HIGH SCHOOL EDITION
Journal of Student Research
Volume 11 Issue 1 (2022)

Data Privacy Perception Among Adolescents in a Silicon Valley High School

Pranav Gunda Naga[1] and Kate Flowers Rossner[#]

[1]Santa Clara High School, Santa Clara, CA, USA
[#]Advisor

ABSTRACT

Social media usage has increased tremendously over the last few decades, thereby becoming a mainstay in the global sphere. This technology is nearly ubiquitous in Silicon Valley, a technological center within the San Francisco Bay Area. In recent years, concerns have been raised over privacy and the extent of data companies collect from their user base. Minimal research has been conducted on adolescents' privacy perceptions as well as conceptions in the Silicon Valley. Prior studies contend that adolescents may reveal too much personal information online but can also have varying privacy values depending on socioeconomic status. This study investigates the data privacy perceptions of students in a Silicon Valley high school (SVHS) and compares results to two studies, conducted in a different location (Turkish high schools) and with a different age group (US adults). The descriptive research method was used with Google Forms questionnaires distributed to students through email. Questionnaires were based on similar questions from the comparison surveys. Results showed that Internet and social media usage is indeed almost omnipresent among SVHS students. The students are more knowledgeable about privacy protection techniques and at least as concerned about privacy as American adults. SVHS students are also much more private about their personal information in comparison to the Turkish high school students. More research and comparisons in different socioeconomic areas and age levels is needed to determine the reasons behind these trends.

Introduction

Since the advent of early social media applications in the 1980s, Internet-based programs have become more sophisticated, accessible, and utilized. Services like Facebook, Snapchat, and Instagram have grown exponentially in usage throughout the 2000s and 2010s with adolescents using these technologies at the highest levels (Pew Research Center, 2019). "Adolescents" in this study refers to people between the ages of thirteen and eighteen. According to Anderson and Jiang, (2018), 95% of teens in the United States have access to a smartphone and 45% use the Internet 'almost constantly'. Adolescents primarily use social networking services to communicate and acquire information about others (Joshi et al., 2019), and 65% of children use the Internet at school as part of their educational demands (NCES, 2015).

As companies and the government continue to collect data from the growing Internet user base, people are showing concern and uncertainty about how their data are collected and used. 81% of United States adults say they have very little or no control over the data companies collect and 78% of United States adults say they have very little to no understanding about what the government does with the data collected (Auxier et al., 2019).

Many of the global technology companies spearheading innovation in the tech sector are located in Silicon Valley, which is found in the southern San Francisco Bay Area in California. Internet usage is deeply integrated into the curriculum as many high schools administer laptops and tablets for students and use online

portals to list assignment and grade information. As a result of the COVID-19 pandemic, online interaction has become essential in the classroom in order to attend classes and submit homework; this has heightened the frequency of Internet usage in the area and may also play a role in students' privacy perception and habits. However, despite the prevalence of Internet activity in Silicon Valley, little information exists about adolescent behavior with the technology in the area.

This study aims to find teenagers' behavioral patterns of and attitudes on data privacy, particular with the Internet and large social media applications. Data collected from this study may provide a general picture of how aware students are of data collection methods that social media applications employ and measures they can take to reduce or enlarge exposure of their personal information or habits. Therefore, this research attempts to answer the following question: how do students in a Silicon Valley high school (SVHS) perceive data privacy on the Internet and in social media applications?

Literature Review

Privacy Perception

"Privacy perception" in this study refers to the extent to which an individual believes they have the agency to decide who collects their personal information and how that information is used (Lanier and Saini, 2008). In the context of the United States, American adults place much value on their privacy, as 93% of adults believe that being in control of who can collect their personal information is important (Madden and Rainie, 2015). Although threats to online privacy are recognized by the general public, people seldom protect their privacy and often only delete browser history and cookies in order to do so, with many having little confidence in their own ability to protect their cyber identity (Boerman et al., 2018). While privacy concerns play a major role, part of the reason why individuals feel a loss of confidence is also due to "privacy fatigue", which is defined as the burnout that comes from feeling the need to constantly protect one's digital privacy (Choi, 2018).

Privacy Perception Based on Location

Privacy perception can vary depending on the location, as users may exist in different socioeconomic environments and follow differing privacy laws. For example, according to Schomakers et al. (2019), the privacy perception of Brazilians, Americans, and Germans are not the same, with Brazilians perceiving information the least sensitive and Americans perceiving information the most sensitive. Several factors were found to influence these results, including the level of privacy users wanted, education level, and risk-taking tendency.

Many countries are often linked or resemble one another's privacy laws, which may affect data privacy perception. According to Rakuten Insight (2017), many countries, especially in the Asian region, use European Union laws like the EU Data Protection Directive of 1995 as a base for their own laws, which often come years later. Furthermore, there are significant differences between US and EU data privacy law, as the US regulates privacy at a subdivided level with less restrictions, while the EU considers data privacy protection to be a fundamental right (Congressional Research Service, 2020).

Adolescent Privacy Perception and Habits

It is commonly thought that adolescents care less about their data privacy; however, lower privacy concerns can be explained by adolescents having different conceptions of privacy than adults, as they are often more concerned with using the Internet to maintain privacy from adults than worrying about identity theft or government surveillance (Steijn and Vedder, 2015). Entities like banks, employers, and government agencies do not

yet play a major role in adolescents' lives. Additionally, the privacy value of teens can be high, but this varies among different socioeconomic groups, social networking sites, and perceived rewards from information disclosure (Soffer and Cohen, 2015). Adolescents may also have different perceptions of how much control they believe they have over their data, which can affect their motivation to protect their data privacy (Youn, 2009). According to a study on privacy perception and media device usage of high school students in Turkey, students have a personal data privacy algorithm defined for them individually, and any entity outside of the algorithm is regarded as a threat (Gogus and Saygin, 2019).

Computer usage and media multitasking (usage of multiple media streams) rates are high among adolescents, and this can result in sleep deprivation and lower cognitive control; however, a prohibitory approach toward electronic devices and social media may backfire, thereby rendering social networking sites an integrated part of an adolescent's development (Abi-Jaoude et al., 2020). Teens often reveal much of their personal information on social media platforms such as Facebook, but still place some value on privacy control (Christofides et al., 2009). However, adolescents pose themselves to many outside risks and children have been found to have inadequate Internet skills to reduce these risks (Kaşıkcı, 2014).

Methods

Comparison of Previous Studies with Current Study

This survey study utilized questionnaires from both Madden and Rainie (2015) on all American adults and from the study on privacy perception among Turkish high school students in a metropolitan area (Gogus and Saygin, 2019). This study used the descriptive research method and therefore aimed to find the general trends among the population. The questions from the Madden and Rainie (2015) survey centered around privacy perception, such as how much control adolescents believe they have over personal data, and some of the questions were modified to represent the participant base more accurately (i.e. omission of questions asking about perceptions of telephone and cable TV companies). Many of these questions maintained the four-point Likert scale used by the Pew Research Center. The questions from the Turkish study (Gogus and Saygin, 2019) mainly focused on Internet usage and social media statistics, device usage/ownership and password sharing, and privacy perceptions, thereby providing information on both habits and perceptions of adolescents. Changes included the modification of question wording for coherence and modification of answer options for clarity. Additionally, some questions had the answer choices of "Strongly Agree", "Partially Agree", and "Strongly Disagree"; the options for these questions were shifted to a five-point Likert scale to include more response variability as "Partially Agree" can be a confusing term. A five-point Likert scale has the answer choices of "Strongly Agree", "Agree", "Neutral", "Disagree" and "Strongly Disagree".

Participants and Data Collection

This study was conducted at a high school in Santa Clara, California, United States. The study obtained ethical approval from the high school's Institutional Review Board participants provided informed consent before completing the questionnaire. The survey was distributed by a Vice Principal of the school to all students from 9th to 12th grade using SchoolLoop's LoopMail email service. The survey was created and completed by participants online on Google Forms with a total of 29 questions. 50 students responded to the survey but one student did not attend the high school, leading to 49 overall participants.

Data Collection and Analysis Instrument

Data were collected into a Google Forms spreadsheet and were transferred to Excel for organization and analysis. Analysis took place in the form of comparison of results with the previous studies mentioned and analysis of the results individually as part of the descriptive research method. The survey was composed of 29 questions, but only 26 questions were analyzed which excluded the informed consent and two demographics questions. The four main sections covered by the questionnaire were: (1) Internet usage and social media, (2) device usage/ownership and password sharing, (3) privacy perception, and (4) privacy perception statements.

Maintaining Confidentiality

In order to ensure the safety and privacy of each participant, as well as the confidentiality of their data, only a small amount of identifiable data are revealed in the research paper. This information is the participants' grade level distribution and their enrollment in the high school in the 2020-2021 school year, which cannot be used to find further information about the participants. No other identifiable data were collected. The data were stored in a personal Excel file inaccessible to other users after the data were collected.

Results

Demographic Information

Table 1 shows demographic information of the adolescents by their grade level information. The average grade level of student participants is 10.8, and students in this study are between the grade levels of 9 and 12.

Table 1. Demographic Information

Grade Level	Count
9th	12 (24%)
10th	8 (16%)
11th	8 (16%)
12th	22 (44%)

The following results of this study will be discussed under these four headings:

1. Internet usage and social media
2. Device usage/ownership and password sharing
3. Privacy perception
4. Privacy perception statements

Internet Usage and Social Media

Frequency of Internet usage, time spent on the Internet daily, and the usage of various social media accounts is reported in this section.

Frequency of Internet Usage

Table 2 conveys the frequency of Internet usage in a month compared between SVHS participants and participants from the Turkish study. 95.9% of SVHS participants use the Internet everyday and the remaining 4.1% of students use the Internet 5-6 days per week. The Turkish data reported that almost 3 out of every 4 students use the Internet everyday.

Table 2. Frequency of Internet Utilization

Frequency of Internet Utilization	SVHS	Turkish HS
Every day	95.9%	74.7%
5-6 days per week	4.1%	6.8%
3-4 days per week	0.0%	7.1%
1-2 days per week	0.0%	7.7%
Few times a month	0.0%	1.8%
Once or less a month	0.0%	1.9%

Time Spent on Internet Daily

In Table 3, the daily time spent on the Internet among participants is recorded. 85.7% of SVHS participants use the Internet for more than 4 hours a day whereas only 19.8% of the Turkish participants use the Internet for more than 4 hours a day. The average time spent on the Internet among Turkish students is between 1-2 hours and 2-3 hours a day.

Table 3. Time Spent on Internet Daily

Time Spent on Internet Daily	SVHS	Turkish HS
4 hours or more	85.7%	19.8%
3-4 hours	2.0%	11.0%
2-3 hours	8.2%	17.8%
1-2 hours	4.1%	22.9%
30 minutes - 1 hour	0.0%	17.6%
Less than 30 minutes	0.0%	10.8%

Social Media Account

Table 4 presents some of the various social media applications that students use and the percentage of students that use them. The application list for both studies are different as they correspond to social media preferences in the respective area of study. Most SVHS students use Instagram (80.7%), with Discord (61.7%), Twitter (46.8%), TikTok (44.7%), and Snapchat (40.4%) following. Only 10.6% of SVHS students use Facebook, while 75% of the Turkish students use Facebook. 67.4% of the Turkish students use Instagram.

Table 4. Social Media Accounts in Usage

	Facebook	Instagram	Twitter	Snapchat	TikTok	Reddit	Discord	No account
SVHS	10.6%	80.9%	46.8%	40.4%	44.7%	27.7%	61.7%	N/A
Turkish HS	75.0%	67.4%	43.9%	42.3%	N/A	N/A	N/A	8.2%

Device Usage/Ownership and Password Sharing

Device usage, device ownership, and password sharing preferences are reported in this section.

Device Usage

Table 5 shows the number of students who use certain electronic devices at home. “Smart Speaker” was added as an option for this study as it can disseminate information and perform certain tasks. Most SVHS students use laptops and smartphones, while around 30% of participants use desktops and tablets. Smart speaker usage is reported at 22.4%. The Turkish data show that smartphone usage is very high whereas other devices are used within the 35% to 50% range.

Table 5. Device Usage Rates

	Desktop	Laptop	Tablet	Smart Phone	Smart Speaker
SVHS	30.6%	87.8%	32.7%	95.9%	22.4%
Turkish HS	35.5%	47.2%	39.3%	86.5%	N/A

Device Ownership

Table 6 shows the number of students who own certain electronic devices at home. Once again, most SVHS students own laptops and smartphones, while about half own desktops and tablets. 37.5% of students own a smart speaker. The Turkish data show that smartphone ownership is similarly as frequent as the usage statistic, with the rest of the devices being used by around half of the students.

Table 6. Device Ownership Rates

	Desktop	Laptop	Tablet	Smart Phone	Smart Speaker
SVHS	45.8%	89.6%	56.3%	93.8%	22.4%
Turkish HS	44.8%	53.7%	50.9%	87.5%	N/A

Password Sharing

Table 7 presents the percentage of participants who do not share passwords of their devices to people like family, close friends, teachers, etc. The "Government" option is omitted from the SVHS study as there is no clear method to share device passwords with the government. Less than 20% of SVHS participants share their passwords with close friends, teachers, and others, while 71.7% share their passwords with family. The Turkish data show that almost 10% of the respondents share passwords with teachers and other acquaintances, but more than half of students share passwords with close friends (64.5%) and family members (57.4%).

Table 7. Password Sharing Rates

	Close Friends	Family	Teachers	Government	Other Acquaintance	Other
SVHS	15.2%	71.7%	2.2%	N/A	N/A	17.4%
Turkish HS	64.5%	57.4%	10.6%	10.3%	13.6%	N/A

Privacy Perception

Control over information collection and usage, reasonable length for entities to retain archives of activity, confidence in data privacy and security, privacy protection habits, data privacy preferences are discussed in this section.

Control Over Information Collection and Usage

Table 8 presents data on how much control respondents believe they have on the amount of information collected about them and the way their information is being used. The data collected by Madden and Rainie (2015) on all adults combines both "how much control do you feel you have over how much information is collected about you?" and "how much control do you feel you have over how your information is being used?" into one question, while the SVHS study asks respondents in separate questions. 47% of US Adults report having some or a lot of control, compared to 60.5% of SVHS students reporting having some or a lot of control on how much information is collected about them and 35.4% of SVHS students reporting having some or a lot of control on how their information is being used.

Table 8. Perception of Control over Data Collection and Usage

	US Adults	SVHS (Collection)	SVHS (Usage)
A lot of control	9.0%	16.7%	8.3%
Some control	38.0%	43.8%	27.1%
Not much control	37.0%	27.1%	35.4%
No control at all	13.0%	12.5%	29.2%

Refused	3.0%	N/A	N/A

Reasonable Length for Entities to Retain Archives

Table 9 shows SVHS student responses to the question, "How long do you think it is reasonable for companies or organizations to retain their records or archives of your activity?" These data are not compared with data from the study on American adults because the American adult study asked this question for different types of agencies, such as the landline telephone company and cable TV company; these entities are often not relevant for adolescents. A plurality of SVHS responses believe that companies should not save any information (38.3%) and a significant portion believe that it "depends on what they are using the archives for" (27.7%).

Table 9. Reasonable Length for Entities to Retain Archives

Choice	Percentage
A few weeks	27.7%
A few months	17.0%
A few years	4.3%
As long as they need to	10.6%
They should not save any information	38.3%
Depends on type of usage	2.1%

Confidence in Data Privacy and Security

Table 10 presents SVHS student responses to the question, "How confident are you that your records and personal information stored by companies and organizations will remain private and secure?" These data are not compared with data from the study on American adults because the American adult study asked this question for different types of agencies, such as the landline telephone company and cable TV company; these entities are often not relevant for adolescents. The majority of participants are somewhat confident or not too confident that their data will remain secure (81.6%).

Table 10. Confidence in Entities Keeping Personal Information Secure

Choice	Percentage
Very confident	4.1%
Somewhat confident	34.7%

Not too confident	46.9%
Not at all confident	10.2%
Don't know	4.1%

Ease of 3rd Parties Uncovering Personal Information

Table 11 conveys how easy respondents believe it is for someone or some company/organization to find their personal information or details from their past. 74% of SVHS respondents answered very easy or somewhat easy compared to 64% of American adults responding the same.

Table 11. Perceived Ease of 3rd Parties Uncovering Personal Information

Choice	Percentage
Very easy	26.5%
Somewhat easy	49.0%
Not too easy	16.3%
Not easy at all	0.0%
Don't know	8.2%

Privacy Protection Habits

Table 12 presents various privacy protection measures that people have used to maintain digital privacy. Across the board, SVHS students adopt these measures significantly more than the American adults do. Almost all of the habits were adopted by the plurality of SVHS students whereas almost all of the habits were not used by the plurality of American adults.

Table 12. Adoption Rates of Privacy Protection Measures

Statement	SVHS			US Adults		
	Yes	No	Don't know	Yes	No	Don't know
Used a temporary username or email address	75.0%	20.8%	4.2%	25.0%	56.0%	5.0%
Used a privacy-focused browser plug-in or extension	59.6%	23.4%	17.0%	9.0%	72.0%	8.0%
Given inaccurate or misleading information about yourself	83.7%	12.2%	4.1%	24.0%	60.0%	6.0%
Cleared cookies and browser history	79.6%	10.2%	10.2%	59.0%	22.0%	8.0%

Used a proxy server, Tor software, or virtual private network (VPN)	45.8%	47.9%	6.3%	9.0%	67.0%	10.0%
Refused to use a website or application because it asked for personal information	85.7%	10.2%	4.1%	23.0%	55.0%	7.0%
Deleted or edited something you posted in the past	91.8%	8.2%	0.0%	29.0%	46.0%	8.0%
Asked someone to remove something that was posted about you online	54.2%	39.6%	6.3%	11.0%	63.0%	7.0%
Used a public computer to browse anonymously	40.8%	53.1%	6.1%	12.0%	68.0%	6.0%
Used a search engine that does not keep track of your search history	61.2%	20.4%	18.4%	15.0%	52.0%	19.0%
Refused to provide information about yourself that was irrelevant to the website or application	93.9%	4.1%	2.0%	57.0%	23.0%	8.0%

Data Privacy Preferences on Social Media

Table 13 shows the groups of people respondents would allow to see their various social media information. Photos and shared content, friend list, profile information, and contact information are the information categories, and close friends, family, teachers, other contact, public, government, and no one are the group names. The SVHS data show that students are generally fine with sharing information with close friends and family, but mostly object to sharing information with teachers, other contacts, and the public. The Turkish data, on the other hand, also show that students are fine with sharing information with close friends and family, but furthermore over 50% of respondents are fine with sharing information with teachers and the government for almost all of the categories.

Table 13. Data Privacy Preferences on Social Media

	Photos (Turkish HS)	Shared Content (Turkish HS)	Photos & Shared Content (SVHS)	Friend List (Turkish HS)	Friend List (SVHS)	Profile Information (Turkish HS)	Profile Information (SVHS)	Contact Information (Turkish HS)	Contact Information (SVHS)
Close Friends	87.1%	89.8%	64.6%	85.2%	75.5%	86.9%	59.2%	73.4%	81.3%
Family	80.1%	78.9%	60.4%	78.7%	55.1%	89.2%	73.5%	85.0%	85.4%
Teachers	60.5%	60.5%	8.3%	67.4%	4.1%	75.9%	12.2%	53.3%	25.0%
Other Contact	N/A	N/A	12.5%	N/A	6.1%	N/A	6.1%	N/A	6.3%
Public	N/A	N/A	16.7%	N/A	12.2%	N/A	0.0%	N/A	4.2%
Government	54.8%	59.4%	0.0%	61.6%	2.0%	60.9%	6.1%	45.4%	4.2%

No one	N/A	N/A	12.0%	N/A	20.4%	N/A	22.4%	N/A	12.5%
Other Acquaintance	57.2%	59.4%	N/A	63.1%	N/A	59.3%	N/A	38.7%	N/A
Other Strangers	36.3%	40.4%	N/A	43.7%	N/A	36.3%	N/A	17.3%	N/A

Data Privacy Preferences on Web History and Academic Records

Table 14 shows the groups of people respondents would allow to see their web history and academic records. SVHS students overwhelmingly responded "no one" (87.5%) to the web history question while Turkish students responded with more variety. For the academic records question, SVHS students mostly think family and teachers should have access whereas Turkish students generally object to other groups from having access.

Table 14. Data Privacy Preferences on Web History and Academic Records

	Web History (Turkish HS)	Web History (SVHS)	Academic Records (Turkish HS)	Academic Records (SVHS)
Close Friends	34.8%	0.0%	35.9%	6.1%
Family	38.8%	12.5%	28.0%	77.6%
Teachers	53.7%	0.0%	27.0%	79.6%
Other Contact	N/A	0.0%	N/A	4.1%
Public	N/A	0.0%	N/A	0.0%
Government	56.1%	4.2%	37.9%	30.6%
No one	N/A	87.5%	N/A	6.1%
Other Acquaintance	59.8%	N/A	57.1%	N/A
Other Strangers	71.5%	N/A	69.0%	N/A

Privacy Perception Statements

Perception of security on social media is discussed in this section.

Perception of Security on Social Media

Table 15 shows data on SVHS student responses to various statements surrounding social media privacy perception. These queries use a five-point Likert scale as opposed to the "Strongly agree", "Partly agree", and "Strongly disagree" options used by the Turkish study; therefore, data from this section cannot be compared.

Table 15. Perception of Security on Social Media

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
While installing a new application on my smartphone, I cancel the installation if it asks for permission to access contacts, location information, etc.	14.3%	16.3%	36.7%	24.5%	8.2%
When using a new or updated service, I skim through the Terms of Service agreements before accepting/rejecting them.	18.4%	32.7%	12.2%	20.4%	16.3%
It is not safe to be friends with strangers on social media.	8.2%	28.6%	32.7%	22.4%	8.2%
You are aware of who has access to your data on social media.	20.8%	27.1%	18.8%	20.8%	12.5%
It makes me uncomfortable to have my application usage statistics (which programs, when and how long) in computers/tablets tracked.	18.4%	32.7%	32.7%	10.2%	6.1%

Web Page Safety

Table 16 presents data on responses to the question: "In your opinion, who can decide BEST whether a web page is safe or not?" Students selected their three top choices for this question, and these data was then used to calculate a weighted average for each group. The formula is the same used in the Turkish study; $(N_1*50 + N_2*33 + N_3*17)/(N_{all})$, where N_j refers to the number of students who responded to the question with j label (1, 2, 3). N_{all} is the total number of participants who answered the question. SVHS students mainly trust family and themselves, with the government following after. Turkish students mainly trust family, themselves, and close friends.

Table 16. Groups That Can Decide Best Whether a Web Page is Safe or Not

Who can decide	N_1 (SVHS)	N_2 (SVHS)	N_3 (SVHS)	Scores (SVHS)	Scores (Turkish HS)
Close Friends	4	1	19	11.3	24.0
Family	10	19	4	24.4	35.0
Teachers	2	12	9	13.2	7.3
Government	12	5	5	17.3	6.8
No one	3	1	4	5.1	4.3
Myself	18	10	7	27.5	30.0

Discussion

Analysis

The results of this study were compared with results from Turkish metropolitan high schools and with all American adults for those respective questions. SVHS students use the Internet almost omnipresently, which is greater than the result from the Turkish counterpart. Similarly, most SVHS students use the Internet frequently each day with 85.7% using it for 4 hours or more. These results are more likely from the adoption of Google Classroom education technology services in the standard curriculum, as well as from the transition to distance learning in the light of the COVID-19 pandemic. Another clear divergence of SVHS students from the Turkish students is the widespread usage of Instagram over Facebook, which may be attributed to Facebook being seen as a service for "older people" by teenagers in the Silicon Valley area.

SVHS students most commonly use and own laptops and smartphones at around 90%, while desktop and tablet usage is much lower. Laptop usage and ownership is most likely higher in SVHS than in the Turkish high schools as all students are provided Chromebooks to use. SVHS students are very selective about who they share passwords with, as the only group majority of students report sharing passwords with is their family. In comparison, the Turkish students share passwords at a similarly high rate with family members and close friends.

SVHS students feel that they have more control over what data are collected on them than American adults do but also feel they have less control over how the data are used than American adults do. This may be due to privacy laws like the California Consumer Privacy Act allowing people to read and delete their personal data; students feel that they can somewhat control what information companies retain but cannot control how these data are used in many ways. SVHS students are wary of companies retaining archives of personal data for longer periods of time, with a plurality believing no information should be saved. SVHS students are mostly somewhat or not too confident that companies will keep their personal information secure, showing a perceived threat to privacy among the students. This sentiment is echoed further as over 75% of students believe it is very easy or somewhat easy for companies to find their personal information or details from their past.

The most significant deviance of SVHS student responses from that of American adults is found in their relative adoption rates of privacy protection measures. SVHS students are significantly more likely to use privacy protection measures like using temporary contact information, providing inaccurate information, refusing to provide irrelevant information, etc., than American adults are. SVHS students therefore seem to be much more knowledgeable about ways to protect privacy and often use these methods, which is contrary to the opinion that teenagers are reckless with their information online.

Across the board, SVHS students are very wary of sharing information from social media, other than contact information, with groups other than close friends and family, while Turkish students share data with the other groups at higher rates too. SVHS students overwhelmingly are only fine with web history being shared with no one, while Turkish students generally accept the data being shared with other groups at much higher rates, showing that SVHS students view web history as very private information. Similar trends are found with academic records, with the only groups that the majority of SVHS students are willing to share being family and teachers.

Responses to the perception of security on social media inquiry are more varied than responses to previous questions. Data are mixed on whether students cancel application installations when asked for permission to access various permission. This may be because most applications ask for these permissions, but cancellation of the installation is a drastic step for many. Data are also somewhat varied for groups that can decide best whether a web page is safe or not, with SVHS students reporting the highest scores for themselves and family.

Conclusion

The results of this study show that the Internet and social media have become nearly omnipresent among SVHS students and have become an integral part of their livelihoods for information collection, academics, and socialization. As expected, the students' proximity to Silicon Valley, access to electronic devices, and distance learning as a result of the COVID pandemic have acclimated them to these technologies more so than the Turkish metropolitan students. Furthermore, the SVHS students seem to have much greater knowledge of privacy protection techniques than American adults, which leads them to be more knowledgeable about how their data is collected and how to prevent this collection. SVHS students also seem to be as or more concerned about their privacy than American adults, which shows clear awareness of the threat of corporate and governmental surveillance. However, because SVHS students use more applications and resources on the Internet than American adults on average, more of their personal information may be collected which may lessen the advantage of knowing more privacy protection methods.

SVHS students are also much more private than metropolitan Turkish students in terms of who they share their personal information with. SVHS students seem to be more independent and cognizant of the impact that their information and social media activity may have if known to other parties. SVHS students are also more confident about their knowledge of who collects their data and what data is collected.

Implications

Usage rates appear to be very high among the population, with most students using devices in excess of four hours per day, everyday. This was expected as a result of the school's proximity to the Silicon Valley and adoption of computer-based distance learning in the midst of the COVID-19 pandemic. While these factors exist, there is still a need for moderation as increased screen time can cause disturbances in sleep patterns and increase problematic behaviors among adolescents (Parent et al., 2016). With technology becoming more integrated with society over time, screen time is likely to continue rising unless screen time is given heightened concern.

While the SVHS population seems to be using privacy protection measures at much higher rates than American adults, the adolescents seem about as sensitive about their data privacy and not very confident about the control and security of their personal information. As data collection becomes more ingrained in students' livelihoods, there may be a benefit in introducing comprehensive data privacy education to enable students to know about privacy measures and understand how their data is collected and used.

Future Directions

Further studies can be conducted to assess whether these perceptions match up with the actual knowledge of the students. This study only tested for student perceptions and confident adolescents believed they were about their data privacy. A test on students' true knowledge of different privacy measures and how their data is used and collected may provide information into the extent to which students' perceptions and actual knowledge correlate. This information may be more useful in finding whether the population needs more data privacy education.

As this study compared results with findings from other socioeconomic groups and environments, further research can be done in other high schools and demographics to find data about those respective locations and determine whether and how much surrounding conditions affect results. Furthermore, different research methods could be used to determine other factors that influence these trends and how important they are in shaping privacy perceptions.

Limitations

The scope of this study is limited and does not test whether the students' perceived knowledge or confidence translates to their true grasp of information, such as the type of data companies collect and the entities that collect information; only perceptions and habits are found. Since the survey used the descriptive research method, only the baseline trends of the population were found whereas the factors behind these trends were not investigated for correlation. The survey was conducted on a voluntary response basis with no incentive offered, so results may be skewed toward those who are more inclined to take surveys and/or have an interest in data privacy perception and social media. Only 49 students answered the questions among a school population of 1953, so the results of the study may not be representative of the entire population. Additionally, some of the answer choices for certain questions were modified from the original questionnaires for clarity, so the comparison between studies may be somewhat conflicting and difficult to correlate.

Acknowledgments

I would like to thank my advisor Kate Flowers Rossner for her guidance.

References

Abi-Jaoude, E., Naylor, K. T., & Pignatiello, A. (2020). Smartphones, social media use and youth mental health. Canadian Medical Association Journal, 192(6). https://doi.org/10.1503/cmaj.190434

Anderson, M., & Jiang, J. (2020, August 14). Teens, Social Media & Technology 2018. Pew Research Center: Internet, Science & Tech. http://pewresearch.org/internet/2018/05/31/teens-social-media-technology-2018/.

Auxier, B., Rainie, L., Anderson, M., Perrin, A., Kumar, M., & Turner, E. (2020, August 17). Americans and Privacy: Concerned, Confused and Feeling Lack of Control Over Their Personal Information. Pew Research Center: Internet, Science & Tech. https://www.pewresearch.org/internet/2019/11/15/americans-and-privacy-concerned-confused-and-feeling-lack-of-control-over-their-personal-information/.

Boerman, S. C., Kruikemeier, S., & Zuiderveen Borgesius, F. J. (2018). Exploring Motivations for Online Privacy Protection Behavior: Insights From Panel Data. Communication Research, 009365021880091. https://doi.org/10.1177/0093650218800915

Choi, H., Park, J., & Jung, Y. (2018). The role of privacy fatigue in online privacy behavior. Computers in Human Behavior, 81, 42–51. https://doi.org/10.1016/j.chb.2017.12.001

Christofides, E., Muise, A., & Desmarais, S. (2009). Information Disclosure and Control on Facebook: Are They Two Sides of the Same Coin or Two Different Processes? CyberPsychology & Behavior, 12(3), 341–345. https://doi.org/10.1089/cpb.2008.0226

Congressional Research Service. (2020, July 17). EU Data Protection Rules and U.S. Implications. https://fas.org/sgp/crs/row/IF10896.pdf.

Consumer perception of data privacy in Asia. Rakuten Insight. (2019, January 15). https://insight.rakuten.com/consumer-perception-of-data-privacy-in-asia/.

Demographics of social media users and adoption in the United States. (2020, June 5). https://www.pewresearch.org/internet/fact-sheet/social-media/.

Gogus, A., & Saygın, Y. (2019). Privacy perception and information technology utilization of high school students. Heliyon, 5(5). https://doi.org/10.1016/j.heliyon.2019.e01614

Joshi, S. V., Stubbe, D., Li, S.-T. T., & Hilty, D. M. (2018). The Use of Technology by Youth: Implications for Psychiatric Educators. Academic Psychiatry, 43(1), 101–109. https://doi.org/10.1007/s40596-018-1007-2

Kaşıkcı, Duygu & Cagiltay, Kursat & Karakus Yılmaz, Turkan & Kursun, Engin & Ogan, Christine. (2014). Internet Habits and Safe Internet Use of Children in Turkey and Europe. Egitim ve Bilim. 39. 230-243.

Lanier, Clinton & Saini, Amit. (2008). Understanding Consumer Privacy: A Review and Future Directions. 12.

Madden, M., & Rainie, L. (2015, May 20). Americans' Attitudes About Privacy, Security and Surveillance. Pew Research Center: Internet, Science & Tech. https://www.pewresearch.org/internet/2015/05/20/americans-attitudes-about-privacy-security-and-surveillance/.

Parent, J., Sanders, W., & Forehand, R. (2016, May). Youth screen time and behavioral health problems: The role of sleep duration and disturbances. Retrieved May 05, 2021, from https://doi.org/10.1097/dbp.0000000000000272

Schomakers, E.-M., Lidynia, C., Müllmann, D., & Ziefle, M. (2019). Internet users' perceptions of information sensitivity – insights from Germany. International Journal of Information Management, 46, 142–150. https://doi.org/10.1016/j.ijinfomgt.2018.11.018

Soffer, T., & Cohen, A. (2014). Privacy Perception of Adolescents in a Digital World. Bulletin of Science, Technology & Society, 34(5-6), 145–158. https://doi.org/10.1177/0270467615578408

Steijn, W., & Vedder, A. (2015). Privacy under Construction: A Developmental Perspective on Privacy Perception. Science, Technology, & Human Values, 40(4), 615-637. Retrieved March 27, 2021, from https://doi.org/10.1177/0162243915571167

The NCES Fast Facts Tool provides quick answers to many education questions (National Center for Education Statistics). National Center for Education Statistics (NCES) Home Page, a part of the U.S. Department of Education. (n.d.). https://nces.ed.gov/fastfacts/display.asp?id=46.

YOUN, S. (2009). Determinants of Online Privacy Concern and Its Influence on Privacy

Protection Behaviors Among Young Adolescents. The Journal of Consumer Affairs, 43(3), 389-418. Retrieved March 27, 2021, from http://www.jstor.org/stable/23859694