession (39%) an even greater proportion, 59%, of adolescent participants did so.

Grisso (1981) observed 390 police interrogations of juvenile suspects where the juvenile’s parents were statutorily required to be present. Parents did not communicate at all with their children in 66% of these interrogation. In addition, less than 10% of the juveniles turned to their parents for advice. Viljoen, Klaver and Roesch (2005) interviewed juvenile offenders regarding their recent police interrogations. One-quarter of the offenders reported having one or more parent present for the interrogation; all of them stated that they did not specifically ask for their parent to be present. Forty percent of these juveniles reported they were not aware of what their parents wanted them to do; of those that were aware, most thought their parents wanted them to confess (55.6%) or to tell the truth (33.3%). Only two juveniles (11.1%) thought their parents wanted them to deny the offense. This type of research indicates that parents may not always adequately help their children in the police interrogation setting, whether because they are unable, unwilling, or their children do not want their help. Even when parents are
physically present for interrogations, they do not always participate or make their advice clear to their children.

Adults are often not fully aware of their own or their children’s legal rights. Woolard and colleagues (2008) compared parent’s understanding of legal rights in an interrogation with that of their adolescent child’s. While parents had better knowledge of their Miranda rights and the behavioral implications of those rights, parents were not any more knowledgeable of police practices. For example, 90% of adults and 95% of adolescents wrongly believed that police must identify whether the juvenile is a suspect or a witness, 2/3 of parents and half of the adolescents wrongly believed that the police must always wait for the parent to be present before interrogating the adolescent, and 50% of both parents and adolescents wrongly believed that police could not lie in an interrogation. Thus, even when parents are physically present, they may not know enough to adequately protect their child’s rights.

Development of risk taking and decision making in adolescence could help explain why adolescents exhibit less knowledge of their legal rights. If adolescents do exhibit different expectations of privacy than adults, it could be due to how they evaluate risks and rewards. One difficulty in extrapolating research findings to real-world decisions is that much research examines knowledge and decision making in a low-risk, low-emotion setting in which the individual has ample time to consider his or her options. Instead, the decision to confess and to waive one’s rights are actually made in a very high-risk, high-emotion, time sensitive situation. The next section discusses a developmental model of adolescent risk-taking and decision making models that could be
why adolescents’ decisions regarding their legal rights and evaluations of privacy differ from those of adults.

**Dual Systems Model of Adolescent Risk-taking**

Steinberg’s (2010) Dual Systems Model of Adolescent Risk-Taking differentiates between two systems in the brain: the incentive processing system and the cognitive control system. The incentive processing system involves the valuation and prediction of rewards and punishments. This theory is based on developmental neuroscience research that identified two separate systems at work in adolescent risk-taking (Casey, Getz, & Galvan, 2008; Steinberg, 2008). The “socioemotional” system (or incentive processing system) is located in the limbic and paralimbic brain areas and involves the amygdala, ventral striatum, orbitofrontal cortex, medial prefrontal cortex, and superior temporal sulcus. The “cognitive control” system consists of the prefrontal and parietal cortices and related parts of anterior cingulate cortex.

Steinberg (2010) connected adolescent risk-taking behaviors to an increase in dopamine activity in the socioemotional system beginning around puberty. This leads to an increased attentiveness to rewards, increased sensation seeking, and heightened emotional arousal. When this system is at its peak, adolescents may focus more on short term rewards and ignore long term consequences.

In contrast, the cognitive control system involves impulse control, foresight, and future planning (Steinberg, 2010). This system matures gradually throughout adolescence, unlike the abrupt increase and then drop off seen with the incentive processing system. Around age sixteen, the incentive processing system is at its most active point, while the cognitive control system is not yet fully matured. Steinberg
(2010) identifies a temporal gap between the incentive processing system, which develops early in adolescence, and the cognitive control system, which fully matures much later, that makes adolescence a particularly vulnerable time for risk-taking behaviors. This period of vulnerability coincides with an increase of risk-taking behaviors such as delinquency and reckless driving (Steinberg, 2008); these behaviors then decrease in early adulthood. Subsequent research has demonstrated a link between reward seeking, cognitive control, and sexual behaviors in adolescence (Wasserman, Crockett & Hoffman, 2017), and an association with the gap between sensation seeking and impulsivity and juvenile deviant behaviors (Vazsonyi & Ksinan, 2017).

Steinberg (2010) empirically tested the development of the reward-processing and impulse control systems. Steinberg collected data on 935 individuals ages 10 to 30. Participants completed self-report measures of reward-seeking (Sensation Seeking Scale; Zuckerman, Eysenck & Eysenck, 1978) and impulsivity (Barratt Impulsiveness Scale, Patton & Stanford, 1995), a behavioral measure of impulsivity (the Tower of London task), and a behavioral measure of reward-seeking (an adapted version of the Iowa Gambling Task, described in detail below). Consistent with the hypothesis of the Dual Systems Model, Steinberg observed an increase in reward-seeking in the early part of adolescence, which then declined starting around age sixteen. Impulsivity, in contrast, declined throughout adolescence. This pattern was displayed in both the self-report measures and the behavioral measures of these constructs.

Longitudinal studies of adolescents also demonstrate the period of vulnerability (Harden & Tucker-Drob, 2011). Harden and Tucker-Drob measured self-reported reward-seeking and impulsivity in a sample from the National Longitudinal Study of
Youth, Children and Young Adults. Consistent with Steinberg’s (2010) cross-sectional research, mean levels of self-reported impulsivity declined from ages 12-24, but mean levels of self-reported reward-seeking increased from ages 12-16 before gradually declining through age 24 (Harden & Tucker-Drob, 2011). This longitudinal data also showed significant individual differences in the changes in self-reported impulsivity and reward-seeking. While most adolescents did follow the general trend, the magnitude of the developmental changes differed between individuals. In addition, the correlation between individual differences in changes in self-reported impulsivity and individual differences in changes in self-reported reward-seeking was not statistically significant, indicating that the two systems develop independently from one another. Longitudinal research has also identified sex differences in the development of the dual systems; female participants are higher in impulse control and lower in sensation-seeking than same-age male participants throughout adolescence and early adulthood (Shulman, Harden & Steinberg, 2014). Sex differences in impulsivity and sensation-seeking increased with age, and females tended to reach the peak sensation-seeking behaviors around age 16-17, while males tended to reach the peak sensation-seeking around age 18-19.

“Hot” vs. “cold” decision making: Empirically studying the Dual Systems Model. One way researchers measure decision making in the lab is the Iowa Gambling Task (Bechara, Damasio, Damasio & Anderson, 1994; Cauffman et. al., 2010). The Iowa Gambling Task is a computerized task where participants are presented with four decks of cards and aim to get as much “money” as possible. Participants must choose a card from one of the decks; the card will either add or take away simulated money. Two of the
decks are “good” decks in that they lead to gains over the course of many trials, while the other two decks are “bad” decks and lead to overall losses. Adults demonstrate a preference for the advantageous decks over the course of many trials (Bowman & Turnbull, 2003). Young children (ages 6-12) keep a preference for the bad decks, while adolescents (ages 13-17) do learn to choose from the good decks (Crone & van der Molen, 2007). However, adolescents still do not exhibit as strong of a preference for the good decks as adults.

The Iowa Gambling Task is designed to approximate “hot” or emotional decision making, decisions that are made under time pressure and that involve considerations of risks and rewards. Performance on the IGT has been linked to risk-taking behaviors, such as smoking (Xiao, Koritzky, Johnson, & Bechara, 2013) and risky driving behaviors (Lambert, Simons-Morton, Cain, Weisz, & Cox, 2014) and has been tied to intelligence (Webb, DelDonno, & Killgore, 2014). Poor performance on the IGT in adolescence may be linked to increased impulsivity; Smith, Ziao and Bechara (2012) found that individuals who fail to exhibit a preference for the advantageous decks on the IGT had significantly faster response times when choosing a “bad” deck than individuals who perform advantageously. Response times on the IGT get faster throughout middle adolescence, which supports the theory that reward-seeking peaks during adolescence and impulsivity generally declines. In addition, adolescents’ poor performance may be due to their increased sensation seeking and sensitivity to rewards (Singh, 2013).

Different decision-making tasks can measure capabilities under more controlled, less emotional circumstances. The Gambling Machine Task (van Duijvenvoorde, Jansen, Visser, & Huizenga, 2010) presents participants with two different gambling machines
that differ in their frequency of loss, the amount of loss, and the amount of constant gain. Participants need to indicate which machine is more advantageous (or if they are equally advantageous). Unlike the Iowa Gambling Task, no feedback is provided to participants and gains and losses are not tracked over trials. Adolescents perform similarly to adults on such a task. While adolescents generally use one-dimensional decision rules on the Iowa Gambling Task (e.g., choosing decks that are characterized by infrequent loss), adolescents frequently employ more complicated two- or three-dimensional decision rules on the less affective Gambling Machine Task. Adolescents also differed on the complexity of decision-rules they used on the GMT, demonstrating that individual differences may be important to examine in adolescent capabilities. Similarly, providing more information about the probabilities of gains and losses on the Iowa Gambling Task can help bring adolescents’ performance close to that of adults (van Duijvenvoorde, Jansen, Bredman, & Huizenga, 2012). Thus, it may be possible to help improve adolescents’ decision making in hot circumstances by providing adolescents more information about the decision. This would not, of course, completely do away with the risk and emotion associated with the decision, but would at least provide the adolescent more time to “cool down” this hot decision. This research indicates that adolescents’ cognitive control system can utilize complicated decision-making rules but only under certain circumstances.

The Columbia Card Task (CCT) (Figner et. al., 2009) includes two types of trials: hot and cold. The hot version of the CCT allows participants to make step-wise decisions and receive feedback at every level. For example, the participant clicks on a card and immediately learns whether it is a gain or a loss; if it is a gain, the participant
immediately sees the new value of the payoff and then determines whether to continue or to end the trial. Neuroimaging studies (Aron et. al., 2004) show that this type of task activates the affective system in the brain. In contrast, the cold CCT version does not provide feedback to avoid triggering the affective system. Participants merely indicate the number of cards they wished to turn over, not which cards they would turn over. The combination of no immediate feedback and a single, final decision avoids activation of the affective system.

Adolescents demonstrate greater risk-taking (operationalized by turning over more cards) than adults in the hot version of the CCT, but not the cold (Figner et. al., 2009). It is possible that adolescents’ decision making was more influenced by the feedback than that of adults due to adolescents’ increased sensitivity to rewards. In addition, greater risk-taking was associated with less use of relevant information (such as the number of loss cards) for adolescent participants in the hot version, but not the cold. Adolescents may be less likely to use provided information in affective situations than in deliberative situations.

One potential reason adolescents demonstrate impaired capacity for “hot” decisions compared to adults could be their ability to anticipate negative outcomes (Crone & van der Molen, 2007). Crone and van der Molen examined heart rate and skin conductance in children and adolescents as they completed the Iowa Gambling Task. Improved performance on the IGT was associated with changes in heart rate and skin conductance immediately prior to choosing from a “bad” deck, and this increased with age. However, all participants, regardless of IGT performance or age, had similar heart rate and skin conductance responses immediately following a draw from a “bad” deck.
This indicates that while children and adolescents understand a negative outcome and are similarly impacted by it, children and younger adolescents do not anticipate the negative outcome the same as older adolescents or adults.

**Dual systems and legal decision making.** Steinberg and colleagues (2009) recognize that this discrepancy between the two processing systems has legal implication. The American Psychological Association wrote *amicus briefs* in two Supreme Court cases that commentators observed were conflicting: in the brief for *Roper v. Simmons* (2005), the APA argued that adolescents are developmentally immature and should not be held as culpable as adults for criminal acts, but in the brief for *Hodgson v. Minnesota* (1990), the APA claimed that adolescents are as capable as adults at making medical decisions.

According to Steinberg and colleagues (2009), these seemingly contradictory positions just reflect the fact that research has shown that adolescents are worse than adults when making “hot,” or emotional, decisions, but are as capable as adults at making “cold,” or cognitive, decisions. Arguably, adolescents’ cognitive control system is adequately developed to reason through decisions when given enough information and time to do so, while being incapable to evaluate more emotionally-involved decisions made under time pressure. The developmental gap between the incentive processing system and the cognitive control system may be responsible for the dichotomy between hot and cold decisions.

The dual systems model for adolescent risk-taking may help predict adolescent delinquent behavior (Peach & Gaultney, 2013). Data from the National Longitudinal Study of Adolescent Health on self-reported impulsivity, sensation-seeking, and
delinquent behavior was collected at three time points. The average age at the first time point was 16.0 years, 21.8 years at the second time point, and 28.4 years at the third time point. Similar to age-related differences in impulsivity and sensation-seeking, self-reported impulsivity and sensation-seeking predicted delinquent behaviors at all three waves even after controlling for age, gender, and depression. Thus, the dual systems model provides a framework for understanding one type of “hot” decision: delinquency through adolescence and adulthood. As the cognitive control system develops and sensation seeking system activity declines, delinquent behaviors also decline.

Reward appraisal may be especially important in delinquent behaviors. Shulman and Cauffman (2013) hypothesized the development gap between the two systems results in an inability to properly evaluate rewards and risks. The incentive processing system sensitizes individuals to potential rewards and the excitement of novel experiences; the sensation-seeking aspect of this system is the most active in early and middle adolescence, while the cognitive control system develops slowly and is unable to “override” the more immature incentive processing system. This may alter adolescents’ perceptions of rewards and costs of crime.

Shulman and Cauffman (2013) measured reward bias (the tendency to perceive more rewards, fewer costs, and less danger when evaluating risk-taking behaviors) and law-breaking behaviors in adolescents and young adults. Reward bias increases through early adolescence and is highest for ages 16-17, before declining through young adulthood. Self-reported delinquent behaviors is strongly associated with reward bias for adolescents, but the association is weaker for adults. The same pattern is shown when comparing court-involved youth with non-court-involved youth (the researchers used
whether an individual youth was involved in a case before the juvenile court as a proxy for delinquent behaviors). While court-involved youth showed more reward bias than non-court involved, this association was strongest for the youngest age group included (12-13 year olds) and the weakest for the oldest age group (22-24 year olds). This indicates reward bias is more related to law-breaking behaviors for early- and mid-adolescents than it is for young adults.

The above research indicates development of sensation-seeking and cognitive control system is relevant for both “hot” and “cold” decisions. Decisions relevant to the Fourth Amendment could be either hot or cold. Some empirical research on perceptions of privacy (e.g., Slobogin & Schumacher, 1993) ask participants to evaluate search scenarios in a cold, deliberative scenario; this is similar to the circumstances under which judges evaluate expectations of privacy. Other research (e.g., Groscup, Brank, & Hoetger, in progress) use methodology that sets up a time-pressured, stressed decision and thus is more comparable to an actual search. It is possible lay individuals evaluate expectations of privacy in a way that is similar to the decision to engage in law-breaking behaviors because it involves the immediate valuation of rewards and costs, and thus early- and mid-adolescents would not have the decision-making capacity to reason through the implications of violations of privacy (Shulman & Cauffman, 2013). This is in contrast to the cold, “cognitive” decisions judges and policymakers make that involve evaluating objective expectations of privacy. Further research is needed to explore how adolescents make decisions regarding their Fourth Amendment rights.
Kahneman’s Dual Systems Processing Model

Other decision-making theorists have discussed and studied different systems in decision making. Kahneman (2011) divides decision making into two systems: System 1 and System 2. Kahneman observes that social scientists often assume that humans are rational thinkers, while also recognizing that human logic is flawed and people frequently make errors in judgment. He reconciled these observations with two separate systems.

System 1 involves fast, automatic thinking. Much of System 1 thinking is developed through experience, but some skills (such as being able to recognize faces from multiple angles), may be native to human thinking (Kahneman & Frederick, 2006). Thinking under this system is often so quick people are not aware of the processes behind the thought (Kahneman, 2011). System 1 decision making often involves encoding choices in a way that disregards superficial or irrelevant features while still capturing the important and essential aspect of the choice. If the context around the decision is overly-complex or involves ambiguous circumstances, people often rely on heuristics to simplify the decision. Heuristics are decision rules that may not be optimal but are “good enough” in a given situation. Examples of heuristics that are at work in System 1 processing are the anchoring and adjustment heuristic (people rely on an initial piece of information, even when they know that information is not related to the answer), the availability heuristic (people judge the probability of an event occurring based on the ease with which examples of the event come to mind), or the representativeness heuristic (people evaluate the probability of an event or characteristic occurring based on how similar the person or situation is to a prototype of that event or characteristic). These heuristics are not “wrong” necessarily but can lead to errors in judgment.
System 2, in contrast, involves more systematic, controlled, and effortful processing (Kahneman, 2011). System 2 requires more time and mental resources to think through a problem; because of this, effortful processes can disrupt one another and cause errors in thinking. Kahneman suggests that “System 2 monitors the activities of System 1” (Kahneman, 2003), meaning that System 1 processes (and all the heuristics that go along with them) kick in when System 2 processes are disrupted. One example of the difference between System 1 and System 2 thinking is the “bat and ball problem” (Frederick, 2003). Participants are told that, together, a bat and a ball cost $1.10 and that the bat cost $1.00 more than the ball. When asked how much the ball costs, the majority of participants (50% of Princeton undergraduates and 56% of University of Michigan undergraduates) immediately give the incorrect answer of 10 cents (the correct answer is the ball cost five cents). This is an example of an immediate judgment that would involve System 1 processing. Kahneman (2003) hypothesizes that errors in the bat and ball problem would be even higher if participants’ System 2 thinking was disrupted, such as being involved in a different task.

The dual system processing model can be applied to legal decisions. Danzinger, Levav, and Avnaim-Pesso (2011) studied the parole decisions of Israeli judges and when the judges made those decisions in relation to their two daily meal breaks (a late morning snack and their lunch break). The likelihood of a favorable ruling for the prisoner requesting parole was greater at the beginning of the day or immediately following one of the meal breaks. The probability of a favorable ruling was around .65 at the beginning of the day or following a break, and declined steadily to nearly zero as the work period progressed. The probability jumped back up to .65 after the break. The authors
suggested that the results indicate that, when judges make repeated decisions, they tend to
default to the “status quo” as they get fatigued. The breaks restored the judges (either
because of eating, resting, or an improvement of mood, but the authors could not
determine which) to be able to fully use their deliberative System 2 processing. The
authors hypothesize that the same effects could be seen in other expert decision making,
such as medical and legislative decisions. The dual systems processing model may be
important in a wide range of legally relevant decisions. Specifically, subjective
expectations of privacy may involve System 1 processing, while judges and policymakers
likely use the more deliberative System 2 processing to evaluating objective and
reasonable expectations of privacy.

Kahneman’s (2011) dual systems processing model of decision making has some
overlap with Steinberg’s (2010) dual processing model of adolescent risk-taking. Both
theories identify a deliberative process that requires utilizing mental resources and
involves reasoned, effortful processing. However, Kahneman’s (2011) System 1 does not
exactly overlap with Steinberg’s (2010) incentive processing system. Kahneman’s
System 1 involves fast, automatic evaluations, while Steinberg’s incentive processing
system involves the valuation of risks and rewards. While this valuation may be
automatic and fast, Kahneman’s System 1 applies to situations that do not necessarily
involve valuation of risks and rewards. For example, the ball and bat problem previously
discussed does not involve risks or rewards but often demonstrates System 1 errors.
However, it is possible that the valuation of risks and rewards involved in the incentive
processing system occurs using System 1 thinking. Thus, many of the biases and
heuristics that Kahneman discusses may also occur when individuals evaluate the risks to a certain decision.

Like Steinberg’s (2010) Dual Systems Processing Model of Adolescent Risk-Taking, Kahneman’s (2011) dual systems processing model of decision making is applicable to adolescents’ Fourth Amendment decisions. Fourth Amendment decisions in the real world are often made in high-pressure situations without time to reason through them. Thus, subjective expectations of privacy involve System 1 thinking and individuals may resort to the “status quo”, much like the judges in Danzinger, Levav, and Avnaim-Pesso (2011). The status quo for adolescents (and, potentially, all people) may be both obedience to authority and expecting violations of privacy. This may be especially true if the adolescents are especially accustomed to sharing information with others, as evident in the research on adolescents’ privacy expectations and information management within the family. Thus, if subjective expectations of privacy are made using System 1 processing, individuals may be more likely to think that privacy invasions are reasonable.

**Applying Legal and Decision-Making Research to the Fourth Amendment**

Legal scholars and judges often struggle with balancing policies that aim to protect adolescents from harm and policies that recognize adolescents have the capacities to make certain decisions and these decisions should be respected. Psychological research has demonstrated adolescents have the cognitive ability to make certain decisions adequately, particularly those that are made in a cognitively cool setting that is not highly emotional. One way to reconcile the difference between protectionism and personhood theories is to identify the types of decisions where adolescents are more
vulnerable to harm and creating policies that protect them, while allowing adolescents to make decisions in more cognitively cold situations.

One area where psychological research can particularly help inform this tension is in Fourth Amendment decision making. The current standard of evaluating what privacy interests the Fourth Amendment protects involves an evaluation of both subjective and objective expectations of privacy. Judges may have a particularly difficult time understanding adolescents’ expectations of privacy, and psychological research can help inform that. Adolescents’ expectations of privacy may differ from those of adults for two potential reasons. One, adolescents’ decision-making capacities are still developing. Adolescents differ from adults in incentive processing and sensation-seeking, and this may impact how they evaluate expectations of privacy, especially where their cognitive control system is not yet fully developed.

In addition, current adolescents’ expectations of privacy have developed in the “Digital Age,” where digital communications and sharing of information are very common. Adolescents are growing up aware of governmental privacy intrusions; for example, in 2013, the controversial National Security Agency policy of collecting mass amounts of on-line and cellular data was revealed (Greenwald, MacAskill, & Poira, 2013). Private policies and practices may also impact development of expectations of privacy. For instance, commentators have suggested that the recently popular Elf on a Shelf fairy tale may lessen expectations of privacy (Pinto & Nemorin, 2014). Elf on a Shelf is a holiday practice where parents place a small toy elf in their home and tell their children the elf is there to observe their actions and report back each night to Santa Clause in the North Pole. Pinto and Nemorin argue that this accustoms children to
surveillance from third parties, which will translate to accepting surveillance and privacy intrusions from the government. Today’s youth are constantly surrounded by technology, such as Amazon’s Alexa or iPhone’s Siri, that is constantly watching, listening, and attempting to make their lives easier. Thus, adolescents differ from adults both in development and in experiences, and both of these factors may lead to differences in expectations of privacy.

Such differences may have important impacts on the development of Fourth Amendment jurisprudence. The reasonable expectation of privacy standard allows for Fourth Amendment protections to change over time as those expectations that society is willing to recognize as reasonable evolve. If adolescents’ expectations of privacy differ from those of adults’ due to generational differences, eventually the types of searches that are currently protected under the Fourth Amendment will change. However, if adolescents’ expectations differ more so because of developmental differences in decision making, as adolescents’ develop their expectations will look more like those of adults’, and the current Fourth Amendment protections will arguably not need to evolve.

The current dissertation has detailed several lines of social science research that have studied issues relevant to understanding adolescents’ Fourth Amendment rights, including adolescents’ privacy expectations within the family and adolescents’ risk taking and decision making. Next, the dissertation describes three studies that examine adolescents’ expectations of privacy and how those expectations differ from those of adults due to developmental or generational differences. Study 1 extends studies from Slobogin and Schumacher (1993), Blumenthal, Adya and Mogle (2009), and Fradella and colleagues (2010) to examine adolescents’ expectations of privacy and compare those
expectations to Supreme Court Fourth Amendment decisions. Study 2 measures the relationship between the sensation seeking and cognitive control systems in Steinberg’s (2010) Dual Systems Model of Adolescent Risk-taking and expectations of privacy. Lastly, Study 3 tests one hypothesis for differences between adults and adolescents on privacy protecting behaviors: perception of risk in sharing information online, as measured by physiological responses.
CHAPTER 3: EMPIRICAL EXAMINATION OF ADOLESCENTS’ REASONABLE EXPECTATIONS OF PRIVACY

Pilot Study 1: Adolescent Experiences with Searches

The first pilot study asked adolescents’ about their experiences with searches by police officers and school officials. Adolescent participants also answered questions on how they think their parents would respond if requested to consent to a search of their (the adolescent children’s) belongings.

Method.

Participants. Participants were recruited from Holmes Middle School in Livonia, MI. A teacher at the middle school forwarded an email to 68 parents of her seventh grade students that explained the opportunity for participation and provided a link to parental consent. Students of parents who consented were provided with a password to allow them access to the online study. Forty-five participants completed the survey; two participants were excluded for failing one or more of the attention checks for a total sample of 43 students (mean age = 12.2, 68.9% female).

Procedures. Participants were told that the survey examined teenagers and searches. Participants first completed the informed assent online before proceeding to the survey. The survey first collected demographic information. The next section of the survey asked participants about searches by a police officer, which excluded security officers such as at an airport. If the participant had been searched by a police officer, the participant answered questions about if they gave consent, how the search made them feel, and what exactly was searched. The participant also answered questions regarding whether they thought their parents would give police officers consent to search the
participant’s room, the participant and his or her clothing, and the participant’s cell phone (including text messages, email, and all social media accessible on the cell phone). The participant then answered the same questions regarding school officials, which includes teachers and principals but excluded police officers who came to the school.

**Results.** No participants reported being searched by a police officer; three participants (7.0%) reported being subject to a dog sniff by a police officer. Two participants reported being searched by a school official. Of these, both students reported that the school official asked them for their consent to search and both students reported consenting to the search. One student reported her consent was voluntary, while the other student reported her consent was not voluntary. No students reported being subject to a dog sniff by a school official.

Participants also reported whether they thought their parents would consent to a search of their belongings in three situations by either a teacher or a school official. Table 1 depicts participants’ responses to these questions. Participants were significantly more likely to predict that their parents would consent to a police search of their room (65.1%) or their cell phone (60.5%; $\chi^2(1) = 18.06, p = .001$) than a police pat down (48.8%; $\chi^2(1) = 10.38, p = .035$). Participants were significantly more likely to predict that their parents would consent to a teacher search of their bag (71.1%) than a teacher pat down (51.2%; $\chi^2(1) = 13.56, p < .01$) or a school official search of their cell phone (55.8%; $\chi^2(1) = 14.75, p < .01$). There was no significant differences in participants’ predictions of whether their parent would consent to a search conducted by a police officer compared to their predictions of whether their parent would consent to a search conducted by a teacher.
Table 1

Adolescents’ Predictions of Parental Consent to a Search of Their Belongings

<table>
<thead>
<tr>
<th>Search</th>
<th>Parent Consent</th>
<th>Parent Wouldn’t Consent</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police: room</td>
<td>28 (65.1%)</td>
<td>6 (14.0%)</td>
<td>9 (20.9%)</td>
</tr>
<tr>
<td>Police: pat down</td>
<td>21 (48.8%)</td>
<td>11 (25.6%)</td>
<td>11 (25.6%)</td>
</tr>
<tr>
<td>Police: cell phone</td>
<td>26 (60.5%)</td>
<td>9 (20.9%)</td>
<td>8 (18.6%)</td>
</tr>
<tr>
<td>Teacher: bag</td>
<td>31 (71.1%)</td>
<td>4 (9.3%)</td>
<td>8 (18.6%)</td>
</tr>
<tr>
<td>Teacher: pat down</td>
<td>22 (51.2%)</td>
<td>11 (25.6%)</td>
<td>10 (23.3%)</td>
</tr>
<tr>
<td>Teacher: cell phone</td>
<td>24 (55.8%)</td>
<td>8 (18.6%)</td>
<td>11 (25.6%)</td>
</tr>
</tbody>
</table>

Pilot Study 2: Parental Knowledge and Experiences with Adolescent Searches

The second pilot study was designed to measure parents’ awareness of their adolescent children’s experiences of searches by both police officers and school officials. In addition, the study asked parents how they think they would react if police officers or school officials asked for their consent to search their adolescent child or their belongings.

Method.

Participants. Participants were recruited via Amazon’s Mechanical Turk survey. Amazon Mechanical Turk “workers” that had at least a 90% approval rate for their completed surveys, had completed at least 500 surveys, and were located in the United States were eligible for the survey. Participants were not limited to any location in the United States. Participants were told that they must have at least one child between the ages of 12 and 17 to be able to participate. Two hundred and five participants completed the survey (53% female, $M$ age = 37.92). No participants had to be excluded for failing the attention checks. The average number of teenaged children the participants had was 1.79 ($SD = .68$).
**Procedures.** Participants were told that the survey was examining parent’s knowledge and decision making regarding their adolescent children and searches. Participants first completed the informed consent online before proceeding to the survey. The survey first collected demographic information, including the number, gender, and ages of children. Participants reported if they or their adolescent child had ever been arrested and, if so, for what. Participants also reported if they had ever been searched and, if so, answered questions about their perceptions of that search.

The next section of the survey informed parents that the survey was asking questions about searches of their adolescent child by a police officer, which excluded security officers such as at an airport. If the participant did know their child had been searched by a police officer, the participant answered questions about if they or the child gave consent, how they believe the search made their child feel, and what exactly was searched on their child. The participant also answered questions regarding whether they would give police officers consent to search their adolescent child’s room, their adolescent child and his or her clothing, and their adolescent’s cell phone (including text messages, email, and all social media accessible on the cell phone). The participant then answered these same questions regarding school officials, which includes teachers and principals but excluded police officers who came to the school.

**Results.** Seventeen participants (8.3%) reported that their adolescent child had experienced a search by a police officer. Most (n = 11) reported their child had only been searched once, but 6 reported their child had been searched on two different occasions. The most common items searched were the teenager’s backpack or bag (n = 13) or a pat down of the teenager’s outer clothing (n = 11). Fifteen (7.3%) participants reported that
their adolescent child had been searched by a school official. Most (n = 9, 92.7%) reported only one search, but two participants reported two searches, two reported three searches, one reported four searches, and one reported five searches. The most common item searched was the teenager’s bag or purse (n = 12, 80%). Twelve (5.9%) participants reported that a school official used a trained dog to sniff their adolescent child’s person or property.

Table 2 shows the parents’ predictions of whether they would consent to a search of their adolescent child or their adolescent child’s belongings by either a police officer or school official. Participants were significantly more likely to predict they would consent to a police search of their child’s room (28.9%) or a police pat down of their child (28.3%) than a search of their child’s cell phone (21%; $\chi^2(1) = 222.04, p < .001$; $\chi^2(1) = 140.19, p < .001$). Participants were also significantly more likely to predict they would consent to a school official’s search of their child’s bag (30.7%) than a school official pat down of their child (23.9%); $\chi^2(1) = 174.69, p < .001$; or a school official search of their child’s cell phone (21.0%; $\chi^2(1) = 113.77, p < .001$). Similarly, participants were significantly more likely to predict they would consent to a school official pat down of their child than a school official’s search of their child’s cell phone ($\chi^2(1) = 144.446, p < .001$). In addition, participants were significantly more likely to predict they would consent to a police pat down of their child than a school official pat down of their child ($\chi^2(1) = 93.76, p < .001$) and a police search of their child’s cell phone than a school official search of their child’s cell phone ($\chi^2(1) = 120.28, p < .001$).

Table 2

<table>
<thead>
<tr>
<th>Search</th>
<th>Consent</th>
<th>Wouldn’t Consent</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police: room</td>
<td>59 (28.9%)</td>
<td>131 (64.2%)</td>
<td>14 (6.9%)</td>
</tr>
</tbody>
</table>

Parents’ Predictions of Parental Consent to a Search of Their Belongings
Police: pat down 58 (28.3%) 135 (65.9%) 12 (5.9%)
Police: cell phone 43 (21.0%) 149 (72.7%) 13 (6.3%)
Teacher: bag 63 (30.7%) 118 (57.6%) 24 (11.7%)
Teacher: pat down 49 (23.9%) 140 (68.3%) 16 (7.8%)
Teacher: cell phone 28 (13.7%) 163 (79.5%) 14 (6.8%)

**Pilot Data Discussion**

The pilot data demonstrate that adolescents and parents of adolescents think very differently about searches by police officers and school officials. While a majority or near-majority of adolescents predicted their parents would consent to a search of their belongings or a pat down search, a majority of parents predicted they would *not* consent to such searches. In addition, parents of adolescents differentiated between police officers and school officials. For equivalent searches (a pat down of their child and a search of their child’s cell phone), parents were more likely to predict they would consent to the police officer search than the school official search. Adolescent participants did not show such a pattern of differentiating between consent to police officer searches and teacher searches.

There are several explanations for why the parent participants predicted they would not consent to searches while the adolescent participants predicted their parents would consent. Adolescents may expect their parents to consent to a search because they are accustomed to parents invading their privacy. Another explanation may be that adolescents and adults just think about privacy in different ways. The following three studies examine how adolescents and adults conceptualize privacy, and whether these differences are due to a generational difference or due to developmental changes in risk-taking.
Study 1: Adolescents’ Expectations of Privacy and Fourth Amendment Case Law

Study 1 extends the research of Slobogin and Schumacher (1993), Blumenthal, Adya and Mogle (2009), and Fradella and colleagues (2010) by comparing adolescent’s expectations of privacy with court rulings on reasonable expectations of privacy.

Method.

Participants. Participants are 95 adolescents ages 12 through 17 recruited from schools in the Livonia School District in Southeast Michigan. Livonia School District serves 14,880 students, 2,263 students in middle schools (grades 7-8) and 5,201 enrolled in high school (grades 9-12). Of the final sample, 32 (33.6%) were in the seventh grade, 8 (8.4%) were in the eighth grade, 0 (0.0%) were in the ninth grade, 5 (5.2%) were in the tenth grade, 12 (12.6%) were in the eleventh grade, and 38 (40.0%) were in the twelfth grade, when they completed the survey.

The majority of participants, 85 (89.5%) identified their race as White or Caucasian, 2 (2.1%) identified as Black or African American, 6 (6.3%) identified as Asian, and 2 (2.1%) identified as Hispanic. Fifty-five participants (57.9%) identified as male, and 40 (42.1%) identified as female. The mean age of participants was 14.8 (SD = 1.35), and the median age was 16.

Procedures. Parental consent was first obtained from parents via email. Livonia School District regularly collects email addresses from all parents and uses them to communicate important information. Two middle school teachers and two high school teachers forwarded an email to parents of children enrolled in their classes explaining their child’s opportunity to participate in an online study and providing a link to an online parental consent. A total of 540 parents were emailed the parental consent survey and
375 parents (69.4%) provided parental consent for their child to participate in the study. When providing consent, parents entered an email address for their adolescent child to facilitate communication directly with the child.

The 375 adolescents who had parental consent were emailed with a secure password and a link to the study. If the adolescent did not complete the survey, a follow-up email was sent one week after the initial email and two weeks after the first follow-up email. Of these 375 adolescents, 187 (49.9%) opened the provided link, 175 (46.7%) answered at least one question, and 96 participants (25.6%) completed the survey. One participant who completed the survey was excluded due to failing the attention check questions for a final sample size of 95 participants (25.3% of the contacted sample). Because demographics were not collected on the contacted sample, it is not possible to compare the demographics of those who completed the survey with those who chose not to participate.

The middle and high school teachers provided time during school and school computers for participants to complete the study. Informed assent and all study materials were completed online. Participants who completed the study received a $3.00 Amazon.com gift card via email.

**Measures.** Participants read a series of short vignettes (see Appendix A) describing searches from already-decided appellate and Supreme Court cases. The selected cases involve juveniles (e.g., the search of a purse from *New Jersey v. T.L.O.* or random drug testing from *Vernonia School District*) or scenarios that are applicable to adolescents (e.g., driving a car). Consistent with Slobogin and Schumacher (1993), participants evaluated each search from two different perspectives: a first person
perspective (e.g., the school principal searches your bag) and a third person perspective (e.g., the school principal searches a student’s bag). The twenty-four search descriptions were presented in random order.

Participants rated each search using a Likert scale (0 = not at all, 5 = extremely) on the following dimensions identified from previous research (Blumenthal et al., 2009; Fradella et al, 2010): personal nature of the item searched; intrusiveness of the search; extent of permission for the search; the extent to which the participant expected the thing or area that was searched to be private; and the extent the search violates bodily privacy, territorial privacy, informational privacy, and communications privacy. Readability statistics conducted with Microsoft Word revealed all vignettes and questions were written at a sixth grade reading level.

**Hypotheses.** It is hypothesized that, consistent with previous research (Slobogin & Schumacher, 1993; Fradella, et al., 2010) and with Steinberg’s Dual Processing Model, adolescents will mostly agree with court rulings on what areas or things should be protected by the Fourth Amendment because the decision is a cold or cognitive one separated from the actual incident. It is also hypothesized that adolescents will rate searches described in the first person as more intrusive than those described in the third person. Additionally, it is hypothesized that the dimensions identified by previous research (e.g., permission for the search, intrusiveness) will predict ratings of whether the search violates privacy.

**Results.**

*Adolescents’ ratings of searches.* Participants’ average ratings of the searches from a third-party perspective is depicted in tables three through seven. Because courts
view searches from a third-party perspective, these tables only include data on the ratings for searches presented in the third person. These tables will only provide descriptive statistics; a statistical comparison of the different searches and of first vs. third-person perspective follows in the next section.

Participants rated each search on the three domains of privacy described by Slobogin and Schumacher (1993): intrusiveness, personal nature, and consent. As shown in Table 3, participants rated the intrusiveness of a bodily search—a pat down in a school setting—as the most intrusive, most personal in nature, and the least amount of consent given. Additionally, participants consistently rated searches of information, including electronic tracking devices, cell phones, and Social Networking Sites, at or above the midpoint of the Likert scale on both intrusiveness and personal nature. In fact, participants rated a search of a cell phone by police officers \( (M = 4.23) \) and school officials \( (M = 4.22) \) as personal in nature as a pat down search by school officials \( (M = 4.23) \). Participants rated a pat down search as fairly intrusive \( (M = 4.33) \), as they did searches of a cell phone \( (M = 3.94 \text{ for a police search}; M = 4.00 \text{ for a school official search}) \), and these results indicate adolescent participants view cell phones as very personal to them.

Participants also rated the amount of consent given for a particular search. The average rating was below the midpoint on the scale for every search presented. Participants rated airport security searches as having the most consent \( (M = 2.39) \), along with a search of a bedroom with parental consent \( (M = 2.16) \). Participants rated random drug testing for students involved in extra-curricular activities \( (M = 2.10) \) as having the same level of consent as random drug testing for students involved in athletics \( (M = 1.94), \)
The Supreme Court determined a random drug testing scheme for students involved in athletics was constitutional under the Fourth Amendment, while a random drug testing scheme for students involved in extra-curricular activities was not. Also, the two searches participants rated as having the least amount of consent—a flashlight looking through a car window (M = 1.16) and a search of garbage left at the curb (M = 1.18)—are consistently found as not searches violating the Fourth Amendment under the plain view exception. This may indicate adolescents do not consider consent when evaluating privacy rights the same way adults or courts consider it.

Table 3

Adolescents’ Third Person Ratings of Searches: Slobogin and Schumacher’s Privacy Domains (0 = not at all; 5 = extremely)

<table>
<thead>
<tr>
<th>Search</th>
<th>Intrusiveness</th>
<th>Personal Nature</th>
<th>Consent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Searches</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pat down (school)</td>
<td>4.33</td>
<td>4.23</td>
<td>1.53</td>
</tr>
<tr>
<td>Backpack (school)</td>
<td>3.87</td>
<td>4.00</td>
<td>1.36</td>
</tr>
<tr>
<td>Bus passenger’s bag</td>
<td>3.58</td>
<td>3.52</td>
<td>1.65</td>
</tr>
<tr>
<td>Bedroom with parental consent</td>
<td>3.54</td>
<td>3.75</td>
<td>2.16</td>
</tr>
<tr>
<td>Blood draw</td>
<td>3.52</td>
<td>3.54</td>
<td>1.93</td>
</tr>
<tr>
<td>Plain view</td>
<td>3.41</td>
<td>3.38</td>
<td>1.40</td>
</tr>
<tr>
<td>Fingerprint student (police)</td>
<td>3.26</td>
<td>3.31</td>
<td>1.39</td>
</tr>
<tr>
<td>Drug sniff (police)</td>
<td>3.20</td>
<td>3.23</td>
<td>1.68</td>
</tr>
<tr>
<td>Drug sniff (school)</td>
<td>3.18</td>
<td>3.09</td>
<td>1.58</td>
</tr>
<tr>
<td>Random drug test (extra-curricular)</td>
<td>3.09</td>
<td>3.20</td>
<td>2.10</td>
</tr>
<tr>
<td>Curtilage of home</td>
<td>2.98</td>
<td>2.93</td>
<td>1.52</td>
</tr>
<tr>
<td>Random drug test (sports)</td>
<td>2.84</td>
<td>2.96</td>
<td>1.94</td>
</tr>
<tr>
<td>Stop and talk</td>
<td>2.70</td>
<td>2.46</td>
<td>1.82</td>
</tr>
<tr>
<td>Flashlight through car window</td>
<td>2.51</td>
<td>2.48</td>
<td>1.16</td>
</tr>
<tr>
<td>Garbage</td>
<td>2.18</td>
<td>2.11</td>
<td>1.18</td>
</tr>
<tr>
<td>Airport security</td>
<td>2.17</td>
<td>2.49</td>
<td>2.39</td>
</tr>
<tr>
<td><strong>Information Searches</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Cell phone (school)</td>
<td>4.00</td>
<td>4.22</td>
<td>1.48</td>
</tr>
<tr>
<td>Cell phone (police)</td>
<td>3.94</td>
<td>4.23</td>
<td>1.46</td>
</tr>
<tr>
<td>Diary</td>
<td>3.90</td>
<td>3.93</td>
<td>1.40</td>
</tr>
<tr>
<td>Cell phone pictures</td>
<td>3.74</td>
<td>3.88</td>
<td>1.55</td>
</tr>
<tr>
<td>Instant messages (school)</td>
<td>3.60</td>
<td>3.72</td>
<td>1.52</td>
</tr>
<tr>
<td>Electronic tracking device on car</td>
<td>3.49</td>
<td>3.38</td>
<td>1.63</td>
</tr>
<tr>
<td>Social Networking Site (school)</td>
<td>3.01</td>
<td>2.92</td>
<td>1.49</td>
</tr>
</tbody>
</table>
Table 4 compares adolescent participants’ ratings of intrusiveness of the searches with Slobogin and Schumacher’s adult participants’ ratings. These comparisons must be interpreted with caution, as there is nearly twenty-five years between the two studies and many differences in the samples beyond age. One major difference that is apparent is how participants rated a pat down search by a school official. Participants in the current study rated a pat down search as the most intrusive search presented to them ($M = 4.33$), while adult participants in Slobogin and Schumacher’s study rated the search thirtieth out of fifty searches presented. Conversely, adult participants in Slobogin and Schumacher’s study considered a stop and talk as relatively more intrusive (ranked as 15th most intrusive out of the 50 searches presented) than did adolescent participants in the current study (ranked as 20th most intrusive out of the 23 searches presented). Current adolescents may not view brief stop and talk procedures as intrusive, perhaps because they are used to being routinely questioned by adults.

On the other hand, adults in Slobogin and Schumacher’s study viewed some searches as similarly intrusive to adolescents in the current study. Both a flashlight search through a car window and airport security were ranked as relatively unintrusive in both studies, while reading a private diary ranked as relatively very intrusive. Certain types of searches—such as searches of private information—may universally be viewed as intrusive.

Like Slobogin and Schumacher (1993), current participants’ ratings of intrusiveness can be compared to how courts ruled on the same search. Notably, the three searches adolescent participants in the current study rated as most intrusive—pat down search, school official search of a cell phone, and police officer search of a cell
phone—were all determined to be an unreasonable search by the courts that evaluated them. The fourth-ranked most intrusive search (diary) was only ruled as not a Fourth Amendment violation because the search was conducted by a private actor.

On the other end of the intrusiveness spectrum, the seven searches ranked as least intrusive were all ruled by courts to be not unreasonable searches in violation of the Fourth Amendment. However, the current participants did not always agree with courts. While courts have ruled both a school official’s search of a student’s backpack with reasonable suspicion and a school official’s search of pictures on a student’s cell phone do not violate the Fourth Amendment, current participants saw these searches as fairly intrusive (ranked at 5th and 6th most intrusive, respectively). And while the Supreme Court held a school’s procedure of randomly drug testing all students involved in extra-curricular activities as violating the Fourth Amendment, current participants did not view this search as highly intrusive (ranked at 16th most intrusive out of 23). Thus, similar to Slobogin and Schumacher’s comparison of adult lay individuals to court rulings, while there seems to be agreement between adolescents and courts on the extreme ends of the intrusiveness spectrum, in the middle there is most disagreement. It is in these “gray area” cases that courts’ rulings differ the most from adolescents’ opinions.

Table 4

*Perceptions of Third-Person Searches Ranked by Intrusiveness: Comparison to Slobogin & Schumacher*

<table>
<thead>
<tr>
<th>Search</th>
<th>Intrusiveness</th>
<th>Current Rank</th>
<th>Rank in S&amp;S</th>
<th>Court Ruling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pat down (school)</td>
<td>4.33</td>
<td>1</td>
<td>30/50</td>
<td>Search</td>
</tr>
<tr>
<td>Cell phone (school)</td>
<td>4.00</td>
<td>2</td>
<td>--</td>
<td>Search</td>
</tr>
<tr>
<td>Cell phone (police)</td>
<td>3.94</td>
<td>3</td>
<td>--</td>
<td>Search</td>
</tr>
<tr>
<td>Diary</td>
<td>3.90</td>
<td>4</td>
<td>3/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Backpack (school)</td>
<td>3.87</td>
<td>5</td>
<td>10/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Cell phone pictures</td>
<td>3.74</td>
<td>6</td>
<td>--</td>
<td>Not a search</td>
</tr>
<tr>
<td>Instant messages (school)</td>
<td>3.60</td>
<td>7</td>
<td>--</td>
<td>Search</td>
</tr>
<tr>
<td>Bus passenger’s bag</td>
<td>3.58</td>
<td>8</td>
<td>7/50</td>
<td>Not a search</td>
</tr>
</tbody>
</table>
Table 5 shows participants’ ratings of each search on Fradella et. al.’s privacy domains. Some average ratings are obvious based on the description of the search; for example, the search rated highest in bodily privacy was a pat down search ($M = 4.29$). But participants also rated a cell phone search by a school official as violating bodily privacy ($M = 3.04$) and privacy of a person’s space ($M = 3.77$) — ratings comparable to the average ratings for a school official search of a backpack ($M = 3.07$ for bodily privacy and $M = 3.68$ for territorial privacy) and a drug sniff at school ($M = 3.00$ for bodily privacy and $M = 3.14$ for territorial privacy). Searches of a cell phone were rated the highest in violating privacy of information and privacy of communications (police officer search: 4.00 for informational privacy, 4.10 for communications privacy; school official search: 4.10 for information privacy, 4.08 for communications privacy). The relationship between the privacy domains and other perceptions of searches is discussed below.

Table 5

Adolescents’ Third-Person Ratings of Searches: Fradella et. al.’s Privacy Domains (0 = not at all; 5 = extremely)

<table>
<thead>
<tr>
<th>Search</th>
<th>Body</th>
<th>Terr.</th>
<th>Info.</th>
<th>Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedroom with parental consent</td>
<td>3.54</td>
<td>9</td>
<td>4/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Blood draw</td>
<td>3.52</td>
<td>10</td>
<td>5/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Electronic tracking device on car</td>
<td>3.49</td>
<td>11</td>
<td>33/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Plain view</td>
<td>3.41</td>
<td>12</td>
<td>41/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Fingerprinting student (police)</td>
<td>3.26</td>
<td>13</td>
<td>--</td>
<td>Search</td>
</tr>
<tr>
<td>Dog sniff (police)</td>
<td>3.20</td>
<td>14</td>
<td>28/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Dog sniff (school)</td>
<td>3.18</td>
<td>15</td>
<td>--</td>
<td>Not a search</td>
</tr>
<tr>
<td>Random drug test (extra-curricular)</td>
<td>3.09</td>
<td>16</td>
<td>--</td>
<td>Search</td>
</tr>
<tr>
<td>Social Networking Site (school)</td>
<td>3.01</td>
<td>17</td>
<td>--</td>
<td>Not a search</td>
</tr>
<tr>
<td>Curtilage of a home</td>
<td>2.98</td>
<td>18</td>
<td>30/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Random drug test (sports)</td>
<td>2.84</td>
<td>19</td>
<td>--</td>
<td>Not a search</td>
</tr>
<tr>
<td>Stop and talk</td>
<td>2.70</td>
<td>20</td>
<td>15/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Flashlight through car window</td>
<td>2.51</td>
<td>21</td>
<td>47/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Garbage</td>
<td>2.18</td>
<td>22</td>
<td>38/50</td>
<td>Not a search</td>
</tr>
<tr>
<td>Airport security</td>
<td>2.17</td>
<td>23</td>
<td>49/50</td>
<td>Not a search</td>
</tr>
</tbody>
</table>
**Physical Searches**

<table>
<thead>
<tr>
<th>Search</th>
<th>Expectation of Privacy</th>
<th>Violation of Privacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood draw</td>
<td>3.45</td>
<td>3.23</td>
</tr>
<tr>
<td>Backpack (school)</td>
<td>3.07</td>
<td>3.68</td>
</tr>
<tr>
<td>Pat down (school)</td>
<td>4.29</td>
<td>4.33</td>
</tr>
<tr>
<td>Random drug test (extra-curricular)</td>
<td>2.86</td>
<td>2.85</td>
</tr>
<tr>
<td>Random drug test (sports)</td>
<td>2.57</td>
<td>2.45</td>
</tr>
<tr>
<td>Plain view</td>
<td>2.71</td>
<td>3.38</td>
</tr>
<tr>
<td>Curtilage of home</td>
<td>2.09</td>
<td>3.12</td>
</tr>
<tr>
<td>Airport security</td>
<td>2.04</td>
<td>2.05</td>
</tr>
<tr>
<td>Flashlight through car window</td>
<td>2.21</td>
<td>2.50</td>
</tr>
<tr>
<td>Drug sniff (police)</td>
<td>3.16</td>
<td>3.12</td>
</tr>
<tr>
<td>Drug sniff (school)</td>
<td>3.00</td>
<td>3.14</td>
</tr>
<tr>
<td>Bedroom with parental consent</td>
<td>3.01</td>
<td>3.78</td>
</tr>
<tr>
<td>Stop and talk</td>
<td>2.13</td>
<td>2.29</td>
</tr>
<tr>
<td>Bus passenger’s bag</td>
<td>2.80</td>
<td>3.58</td>
</tr>
<tr>
<td>Garbage</td>
<td>2.00</td>
<td>2.11</td>
</tr>
<tr>
<td>Fingerprint student (police)</td>
<td>3.17</td>
<td>3.07</td>
</tr>
</tbody>
</table>

**Information Searches**

<table>
<thead>
<tr>
<th>Search</th>
<th>Expectation of Privacy</th>
<th>Violation of Privacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic tracking device on car</td>
<td>2.81</td>
<td>3.32</td>
</tr>
<tr>
<td>Cell phone (police)</td>
<td>2.96</td>
<td>3.65</td>
</tr>
<tr>
<td>Cell phone (school)</td>
<td>3.04</td>
<td>3.77</td>
</tr>
<tr>
<td>Diary</td>
<td>2.86</td>
<td>3.49</td>
</tr>
<tr>
<td>Cell phone pictures</td>
<td>2.81</td>
<td>3.56</td>
</tr>
<tr>
<td>Social Networking Site (school)</td>
<td>2.61</td>
<td>2.77</td>
</tr>
<tr>
<td>Instant messages (school)</td>
<td>2.74</td>
<td>3.51</td>
</tr>
</tbody>
</table>

Three searches were rated as the most violating of privacy: school official pat-down (\(M = 4.16\)), school official cell phone search (\(M = 4.14\)), and police officer cell phone search (\(M = 4.00\)). Airport security (\(M = 2.15\)) and a search of garbage left at the curb (\(M = 2.22\)) were the least violating of privacy. The same pattern was found for ratings of expectations of privacy.

Table 6

*Adolescents’ Third-Person Ratings of Searches: Privacy Expectations (0 = not at all; 5 = extremely)*

<table>
<thead>
<tr>
<th>Search</th>
<th>Expectation of Privacy</th>
<th>Violation of Privacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood draw</td>
<td>3.33</td>
<td>3.33</td>
</tr>
<tr>
<td>Backpack (school)</td>
<td>3.67</td>
<td>3.68</td>
</tr>
<tr>
<td>Pat down (school)</td>
<td>4.22</td>
<td>4.16</td>
</tr>
<tr>
<td>Search</td>
<td>Participant Rating</td>
<td>Average Rating</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Random drug test (extra-curricular)</td>
<td>2.83</td>
<td>2.67</td>
</tr>
<tr>
<td>Random drug test (sports)</td>
<td>2.64</td>
<td>2.63</td>
</tr>
<tr>
<td>Plain view</td>
<td>3.31</td>
<td>3.39</td>
</tr>
<tr>
<td>Curtilage of home</td>
<td>2.98</td>
<td>2.98</td>
</tr>
<tr>
<td>Airport security</td>
<td>2.13</td>
<td>2.15</td>
</tr>
<tr>
<td>Flashlight through car window</td>
<td>2.49</td>
<td>2.49</td>
</tr>
<tr>
<td>Drug sniff (police)</td>
<td>3.09</td>
<td>3.12</td>
</tr>
<tr>
<td>Drug sniff (school)</td>
<td>3.04</td>
<td>2.92</td>
</tr>
<tr>
<td>Bedroom with parental consent</td>
<td>3.78</td>
<td>3.65</td>
</tr>
<tr>
<td>Stop and talk</td>
<td>2.36</td>
<td>2.51</td>
</tr>
<tr>
<td>Bus passenger’s bag</td>
<td>3.35</td>
<td>3.42</td>
</tr>
<tr>
<td>Garbage</td>
<td>2.27</td>
<td>2.22</td>
</tr>
<tr>
<td>Fingerprint student (police)</td>
<td>3.09</td>
<td>3.16</td>
</tr>
</tbody>
</table>

**Information Searches**

<table>
<thead>
<tr>
<th>Search</th>
<th>Participant Rating</th>
<th>Average Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic tracking device on car</td>
<td>3.31</td>
<td>3.45</td>
</tr>
<tr>
<td>Cell phone (police)</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Cell phone (school)</td>
<td>4.10</td>
<td>4.14</td>
</tr>
<tr>
<td>Diary</td>
<td>3.75</td>
<td>3.70</td>
</tr>
<tr>
<td>Cell phone pictures</td>
<td>3.75</td>
<td>3.86</td>
</tr>
<tr>
<td>Social Networking Site (school)</td>
<td>2.90</td>
<td>2.82</td>
</tr>
<tr>
<td>Instant messages (school)</td>
<td>3.82</td>
<td>3.67</td>
</tr>
</tbody>
</table>

Participants also predicted how upset they would be and how upset they thought the average person their age would be if they experienced each search. Participants also rated how relieved they would be and how relieved the average person would be; however these ratings were included to not bias responses to the other questions and are not important to the current analyses. As shown in Table 7, participants consistently predicted they would be less upset than the average person their age for each of the 23 searches presented. For sixteen of the twenty-three searches, participants rated the average person would be statistically significantly more upset than they would be. There was no statistically significant difference for the searches the participants predicted they would be the most upset (pat down, cell phone search by school, cell phone search by police officer, electronic tracking device on a car, and a diary search).
Table 7

Adolescents’ Third-Person Ratings of Searches: Average Person vs. Participant (0 = not at all; 5 = extremely)

<table>
<thead>
<tr>
<th>Search</th>
<th>Upset (Avg.)</th>
<th>Upset (You)</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Searches</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood draw</td>
<td>3.44</td>
<td>3.41</td>
<td>1.96</td>
<td>.05</td>
</tr>
<tr>
<td>Backpack (school)</td>
<td>4.04</td>
<td>3.86</td>
<td>1.84</td>
<td>.07</td>
</tr>
<tr>
<td>Pat down (school)</td>
<td>4.27</td>
<td>4.26</td>
<td>-.24</td>
<td>.81</td>
</tr>
<tr>
<td>Random drug test (extra-curricular)</td>
<td>3.20</td>
<td>2.70</td>
<td>3.96</td>
<td>.00</td>
</tr>
<tr>
<td>Random drug test (sports)</td>
<td>2.95</td>
<td>2.53</td>
<td>2.78</td>
<td>.01</td>
</tr>
<tr>
<td>Plain view</td>
<td>3.54</td>
<td>3.34</td>
<td>1.92</td>
<td>.06</td>
</tr>
<tr>
<td>Curtilage of home</td>
<td>3.36</td>
<td>3.02</td>
<td>3.09</td>
<td>.00</td>
</tr>
<tr>
<td>Airport security</td>
<td>2.09</td>
<td>1.70</td>
<td>3.36</td>
<td>.00</td>
</tr>
<tr>
<td>Flashlight through car window</td>
<td>2.83</td>
<td>2.55</td>
<td>2.00</td>
<td>.05</td>
</tr>
<tr>
<td>Drug sniff (police)</td>
<td>3.45</td>
<td>3.20</td>
<td>2.39</td>
<td>.02</td>
</tr>
<tr>
<td>Drug sniff (school)</td>
<td>3.23</td>
<td>2.96</td>
<td>2.07</td>
<td>.04</td>
</tr>
<tr>
<td>Bedroom with parental consent</td>
<td>3.93</td>
<td>3.70</td>
<td>2.35</td>
<td>.02</td>
</tr>
<tr>
<td>Stop and talk</td>
<td>2.63</td>
<td>2.40</td>
<td>2.32</td>
<td>.02</td>
</tr>
<tr>
<td>Bus passenger’s bag</td>
<td>3.65</td>
<td>3.33</td>
<td>3.18</td>
<td>.00</td>
</tr>
<tr>
<td>Garbage</td>
<td>2.49</td>
<td>2.33</td>
<td>1.47</td>
<td>.15</td>
</tr>
<tr>
<td>Fingerprint student (police)</td>
<td>3.49</td>
<td>3.20</td>
<td>.34</td>
<td>.73</td>
</tr>
<tr>
<td><strong>Information Searches</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic tracking device on car</td>
<td>3.92</td>
<td>3.60</td>
<td>.81</td>
<td>.85</td>
</tr>
<tr>
<td>Cell phone (police)</td>
<td>4.11</td>
<td>3.98</td>
<td>1.60</td>
<td>.11</td>
</tr>
<tr>
<td>Cell phone (school)</td>
<td>4.08</td>
<td>3.99</td>
<td>.78</td>
<td>.44</td>
</tr>
<tr>
<td>Diary</td>
<td>3.91</td>
<td>3.82</td>
<td>.71</td>
<td>.48</td>
</tr>
<tr>
<td>Cell phone pictures</td>
<td>3.87</td>
<td>3.84</td>
<td>2.45</td>
<td>.02</td>
</tr>
<tr>
<td>Social Networking Site (school)</td>
<td>3.54</td>
<td>3.06</td>
<td>2.51</td>
<td>.01</td>
</tr>
<tr>
<td>Instant messages (school)</td>
<td>3.90</td>
<td>3.67</td>
<td>2.21</td>
<td>.03</td>
</tr>
</tbody>
</table>

Search perspective: Third vs. first person searches. Multilevel modeling (MLM) was used to examine whether adolescents’ ratings of searches presented in the first person differed from the ratings of searches presented in the third person. MLM is appropriate to use for repeated measures within individual participants to account for the nested structure of the vignettes and to test both within-subject and between-subject differences (Woltman, Feldstain, MacKay & Rocchi, 2012). MLM accounts for the interdependence of ratings of vignettes within each participant. Further, vignette
characteristics (first person vs. third person) can be examined as within-subject predictors of outcome ratings. The model was specified as followed:

**Level 1:** $Y_{ij}$ (outcome rating) = $\beta_{0j} + \beta_{1j}$ (vignette characteristic) + $r_{ij}$

**Level 2:** $\beta_{0j} = \gamma_{00} + \mu_{0j}$

$\beta_{1j} = \gamma_{10} + \mu_{1j}$

where $Y_{ij}$ represents scores on the outcome variable for vignette $i$ by respondent $j$; $\beta_{0j}$ represents the intercept of respondent $j$ (i.e., the average rating across vignettes); $\beta_{1j}$ represents the degree to which ratings vary as a function of vignette characteristic (first-person=0, third-person=1); and $r_{ij}$ represents random error for individual $j$. Coefficients can be understood as functionally similar to unstandardized regression coefficients, and they represent the degree of association between two variables. All Level 1 parameters include a constant and a unique error term (at Level 2).

Separate models were tested for each of the following individual outcome variables: intrusiveness, violations of privacy, and expectations of privacy. It was hypothesized there would be a negative slope coefficient for $\beta_{1j}$ suggesting that first-person vignettes are rated with higher scores of intrusiveness, violations of privacy, and expectations of privacy than third-person vignettes.

Contrary to this hypothesis, perspective of vignette was not significantly associated with intrusiveness ratings, $t(3421) = .7, p = .48$, ratings of personal nature of item searched, $t(3325) = .49, p = .623$, ratings of permission granted for the search, $t(3325) = .68, p = .49$, ratings of privacy of the item searched, $t(3325) = -.22, p = .83$, ratings of how much the search violated privacy, $t(3325) = -.24, p = .81$, ratings of how upset the participant thought they would be, $t(3325) = .53, p = .60$, or ratings of how
upset the participant thought the average person their age would be, \( t(3325) = 1.4, p = .16 \). These results indicate adolescents do not rate searches presented in the first person differently than those presented in the third person on any of the measured dimensions.

**Searcher: Teacher vs. police officers.** MLM was also used to examine whether adolescents rate searches conducted by a teacher differently than those conducted by police officers. The model was specified as followed:

**Level 1:**  
\[ Y_{ij} (\text{outcome rating}) = \beta_{0j} + \beta_{1j} (\text{vigette characteristic}) + r_{ij} \]

**Level 2:**  
\[ \beta_{0j} = \gamma_{00} + \mu_{0j} \]
\[ \beta_{1j} = \gamma_{10} + \mu_{1j} \]

where \( Y_{ij} \) represents scores on the outcome variable for vignette \( i \) by respondent \( j \); \( \beta_{0j} \) represents the intercept of respondent \( j \) (i.e., the average rating across vignettes); \( \beta_{1j} \) represents the degree to which ratings vary as a function of vignette characteristic (school official=0, police officer=1); and \( r_{ij} \) represents random error for individual \( j \). Coefficients can be understood as functionally similar to unstandardized regression coefficients, and they represent the degree of association between two variables. All Level 1 parameters include a constant and a unique error term (at Level 2).

Separate models were tested for each of the following individual outcome variables: intrusiveness, violations of privacy, and expectations of privacy. It was hypothesized there would be a positive slope coefficient for \( \beta_{1j} \) suggesting that police officer vignettes are rated with higher scores of intrusiveness, violations of privacy, and expectations of privacy than school vignettes.

Identity of the searcher was not significantly associated with ratings of how much the search violated privacy, \( t(3325) = .73, p = .47 \), ratings of how upset the participant
thought they would be, \( t(3325) = -.32, p = .75 \), or ratings of how upset the participant thought the average person their age would be, \( t(3325) = .82, p = .41 \). Identity of the searcher was marginally associated with intrusiveness ratings; on average, searches conducted by police officers were rated as more intrusive than those conducted by school officials, \( t(3325) = 1.89, p = .058 \). Identity of the searcher was marginally associated with ratings of private nature of the item search, \( t(3325) = 1.69, p = .09 \).

Identity of the searcher was positively associated with ratings of the personal nature of the item searched, \( t(3325) = 5.93, p < .001 \). On average, searches conducted by police officers were rated as more personal in nature than those conducted by school officials. This relationship between identity of the searcher and ratings of personal nature was significantly associated with age, \( t(92) = 2.69, p < .01 \). As age increased, searches conducted by police officers were rated as increasingly more personal in nature than those conducted by school officials.

Identity of the searcher was also positively associated with ratings of permission granted for the search, \( t(3325) = 5.18, p < .001 \). On average, searches conducted by police officers were rated as having more permission than those conducted by school officials. Age was not significantly associated with this relationship, \( t(92) = .22, p = .83 \).

**Variables that predict privacy perceptions.** To determine whether variables identified by Slobogin and Schumacher (1993) or Fradella and colleagues (2009) accurately describe the variables adolescents use to determine whether a search violates privacy, two different models were analyzed using MLM. The models were specified as followed:

**Level 1:** \( Y_{ij} \) (outcome rating) = \( \beta_{0j} + \beta_{ij} \) (vignette characteristic) + \( r_{ij} \)
**Level 2:** $\beta_{0j} = \gamma_{00} + \mu_{0j}$

$\beta_{1j} = \gamma_{10} + \mu_{1j}$

where $Y_{ij}$ represents scores on the outcome variable for vignette $i$ by respondent $j$; $\beta_{0j}$ represents the intercept of respondent $j$ (i.e., the average rating across vignettes); $\beta_{1j}$ represents the degree to which ratings vary as a function of vignette characteristic (personal nature, consent given, bodily privacy, territorial privacy, communications privacy, and informational privacy); and $r_{ij}$ represents random error for individual $j$.

Separate models were tested for each vignette characteristic and for each of the three outcomes (intrusiveness, violation of privacy, and expectation of privacy). A significant $\beta_{1j}$ coefficient for a given model will provide evidence that an outcome varies as a function of a particular vignette characteristic (e.g., vignettes of a more personal nature will be rated significantly higher with regard to intrusiveness).

The first model includes variables Slobogin and Schumacher identified—personal nature of item searched, intrusiveness of the search, and consent (extent to which permission was granted for the search)—as Level 1 predictors of ratings of how much the search violated privacy.

Ratings of the personal nature of the item search were associated with ratings of how much the search violated privacy, $t(3324) = 10.91$, $p < .001$; on average, as ratings of the personal nature of the item searched increased, so did ratings of how much the search violated privacy. Ratings of the intrusiveness of the search were also significantly associated with ratings of how much the search violated privacy, $t(3324) = 53.39$, $p < .001$; on average, as ratings of the intrusiveness of the search increased, so did ratings of how much the search violated privacy. However, ratings of the extent to which
permission was granted were not associated with ratings of how much the search violated privacy, \( t(3324) = .01, p = .99 \). Thus, while perceptions of the intrusiveness of the search and perceptions of the personal nature of the item searched are related to perceptions of the extent to which the search violated privacy, perceptions of consent are not.

These relationships were not significantly associated with the participant’s age, \( t(92) = -.13, p = .19 \).

The second model included the four variables Fradella and colleagues posited affect perceptions of searches—bodily privacy, territorial, informational privacy, and communications privacy—as Level 1 predictors of perceptions of how much a search violated privacy. All four of the variables were significantly associated with perceptions of privacy violations. On average, as ratings of the extent to which the search implicated bodily privacy increased, so did ratings of how much the search violated privacy, \( t(3323) = 7.88, p < .001 \). The same effect was found for territorial privacy, \( t(3323) = 23.04, p < .001 \), informational privacy, \( t(3323) = 21.69, p < .001 \), and communications privacy, \( t(3323) = 7.85, p < .001 \). These relationships were not significantly associated with the participant’s age, \( t(92) = 1.54, p = .13 \).

**Study 1 Discussion**

One implication from Study 1 is that adolescents view searches of cell phones—either conducted by school officials or police officers—as highly violating privacy, as much as a pat-down search. The Supreme Court indicated a search such as a pat-down is highly intrusive and requires a heightened level of suspicion in a school setting (Safford v. Redding, 2013). In light of this research, courts may want to take into account that individuals view searches of cell phones as similar to the physical pat-down.
The Supreme Court has determined searches of cell phones receive Fourth Amendment protections, partly because of their importance in society, so the Court may agree with adolescents in that regard (Riley v. California, 2015). This is consistent with another finding from Study 1—while adolescents’ ratings of intrusiveness agree with court rulings on searches deemed to be either highly intrusive or not at all intrusive, there is still a “gray area” where adolescents and courts view searches differently. This finding is consistent with Slobogin and Shumacher’s comparison of adult ratings to court rulings. This may be because there are some searches that are so intrusive (e.g., physical pat down) or so not intrusive (e.g., search of garbage placed at a curb) that the vast majority of people, regardless of age or profession, agree on the privacy implications.

Contrary to Slobogin and Shumacher’s findings, adolescents in the current study did not rate searches presented in the first person differently than those presented in the third person. This may be due to a phenomenon referred to as the egocentric bias, in which people fail to consider situations from others’ perspectives (Greenwald, 1980). One form of this bias is the Emotional Egocentricity Bias: when individuals consider others’ emotions, they are highly influenced by their own emotions (Riva, Triscoli, Lamm, Carnaghi, & Silani, 2016). This bias is enhanced in adolescents compared to adults. Thus, adolescents’ ratings of first- and third-person searches may not differ because adolescents are highly likely to consider the third-person searches from their own, first-person perspective.

However, the Emotional Egocentricity Bias would hypothesize that adolescents would predict others would have the same reaction to the search as they would. This, however, was not found in Study 1. Instead, for the majority of searches, adolescents
predicted average individuals their age would be more upset than they would be if they were the subject of the search. One potential reason is adolescents (as do most individuals) have a desire to present themselves in a positive light (Fisher, 1993). Thus, participants may have rated their own potential upset feelings lower than others’ because they wanted to be seen as someone not likely to have negative feelings.

Study 1 also examined whether adolescents’ ratings of dimensions identified by previous research were predictive of adolescents’ ratings of privacy violations. One finding of Study 1 is that adolescents’ ratings of permission granted for the search were not predictive of ratings of whether the search violated privacy. This finding is contrary to Blumenthal and colleagues, who identified consent as an important domain of privacy expectations in adults. It is possible adolescents do not view consent as importantly as do adults; possibly, adolescents do not consider themselves as having the ability to consent to various searches, whether because others (such as their parents) are the ones to consent, or because adolescents are so accustomed to being the subject of searches in which explicit consent is not a factor (e.g., airport searches, security searches at schools). Further research can explore how adolescents understand the concept of consent and how this may differ from adults.

The current study also examined the privacy domains identified by Fradella and colleagues—bodily, territorial, informational, and communications privacy—and how adolescents’ ratings of these domains predicted whether adolescents thought a search violated privacy. All four of the domains were significant predictors of ratings of privacy violations. And while it may be predicted from Fradella and colleagues and adolescents’ increased use of wired communications that ratings of informational and communications
privacy may be more predictive of ratings of privacy violations, that was not the case in the current study. This may be because adolescents view searches of property highly connected with information and communications (a cell phone search) as also violating bodily and personal space privacy. This may indicate cell phones are so important to adolescents that they view the phones as part of their personal space, potentially as part of their identity.

Study 1 only examined adolescents’ perceptions of searches that courts had already confronted. While the results could be compared to prior research and court rulings, direct comparisons of different age groups was not possible due to different measures and dependent variables. Study 2 sought to expand the results of Study 1 by including participants across the lifespan. In addition, Study 2 includes more individual difference variables to examine whether age and development play a role in privacy expectations. Because searches of wired communications, such as cell phones and Social Networking Sites, are just now reaching the courts, and due to generational differences in the use of these types of communications, Study 2 focused on these types of searches.

**Study 2: Dual Systems Model and Reasonable Expectations of Privacy**

The purpose of Study 2 was to examine the link between reasonable expectations of privacy and privacy-protecting behaviors. Previous research (Patchin & Hinduja, 2010) has established that adolescents’ expectation of privacy from private actors is positively correlated with privacy-protecting behaviors online and that adolescents disclose more information online than do adults (Christofides et. al., 2012). Study 2 compared expectations of privacy from government intrusions online and privacy protecting behaviors for a wide range of age groups and whether differences in privacy
expectations and privacy-protecting behaviors are related to decision-making
development or due to a generational gap in experience with digital communications.

**Method.**

**Participants.** A total of 341 participants completed the second study. The
average age of all participants was 33.4 years. Two hundred eighty-three participants
(81.8%) identified their race was White or Caucasian, 22 (6.4%) identified as Asian, 16
(4.6%) identified as Hispanic, 14 (4.0%) identified as Black, 2 (.6%) identified as Native
American or Pacific Islander, and 5 (1.4%) identified their race as “other.” One hundred
seventy-seven participants (51.2%) identified as female, 163 (47.4%) identified as male, and 1 (.3%) identified as other.

Forty-three adolescent participants ages 12-17 were recruited from the same
school district as in Study 1 and received a $3.00 Amazon.com gift card via email. The
recruitment was done in a different semester as was Study 1, so while it cannot be
guaranteed there were no participants who completed both studies, the overall population
from which participants were recruited was mostly different.

The mean age of the adolescent participant sample was 12.9 years (SD = 1.34).
The majority (35 participants, 81.4%) identified their race as White or Caucasian, 5
(11.6%) identified as Asian, 1 (2.3%) identified as Native American or Pacific Islander,
and 2 (4.6%) identified as “other.” Twenty-five (58.1%) adolescents identified as female
and 18 (41.9%) identified as male.

One hundred and twenty-nine young adult participants (ages 18-25) were
recruited from undergraduate psychology classes at the University of Nebraska-Lincoln
in exchange for course credit. The mean age of the young adult population was 20.3
years \((SD = 1.69)\). The majority of young adult participants \((113, 87.6\%)\) identified their race as White or Caucasian, \(8 (6.2\%)\) identified as Asian, \(7 (5.4\%)\) identified as Hispanic, and \(2 (1.6\%)\) identified as Black. The majority \((84, 65.1\%)\) of participants identified as female, and \(45 (34.9\%)\) identified as male.

One hundred and sixty-nine adults—91 middle age adults \((age 26-59)\) and 78 older adults \((age 60 and older)\) were recruited from the online Amazon MTurk database. Only participants who live in the Midwest were included in recruitment from MTurk to obtain similar demographic profiles across age samples. Previous empirical research indicates participants who complete surveys via MTurk provide data that is reliable as data obtained from other methods \((Buhrmester, Kwang, & Gosling, 2011; Paolacci, Chandler & Ipeirotis, 2010)\). Adult participants received $3.00 via the MTurk system in exchange for their participation.

The mean age of the overall adult population was 48.6 years \((SD = 14.85)\). The majority \((135, 79.9\%)\) identified their race as White or Caucasian, \(12 (7.1\%)\) identified as Black, \(9 (5.3\%)\) identified as Hispanic, \(9 (5.3\%)\) identified as Asian, \(1 (.6\%)\) identified as Native American or Pacific Islander, and \(3 (1.8\%)\) identified as “other.” The majority of the adult sample \((101, 59.8\%)\) was male, and \(68 (40.2\%)\) was female. The adult sample also reported their highest level of education. Eleven participants \((6.5\%)\) reported an advanced degree such as a master’s or doctorate and \(92 (54.4\%)\) reported completing college. Thirty-two \((18.9\%)\) reported completing some college. Thirty-one \((18.3\%)\) reported the highest level of education they completed was high school and two \((1.2\%)\) reported completing some high school.
**Procedures.** All participants completed the measures on-line. Parental consent for adolescent participants was obtained the same way as in Study 1. Two middle school teachers emailed the link to the parental consent survey to the parents of adolescents currently enrolled in their class. Two-hundred and four parents were emailed the survey and 117 parents (57.3%) provided parental consent for their adolescent child to participate in the survey and an email address at which to contact their child. Of the 117 adolescents emailed the survey, 62 (52.9%) opened the survey link, 47 (40.2%) answered at least one question, and 45 (38.5%) completed the survey. Two adolescent participants were excluded for failing the attention check questions for a final sample size of 43 participants (36.8% of the contacted sample).

University students were recruited via the on-line system SONA and received one credit of research participation. Adult participants were recruited using Amazon’s Mechanical Turk website. Only MTurk “workers” that had at least a 90% approval rate for their completed surveys, had completed at least 500 surveys, and were located in the Midwestern United States were eligible for the survey. MTurk participants received $3.00 in exchange for their participation.

**Measures.** Participants first answered demographic questions, and then completed the Social Networking Site disclosure survey (included in Appendix E) and information about their experience with digital communications. Participants then answered questions regarding their expectations of privacy online from government actors. Participants rated how likely it is that the government will access various forms of information (such as their Social Networking Site profile, private e-mails and instant messages, and pictures posted to social networking sites) and how reasonable they think
it is for government actors to access this information. The search scenarios and questions are included in Appendix B.

In addition, participants completed the Barratt Impulsiveness Scale (Patton & Stanford, 1995) and six items from the Sensation Seeking Scale (Zuckerman, Eysenck & Eysenck, 1978) to measure developmental trajectories of the dual systems model of adolescent risk-taking. Steinberg (2008) used the Barratt Impulsiveness Scale and the Sensation Seeking Scale to measure the incentive processing system of adolescents. The Barratt Impulsiveness Scale (Version 11) is a 30-item self-report measure; participants rate how often they do certain things on a scale of 1 (almost never/never) to 4 (almost always/always). Higher scores indicate more impulsiveness. The Barratt Impulsiveness Scale Version 11 has been found to be an internally consistent measure of impulsiveness (Patton, Stanford & Barratt, 1995) and suitable for measuring impulsiveness among adolescents (Steinberg, 2008). The Sensation Seeking Scale is a 19-item true/false measure. The original Sensation Seeking Scale includes four sub-scales: thrill and adventure seeking, disinhibition, experience seeking, and boredom susceptibility. Steinberg (2008) only included six items from the original Sensation Seeking Scale because the other items measured impulsivity, not sensation seeking. Both the entire Sensation Seeking Scale and the subset of six items has adequate internal reliability (Zuckerman, Eysenck & Eysenck, 1978; Steinberg, 2008). The scales are included in Appendices C and D.

**Hypotheses.** It is hypothesized that, consistent with risk-taking research (Steinberg, 2010) privacy-protecting behaviors will be at their lowest in early and middle adolescence and increase in late adolescence to adulthood. Similarly, age, impulsivity,
and sensation-seeking will be associated with ratings of privacy, indicating both age and development of decision-making behaviors are related to evaluations of privacy.

Results.

Social networking usage and privacy disclosures. The majority of participants (327, 94.5%) were a member of at least one Social Networking Site (SNS). The most popular SNS was Facebook, with 299 participants (91.4% of participants who are a member of at least one SNS) reporting they had a profile on that platform. One hundred ninety-six participants (59.9% of participants who are a member of at least one SNS) reported they used Facebook more than any other SNS platform. Table 8 displays the information participants share on the SNS profile they use the most and the privacy settings they utilize for each type of information. The average number of hours participants spent each day on SNS was 1.71 (SD = 1.34); this number was significantly correlated with age (r = -.22, p < .05), such that as the age of the participant increased, the time the participant reported they spent on social media decreased. The average number of years participants had been using social media was less than a year; this was not associated with age (r = .08).

As shown in Table 8, the majority of participants publicly share their first (67.7%) and last names (60.2%). The majority of participants did not include contact information such as their address (90.0%), phone number (75.8%), or email address (64.5%) anywhere on their SNS profile. Participants commonly utilized privacy settings for pictures and posts; 48.9% of participants shared their pictures only with their friends and 47.9% shared their posts only with their friends. Additional privacy-protecting behaviors, such as sharing information with only some friends or posting only fake
information, were less commonly utilized. For example, 3.0% of participants reported utilizing a fake profile picture.

Table 8

*Privacy Settings for Specific Information on SNS Profile (All Age Groups Included; N = 341)*

<table>
<thead>
<tr>
<th>Information</th>
<th>Not On Profile</th>
<th>Public</th>
<th>Limited Public</th>
<th>Friends</th>
<th>Some Friends</th>
<th>Fake Public</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name</td>
<td>8.2%</td>
<td>67.7%</td>
<td>6.4%</td>
<td>11.9%</td>
<td>4.0%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Last Name</td>
<td>17.3%</td>
<td>60.2%</td>
<td>6.1%</td>
<td>11.6%</td>
<td>3.0%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Picture</td>
<td>13.7%</td>
<td>60.8%</td>
<td>7.0%</td>
<td>10.9%</td>
<td>4.6%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Birthday</td>
<td>30.0%</td>
<td>19.3%</td>
<td>12.8%</td>
<td>31.8%</td>
<td>5.2%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Phone #</td>
<td>75.8%</td>
<td>2.1%</td>
<td>4.3%</td>
<td>11.6%</td>
<td>5.8%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Email</td>
<td>64.5%</td>
<td>6.4%</td>
<td>5.2%</td>
<td>15.6%</td>
<td>7.0%</td>
<td>1.2%</td>
</tr>
<tr>
<td>IM Name</td>
<td>67.3%</td>
<td>11.0%</td>
<td>3.7%</td>
<td>14.1%</td>
<td>3.1%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Address</td>
<td>90.5%</td>
<td>0.3%</td>
<td>1.5%</td>
<td>4.6%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Current City</td>
<td>39.9%</td>
<td>25.3%</td>
<td>7.6%</td>
<td>20.7%</td>
<td>3.6%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Schedule</td>
<td>90.0%</td>
<td>0.9%</td>
<td>2.7%</td>
<td>4.6%</td>
<td>0.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Employment</td>
<td>60.4%</td>
<td>15.5%</td>
<td>5.5%</td>
<td>15.5%</td>
<td>2.1%</td>
<td>0.9%</td>
</tr>
<tr>
<td>School</td>
<td>51.5%</td>
<td>23.2%</td>
<td>5.8%</td>
<td>16.5%</td>
<td>2.1%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Orientation</td>
<td>62.1%</td>
<td>14.1%</td>
<td>5.2%</td>
<td>15.6%</td>
<td>2.4%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Likes</td>
<td>35.4%</td>
<td>26.5%</td>
<td>9.1%</td>
<td>25.0%</td>
<td>3.4%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Relationship</td>
<td>49.1%</td>
<td>20.4%</td>
<td>6.4%</td>
<td>21.0%</td>
<td>3.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Groups</td>
<td>63.0%</td>
<td>9.5%</td>
<td>7.3%</td>
<td>17.1%</td>
<td>2.4%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Pictures Tagged</td>
<td>15.9%</td>
<td>17.7%</td>
<td>23.2%</td>
<td>35.8%</td>
<td>7.3%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Own Pictures</td>
<td>9.2%</td>
<td>19.4%</td>
<td>17.2%</td>
<td>48.9%</td>
<td>4.9%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Others’ Posts</td>
<td>8.5%</td>
<td>22.6%</td>
<td>17.4%</td>
<td>47.9%</td>
<td>4.0%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Own Posts</td>
<td>13.1%</td>
<td>26.2%</td>
<td>21.3%</td>
<td>34/5%</td>
<td>4.6%</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

A composite Privacy Disclosure Score was created to facilitate analysis of amount of information shared on social media and individual characteristics. Responses that the information was not on the user’s profile received a score of 0, responses that the information was on the profile but access to the information was limited (limited public, friends only, some friends, and fake information) received a score of 1, and responses that the information was on the profile and all users had access to it received a score of 2. Thus, higher scores indicate more information shared on the profile with more public access. Scores ranged from 0 to 40, and reliability analysis indicated adequate internal
reliability (Cronbach’s alpha = .85). The average Privacy Disclosure Score was 15.76 ($SD = 6.63$).

The Privacy Disclosure Score was not significantly correlated with age ($r = -.07$) or scores on the Sensation Seeking Scale ($r = .08$), but was significantly correlated with scores on the Barratt Impulsivity Scale. As impulsivity increased, so did the amount of information the user disclosed on social media ($r = .18$, $p < .01$). A multiple regression examining whether age, impulsivity, sensation seeking, and hours per day using an SNS and years using an SNS predicted the Privacy Disclosure Score was significant ($R^2 = .06$, $F(5, 250) = 3.55$, $p < .01$). As shown in Table 9, the hours per day participants reported using social media and participants’ scores on impulsivity were significant predictors of the Privacy Disclosure Score, but age, years on SNS, and sensation seeking were not.

Table 9

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-.02</td>
<td>.02</td>
<td>-.07</td>
</tr>
<tr>
<td>Years on SNS</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Hours/Day</td>
<td>.81</td>
<td>.32</td>
<td>.16*</td>
</tr>
<tr>
<td>Impulsivity</td>
<td>.12</td>
<td>.05</td>
<td>.15*</td>
</tr>
<tr>
<td>Sensation Seeking</td>
<td>-.04</td>
<td>.21</td>
<td>-.01</td>
</tr>
</tbody>
</table>

*Note: beta values identified with an asterisk are significant at the $p < .05$ level*

Risk perceptions of sharing information. Participants rated the risk associated with sharing each piece of information on a Likert scale of 0 (*not at all risky*) to 5 (*extremely risky*). One-way ANOVA’s were conducted to examine mean group differences in perceptions of risk; for significant differences, post-hoc analyses were conducted using Tukey’s HSD and LSD. The average risk ratings are shown in Table 10. Information that would enable others to contact the participant, such as phone number or address, was rated the riskiest information across all age groups. The least risky
information included first name, a user’s “likes,” and relationship status. The risk perceptions for the riskiest and least risky rated information did not differ between the three age groups ($F$’s(2,329) < 2.5, $p$’s > .1).

There was no consistent pattern of differences in risk perceptions across the three age groups. The perceived level of risk of each information may have been affected by variables unique to each age group. Young adults perceived sharing some types of information—e.g., first name, last name, birthday—as less risky than did both adolescents and adults ($F$’s(2,329) > 8.5, $p$’s < .05). But young adults perceived sharing their schedule as riskier ($M = 4.28$) than did both adults ($M = 3.76$) and adolescents ($M = 3.45$; $F(2,329) = 8.54$, $p < .001$). Perhaps college students, with schedules that vary from day-to-day, perceive publicly posting their schedule as riskier than do other age groups, members of which have schedules that are more predictably set with school and work.

Adolescents rated sharing their current city as riskier ($M = 4.15$) than did young adults ($M = 3.34$) and adults ($M = 3.00$; $F(2,329) = 9.73$, $p < .001$). The same pattern was found with other types of information, with adolescents rating sharing sexual orientation as riskier ($M = 2.63$) than both young adults ($M = 1.22$) and adults ($M = 1.66$; $F(2,326) = 13.76$, $p < .001$) and sharing school information as riskier ($M = 3.76$) than both young adults ($M = 2.36$) and adults ($M = 2.74$; $F(2,326) = 12.71$, $p < .001$).

Table 10

<table>
<thead>
<tr>
<th>Information</th>
<th>Adolescent (N = 43)</th>
<th>Young Adult (N = 129)</th>
<th>Adult (N = 169)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name</td>
<td>1.70</td>
<td>.88</td>
<td>1.43</td>
<td>1.25</td>
</tr>
<tr>
<td>Last Name</td>
<td>3.07</td>
<td>1.77</td>
<td>2.46</td>
<td>2.27</td>
</tr>
<tr>
<td>Profile Picture</td>
<td>2.43</td>
<td>1.50</td>
<td>1.87</td>
<td>1.80</td>
</tr>
<tr>
<td>Birthday</td>
<td>2.67</td>
<td>1.98</td>
<td>2.56</td>
<td>2.35</td>
</tr>
<tr>
<td>Phone #</td>
<td>4.00</td>
<td>4.02</td>
<td>4.07</td>
<td>4.04</td>
</tr>
</tbody>
</table>
**Age, impulsivity, and sensation seeking.** Pearson’s correlation was used to examine the relationship between impulsivity, sensation seeking, and age. As predicted, scores on the Sensation Seeking Scale were significantly negatively related to age—as age increased, scores on the SSS decreased ($r = -.36$, $p < .001$, $n = 309$). However, the relationship between age and scores on the Barratt Impulsivity Scale was only trending toward significance, though in the predicted direction ($r = -.10$, $p = .09$, $n = 277$). Also as predicted, scores on the BIS and SSS were significantly positively correlated; as impulsivity increased, so did sensation seeking ($r = .28$, $p < .001$, $n = 277$).

To examine the relationship between age and impulsivity and age and sensation seeking another way, one-way ANOVAs were conducted. The same result was obtained; adolescents scored significantly higher on the SSS than young adults, who scored significantly higher than adults ($F(2, 307) = 34.72$, $p < .001$). The same pattern was observed with scores on the BIS, but the difference was not statistically significant ($F(2,275) = 2.50$, $p = .08$).
Table 11

Average Scores on the SSS and BIS by Age Group

<table>
<thead>
<tr>
<th></th>
<th>Adolescents (N = 43)</th>
<th>Young Adults (N = 129)</th>
<th>Adults (N = 169)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSS (Max = 6.00)</td>
<td>4.45</td>
<td>3.85</td>
<td>2.15</td>
<td>3.08</td>
</tr>
<tr>
<td>BIS (Max = 120.00)</td>
<td>69.54</td>
<td>67.69</td>
<td>65.94</td>
<td>67.00</td>
</tr>
</tbody>
</table>

Perceptions of searches. Participants rated searches on eight dimensions on a scale of 0 (not at all) to 7 (extremely). The following tables show the average ratings for each dimension by age group.

Table 12 displays the average likelihood ratings for searches. Participants overall rated police officer searches of text messages stored by a cell phone provider ($M = 4.43$), phone numbers dialed ($M = 4.20$), and text messages stored on a cell phone ($M = 4.17$) as the police officer searches most likely to occur, and rated searches of apps on a cell phone ($M = 2.85$) and searches of anonymous SNS posts ($M = 3.66$) as the least likely to occur. Searches by school officials of social networking posts ($M = 3.40$) and pictures ($M = 3.15$) were rated the most likely to occur.

Table 12

Likelihood of Search Occurring (0 = not at all likely; 7 = extremely likely)

<table>
<thead>
<tr>
<th>Police Officer Searches</th>
<th>Adolescents (N = 43)</th>
<th>Young Adults (N = 129)</th>
<th>Adults (N = 169)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Messages</td>
<td>2.84</td>
<td>4.34</td>
<td>4.36</td>
<td>4.17</td>
</tr>
<tr>
<td>Phone Numbers Dialed</td>
<td>3.08</td>
<td>4.30</td>
<td>4.37</td>
<td>4.20</td>
</tr>
<tr>
<td>Cell Phone Contacts</td>
<td>2.70</td>
<td>3.78</td>
<td>4.30</td>
<td>3.91</td>
</tr>
<tr>
<td>Websites Visited on Cell</td>
<td>2.55</td>
<td>3.71</td>
<td>4.07</td>
<td>3.75</td>
</tr>
<tr>
<td>Cell Phone GPS</td>
<td>2.44</td>
<td>4.24</td>
<td>4.27</td>
<td>4.05</td>
</tr>
<tr>
<td>Car GPS</td>
<td>2.84</td>
<td>4.05</td>
<td>4.16</td>
<td>3.96</td>
</tr>
<tr>
<td>Cell Phone Apps</td>
<td>1.39</td>
<td>2.68</td>
<td>3.32</td>
<td>2.85</td>
</tr>
<tr>
<td>Emails on Computer</td>
<td>3.00</td>
<td>4.13</td>
<td>4.18</td>
<td>4.03</td>
</tr>
<tr>
<td>Emails on Cell Phone</td>
<td>2.70</td>
<td>3.93</td>
<td>4.04</td>
<td>3.84</td>
</tr>
<tr>
<td>Private Messages</td>
<td>2.59</td>
<td>3.93</td>
<td>3.97</td>
<td>3.80</td>
</tr>
<tr>
<td>Texts Stored by Provider</td>
<td>3.15</td>
<td>4.47</td>
<td>4.68</td>
<td>4.43</td>
</tr>
<tr>
<td>Posts on SNS</td>
<td>2.84</td>
<td>4.29</td>
<td>4.17</td>
<td>4.07</td>
</tr>
<tr>
<td>Pictures on SNS</td>
<td>2.87</td>
<td>4.13</td>
<td>4.17</td>
<td>4.00</td>
</tr>
<tr>
<td>Anonymous SNS Posts</td>
<td>2.77</td>
<td>3.66</td>
<td>3.86</td>
<td>3.66</td>
</tr>
</tbody>
</table>
Participants’ average ratings of the reasonableness of each search are presented in Table 13. The most reasonable police officer searches as perceived by participants were searches of posts on SNS (M = 3.74) and searches of anonymous SNS posts (M = 3.65), while the least reasonable search were a search of cell phone apps (M = 2.50).

Participants rated school official searches of posts on SNS (M = 2.80), pictures on SNS (M = 2.70), and anonymous SNS posts (M = 2.59) as the most reasonable, and a school official search of a GPS on a car was the search rated the least reasonable (M = 1.28).

<table>
<thead>
<tr>
<th>School Official Searches</th>
<th>Adolescents (N = 43)</th>
<th>Young Adults (N = 129)</th>
<th>Adults (N = 169)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Messages</td>
<td>2.76</td>
<td>2.47</td>
<td>2.40</td>
<td>2.47</td>
</tr>
<tr>
<td>Phone Numbers Dialed</td>
<td>2.08</td>
<td>1.98</td>
<td>2.10</td>
<td>2.05</td>
</tr>
<tr>
<td>Cell Phone Contacts</td>
<td>1.72</td>
<td>1.91</td>
<td>2.28</td>
<td>2.07</td>
</tr>
<tr>
<td>Websites Visited on Cell</td>
<td>2.42</td>
<td>2.15</td>
<td>2.33</td>
<td>2.72</td>
</tr>
<tr>
<td>Cell Phone GPS</td>
<td>1.58</td>
<td>1.77</td>
<td>1.73</td>
<td>1.73</td>
</tr>
<tr>
<td>Car GPS</td>
<td>1.78</td>
<td>1.36</td>
<td>1.56</td>
<td>1.50</td>
</tr>
<tr>
<td>Cell Phone Apps</td>
<td>1.59</td>
<td>1.91</td>
<td>2.14</td>
<td>1.98</td>
</tr>
<tr>
<td>Emails on Computer</td>
<td>2.91</td>
<td>2.20</td>
<td>2.26</td>
<td>2.31</td>
</tr>
<tr>
<td>Emails on Cell Phone</td>
<td>2.27</td>
<td>2.17</td>
<td>2.22</td>
<td>2.21</td>
</tr>
<tr>
<td>Private Messages</td>
<td>2.56</td>
<td>2.29</td>
<td>2.29</td>
<td>2.32</td>
</tr>
<tr>
<td>Texts Stored by Provider</td>
<td>2.41</td>
<td>2.11</td>
<td>2.10</td>
<td>2.14</td>
</tr>
<tr>
<td>Posts on SNS</td>
<td>2.57</td>
<td>3.48</td>
<td>3.54</td>
<td>3.40</td>
</tr>
<tr>
<td>Pictures on SNS</td>
<td>2.76</td>
<td>3.24</td>
<td>3.17</td>
<td>3.15</td>
</tr>
<tr>
<td>Anonymous SNS Posts</td>
<td>2.49</td>
<td>2.73</td>
<td>3.05</td>
<td>2.85</td>
</tr>
<tr>
<td>Audio of Phone Calls</td>
<td>1.89</td>
<td>1.95</td>
<td>1.71</td>
<td>1.83</td>
</tr>
<tr>
<td>Documents on Computer</td>
<td>2.37</td>
<td>2.40</td>
<td>2.37</td>
<td>2.38</td>
</tr>
<tr>
<td>Websites Visited on Comp</td>
<td>2.79</td>
<td>2.59</td>
<td>2.84</td>
<td>2.73</td>
</tr>
</tbody>
</table>

Table 13

Reasonableness of Search (0 = not at all reasonable, 7 = extremely reasonable)
<table>
<thead>
<tr>
<th>Category</th>
<th>Overall</th>
<th>Adolescents (N = 43)</th>
<th>Young Adults (N = 129)</th>
<th>Adults (N = 169)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Websites Visited on Cell</td>
<td>3.07</td>
<td>2.95</td>
<td>3.42</td>
<td>2.81</td>
</tr>
<tr>
<td>Cell Phone GPS</td>
<td>3.49</td>
<td>2.63</td>
<td>3.87</td>
<td>3.36</td>
</tr>
<tr>
<td>Car GPS</td>
<td>3.45</td>
<td>2.70</td>
<td>3.84</td>
<td>3.30</td>
</tr>
<tr>
<td>Cell Phone Apps</td>
<td>2.50</td>
<td>1.69</td>
<td>2.60</td>
<td>2.61</td>
</tr>
<tr>
<td>Emails on Computer</td>
<td>3.32</td>
<td>2.94</td>
<td>3.68</td>
<td>3.12</td>
</tr>
<tr>
<td>Emails on Cell Phone</td>
<td>3.20</td>
<td>3.11</td>
<td>3.49</td>
<td>2.99</td>
</tr>
<tr>
<td>Private Messages</td>
<td>3.04</td>
<td>2.86</td>
<td>3.40</td>
<td>2.78</td>
</tr>
<tr>
<td>Texts Stored by Provider</td>
<td>3.42</td>
<td>3.21</td>
<td>3.71</td>
<td>3.22</td>
</tr>
<tr>
<td>Posts on SNS</td>
<td>3.74</td>
<td>2.92</td>
<td>4.12</td>
<td>3.61</td>
</tr>
<tr>
<td>Pictures on SNS</td>
<td>3.44</td>
<td>3.00</td>
<td>3.88</td>
<td>3.19</td>
</tr>
<tr>
<td>Anonymous SNS Posts</td>
<td>3.65</td>
<td>3.34</td>
<td>3.67</td>
<td>3.70</td>
</tr>
<tr>
<td>Audio of Phone Calls</td>
<td>3.38</td>
<td>2.89</td>
<td>3.80</td>
<td>3.15</td>
</tr>
<tr>
<td>Documents on Computer</td>
<td>3.27</td>
<td>3.20</td>
<td>3.54</td>
<td>3.06</td>
</tr>
<tr>
<td>Websites Visited on Comp</td>
<td>3.44</td>
<td>3.18</td>
<td>3.72</td>
<td>3.27</td>
</tr>
</tbody>
</table>

As shown in Table 14, participants predicted they would be the most upset if police officers searched their text messages \(M = 4.34\) or private messages \(M = 4.25\), while they would be the least upset if their anonymous SNS posts \(M = 2.45\) were searched. Similarly, participants predicted they would be the most upset if school officials searched their text messages \(M = 4.87\) and private messages \(M = 4.67\), and
least upset if school officials searched their anonymous posts on an SNS ($M = 2.70$). The same pattern is seen in Table 15, with ratings of participants’ predictions of how upset the average person their age would be. Participants predicted the average person their age would be the most upset at a police officer search of their text messages stored on their phone ($M = 5.05$), text messages stored by their cell phone provider ($M = 4.90$), and private messages ($M = 4.89$). Participants predicted the average person their age would be least upset at a police officer search of their anonymous SNS posts ($M = 3.15$).

Looking at school official searches, participants predicted the average person their age would be most upset at a search of their text messages stored on a cell phone ($M = 5.27$) and by the service provider ($M = 5.13$) and private message ($M = 5.08$).

As in Study 1, participants predicted the average person their age would be more upset than the participant would be for each search presented. This pattern was observed for both police officer and school official searches.

Table 14

<table>
<thead>
<tr>
<th>Prediction of How Upset Participant Would be if Search Occurred (0 = not at all upset, 7 = extremely upset)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Police Officer Searches</strong></td>
</tr>
<tr>
<td>Text Messages</td>
</tr>
<tr>
<td>Phone Numbers Dialed</td>
</tr>
<tr>
<td>Cell Phone Contacts</td>
</tr>
<tr>
<td>Websites Visited on Cell</td>
</tr>
<tr>
<td>Cell Phone GPS</td>
</tr>
<tr>
<td>Car GPS</td>
</tr>
<tr>
<td>Cell Phone Apps</td>
</tr>
<tr>
<td>Emails on Computer</td>
</tr>
<tr>
<td>Emails on Cell Phone</td>
</tr>
<tr>
<td>Private Messages</td>
</tr>
<tr>
<td>Texts Stored by Provider</td>
</tr>
<tr>
<td>Posts on SNS</td>
</tr>
<tr>
<td>Pictures on SNS</td>
</tr>
<tr>
<td>Anonymous SNS Posts</td>
</tr>
<tr>
<td>Audio of Phone Calls</td>
</tr>
<tr>
<td>School Official Searches</td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Text Messages</td>
</tr>
<tr>
<td>Phone Numbers Dialed</td>
</tr>
<tr>
<td>Cell Phone Contacts</td>
</tr>
<tr>
<td>Websites Visited on Cell</td>
</tr>
<tr>
<td>Cell Phone GPS</td>
</tr>
<tr>
<td>Car GPS</td>
</tr>
<tr>
<td>Cell Phone Apps</td>
</tr>
<tr>
<td>Emails on Computer</td>
</tr>
<tr>
<td>Emails on Cell Phone</td>
</tr>
<tr>
<td>Private Messages</td>
</tr>
<tr>
<td>Texts Stored by Provider</td>
</tr>
<tr>
<td>Posts on SNS</td>
</tr>
<tr>
<td>Pictures on SNS</td>
</tr>
<tr>
<td>Anonymous SNS Posts</td>
</tr>
<tr>
<td>Audio of Phone Calls</td>
</tr>
<tr>
<td>Documents on Computer</td>
</tr>
<tr>
<td>Websites Visited on Comp</td>
</tr>
</tbody>
</table>

Table 15

*Prediction of How Upset Average Person Would Be if Search Occurred (0 = not at all upset, 7 = extremely upset)*

<table>
<thead>
<tr>
<th>Police Officer Searches</th>
<th>Adolescents (N = 43)</th>
<th>Young Adults (N = 129)</th>
<th>Adults (N = 169)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Messages</td>
<td>3.84</td>
<td>5.28</td>
<td>5.15</td>
<td>5.05</td>
</tr>
<tr>
<td>Phone Numbers Dialed</td>
<td>3.32</td>
<td>3.79</td>
<td>4.26</td>
<td>3.97</td>
</tr>
<tr>
<td>Cell Phone Contacts</td>
<td>3.33</td>
<td>3.78</td>
<td>4.48</td>
<td>4.07</td>
</tr>
<tr>
<td>Websites Visited on Cell</td>
<td>3.53</td>
<td>4.30</td>
<td>4.93</td>
<td>4.51</td>
</tr>
<tr>
<td>Cell Phone GPS</td>
<td>3.08</td>
<td>4.40</td>
<td>4.62</td>
<td>4.36</td>
</tr>
<tr>
<td>Car GPS</td>
<td>3.11</td>
<td>4.07</td>
<td>4.37</td>
<td>4.10</td>
</tr>
<tr>
<td>Cell Phone Apps</td>
<td>2.25</td>
<td>3.20</td>
<td>4.07</td>
<td>3.51</td>
</tr>
<tr>
<td>Emails on Computer</td>
<td>3.43</td>
<td>4.46</td>
<td>5.02</td>
<td>4.62</td>
</tr>
<tr>
<td>Emails on Cell Phone</td>
<td>2.84</td>
<td>4.13</td>
<td>4.94</td>
<td>4.37</td>
</tr>
<tr>
<td>Private Messages</td>
<td>3.83</td>
<td>4.95</td>
<td>5.09</td>
<td>4.89</td>
</tr>
<tr>
<td>Texts Stored by Provider</td>
<td>3.94</td>
<td>4.94</td>
<td>5.08</td>
<td>4.90</td>
</tr>
<tr>
<td>Posts on SNS</td>
<td>3.35</td>
<td>3.53</td>
<td>4.26</td>
<td>3.86</td>
</tr>
<tr>
<td>Pictures on SNS</td>
<td>2.87</td>
<td>3.60</td>
<td>4.18</td>
<td>3.80</td>
</tr>
<tr>
<td>Anonymous SNS Posts</td>
<td>2.97</td>
<td>3.04</td>
<td>3.29</td>
<td>3.15</td>
</tr>
<tr>
<td>Audio of Phone Calls</td>
<td>2.86</td>
<td>4.53</td>
<td>5.06</td>
<td>4.60</td>
</tr>
<tr>
<td>Documents on Computer</td>
<td>3.43</td>
<td>4.69</td>
<td>5.19</td>
<td>4.79</td>
</tr>
<tr>
<td>Websites Visited on Comp</td>
<td>3.61</td>
<td>4.20</td>
<td>4.58</td>
<td>4.32</td>
</tr>
</tbody>
</table>
School Official Searches                            Adolescents (N = 43) | Young Adults (N = 129) | Adults (N = 169) | Overall
Text Messages                                     4.03 | 5.57 | 5.33 | 5.27
Phone Numbers Dialed                             3.51 | 4.51 | 4.95 | 4.61
Cell Phone Contacts                               3.31 | 4.16 | 4.92 | 4.43
Websites Visited on Cell                         3.29 | 4.64 | 5.28 | 4.79
Cell Phone GPS                                    2.83 | 4.67 | 5.14 | 4.70
Car GPS                                          3.30 | 4.78 | 4.98 | 4.71
Cell Phone Apps                                   2.59 | 3.63 | 4.44 | 3.90
Emails on Computer                                3.69 | 4.62 | 5.17 | 4.78
Emails on Cell Phone                              2.84 | 4.71 | 5.16 | 4.71
Private Messages                                  4.03 | 5.13 | 5.30 | 5.08
Texts Stored by Provider                         3.88 | 5.28 | 5.26 | 5.13
Posts on SNS                                      3.43 | 3.72 | 4.25 | 3.94
Pictures on SNS                                   3.24 | 3.47 | 4.15 | 3.33
Anonymous SNS Posts                               2.74 | 2.97 | 3.32 | 3.11
Audio of Phone Calls                              3.28 | 4.85 | 5.27 | 4.88
Documents on Computer                             3.46 | 4.43 | 5.31 | 4.75
Websites Visited on Comp                         3.52 | 4.21 | 4.67 | 4.36

Table 16 shows the average participant ratings for how relieved they would be, and Table 17 shows the average participant ratings for how relieved the average person their age would be. As in Study 1, these ratings were primarily used to prevent a negative bias in participants’ ratings. While participants predicted the average person their age would be more upset if they experienced each search than the participant himself would be, the opposite pattern was observed here with police officer searches— participants predicted they would be more relieved if they experienced each search than the average person would be.

Table 16

<table>
<thead>
<tr>
<th>Prediction of How Relieved Participant Would Be if Search Occurred (0 = not at all relieved, 7 = extremely relieved)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Police Officer Searches</strong></td>
</tr>
<tr>
<td>Adolescents (N = 43)</td>
</tr>
<tr>
<td>Text Messages                                                 2.18</td>
</tr>
<tr>
<td>Phone Numbers Dialed                                          2.19</td>
</tr>
<tr>
<td>Cell Phone Contacts                                           2.08</td>
</tr>
<tr>
<td>Websites Visited on Cell                                     1.92</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td><strong>Table 17</strong></td>
</tr>
<tr>
<td><strong>Prediction of How Relieved Average Person Would Be if Search Occurred (0 = not at all relieved, 7 = extremely relieved)</strong></td>
</tr>
<tr>
<td><strong>Police Officer Searches</strong></td>
</tr>
<tr>
<td>Text Messages</td>
</tr>
<tr>
<td>Phone Numbers Dialed</td>
</tr>
<tr>
<td>Cell Phone Contacts</td>
</tr>
<tr>
<td>Websites Visited on Cell</td>
</tr>
<tr>
<td>Cell Phone GPS</td>
</tr>
<tr>
<td>Car GPS</td>
</tr>
<tr>
<td>Cell Phone Apps</td>
</tr>
</tbody>
</table>
Table 18: Average ratings of two of Slobogin and Schumacher’s perceived privacy domains—personal nature and intrusiveness—are presented in Tables 18 and 19. Text messages ($M = 5.57$) and audio of phone calls ($M = 5.31$) were rated the most personal, while anonymous SNS posts were rated the least personal ($M = 2.94$). Similarly, participants rated searches of text messages, either stored on their cell phone ($M = 5.66$) or cell service provider ($M = 5.50$) as the most intrusive. Searches of anonymous posts on SNS were rated the least intrusive ($M = 3.23$).
Table 18

*Ratings of Personal Nature of Information (0 = not at all personal, 7 = extremely personal)*

<table>
<thead>
<tr>
<th></th>
<th>Adolescents (N = 43)</th>
<th>Young Adults (N = 129)</th>
<th>Adults (N = 169)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Messages</td>
<td>4.42</td>
<td>5.74</td>
<td>5.71</td>
<td>5.57</td>
</tr>
<tr>
<td>Phone Numbers Dialed</td>
<td>3.51</td>
<td>4.27</td>
<td>4.91</td>
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<tr>
<td>Cell Phone Contacts</td>
<td>3.61</td>
<td>4.14</td>
<td>5.08</td>
<td>4.53</td>
</tr>
<tr>
<td>Websites Visited on Cell</td>
<td>3.29</td>
<td>4.38</td>
<td>4.96</td>
<td>4.53</td>
</tr>
<tr>
<td>Cell Phone GPS</td>
<td>3.72</td>
<td>4.76</td>
<td>4.95</td>
<td>4.73</td>
</tr>
<tr>
<td>Car GPS</td>
<td>3.59</td>
<td>4.40</td>
<td>4.76</td>
<td>4.48</td>
</tr>
<tr>
<td>Cell Phone Apps</td>
<td>2.46</td>
<td>3.06</td>
<td>3.80</td>
<td>3.35</td>
</tr>
<tr>
<td>Emails on Computer</td>
<td>3.43</td>
<td>4.70</td>
<td>5.53</td>
<td>4.97</td>
</tr>
<tr>
<td>Emails on Cell Phone</td>
<td>3.19</td>
<td>4.86</td>
<td>5.48</td>
<td>4.98</td>
</tr>
<tr>
<td>Private Messages</td>
<td>4.14</td>
<td>4.87</td>
<td>5.54</td>
<td>5.11</td>
</tr>
<tr>
<td>Texts Stored by Provider</td>
<td>3.85</td>
<td>5.32</td>
<td>5.56</td>
<td>5.28</td>
</tr>
<tr>
<td>Posts on SNS</td>
<td>2.86</td>
<td>3.69</td>
<td>4.26</td>
<td>3.87</td>
</tr>
<tr>
<td>Pictures on SNS</td>
<td>3.05</td>
<td>3.67</td>
<td>4.40</td>
<td>3.94</td>
</tr>
<tr>
<td>Anonymous SNS Posts</td>
<td>2.94</td>
<td>2.85</td>
<td>3.01</td>
<td>2.94</td>
</tr>
<tr>
<td>Audio of Phone Calls</td>
<td>3.42</td>
<td>5.39</td>
<td>5.68</td>
<td>5.31</td>
</tr>
<tr>
<td>Documents on Computer</td>
<td>3.54</td>
<td>4.77</td>
<td>5.54</td>
<td>5.01</td>
</tr>
<tr>
<td>Websites Visited on Comp</td>
<td>3.36</td>
<td>4.23</td>
<td>4.80</td>
<td>4.42</td>
</tr>
</tbody>
</table>

Table 19

*Ratings of Intrusiveness of Search (0 = not at all intrusive, 7 = extremely intrusive)*

<table>
<thead>
<tr>
<th></th>
<th>Adolescents (N = 43)</th>
<th>Young Adults (N = 129)</th>
<th>Adults (N = 169)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Messages</td>
<td>4.61</td>
<td>5.71</td>
<td>5.87</td>
<td>5.66</td>
</tr>
<tr>
<td>Phone Numbers Dialed</td>
<td>3.84</td>
<td>4.71</td>
<td>5.10</td>
<td>4.80</td>
</tr>
<tr>
<td>Cell Phone Contacts</td>
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<td>5.26</td>
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</tr>
<tr>
<td>Websites Visited on Cell</td>
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<tr>
<td>Cell Phone GPS</td>
<td>4.11</td>
<td>5.16</td>
<td>5.38</td>
<td>5.15</td>
</tr>
<tr>
<td>Car GPS</td>
<td>4.00</td>
<td>4.74</td>
<td>4.99</td>
<td>4.78</td>
</tr>
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<td>Cell Phone Apps</td>
<td>3.22</td>
<td>3.48</td>
<td>4.29</td>
<td>3.84</td>
</tr>
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<td>Emails on Computer</td>
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<td>5.04</td>
<td>5.63</td>
<td>5.22</td>
</tr>
<tr>
<td>Emails on Cell Phone</td>
<td>3.78</td>
<td>5.25</td>
<td>5.58</td>
<td>5.24</td>
</tr>
<tr>
<td>Private Messages</td>
<td>4.26</td>
<td>5.21</td>
<td>5.61</td>
<td>5.30</td>
</tr>
<tr>
<td>Texts Stored by Provider</td>
<td>4.50</td>
<td>5.53</td>
<td>5.70</td>
<td>5.50</td>
</tr>
<tr>
<td>Posts on SNS</td>
<td>3.46</td>
<td>3.31</td>
<td>4.42</td>
<td>3.86</td>
</tr>
<tr>
<td>Pictures on SNS</td>
<td>3.71</td>
<td>3.30</td>
<td>4.42</td>
<td>3.89</td>
</tr>
<tr>
<td>Anonymous SNS Posts</td>
<td>3.63</td>
<td>3.05</td>
<td>3.29</td>
<td>3.23</td>
</tr>
<tr>
<td>Audio of Phone Calls</td>
<td>3.89</td>
<td>5.45</td>
<td>5.67</td>
<td>5.38</td>
</tr>
<tr>
<td>Documents on Computer</td>
<td>4.09</td>
<td>5.10</td>
<td>5.72</td>
<td>5.29</td>
</tr>
<tr>
<td>Websites Visited on Comp</td>
<td>3.91</td>
<td>4.40</td>
<td>5.14</td>
<td>4.71</td>
</tr>
</tbody>
</table>
The final rating participants provided of these searches is the riskiness of sharing
of storing information in each way. Participants rated cell service providers storing text
messages as the most risky ($M = 4.97$), followed by sending private messages ($M = 4.91$).
Storing cell phone apps ($M = 3.58$) and making anonymous posts on SNS ($M = 3.72$)
were rated as the least risky.

Table 20

Ratings of Riskiness of Storing Information ($0 = \text{not at all risky}$, $7 = \text{extremely risky}$)

<table>
<thead>
<tr>
<th></th>
<th>Adolescents (N = 43)</th>
<th>Young Adults (N = 129)</th>
<th>Adults (N = 169)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Messages</td>
<td>4.08</td>
<td>4.98</td>
<td>5.10</td>
<td>4.93</td>
</tr>
<tr>
<td>Phone Numbers Dialed</td>
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<td>3.98</td>
<td>4.47</td>
<td>4.23</td>
</tr>
<tr>
<td>Cell Phone Contacts</td>
<td>3.89</td>
<td>3.74</td>
<td>4.59</td>
<td>4.17</td>
</tr>
<tr>
<td>Websites Visited on Cell</td>
<td>3.79</td>
<td>4.63</td>
<td>4.63</td>
<td>4.53</td>
</tr>
<tr>
<td>Cell Phone GPS</td>
<td>4.22</td>
<td>4.35</td>
<td>4.64</td>
<td>4.71</td>
</tr>
<tr>
<td>Car GPS</td>
<td>4.22</td>
<td>4.74</td>
<td>4.81</td>
<td>4.47</td>
</tr>
<tr>
<td>Cell Phone Apps</td>
<td>3.30</td>
<td>3.29</td>
<td>3.86</td>
<td>3.58</td>
</tr>
<tr>
<td>Emails on Computer</td>
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<td>4.55</td>
<td>5.06</td>
<td>4.77</td>
</tr>
<tr>
<td>Emails on Cell Phone</td>
<td>3.65</td>
<td>4.52</td>
<td>5.09</td>
<td>4.70</td>
</tr>
<tr>
<td>Private Messages</td>
<td>4.19</td>
<td>5.00</td>
<td>5.00</td>
<td>4.91</td>
</tr>
<tr>
<td>Texts Stored by Provider</td>
<td>4.21</td>
<td>4.92</td>
<td>5.17</td>
<td>4.97</td>
</tr>
<tr>
<td>Posts on SNS</td>
<td>4.11</td>
<td>4.50</td>
<td>4.68</td>
<td>4.50</td>
</tr>
<tr>
<td>Pictures on SNS</td>
<td>3.84</td>
<td>4.32</td>
<td>4.55</td>
<td>4.37</td>
</tr>
<tr>
<td>Anonymous SNS Posts</td>
<td>3.80</td>
<td>4.13</td>
<td>3.36</td>
<td>3.72</td>
</tr>
<tr>
<td>Audio of Phone Calls</td>
<td>3.86</td>
<td>4.62</td>
<td>5.06</td>
<td>4.75</td>
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<tr>
<td>Documents on Computer</td>
<td>4.11</td>
<td>4.41</td>
<td>4.95</td>
<td>4.64</td>
</tr>
<tr>
<td>Websites Visited on Comp</td>
<td>4.18</td>
<td>4.68</td>
<td>4.68</td>
<td>4.63</td>
</tr>
</tbody>
</table>

Experience with social media and perceptions of searches. I hypothesized that
perceptions of searches will vary based on experience with Social Networking Sites (SNS).
A multilevel linear model (MLM) was used to test the hypothesis that ratings vary as a
function of experience with social media, and that the strength and direction of that
difference varies as a function of age. The following model was tested:

**Level 1:** $Y_{ij}$ (outcome rating) = $\beta_{0j} + r_{ij}$
**Level 2:** \( \beta_{0j} = \gamma_{00} + \mu_{0j} \)

\[ \beta_{1j} = \gamma_{10} + \gamma_{11} \text{ (experience with SNS)} + \mu_{1j} \]

In this model, experience with SNS was defined as the length of time participants have used SNS and the number of hours per day participants use SNS. I hypothesize that individuals with more experience with SNS will be more likely to view searches of electronic communication devices as intrusive and violating privacy. Level 2 predictors include: (a) number of years the participant has used SNS and (b) the number of hours the participant spends on a SNS each day. A separate MLM was conducted for each outcome variable (intrusiveness, violation of privacy, and expectation of privacy).

Consistent with this hypothesis, years using SNS was significantly associated with ratings of intrusiveness, \( t(317) = 2.68, p < .001 \), and ratings of personal nature of item searches, \( t(317) = 2.80, p < .001 \), but was not significantly associated with ratings of riskiness of sharing information, \( t(317) = .96, p = .34 \). The coefficients of these relationships were all positive, indicating that, on average, as participants reported more years of using social media, their ratings of intrusiveness of the search and personal nature were higher.

Number of hours per day using SNS was also significantly associated with ratings of intrusiveness, \( t(317) = -2.50, p < .05 \), and personal nature of the item searched, \( t(317) = -2.48, p < .05 \), but was marginally significantly associated with ratings of riskiness of sharing information, \( t(317) = -1.80, p = .07 \). Contrary to the hypotheses, these coefficients were negative, indicating that, on average, as participants spend more time on social media each day, their ratings of the intrusiveness of searches, riskiness of sharing information, and personal nature of the item searched are lower.
**Age, development and search perceptions.** This study also examined whether perceptions of searches vary based on development of risk-taking processes. It was hypothesized that individuals who are more impulsive and sensation seeking will view searches as more intrusive and more violating of privacy. Same as the prior analyses, MLM was used for this hypothesis. Level 1 of the model included each vignette and Level 2 was scores on the three risk-taking capacity measures: the Barratt Impulsiveness Scale, the Sensation Seeking Scale, and the self-reported risk-taking behaviors. A separate MLM was conducted for each outcome variable of interest.

Age was significantly associated with ratings of intrusiveness, $t(264) = 2.30, p < .05$, and ratings of the personal nature of the item searched, $t(264) = 2.81, p < .01$, but only marginally significantly associated with ratings of riskiness of sharing information, $t(264) = 1.94, p = .05$. The two significant coefficients were positive, indicating that as the age of the participant increased, on average, ratings of intrusiveness and personal nature also increased.

Impulsivity was not significantly associated with ratings of intrusiveness, $t(264) = .88, p = .38$, ratings of the personal nature of the item searched, $t(264) = 1.22, p = .22$, or ratings of riskiness of sharing information, $t(264) = 1.42, p = .16$.

Sensation seeking was significantly associated with ratings of intrusiveness, $t(264) = -2.31, p < .05$, and ratings of the personal nature of the item searched, $t(264) = -3.11, p < .01$, but only marginally significantly associated with ratings of riskiness of sharing information, $t(264) = -1.70, p = .09$. The coefficients were all negative,
indicating that as participants increased in sensation seeking, on average, their ratings of intrusiveness of the search and personal nature of the item searched decreased.

**Search dimensions and age, impulsivity, and sensation seeking.** Multilevel modeling was also used to examine what dimensions were associated with participants’ ratings of impulsivity, riskiness of sharing information, and personal nature of the item searched, and whether these dimensions varied according to age, impulsivity, and sensation seeking.

Ratings of the personal nature of the item searched were significantly associated with perceptions of intrusiveness, $t(4256) = 58.51, p < .001$, as were ratings of the riskiness of sharing information via the object of the search, $t(4256) = 18.03, p < .001$. On average, as participants perceived the object of the search as more personal in nature, and as riskier to share information using, participants perceived the search as more intrusive. These relationships were not associated with age, $t(271) = .65, p = .52$, impulsivity, $t(271) = - .25, p = .81$, or sensation seeking, $t(271) = - .22, p = .82$.

Individual models were created for perceptions of searches conducted by a police officer and for perceptions of searches conducted by a school official. For searches conducted by a police officer, ratings of the likelihood of the search occurring were significantly associated with ratings of intrusiveness, $t(4254) = 7.70, p < .001$. On average, as ratings of the likelihood of the search occurring increased, so did ratings of the intrusiveness of the search. Ratings of how upset the participant would be if they were the subject of the search were also significantly associated with ratings of intrusiveness, $t(4254) = 17.35, p < .001$. On average, the more upset participants predicted they would be, the more intrusive they rated the search. However, ratings of
the reasonableness of the search were not significantly associated with intrusiveness ratings, \( t(4254) = -0.11, p = .91 \).

These relationships were not significantly associated with age, \( t(271) = 0.01, p = .99 \), or impulsivity, \( t(271) = -0.01, p = .99 \), but were significantly associated with sensation seeking, \( t(271) = -2.01, p < .05 \).

A different pattern of results was observed for school official searches. For searches conducted by a school official, ratings of the likelihood of the search occurring were not significantly associated with ratings of intrusiveness, \( t(4252) = 1.63, p = .1 \). Ratings of the reasonableness of the search were significantly associated with ratings of intrusiveness, \( t(4254) = -5.78, p < .001 \), as were ratings of how upset the participant predicted they would be if they were subject to the search, \( t(4254) = 19.07, p < .001 \). On average, as ratings of the reasonableness of the search increased, ratings of intrusiveness decreased. The more reasonable a search was perceived to be, the less intrusiveness the search was perceived to be. On average, as ratings of how upset the participant would be increased, intrusiveness ratings also increased.

These relationships were not associated with age, \( t(271) = 1.17, p = .25 \), impulsivity, \( t(271) = 1.18, p = .24 \), or sensation seeking, \( t(271) = -.82, p = .41 \).

**Study 2 Discussion**

Study 2 extended the results of Study 1 by including participants across the age span and adding measures of impulsivity, sensation seeking, and experience with social media to further explore what variables may affect how individuals view searches of online information. Replicating prior research, age was negatively correlated with sensation seeking—older participants had lower scores on the sensation seeking measure.
than did younger participants. However, the positive relationship between age and impulsivity was only marginally significant. This may indicate our measure of impulsivity was not sensitive enough to fully capture the change of impulsivity over time.

An initial finding of Study 2 is that while the amount of information participants reported sharing on their social media profile was not associated with either age or sensation-seeking, it was associated with impulsivity. Participants with higher scores on the BIS reported sharing more information on their social media profile. This may indicate what information is shared publicly online is a spur-of-the-moment, “hot” decision that is not fully reasoned, regardless of the age of the social media user.

According to legal scholars, courts make a distinction between “coding” and “content” information when evaluating Fourth Amendment protections—information that only provides the intended recipient is “coding” information not protected by the Fourth Amendment, while information comprising the content of a message is protected by the Fourth Amendment (Kerr, 2009). Participants’ ratings of searches mirror this distinction. Searches of “coding” information, such as phone numbers dialed or cell phone contacts, were not rated as highly intrusive or highly personal in nature, while searches of “content” information, such as text messages, audio of phone calls, and documents, were rated as highly intrusive and personal in nature. This finding supports the distinction courts have made between information regarding the intended address of a recipient, which by its nature is necessarily shared with a third party, and the content of a message. Even in the digital age, where all information sent via wired communication is shared with a third party, individuals view content information as more private than coding information.
This distinction did not hold true, however, for posts and pictures shared on social media. These types of searches were rated as not very intrusive and not very personal in nature. This is possibly because the purpose of these types of posts is to share information with a large number of other people. Users posting a message on another user’s profile intends that user, and the user’s friends, to be able to read that message. In that way, social media posts are more similar to coding information that is necessarily shared with others and not meant to be kept private. Courts evaluating searches of social media posts may be able to analogize to coding information when determining whether the Fourth Amendment protects such searches.

Another difficulty for the coding vs. content distinction is websites. The URL of a website a user visits could be seen as coding information, because the user must type in the address in order to visit that particular site. On the other hand, the URL—which frequently includes a descriptive title of the website—can provide information about the content included on the website, which in turn can provide information about the user. But participants in the current study did not rate searches of websites visited as highly intrusive or personal in nature, and considered such searches fairly reasonable. This may be because participants see such information as similar to coding information that must be shared with a third party. Alternatively, participants may be accustomed to third parties tracking the websites they visit—employers and schools regularly restrict and monitor Internet traffic—that such searches are now routine.

In examining participants’ ratings of the searches, it is clear that participants view searches of text message as highly intrusive and upsetting. This is true whether the text messages are stored on a cell phone or stored by a cell phone service provider. While all
three age groups rated text messages stored on a cell phone as more personal in nature than those stored by a provider, and rated a search of cell phone text messages as more intrusive than a search of messages stored by a provider, a search of text messages stored by a provider was rated the second-most intrusive search and the third-most personal in nature overall.

This finding may have important implications for courts. Currently before the Supreme Court is Carpenter v. United States, a court case challenging the warrantless search of cell phone records of historical cell site location information, which provides information on a cell phone’s physical location over time. The records that were searched in Carpenter were stored solely by the cell phone service provider for their own records, and were not stored or searched on a physical cell phone. Part of the reasoning supporting the United States’ argument that such a search is not an unreasonable search under the Fourth Amendment is that cell phone users knowingly share their cell site location data with their cell phone provider and thus give up all reasonable expectation of privacy in that information (Francisco, Blanco & Ellickson 2017). The findings of this study, however, indicate people of all ages hold at least a subjective expectation of privacy in information stored by their cell phone provider.

One type of search that participants do not view as very intrusive or personal nature, in contrast, is a search of anonymous social media posts. Several social media sites, such as Whisper and YikYak, allow users to post anonymously on various topics. Perhaps because these posts cannot be associated with any individualizing information, participants were not concerned with potential searches of such information. This feeling of “safety” in posting information anonymously may not be warranted. Anonymous
applications often allow law enforcement to subpoena or get a warrant for identifying information such as IP addresses and location information, and users have been able to create fully-automated software that can identify the location of posts with accuracy up to 100 meters (Xue et al. 2016). Anonymous posts are likely not as anonymous as users believe.

This assumed anonymity may lead posters to do things they would not otherwise do. In 2015, students at both Emory University and Virginia Tech University caused quite the kerfuffle when they were arrested for anonymous posts on YikYak stating the user was going to perpetrate a school shooting (Shapiro, 2015). Scholars have professed concern over anonymity leading to increased rates of cyberbullying (Peebles, 2014). The same factor that make users less concerned with privacy online—lack of individualizing information—may also make users more likely to make negative comments or even commit crimes. The anonymity may provide a false sense of security for posters to stalk, harass, or bully other users, but the website and law enforcement are still able to track down the poster. Courts may need to take into account the dichotomy between what users understand to be the information shared with others and what information actually can be accessed by posting online.

Study 2 provided an examination of what individual difference variables—age, impulsivity, sensation seeking, and experience with social media—may be associated with perceptions of searches, and what dimensions individuals use when evaluating searches. One interesting finding of Study 2 was that while impulsivity is related to the amount of information a user posts on their social media profile, impulsivity was not associated with perceptions of searches. This may be because the decision to share
information online is a cognitively “hot” decision, while rating a search on various dimensions is a cognitively “cold” decision. Study 3 sought to provide a more direct measure of decision making regarding posting information online and the link between age, decision-making development, and privacy-protecting behaviors.

**Study 3: Anticipating Negative Outcomes in Sharing Information Online.**

Study 3 extends the results of the prior two studies by examining actual decisions made by adolescents and young adults in sharing information online.

**Methods.**

**Participants.** Adolescents ages 12-18 and young adult participants ages 19 and up were recruited for the third study. Power analysis was estimated with G*Power (Buchner, et al., 2009). Previous research on adolescents’ physiological changes prior to taking risks report average effect sizes of .38 (Crone & van der Molen, 2007); therefore, power analysis included effect size of .38 power of .80 and α = .05. The final goal sample was increased by 10% to account for having to drop participants from final analyses, resulting in the goal of 188 total participants (94 adolescents and 94 young adults).

Adolescent participants were recruited from the Lincoln, Nebraska, community. Various methods were used to recruit participants. First, middle school and high school teachers in the Lincoln Public School District were contacted for their assistance. Teachers willing to assist with recruitment were provided with flyers and a sample email; teachers handed out physical copies of flyers, emailed their students regarding the study, or both. Teachers were contacted for their assistance during three different academic semesters. Second, youth groups and organizations in the Lincoln community were
contacted in a similar manner. A list of organizations that serve the targeted age group was made and contact information was obtained from organizations’ websites. Groups were solicited via email, over the phone, and in person. Organizations that responded with willingness to assist in recruitment were provided with flyers and a sample email and were able to hang or pass out physical copies of flyers, email listservs with the study information, or both. For both methods, I offered to provide a lecture on psychological research, criminal procedure, and/or social media, but no teachers or organizations accepted the offer.

Third, the participant opportunity was shared with the greater Lincoln community. Flyers were hung in the Lincoln community where the targeted population may frequent, including coffee shops, gas stations near schools, and malls. A local electronic newsletter targeting parents ran the study recruitment flyer as an advertisement and posted the advertisement on their social media page. Finally, social media was used to attempt to recruit participants. My academic advisor, members of our lab, and other associates shared the recruitment flyer along with a brief description of the study.

Forty-four adolescents participated in the study in exchange for a gift card to Amazon.com. Twenty-seven adolescents received a $25 gift card and 17 received a $50 gift card. The compensation was increased to a $50 Amazon.com gift card in Spring 2018 to further incentivize participation. Four adolescents had to be removed from the sample due to equipment malfunction and two were removed for failing attention checks resulting in a final adolescent sample of 38. The age of adolescent participants ranged from 12 to 18, with an average of 15.5. More than half (57.9%) of adolescent participants identified as male and 39.5% identified as female. One adolescent
participant (2.6%) identified as non-binary. Most (78.9%) of adolescent participants identified their race as White or Caucasian, 5.3% identified their race as African American, 5.3% identified their race as Asian, 2.6% identified their race as Hispanic, and 7.9% identified their race as other.

Almost all (97.4%) of adolescent participants were a member of at least one social networking site. The most commonly used social media site was Instagram (n = 33 participants, 86.8%), followed by Facebook (n = 26, 68.4%) and Snapchat (n = 25, 65.8%). The average age participants first joined a social networking site was 12.2, and participants had been a member of a social networking site, on average, for 3.5 years. Participants reported spending an average of 2.6 hours each day on a social networking site.

Young adult participants (n = 156) were recruited from undergraduate psychology classes at the University of Nebraska-Lincoln in exchange for course credit. Nineteen young adults did not complete the study due to equipment malfunction or running out of time, and two participants failed attention checks, resulting in a final young adult sample of 135. The age of young adult participants ranged from 19 to 28, with an average of 20.2. Most (73.3%) of the young adult participants identified as female and 25.9% of young adult participants identified as male; one young adult participant (.7%) identified as “other.” Most (77.8%) of young adult participants identified their race as Caucasian, .7% identified their race as African American, 12.6% identified their race as Asian, 6.7% identified their race as Hispanic, and 2.2% identified their race as other.

Virtually all (99.3%) of young adult participants were a member of at least one social media site. The most commonly used social media site was Facebook (n = 129
participants, 95.6%), followed by Instagram (n = 111, 82.2%) and Snapchat (n = 111, 82.2%). The average age participants first joined a social networking site was 13.5, and participants had been a member of a social networking site, on average, for 6.7 years.

Participants reported spending an average of 2.5 hours each day on a social networking site. Tables 21 and 22 depict the information adolescent and young adult participants reported they shared on their social networking profile they use the most.

Table 21

<table>
<thead>
<tr>
<th>Information</th>
<th>Not On</th>
<th>Public</th>
<th>Limited Public</th>
<th>Friends</th>
<th>Some Friends</th>
<th>Fake</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name</td>
<td>8.3%</td>
<td>77.8%</td>
<td>5.6%</td>
<td>8.3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Last Name</td>
<td>5.7%</td>
<td>74.3%</td>
<td>5.7%</td>
<td>14.3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Picture</td>
<td>11.1%</td>
<td>69.4%</td>
<td>11.1%</td>
<td>8.3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Birthday</td>
<td>44.4%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>27.8%</td>
<td>8.3%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Phone #</td>
<td>88.9%</td>
<td>0%</td>
<td>2.8%</td>
<td>5.6%</td>
<td>2.8%</td>
<td>0%</td>
</tr>
<tr>
<td>Email</td>
<td>86.1%</td>
<td>2.8%</td>
<td>2.8%</td>
<td>5.6%</td>
<td>2.8%</td>
<td>0%</td>
</tr>
<tr>
<td>IM Name</td>
<td>47.2%</td>
<td>38.9%</td>
<td>5.6%</td>
<td>5.6%</td>
<td>0%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Address</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Current City</td>
<td>72.2%</td>
<td>11.1%</td>
<td>5.6%</td>
<td>11.1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Schedule</td>
<td>97.2%</td>
<td>0%</td>
<td>0%</td>
<td>2.8%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Employment</td>
<td>91.7%</td>
<td>5.6%</td>
<td>0%</td>
<td>2.8%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>School</td>
<td>47.2%</td>
<td>30.6%</td>
<td>8.3%</td>
<td>13.9%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Orientation</td>
<td>75.0%</td>
<td>13.9%</td>
<td>0%</td>
<td>8.3%</td>
<td>2.8%</td>
<td>0%</td>
</tr>
<tr>
<td>Likes</td>
<td>38.9%</td>
<td>27.8%</td>
<td>8.3%</td>
<td>25.0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Relationship</td>
<td>83.3%</td>
<td>8.3%</td>
<td>0%</td>
<td>8.3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Groups</td>
<td>72.2%</td>
<td>13.9%</td>
<td>2.8%</td>
<td>9.3%</td>
<td>2.8%</td>
<td>0%</td>
</tr>
<tr>
<td>Pictures Tagged</td>
<td>25.0%</td>
<td>30.6%</td>
<td>22.2%</td>
<td>19.4%</td>
<td>2.8%</td>
<td>0%</td>
</tr>
<tr>
<td>Own Pictures</td>
<td>8.3%</td>
<td>25.0%</td>
<td>19.4%</td>
<td>44.4%</td>
<td>2.8%</td>
<td>0%</td>
</tr>
<tr>
<td>Others’ Posts</td>
<td>11.1%</td>
<td>38.9%</td>
<td>11.1%</td>
<td>33.3%</td>
<td>5.6%</td>
<td>0%</td>
</tr>
<tr>
<td>Own Posts</td>
<td>30.6%</td>
<td>38.9%</td>
<td>19.4%</td>
<td>11.1%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 22

<table>
<thead>
<tr>
<th>Information</th>
<th>Not On</th>
<th>Public</th>
<th>Limited Public</th>
<th>Friends</th>
<th>Some Friends</th>
<th>Fake</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name</td>
<td>7.7%</td>
<td>84.4%</td>
<td>4.4%</td>
<td>7.4%</td>
<td>2.2%</td>
<td>.7%</td>
</tr>
<tr>
<td>Last Name</td>
<td>5.2%</td>
<td>77.8%</td>
<td>6.7%</td>
<td>8.9%</td>
<td>1.5%</td>
<td>0%</td>
</tr>
<tr>
<td>Picture</td>
<td>4.4%</td>
<td>81.5%</td>
<td>5.9%</td>
<td>7.4%</td>
<td>.7%</td>
<td>0%</td>
</tr>
</tbody>
</table>
The overall pattern of self-reported information sharing between young adults and adolescents was the same and was similar to the results in Study 2. Participants reported using the most extensive measures of privacy protection (limiting information to only some friends or using fake information) very rarely. But the most identifying information, such as a physical address and email address, participants reported leaving off their profile entirely. While more adolescents left off employment information (91.7%) and relationship information (83.3%) than did young adults (55.6% for employment and 56.3% for relationships), this could be because young adults are more likely than adolescents to have a job or be in a relationship.

**Procedures.** All procedures were conducted in a single, approximately one-hour in-lab session. Adolescents were required to be accompanied by a parent or guardian to provide parental consent. The parent or guardian was brought to the lab to see the setting and the equipment and asked to provide parental consent. If they consented, the parent or guardian was escorted to a waiting area until the debriefing session.
Participants first completed demographic measures and provided information about their experience with and use of Social Networking Sites, including the Social Media Usage and Privacy Questionnaire from Study 2. Participants were then told the experimenters were testing a new SNS that is being developed and were interested in their perceptions.

A “new” SNS was created using buddypress (buddypress.org), a social networking site developing tool for bloggers utilizing the Word Press platform. The SNS, ConnectED, was modeled as a SNS solely for students, similar to the initial purpose of Facebook. ConnectED allowed participants to create profiles; search, “friend,” and instant message other users; and form and join groups. Participants were told the study would like to see how they created a profile on this new site.

For the next part of the study, participants’ heart rate and skin conductance were measured in order to track participants’ physiological responses to the various decisions in creating a social media profile. Skin conductance is related to activity in the autonomic nervous system, which plays an important role in emotion, motivation, and risk taking (Figner & Murphy, 2011). Heart rate is also linked to the autonomic nervous system. Generally, heart rate slows when an individual anticipates making a decision, then accelerates back to baseline, and this deceleration is more pronounced when the individual anticipates the decision to be risky (Crone, Smonsen, van Beek & van der Molen, 2004). Previous studies have found younger adolescents reflect a heightened deceleration of their heart rate compared to older adolescents and young adults when anticipating greater rewards, which may indicate younger adolescents are more sensitive to rewards than are older individuals (Crone & van der Molen, 2007).
Both physiological measures were collected utilizing BIOPAC MP36R technology and data was recorded via Acqknowledge software (Braithwaite, Watson, Jones, & Rowe, 2015). Skin conductance was measured with sensors placed on the second and third finger of the participant’s non-dominant hand. The electrode sensors measures electrical flow between the two points of contact with the skin. BIOPAC collects two measures of skin conductance: background tonic, or stable, skin conductance (skin conductance level) and phasic changes in skin conductance (skin conductance reactance). Because I am interested in how skin conductance changes to stimuli, I focus on skin conductance reactance.

Changes in skin conductance reactance can be either event-related (responses that are attributed to a specific stimulus) or non-specific (responses that are not connected with a stimulus) (Braithwaite, Watson, Jones, & Rowe, 2015). Acqknowledge identifies event-related skin conductance responses (ER-SRCs) as an SCR with a significant deviation in electronic signal occurring between one and three seconds after the stimulus is present. SCRs that occur outside this time window are designated non-specific SCRs (NS-SRC). For the current study, stimuli was identified at set time points when the participant heard the instruction to enter a piece of information into his or her profile.

Heart rate was measured with sensors placed on the inside of the participant’s wrist and on the opposite ankle. Individual heart beats were measured via voltage passed across the chest from the arm to the lower leg. The Acqknowledge software identifies a heartbeat as a positive peak in the electrical current. Participants were instructed to keep their arm and leg as still as possible to minimize noise in the data.
After the participant was connected to the electrodes, the experimenter instructed the participant to continue with the study and left the room. An audio recording guided participants through the profile-creation process. This ensured I would be able to match up each decision point with the participant’s physiological data. Participants first heard and read a brief description of the social networking site and what they would have to do to create a profile. This time also served the purpose of creating a baseline for participants’ physiological measures.

Participants created a personal profile on the SNS, which included information such as full name, location, and school. Participants were also instructed they could take a picture of themselves and upload it as their profile picture (using a webcam connected to the computer) or were able to upload a generic stock photo as their profile picture. Participants were also able to set each piece of information to public (viewable by any person who accessed the website), private (viewable only by people the participant “friended”), or not viewable (only the participant could see the information).

At a set time point, another user instant messaged the participant. This other user was actually a confederate, one of the experimenters in the other room. The experimenter followed an exact script at specific time points, asking the participant a series of questions. The script is reproduced in Appendix F. If the participant asked the confederate for information, the confederate responded with identical answers to the participant to make the participant believe he or she was communicating with an individual of the same age and gender.

After the audio recording walking the participant through the creation of the social media profile concluded, the experimenter disconnected the participant from the
skin conductance and heart rate sensors. Participants then completed the measures from Study 2: the self-reported impulsivity and sensation-seeking scales and the expectation of privacy from governmental actors vignettes. To be consistent with the study’s purported purpose of creating a new social networking site, participants were also asked their perceptions of ConnectEd.

**Hypotheses.** The main hypothesis for Study 3 is that whether the participant makes information public on their profile is a function of the following dimensions: age, development of risk-taking capacities, experience with SNS, and perception of risk. Perception of risk was measured by a physiological response to a decision regarding sharing information. It is hypothesized that older individuals will be more likely to perceive sharing information as risky, as will individuals with lower scores on the Barratt Impulsiveness Scale and Sensation Seeking Scale.

**Results.**

*Amount of information shared on the SNS, age, impulsivity, and sensation seeking.* For each piece of information on the profile, participants had the opportunity to leave the field blank or complete the field and choose to share the information with everyone, friends, or no one. The exception was all participants had to complete the field for their name, and were told this field was viewable to all users who accessed ConnectEd. Table 23 displays the name participants chose to add to their profile: first name only, full name, or other (e.g., initials or an obvious nickname).

Table 23

<table>
<thead>
<tr>
<th>Display Name for Profile by Age Group</th>
<th>Adolescents (N = 38)</th>
<th>Young Adults (N = 135)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>First name only</td>
<td>42.1%</td>
<td>39.7%</td>
<td>40.3%</td>
</tr>
<tr>
<td>Full Name</td>
<td>55.3%</td>
<td>54.4%</td>
<td>54.6%</td>
</tr>
</tbody>
</table>
Other (initials) 2.6% 5.8% 5.2%

For each remaining piece of information, participants had the option to leave the field blank, share the information with all users, share the information only with those users the participant added as a friend, or only have the information viewable to the user. Table 24 and 25 display the privacy settings for each piece of information, by age group.

Table 24
Privacy Settings for Specific Information on ConnectEd Profile for Adolescents (N = 38)

<table>
<thead>
<tr>
<th>Information</th>
<th>Blank</th>
<th>All Users</th>
<th>Friends Only</th>
<th>Only Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>18.4%</td>
<td>39.5%</td>
<td>36.8%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Hometown</td>
<td>2.6%</td>
<td>47.3%</td>
<td>42.1%</td>
<td>7.9%</td>
</tr>
<tr>
<td>Self-Description</td>
<td>18.4%</td>
<td>52.6%</td>
<td>26.3%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Email Address</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Phone Number</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 25
Privacy Settings for Specific Information on ConnectEd Profile for Young Adults (N = 135)

<table>
<thead>
<tr>
<th>Information</th>
<th>Blank</th>
<th>All Users</th>
<th>Friends Only</th>
<th>Only Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>23.5%</td>
<td>41.1%</td>
<td>33.8%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Hometown</td>
<td>5.1%</td>
<td>31.6%</td>
<td>55.8%</td>
<td>7.4%</td>
</tr>
<tr>
<td>Self-Description</td>
<td>52.2%</td>
<td>28.7%</td>
<td>19.1%</td>
<td>0%</td>
</tr>
<tr>
<td>Email Address</td>
<td>5.1%</td>
<td>94.1%</td>
<td>0%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Phone Number</td>
<td>99.2%</td>
<td>0%</td>
<td>0%</td>
<td>0.7%</td>
</tr>
</tbody>
</table>

Participants also had the opportunity to add a profile picture—either a “selfie” they took with the computer’s web camera or a stock photo. Two adolescent participants chose to take an actual photograph of themselves, 9 (23.7%) left the profile picture blank, and 27 (71.1%) used a generic stock photograph. No young adult participants chose to take an actual photograph of themselves, 26 (19.1%) left the profile picture blank, and 110 (80.9%) uploaded a generic stock photograph.
After the participants completed their profile, a confederate posing as another participant in the study instant messaged the participant. The confederate sent up to seven messages to the participant, and the participant could respond, ignore the confederate, and ask his or her own questions. Table 26 displays the distribution of the number of responses per participant for each age group. Fourteen participants (eight young adults and six adolescents) refused to provide the confederate with identifying information such as their age or location, but still responded to the participant. The proportion of young adults and adolescents who indicated an unwillingness to provide identifying information was statistically significantly different, indicating a higher percentage of adolescents than young adults were unwilling to share identifying information ($\chi^2(1) = 3.94, p < .05$)

The overall average number of responses per participant was 3.8. Adolescent participants responded significantly more times ($M = 4.74$, $SD = 2.7$) than did young adult participants ($M = 3.49$, $SD = 2.2$, $F(1, 82) = 4.74$, $p < .05$).

Table 26

<table>
<thead>
<tr>
<th>Number of Messages</th>
<th>Adolescents (N = 38)</th>
<th>Young Adults (N = 135)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (never responded)</td>
<td>39.5%</td>
<td>55.1%</td>
<td>51.7%</td>
</tr>
<tr>
<td>1</td>
<td>10.5%</td>
<td>12.5%</td>
<td>12.1%</td>
</tr>
<tr>
<td>2</td>
<td>10.5%</td>
<td>7.4%</td>
<td>8.0%</td>
</tr>
<tr>
<td>3</td>
<td>0%</td>
<td>2.2%</td>
<td>1.7%</td>
</tr>
<tr>
<td>4</td>
<td>2.6%</td>
<td>6.6%</td>
<td>5.7%</td>
</tr>
<tr>
<td>5</td>
<td>7.9%</td>
<td>6.6%</td>
<td>6.9%</td>
</tr>
<tr>
<td>6</td>
<td>10.5%</td>
<td>5.9%</td>
<td>6.9%</td>
</tr>
<tr>
<td>7</td>
<td>10.5%</td>
<td>2.2%</td>
<td>4.0%</td>
</tr>
<tr>
<td>8</td>
<td>2.6%</td>
<td>.7%</td>
<td>1.1%</td>
</tr>
<tr>
<td>9</td>
<td>5.3%</td>
<td>.7%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>
In addition to the instant messages, several participants spontaneously sent the confederate a friend request. Fourteen young adult (10.3%) and 9 adolescent (23.7%) participants sent the confederate a friend request. This difference was statistically significant ($\chi^2 (1) = 4.62, p < .05$).

A privacy score was calculated using the information participants added to their profile. If a participant left the information off their profile, that was coded as 0. If the participant included the information but limited access to that information, that was coded as 1. Finally, if a participant included the information and made it available to all users, that was coded as 2. Composite privacy scores ranged from zero to ten, as the profile had five pieces of information for which participants selected privacy settings, and higher scores indicate more sharing of information. The ConnectEd Privacy Disclosure scale had reasonable internal consistency (Cronbach’s alpha = .62) (Goforth, 2015).

The mean ConnectEd Privacy Disclosure Score for young adults was 5.1, and for adolescents was 6.0. This difference was statistically significant ($F(1,168) = 6.1, p < .05$), indicating adolescent participants shared more information publicly than did young adult participants.

The bivariate relationship among the individual variables and the ConnectEd Privacy Disclosure Score was also considered. As shown in Table 27, the ConnectEd Privacy Disclosure Score was not significantly correlated with age, scores on the Barratt Impulsivity Scale, or scores on the Sensation Seeking Scale. The number of replies was, however, significantly negatively associated with participants age ($r = -27, p < .05$) and years using a social networking site ($r = -.30, p < .01$), indicating that older participants and participants who had been a member of a social networking site longer were more
likely to give fewer replies to the confederate. Participants’ age and years on social networking site were also significantly positively correlated ($r = .70, p < .01$).

Table 27

Summary of Means and Correlation Between Privacy Score, Number of Replies, and Individual Difference Variables (N = 174)

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Privacy Score (0-10)</td>
<td></td>
<td>.08</td>
<td>-.08</td>
<td>-.01</td>
<td>.06</td>
<td>-.05</td>
<td>-.01</td>
<td>5.1</td>
<td>1.9</td>
</tr>
<tr>
<td>2. Num. of Replies (0-9)</td>
<td>.08</td>
<td></td>
<td>-.27</td>
<td>-.30**</td>
<td>.10</td>
<td>.03</td>
<td>-.09</td>
<td>3.5</td>
<td>2.2</td>
</tr>
<tr>
<td>3. Age (12-28)</td>
<td>-.08</td>
<td>-.27*</td>
<td></td>
<td></td>
<td>.70**</td>
<td>-.01</td>
<td>-.10</td>
<td>-.05</td>
<td>20.2</td>
</tr>
<tr>
<td>4. Years on SNS (2-12)</td>
<td>-.01</td>
<td>-.30**</td>
<td>.70**</td>
<td></td>
<td>.07</td>
<td>-.08</td>
<td>-.06</td>
<td>6.7</td>
<td>1.6</td>
</tr>
<tr>
<td>5. Hours/Day (0-20)</td>
<td>.06</td>
<td>.10</td>
<td>-.01</td>
<td>.07</td>
<td>--</td>
<td>-.10</td>
<td>.12</td>
<td>2.5</td>
<td>2.2</td>
</tr>
<tr>
<td>6. Impulsivity (0-90)</td>
<td>-.05</td>
<td>.03</td>
<td>-.10</td>
<td>-.08</td>
<td>-.10</td>
<td>--</td>
<td>-.09</td>
<td>67.6</td>
<td>7.3</td>
</tr>
<tr>
<td>6. SSS (0-12)</td>
<td>-.01</td>
<td>-.09</td>
<td>-.05</td>
<td>-.06</td>
<td>.12</td>
<td>-.09</td>
<td>--</td>
<td>8.1</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Note: Correlations marked with an asterisk are significant at the .05 level. Correlations marked with a double asterisk are significant at the .01 level.

**Physiological responses to sharing information online.** Physiological data was analyzed utilizing the Acqknowledge software version 4.1. For skin conductance, the “Find Cycle” function creates an excel spreadsheet of all skin conductance responses per participant. The stimuli (here, when the participant was instructed to enter information) is designated with a flag at the specific time point. If an SRC occurs within three seconds of the stimulus, it is designated an event-related SRC (ER-SRC). If the SRC occurs outside this window, it is designated as non-specific (Braithwaite, Watson, Jones, & Rowe, 2015). Using this analysis, the number of ER-SCRs was collected for each participant.

Acqknowledge includes an automated ECG Analysis function that computes heart rate. This function identifies heart beats by positive peaks in the electronic current.
Beating across the chest. Beats per minute (BPM) can be calculated for a specified cycle. The event markers associated with the stimuli served as the reference point for measuring changes in BPM. A cycle was identified as the three seconds immediately after a stimulus, and a significant deceleration in heart rate occurring in this three-second window was identified as being associated with the stimulus. Like with ER-SRCs, the number of stimulus-rated heart rate changes per participant was collected.

As just discussed, the number of ER-SRCs and event-related heart rate changes (ER-HR) was determined using the “Find Cycle” function on Acqknowledge. In completing the profile, participants had eight distinct decisions to make regarding sharing information: enter information in six fields of their profile (name, school, hometown, email address, phone number, and an “About Me” description), take or select a profile picture, and respond to the confederate. Because participant’s subsequent responses were not timed, only when the confederate first instant messaged the participant was included as an event.

As shown in Table 28 below, the overall number of event-related physiological responses was low. The number of ER-SCR was not statistically different between young adults and adolescents ($F(1, 172) = .06, p = .81$), and neither was the number of ER-HR ($F(1,171) = .01, p = .97$).

Table 28

<table>
<thead>
<tr>
<th></th>
<th>Adolescents (N = 38)</th>
<th>Young Adults (N = 135)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER-SCR</td>
<td>1.6 (.98)</td>
<td>1.6 (.97)</td>
<td>1.6 (.97)</td>
</tr>
<tr>
<td>ER-HR</td>
<td>.5 (.50)</td>
<td>.5 (.40)</td>
<td>.5 (.40)</td>
</tr>
</tbody>
</table>
As shown in Table 29, the number of event-related changes in physiological responses was not related to age, years using a SNS, time spent on an SNS each day, impulsivity, or sensation seeking.

Table 29

**Summary of Means and Correlation Between Event-Related Physiological Changes and Individual Difference Variables (N = 174)**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Measure</th>
<th>I</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ER-SCR (0-4)</td>
<td></td>
<td>--</td>
<td>-0.03</td>
<td>-0.03</td>
<td>-0.01</td>
<td>-0.05</td>
<td>0.05</td>
<td>0.01</td>
<td>1.6</td>
<td>0.97</td>
</tr>
<tr>
<td>2. ER-HR (0-2)</td>
<td></td>
<td>-0.03</td>
<td>--</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.01</td>
<td>0.05</td>
<td>0.07</td>
<td>0.5</td>
<td>0.64</td>
</tr>
<tr>
<td>3. Age (12-28)</td>
<td></td>
<td>-0.03</td>
<td>-0.01</td>
<td>--</td>
<td>0.70**</td>
<td>-0.10</td>
<td>-0.05</td>
<td>20.2</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>4. Years on SNS (2-12)</td>
<td></td>
<td>-0.01</td>
<td>0.02</td>
<td>0.70**</td>
<td>--</td>
<td>0.07</td>
<td>-0.08</td>
<td>-0.06</td>
<td>6.7</td>
<td>1.6</td>
</tr>
<tr>
<td>5. Hours/Day (0-20)</td>
<td></td>
<td>-0.05</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.07</td>
<td>--</td>
<td>-0.10</td>
<td>0.12</td>
<td>2.5</td>
<td>2.2</td>
</tr>
<tr>
<td>6. Impulsivity (0-90)</td>
<td></td>
<td>0.05</td>
<td>0.05</td>
<td>-0.10</td>
<td>-0.08</td>
<td>0.10</td>
<td>--</td>
<td>-0.09</td>
<td>67.6</td>
<td>7.3</td>
</tr>
<tr>
<td>7. SSS (0-12)</td>
<td></td>
<td>0.01</td>
<td>0.07</td>
<td>-0.05</td>
<td>-0.06</td>
<td>0.12</td>
<td>-0.09</td>
<td>--</td>
<td>8.1</td>
<td>1.6</td>
</tr>
</tbody>
</table>

*Note*: Correlations marked with an asterisk are significant at the .05 level. Correlations marked with a double asterisk are significant at the .01 level.

**Variables predicting information-sharing online.** A single regression was used to examine the relationship among age, experience with social networking sites, and development of decision making variables to the outcome of sharing information. The outcome variable of interest is the amount of information participant made information public on their SNS profile. As discussed above, a scale was made summing the amount of information the participant made public on his or her profile for the outcome variable: the ConnectEd Privacy Disclosure Score. The independent variables of interest are age, score on the Barratt Impulsiveness Scale, score on the Sensation Seeking Scale, score on the self-reported risk-taking behaviors, number of years using a SNS, number of hours per day using a SNS, and the number of event-related physiological responses. If heart
rate decelerates and skin conductance increases immediately prior to the decision to share information, this will indicate a perception of risk. This regression will establish a model of what factors play a role in whether an individual is likely to share identifying information online. The following model was tested:

\[ Y(\text{ConnectEd Privacy Disclosure Score}) = a + b(\text{age}) + b(\text{Barratt Impulsiveness}) + b(\text{Sensation Seeking Scale}) + b(\text{self-reported risk-taking behaviors}) + b(\text{years using SNS}) + b(\text{hours per day using SNS}) + b(\text{ER-SCR}) + b(\text{ER-HR}) + e \]

This model did not explain the proportion of variance in privacy sum scores with statistical significance \( (R^2 = .03, F(7, 153) = .52, p = .82) \). Table 30 includes the coefficients and standard deviations for each predictor, none of which were statistically significant predictors.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.10</td>
<td>0.09</td>
<td>-0.11</td>
</tr>
<tr>
<td>Years on SNS</td>
<td>0.06</td>
<td>0.11</td>
<td>0.06</td>
</tr>
<tr>
<td>Hours/Day</td>
<td>0.05</td>
<td>0.07</td>
<td>0.06</td>
</tr>
<tr>
<td>Impulsivity</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.08</td>
</tr>
<tr>
<td>Sensation Seeking</td>
<td>-0.04</td>
<td>0.10</td>
<td>-0.03</td>
</tr>
<tr>
<td>ER-SCR</td>
<td>-0.15</td>
<td>0.16</td>
<td>-0.07</td>
</tr>
<tr>
<td>ER-HR</td>
<td>-0.08</td>
<td>0.24</td>
<td>-0.03</td>
</tr>
</tbody>
</table>

A second regression was tested to determine whether the same variables predicted the number of responses the participant gave to the confederate “stranger” when s/he instant messaged the participant.

The model was as follows:
\[
Y(\text{number of replies}) = a + b(\text{age}) + b(\text{Barratt Impulsiveness}) + b(\text{Sensation Seeking Scale}) + b(\text{self-reported risk-taking behaviors}) + b(\text{years using SNS}) + b(\text{hours per day using SNS}) + b(\text{ER-SCR}) + b(\text{ER-HR}) + e
\]

While this model was significant (\(R^2 = .18, F(7,70) = 2.2, p < .05\)), none of the individual independent variables were significant predictors of the number of replies.

Table 31

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-.16</td>
<td>.15</td>
<td>-.17</td>
</tr>
<tr>
<td>Years on SNS</td>
<td>-.22</td>
<td>.20</td>
<td>-.17</td>
</tr>
<tr>
<td>Hours/Day</td>
<td>.16</td>
<td>.12</td>
<td>.16</td>
</tr>
<tr>
<td>Impulsivity</td>
<td>.01</td>
<td>.04</td>
<td>.02</td>
</tr>
<tr>
<td>Sensation Seeking</td>
<td>-.16</td>
<td>.19</td>
<td>-.09</td>
</tr>
<tr>
<td>ER-SCR</td>
<td>.38</td>
<td>.30</td>
<td>.14</td>
</tr>
<tr>
<td>ER-HR</td>
<td>-.40</td>
<td>.43</td>
<td>-.11</td>
</tr>
</tbody>
</table>

**Study 3 Discussion**

While Study 2 relied on self-report data to evaluate the amount of information participants share online, Study 3 observed actual decisions regarding sharing information and attempted to connect that with physiological changes associated with risk perception. Adolescent and young adult participants completed a profile on what they were told was a new social networking site limited to student use.

Adolescent and young adult participants differed in the information they made public on their profiles. Participants had the option to make any information entered on their profile (except for their display name) viewable by everyone, viewable by just users they “friended,” or viewable by no one but the participant. The majority of adolescent participants, 52.6%, made their self-description viewable by all users and did not limit access to it. In contrast, only 28.7% of young adults made their about me publicly
viewable; the majority of young adult participants left their “About Me” section completely blank. It is possible adolescents, higher in sensation seeking than young adults, saw the self-description as a chance to set themselves apart from other users and attract positive attention. Another explanation is that adolescent participants were more engaged in the social networking site itself, while young adult participants favored only entering the bare minimum information.

Just under half of both adolescent (47.3%) and young adult (41.1%) participants entered their school information and made that publicly viewable, while around a third of adolescent (39.5%) and young adult (31.6%) participants included their hometown and made that publicly viewable. Only two participants—both adolescents—uploaded a “selfie” as their profile picture. This result must be interpreted with caution, however, as it was much easier for a participant to upload a generic stock photo than it was for the participant to take a picture. When participants were instructed to upload a profile picture, they were given the option to “select a photo” or to “take a photo.” If the participant chose “select a photo,” a document window opened with various stock photographs of animals, flowers, athletics, and local landmarks. If the participant chose to take a photo, they had to then select which device to use, adjust the device, take the photograph, and then accept the photograph. It is possible participants chose the “easier” route of just selecting a generic stock photograph instead of going through the process of taking a photograph. Additionally, there were reports of the web camera not always working. The web camera was marketed as a “plug and play” device, meaning the only step in setting up the camera was plugging the USB cord into the computer’s port. The experimenter tested the camera prior to each participant, but there were participants
where the camera appeared to enter a sleep mode and the experimenter would have to unplug the camera and plug it back in for it to work. It is not known how many participants this error affected.

Another potential reason for the low use of selfies for a profile picture is vanity. Participants had not been warned prior to their participation that they would have the opportunity to upload a picture of themselves. Participants may have chosen to upload the stock photograph instead of a selfie because they were concerned about their appearance and did not want to upload a selfie without adequate preparation.

Regardless of the issues with the camera, adolescent participants did share more information, and share more information publicly, than did young adult participants. Scores of the ConnectEd Privacy Disclosure scale were significantly higher for adolescent participants ($M = 6.0$ out of 10) than for young adult participants ($M = 5.1$ out of 10). However, the ConnectEd Privacy Disclosure Score was not significantly correlated with age. This may indicate there was a categorical difference between adolescent and young adult participants.

One categorical difference between the participants was type of school. All adolescent participants were middle or high school students, while all young adult participants were college students (and, because the age of majority in Nebraska is 19 and I wanted to make sure none of the young adult participants were considered adolescents, all young adult participants were age 19 or older, so many had been in college for at least one year). Similarly, all adolescent participants still lived with a parent or guardian, while many of the young adult participants lived in a dorm, with friends, or on their own. It is possible that being in the smaller, more protected setting of middle or high school
living with a guardian led to participants being more trusting with their information online, while college students are more wary of the way their information could be used.

Unlike the ConnectEd Privacy Disclosure Score, the number of replies to the “stranger” was significantly correlated with age. Older participants responded to the confederate a fewer number of times. Over half of young adult participants (55.1%) never responded to the confederate at all, while 39.5% of adolescent participants never responded. This could indicate young adult participants were less interested in communicating with a stranger than were adolescent participants, but could also be a sign that young adult participants were less engaged in the SNS than were adolescent participants. Responding to the confederate did require the participant to be paying sufficient attention to the site to see the notification pop up and be interested in the site enough to open the message and read it.

A number of participants did respond to the confederate but indicated they would not share identifying information. Eight young adult participants and six adolescent participants responded but said they would not tell the confederate their age, gender, or location. A significantly higher proportion of adolescent participants (15.8%) than young adult participants (5.9%) responded in this way, indicating adolescents may be more likely to affirmatively tell a stranger they are not willing to share identifying information. However, the proportion of young adult participants who responded at all to the confederate was smaller than for adolescent participants, so it is possible the lack of response is driving that difference.

Almost a quarter of adolescent participants (23.7%) spontaneously sent the confederate a friend request after messaging. A significantly smaller proportion of young
adults (10.3%) requested to “friend” the confederate. As with other results from this study, this could indicate adolescent participants are seeking the positive attention from being “friends” with another user. It could also indicate, however, a higher level of engagement with testing out the social networking site.

Study 3 also attempted to examine whether adolescent and young adult participants viewed the decision to share information online as a risky decision, as reflected in physiological responses. Previous research (e.g., Crone & van der Molen, 2007) has examined age-related differences in skin conductance and heart rate preceding risky decisions involving gambling tasks. Unlike that prior research, however, I found no age-related differences in skin conductance or heart rate changes related to the decision to include information on a SNS profile.

There are a number of explanations for the lack of physiological response. The lack of response could be a result of the method used. Prior research on physiological changes related to decision making used controlled tasks such as the Iowa Gambling Task or the Balloon Analogue Risk Task (e.g., South, Dana, White & Crowley). In these tasks, participants had limited amount of time during which they could make their decision. Here, though participants were guided through making a profile, there was no way to ensure they entered the specific information at the time they were instructed. Participants were given sufficient time to enter each piece of information (between 30 and 45 seconds) but for some participants that may have been too long and the participant could have filled out the profile on their own time table. It is also not clear whether participants first considered whether to include the information at all before considered how public to make the information, or whether participants first considered the privacy
settings before deciding whether to include information. Though the current study allowed participants to complete the SNS profile similarly to how they would in the real world, further research could employ more controlled measures such as only presenting one field of information to the participant at a time, or further measures such as eye tracking to better evaluate how individuals make the decision to share information.

A second possibility is that, unlike the decision to take a risky gamble or add another pump to a balloon that may blow up, the current participants did not view the decision to add information to a profile as a risk. The vast majority of the participants had their own social networking profiles and spent, on average, 2.5 hours each day utilizing social media (the number of hours per day did not significantly differ between adolescents and young adults). The decision to add information to their profile or to respond to a stranger’s instant message may be something so normal, something participants do on their own many times a day, that even in the lab setting it was not seen as a risk. If that is the case, participants may be so accustomed to sharing information they do not take the time to consider the potential risk.

Similarly, unlike gambling, the potential risk and rewards for sharing information online are very remote. The possible risk is someone using private information for a nefarious purpose, which individuals can balance against the possible reward of positive attention and getting information in return. But, unlike in the IGT or the BART where the punishment of losing the trial or the reward of earning money occurs shortly after the decision to take a risk, these possible outcomes will occur at some point in the future. For this reason, it is possible at least adolescent and young adult users do not actively consider the risks and rewards enough to be reflected in a physiological response.
The main hypothesis that the decision to share information publicly on an SNS is a function of age, experience, decision-making development, and physiological perception of risk, was not supported by the current study. A model with age, years using an SNS, hours per day using an SNS, self-reported impulsivity, self-reported sensation seeking, and the number of ER-SCRs and ER-HRs did not significantly explain the variance in ConnectEd Privacy Disclosure Scores.

One explanation is that the age of the current sample was too limited. Though participants ranged in age from 12 to 28, the majority of participants fell in the older adolescent, early emerging adulthood age group of 16 to 20. The adolescent and young adult participants, all of whom are considered digital natives because they have grown up with wired communications, may be too similar to fully capture how age, experience, and decision making affects the information shared online. Future research should extend the sample to include older adults; this may capture more variance in the amount of information uploaded to the profile and more variance in development decision making.
CHAPTER 4: DISCUSSION AND IMPLICATIONS

The vast majority of Americans—approximately 95%—own a cellular phone, and the type of technology upon which individuals rely is increasingly evolving (Pew Research Center, 2018). In 2011, only 35% of Americans owned a smartphone, and that number increased to 77% in 2018 (Pew Research Center, 2018). The use of these devices comes with a catch: when we use a cellular device, we are necessarily communicating information, such as our location and who we are communicating with, with the cellular provider. The provider, then, may share that information with government actors. Courts now face the difficult task of determining what expectations of privacy remain reasonable in an age where information is constantly shared, whether the user is aware of the sharing or not.

The three current studies aimed to begin identifying expectations of privacy in today’s digital age and how privacy may evolve along with technology. A variety of individual factors may shape privacy expectations; these studies focused on age, development, and experience with social media. Age may affect privacy expectations because younger generations have grown up with wired communications and will never know a world that is not constantly connected. Development may affect privacy expectations because of enhanced impulsivity and sensation seeking in adolescence. Experience may affect privacy expectations because the more we use social media and other technology that requires sharing information, we may view privacy differently. These three studies examined the interplay between the various factors that affect privacy expectations.
Across all three studies, a consistent pattern emerged: individuals of all ages view information shared on wired communications such as cell phones as highly private and searches of that information as highly intrusive. In Study 1, adolescents rated searches of cell phones as intrusive as a search of a private diary and nearly as intrusive as a physical pat down. In Study 2, all age groups viewed text messages and private messages sent via social media as the most personal in nature and a search of such communications as highly intrusive; all age groups viewed these types of searches similar to a search of audio recording of phone conversations. It seems that there is something different or special about private communications, even those that are sent via wired communications.

The participants in Study 2 ranged in age from 12 to older than 60 and, predictably, had equally ranging experiences with social media. As a participant’s age increased, they, on average, viewed searches of electronic communication devices as more intrusive. Similarly, as the number of years a participant had been a member of a social media site increased, their average ratings of intrusiveness and personal nature of the item searched also tended to increase. The number of years on social media is closely connected with the age of the participant, so it makes sense the results mirror one another.

The other proxy measure of experience with social media, the number of hours per day a user spends on a social media site, had the opposite relationship with perception of searches: as the self-reported number of hours per day on social media increased, average ratings of intrusiveness, riskiness of sharing information, and personal nature of information decreased. Users who spend more time on social media each day view
searches of private communications as less intrusive, view sharing this type of information as less risky, and view the nature of that information as less personal. This may indicate a desensitization to the privacy risks associated with electronic communication devices. As a user incorporates social media into their daily life, to the point they are logged on to a site for upwards of ten hours a day (as some participants here reported), they may become used to constantly sharing information with others, and less concerned about an unintended party viewing their information.

While one measure of development of decision making—impulsivity—had no relationship to perceptions of searches, sensation seeking did. As sensation seeking increased, the average ratings of intrusiveness and personal nature decreased. Participants higher in sensation seeking viewed searches of electronic communication devices, on average, as less intrusive and the information as less personal in nature. These participants who scored high in sensation seeking may focus on the rewards associated with sharing information—positive attention from others—and may view searches of their information as a potentially good thing.

This finding from Study 2—that age and sensation seeking are associated with ratings of searches, but impulsivity is not—was flipped when examining self-reported privacy protecting behaviors. Participants’ self-reported privacy protection behaviors, such as utilizing privacy settings to limit who can see the information they post on social media, was not significantly associated with either age or sensation seeking, but was associated with impulsivity. This could reflect two different decision making systems at play: hot vs. cold processing (Steinberg, 2010).
The decision whether to share information on social media and what privacy settings could be a “hot” decision, it is made in the moment, as a user is adding information to their profile, and a user may not explicitly take the time to weigh the pros and cons. In contrast, evaluations of searches are a “cold” decision that do not implicate any actual risks or emotion at the time of the decision. Adolescents are more likely to make impulsive decisions than adults in a hot setting, but make decisions that are more similar to older individuals in a cold setting (Steinberg, 2008). That impulsivity was associated with privacy-protecting behaviors in a hot setting, but not privacy ratings in a cold setting, is an example of this distinction. Age and sensation seeking had an effect on decisions in a cold setting, though, that may be entirely unrelated to decision making development. As discussed above, as both age and years on social media increased, average ratings of intrusiveness also increased. It may be that years on social media is driving the relationship between the age of the participant and intrusiveness ratings in that cold decision.

The finding that participants reported privacy concerns with search vignettes but still reported widely sharing information on their social media page can be explained by Kahneman’s (2011) dual systems processing model. This model posits individuals reason through two different processes: System 1, which is automatic, unconscious, and implicit; and System 2, which is conscious, explicit, and controlled. Individual participants may use System 1 when they are deciding what information to post on their social media profiles, but use more deliberative, conscious System 2 when thinking about the implications of a search vignette. But this model does not explain why participants
were fairly restrictive in the amount of information they shared online in the in-lab social media task.

Study 3 further explored whether age, sensation seeking, and impulsivity affects the decision to share information online. Adolescents publicly shared more information online than did young adults. Like the results in Study 2, privacy protecting behaviors as measured by the amount of information publicly shared was not related to age or sensation seeking, but unlike the results from Study 2, these privacy protecting behaviors were also not related to impulsivity. Possibly, creating a profile for a new SNS that the participant did not intend to actually use and knew their profile would be deleted after their participation (to protect participants’ privacy, all profiles were deleted after data collection was completed), did not have the same emotional reaction to the risks and rewards that creating an actual profile did. At least in the lab, the amount of information shared on a public profile is not related to age, sensation seeking, impulsivity, experience with SNS, or physiological perceptions of risk.

Like prior research regarding privacy domains in the parent-child relationship (Smetana & Daddis, 2002), individuals may view governmental intrusions of privacy differently depending on the type of information sought. Fradella and colleagues (2009) explored how lay perceptions of searches differed by the type of privacy interest implicated, but further research can explore how privacy interests differ depending on the type of information revealed by the search. Fourth Amendment jurisprudence generally ignores the type of information or evidence revealed by a search, focusing instead on the act of the search itself. But if lay individuals view governmental intrusions differently depending on the domain intruded upon, scholars may need to consider the implications
for Fourth Amendment case law. It may be that certain searches likely to reveal information in a domain that is considered private (e.g., the type of information you would send as an instant message to a friend on a social media site) are considered more intrusive. While the current studies focused on the medium of communication that was searched, future studies can explore whether lay individuals view intrusions of privacy differently depending on domains and whether those domains mirror those in parent-child private intrusions.

The relationship between age, development, experience, and privacy is complicated. But what can be determined from the current results is that electronic communication devices are changing views of privacy. Scholars have mused for years that the nature of privacy is likely changing due to our reliance on wired communications, and these results, in general, support that hypothesis.

The Court is currently pondering the applicability of doctrines such as the third party doctrine that were developed long before society could even contemplate our current ability to share information with others. In the 1970’s, the Court reasoned that an individual must assume responsibility for the risk of sharing information with a third party, such as a bank teller or a telephone operator (United States v. Miller, 1976; Smith v. Maryland, 1979). The Court grounded this doctrine in reasonable expectations of privacy: users do not have any legitimate expectation of privacy in information they knowingly and willingly share with a third party. The owner of the information—the one who could claim a violation of their expectation of privacy—must accept that by sharing that information with a third party, that third party could share their information with law enforcement.
But the information the Court dealt with in *Miller* and *Smith* was limited to bank records and telephone numbers dialed, respectively. Electronic communication devices today, however, collect and transmit an incredible amount of data. Cell phone towers track our movements while we actively make phone calls or passively receive automated alerts from the applications on our phones. Social media sites collect our likes and dislikes and the identity of our friends and family. Fitness trackers store information about our heart rate and activity level (and may even be able to tell when a user is pregnant before she realizes it herself, or if a plaintiff is faking an injury) (Hern, 2016).

In addition to the amount of information technology collects, users do not always make the explicit choice to share information with a third party. It is likely that in the 1970’s users were aware they were sharing their bank records with the bank teller when they handed over the ledger and aware they were sharing a phone number dialed with the telephone operator (at the time, an actual person). Today, though, technology users do not hand over information to another person. Cell service providers and application platforms automatically collect much of the information without an explicit exchange of information. The data users provide is, in a way, an unlisted price of using the technology.

Facebook, for example, recently revealed it sold massive amounts of user data to advertisers and political firms (Granville, 2018). Applications users installed on the Facebook site collected information on user identities, personal networks, and “likes.” The firms then used this information to target specific advertisements to specific users. While there was a public outcry over this alleged data breach, all user information that the application collected was collected with consent (at least, with consent to participate
in research included in the application’s terms of service; it is not clear whether users actually read those terms or understood them to mean their data would be collected), though some applications did collect data on users’ friends without those friends’ explicit consent.

Should the government obtain Facebook’s data, a strict application of the third party doctrine would hold that the data is not protected by the Fourth Amendment. Thus the government would not need to have probable cause to search Facebook’s data because users have no reasonable expectation of privacy in that information. In light of the results of the current research, that users of all ages view private messages sent via text or social media as secret as a personal diary, this would be contrary to societal expectations of privacy.

Courts developed the third party doctrine over four decades ago, long before the amount of information society shares online was even imaginable. Society’s expectations of privacy then look very different than expectations do now. Courts struggle with how to apply the reasonable expectation of privacy test to technology that changes must faster than does the law. Added to that, judges differ demographically from the general public and may have less experience with the new technology, so may be unable to adequately evaluate expectations of privacy.

This struggle is similar to the struggle courts have in crafting policies regarding rights for juveniles: the struggle to decide between policies that respect personhood and polices that protect vulnerable populations. On the one hand, courts want to honor the decisions individuals make in sharing information or using platforms that collect their personal data. But, on the other hand, courts also want to protect society’s right to
privacy even when individuals do not always take action to protect their own information. A strict application of the reasonable expectation of privacy test and particularly the third party doctrine could lead to a complete loss of the right to privacy protected by the Fourth Amendment because individuals share so much information. Should courts, then, change the reasonable expectation of privacy test to protect society from themselves, or should courts recognize that people exchange their right to privacy for something desirable, and honor that decision?

Some governments have taken steps to protect their citizens’ privacy interests. The European Union recently passed the General Data Protection Regulation (GDPR) that went into effect on May 25, 2018. The stated purpose of the measure is to give users more control over their data (Kharpal, 2018). To do this, the GDPR enhanced the requirements regarding consent to collect and use information, including requiring consent language to be clear and prevent companies from combining consent to lots of different data collection into one document. Under the GDPR, users must be able to withdraw their consent at any time and to access their data if they so desire. The GDPR grants users the “right to be forgotten”—to ask the website to erase all their data and to prevent any third party the site provided the data from using the data going forward. This type of policy puts the decision whether to share information firmly in the hands of the user, but attempts to guide the user by placing more control over private data in the hands of the consumer.

Though the GDPR is only enforceable in the European Union, many United States businesses that also do business the EU were forced to bring their websites into compliance (Handley, 2018). Many United States businesses updated their consent to
data collection to be in compliance with the GDPR to avoid the heavy fines associated with violations. In late May, 2018, many users, even in the United States, experienced a flurry of emails regarding updated terms of service. It remains to be seen, however, if the GDPR will change how users provide consent to the collection of their information or whether it changes expectations of privacy.

Many legal scholars have proposed answers to the problem of determining reasonable expectations of privacy, mostly revolving around either adapting the reasonable expectation of privacy test or doing away with it altogether (Kerr, 2010). But changing this test would require the Supreme Court to overrule Smith v. Maryland or, even more improbably, require the states to pass a constitutional amendment.

Instead, courts may be able to both protect privacy interests and respect individual’s personhood by utilizing empirical research on expectations of privacy. Scholars have published research on empirical expectations of privacy (Kugler, 2017; Slobogin & Schumacher, 1993) and can continue to do so as technology evolves. Scholars have advocated that “empirical research findings lend legitimacy to the Court’s role as a decider of privacy,” but empirical findings can go further than that to help guide judicial rulings (Smith, Madden, & Barton, 2016, pg. 141).

Empirical legal researchers filed an amicus brief in Carpenter v. United States arguing empirical research demonstrates individuals are not aware cell phone companies track their location using cell site location information and people do retain an expectation of privacy in both cell site location information and GPS coordinates (O’Rouke Schrup & Green, 2017). While it remains to be seen if the Court utilizes this brief in their ultimate decision, such briefs can provide valuable information to courts
evaluating expectations of privacy. To be helpful to courts, researchers would have to constantly update studies as new technologies are developed and to include a representative sample of society in their studies. As a result, the law would still lag behind technology because technology will move faster than the empirical studies can. But the law quite often moves even more slowly, and the knowledge that will be added as a result of these studies will help craft a more complete Fourth Amendment.

Kerr (2014) argues the reasonable expectation of privacy standard is normative rather than descriptive, thus courts do not and should not really care what society actually considers private. But perhaps the reasonable expectation of privacy test should turn to being more descriptive. If courts fully consider what privacy interests people actually hold important, this will demonstrate a respect for individual’s right to make decisions regarding their own information, especially where they may consciously trade access to their information for some benefit like attention. At the same time, an understanding of actual privacy interests, as opposed to normative privacy interests, will still protect individual’s privacy rights even when they are vulnerable.

Privacy expectations are a result of a number of factors, including age, development, and experience with social networking sites. As generations continue to grow up with constantly new and changing technology, privacy expectations will also evolve and change. To adapt alongside technology, courts should turn to empirical studies to help guide them. The current dissertation is a first step in providing an understanding of what factors shape expectations of privacy and how expectations of privacy may evolve alongside technology.

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APPENDIX A: STUDY 1 SEARCH VIGNETTES

Perceptions of searches.
For each of the following searches, participants will rate on a scale from 0 (not at all) to 5 (extremely):
How personal was the thing that was searched
How much did the search interfere with property or a person
How intrusive was the search
How much permission was given for this search
How much does this search violate privacy of a person’s body
How much does this search violate privacy of a person’s space
How much does this search violate privacy of information
How much does this search violate privacy of communications
Do you expect this type of thing to be kept private?

Searches (case that evaluated whether the search fell within the Fourth Amendment is in parentheses and will not be included in the questionnaire presented to the participants).
Searches will be presented in both a first person and third person tense
Searches followed by an asterisk were included in previous research (Slobogin & Schumacher, 1993; Blumenthal, Mogle & Adya, 2009; Fradella et. al., 2010).

1. A police officer draws blood to test the blood for alcohol (Schmerber v. California, 1966)*
2. A school principal asks a student for permission to search her purse for evidence of smoking cigarettes in school. The student says no, but the principal searches her purse anyway (New Jersey v. TLO, 1985)*
3. A school principal suspects a student of having drugs. She pats down the student’s outer clothing and asks the student to strip down to her bra and underwear. The principal asks the student to shake out the bands of her bra and underwear to see if there are drugs inside (Safford v. Redding, 2009)*
4. A school has a policy of randomly drug testing any student who participates in extra-curricular activities, including sports, band, and clubs (Board of Education v. Earls, 2002)*
5. A school has a policy of randomly drug testing and student who participates in sports at the school (Vernonia School District v. Acton, 1995).*
6. Police officers see evidence of a crime sitting out in plain view, and enter a home to take that evidence (Illinois v. Caballes, 2005)*
7. Police officers search the area around a person’s home (Oliver v. United States, 1984)*
8. Police officers place an electronic tracking device on a car. The officers track the car’s movement (United States v. Knotts, 1983)*
9. Everyone flying at an airport must go through a metal detector and their bags go through an X-ray machine before they can get to their gate (*United States v. Davis*, 1962)*.

10. A police officer pulls over a driver. While the police officer is questioning the driver, the officer shines his flashlight in the backseat to observe what the passengers are doing (*Texas v. Brown*, 1983)*

11. Police officers bring a trained drug sniffing dog to a school and ask students to line up in the hallway. The dog walks up to and sniffs each student (*United States v. Place*, 1983).

12. A school principal brings a trained drug sniffing dog to school and asks students to line up in the hallway. The dog walks up to and sniffs each student (*Doe v. Renfrow*, 1980).

13. A police officer comes to a teenager’s house when the teenager is not there. The teenager’s mom lets the police officer search the teenager’s bedroom (*Georgia v. Randolph*, 2006)*.

14. A police officer takes a teenager’s cell phone. The police officer looks through the teenager’s text messages, phone calls, and what websites the teenager has visited (*Riley v. California*, 2014).

15. A teacher takes a student’s cell phone. The teacher looks through the student’s text messages, phone calls, and what websites the student has visited (*G.C. v. Owensboro Public Schools; 6th Cir.*, 2013).

16. A police officer stops a teenager on a public sidewalk. The police officer asks the teenager questions for about 10 minutes (*Terry v. Ohio*, 1968)*.


18. Police officers read a private diary to find evidence of breaking the law (*Burdea v. McDowell*, 1921)*.

19. Police officers go through garbage that has been put on the curb (*California v. Greenwood*, 1988)*.


23. Teacher accesses a student’s instant messages that the student privately sent to a friend on a Social Networking Site (*R.S. v. Minnewaska*, 2012)
APPENDIX B: EXPECTATIONS OF PRIVACY AND DIGITAL COMMUNICATIONS VIGNETTES FOR STUDIES 2 AND 3

For each of the follow searches, rate (1) how likely it is that government actors (police officers, agents, or school officials) will access the type of information and (2) how reasonable it is for them to do so.

1. A cellular phone, including all text messages, phone numbers dialed, and websites accessed.
2. Emails saved on a computer
3. Emails saved on a cellular phone
4. Private messages sent to another user on a social networking site
5. Text messages saved by a cellular phone company
6. A user’s post on their own profile of a social networking site
7. Pictures a user posts on their social networking site
8. An anonymous post a user posted on a website
9. An audio recording of a telephone call
10. A computer, including all documents stored on the computer and websites accessed on the computer.
APPENDIX C: BARRATT IMPULSIVENESS SCALE, VERSION 11

Patton, Stanford & Barratt, 1995

People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and indicate which answer is best for you. Do not spend too much time on any statement. Answer quickly and honestly.
Rate: 1 (rarely/never); 2 (occasionally); 3 (often); 4 (almost always/always)
1. I plan tasks carefully
2. I do things without thinking
3. I make-up my mind quickly
4. I am happy-go-lucky.
5. I don’t “pay attention.”
6. I have “racing” thoughts
7. I plan trips well ahead of time.
8. I am self-controlled
9. I concentrate easily
10. I save regularly
11. I “squirm” at plays or lectures
12. I am a careful thinker.
13. I plan for job security.
15. I like to think about complex problems.
16. I change jobs.
17. I act “on impulse”.
18. I get easily bored when solving thought problems.
19. I act on the spur of the moment.
20. I am a steady thinker.
21. I change residences.
22. I buy things on impulse.
23. I can only think about one thing at a time.
24. I change hobbies.
25. I spend or charge more than I earn.
26. I often have extraneous thoughts when thinking.
27. I am more interested in the present than the future.
28. I am restless at the theater or lectures.
29. I like puzzles.
30. I am future oriented.
APPENDIX D: SENSATION SEEKING SCALE

Zuckerman et. al., 1978

True/false:

1. I like to have new and exciting experiences and sensations even if they are a little frightening.
2. I like doing things just for the thrill of it.
3. I sometimes like to do things that are a little frightening.
4. I’ll try anything once
5. I sometimes do “crazy” things just for fun.
6. I like wild and uninhibited parties.
APPENDIX E: SOCIAL NETWORKING SITE USAGE AND PRIVACY SURVEY

1. Are you a member of a social networking site (e.g., Facebook, Myspace, Twitter, etc.)? Y/N

2. What is your primary social networking site (the one you use most often):
   Facebook  Myspace  Twitter  Other: ______

3. How long have you been a member of your primary social networking site? ______ years

4. How much time do you spend on social networking websites in the average week? ______ Hours/Week

5. Please indicate the visibility of your personal information that your profile page accurately contains at this time (e.g., is correctly posted). Check all that apply.
   - Completely Public (CPu): Anyone can see it and the information is truthful.
   - Mostly Public (PPu): Some people outside of my contact list can see it (e.g., friends of friends or networks) and the information is truthful.
   - Mostly Private (PPr): Only people on my contact list can see it, but they all see the same truthful information.
   - Completely Private (CPPr): Only some people on my contacts list can see it and the information is truthful.
   - Posted Inaccurately (NA): Fake or joke information is posted on your profile.
   - Not posted (NP): Information is left off your profile.
     i. Profile Name
     ii. Main Profile (Default) Photo
     iii. Birthday
     iv. Phone Number
     v. Email Address
     vi. Instant Messenger Screen Name
     vii. Home Address (e.g. 5555 Lincoln Ave)
     viii. Current Residence (City/State)
     ix. Personal or class schedule
     x. Current Employment Information
     xi. Name of Current School
     xii. Sexual Orientation
     xiii. Likes/Hobbies/Interests
     xiv. Relationship Status
     xv. Community & Social Groups (e.g., church, clubs, etc.)
APPENDIX F: CONFEDERATE INSTANT MESSAGE SCRIPT

1. [After 5 minutes and 45 seconds from the beginning of the ConnectEd audio] Hi!
   They told me I was supposed to instant message you.
2. [Immediately after above] Um, not sure what to say…
3. [Wait about 1 minute. If participant responds with a question, answer it. Then ask this question. The participant never responds or responds with something that is not a question, ask this question after about 1 minute] How old are you?
   a. If participant asks how old you are: Cool! me too! My birthday is in August.
4. Im in some tall building – is that where u r?
   a. If the participant asks where you are: idk, just some tall building.
5. So what do you think of all this?
   a. If participant asks what you think: I’m getting so bored. Tho its better than school
6. Who’s the person running your study? My guy/girl is kind of weird.
   a. If participant asks who is running your study: My guy/girl is kind of weird – how about yours?
7. OK they’re telling me to move on to the next part. Gotta go!