

# Net Benefits: Digital Inequities in Social Capital, Privacy Preservation, and Digital Parenting Practices of U.S. Social Media Users

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## Abstract

Social media adoption has been shown to exhibit digital inequality: sociodemographic background has been highly correlated with usage rates. As social media use has also been shown to correlate with important benefits, chiefly social capital, low adoption rates can mean a portion of the population is not receiving these benefits. In this work, we examine the equity of social media benefits among users, introducing and validating the existence of two new social media benefits: learning of privacy-preserving behaviors and parental engagement in children's social media use; and explore the equity of their distribution among social media users. To draw generalizable conclusions, we use a probabilistic telephone survey (n=3,000), weighted to represent the responses of the U.S. population within 2.7%. We encouragingly find no difference in adoption of social media based on education and find that lower-income users are *more* likely to use social media. Yet, we find an inequality in benefits: older and less educated social media users report lower degrees of nearly all examined benefits. Further, we find preliminary suggestion of an inherited digital inequality: parents who use social media, especially those who are more educated and higher paid, are more likely both to help their children set up privacy settings and teach them safe posting behaviors.

## Introduction

The effects of social media use are varied and controversial: for example, research has shown that social media can improve social capital and happiness (Ellison, Steinfeld, and Lampe 2007; Valenzuela, Park, and Kee 2009; Burke, Kraut, and Marlow 2011), cause emotional contagion (Kramer, Guillory, and Hancock 2014), or expose users to privacy threats (Gross and Acquisti 2005; Hodge 2006; Livingstone 2008; Zheleva and Getoor 2009). Other work has shown a digital divide in social media adoption – a gap in technology access, adoption, or literacy driven by demographic or socioeconomic differences (Warschauer 2003). While these two issues—benefits and digital inequality—have been separately examined in a number of studies, less work has explored the relationship between the two. In order to understand where to focus our development, research, and educational resources we must understand which, if any, groups are disadvantaged and attempt to restore balance.

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Prior research has primarily established that the benefits of social media use lies in enhanced social capital, which includes connections with friends and family as well as connections to networks of associates who can help with job seeking or drive exposure to new ideas (Ellison, Steinfeld, and Lampe 2007; Valenzuela, Park, and Kee 2009; Burke, Kraut, and Marlow 2011). In this work, we first explore the impact of socioeconomic on people from different backgrounds' ability to gain social capital from social media use. Next, we push beyond considering a singular dimension of social media benefit, and establish the existence of two previously unexplored social media benefits: the adoption of privacy-preserving behaviors and parental engagement in teaching children safe social media practices. We define privacy-preserving behaviors as those that aim to prevent behavioral tracking (e.g., use of private browsing, cookie blocking) or aim to control the viewers of their content (e.g., through privacy settings or posting of intentionally misleading information). Only limited prior work has explored the relationship between social media use and the adoption of privacy-preserving behaviors, yet such behaviors are increasingly important: behavioral advertising and algorithmic discrimination is increasingly “monetizing privacy,” (Jerome 2013) which law-makers and researchers have suggested is particularly concerning for low-socioeconomic status users, who may be more frequently and detrimentally targeted by advertisers than their higher socioeconomic status peers who can afford to purchase privacy protections. Further, privacy concerns have been identified as one of the key reasons for social media non-use or decisions to leave social media platforms (Baumer et al. 2013), yet potential privacy benefits have been left largely unexplored.

In summary, we seek to answer the following research questions:

- RQ1: Is there a difference in the degree and type of social-capital gains related to social media use?
- RQ2: Is social media use positively or negatively related with privacy-behavior adoption and does this relationship suffer from a digital inequality?
- RQ3: Are these privacy benefits or detriments gained from social media use being passed on to next generation (e.g., users' children)?

To answer these questions, we use a probabilistic random-

digit-dial (RDD) telephone survey of 3,000 U.S. residents, the results of which are statistically weighted (Biemer and Christ 2008) to be accurate within 2.7% of the true values in the entire U.S. population. Such a representative sample is rare in work on social media: studies of social media, and especially those on social media benefits, almost exclusively use small, non-representative samples, often focused on young adults (see the review in (Zhang and Leung 2015)). These samples often have limited sociodemographic diversity, making it difficult to evaluate the presence of a digital divide or accurately capture the range of perceptions relating to social media. Thus, using the large representative sample that we analyze in this work, we contribute to the current body of knowledge on the sociodemographics and geographics of U.S. Social media use, in addition to providing reliable data for exploring the digital divide in social media benefits. While valuable insights are gained from all types of samples, a large, population representative study such as ours can provide more generalizable insights into the online benefits and behaviors of social media users and non users.

We find no difference in social media adoption based on education, and see that lower-income users do not face lower adoption rates. We establish that social media use relates to gains in some, but not all of the privacy-preserving behaviors we examine – with social media users being twice as likely to turn off cookies or avoid sharing sensitive information online, and four and a half times more likely to report using privacy settings (including app settings not related to social media). We observe no education or income variance in the privacy-preserving behaviors associated with social media use, suggesting that users with various resources report equal privacy-preserving behavior adoption. However, our results provide tentative evidence that the behavior divide may have migrated generations: we observe that social media users, and particularly those with higher incomes and more education, are more likely to help their children with privacy settings and discuss post content. Given the relationship we find between social media use and privacy-preserving practices online, this gap may widen the chasm for online behaviors beyond social media for these children.

## Related Work

In this section, we briefly review prior work on the impacts of social media use, the digital divide in social media, and the relationship between social media and privacy behavior.

**Impacts.** Social media is typically defined as technology that allows for the creation and exchange of user-generated content, including messages, pictures, and videos (Kaplan and Haenlein 2010). Prior work has shown that using social media is related to increases in social capital (Brian 2007), specifically bonding (close connections and links to those with a shared identity) and bridging (distant connections and links outside of shared interests or identity) capital, which can have many benefits including helping users feel happier and more connected, and even find jobs in their communities (Ellison, Steinfield, and Lampe 2007; Valenzuela, Park, and Kee 2009; Burke, Kraut, and Marlow 2011). On the other hand, social media has also been linked

with feelings of loneliness (Pittman and Reich 2016) and increased exposure to privacy threats (Gross and Acquisti 2005; Hodge 2006; Livingstone 2008; Zheleva and Getoor 2009). Further, these benefits and risks may not always be equally distributed.

**Digital Inequality.** Digital inequality is defined as a gap in access, skills, and/or knowledge that influences adoption or ways of using different digital platforms (van Dijk and Hacker 2003; Stanley 2003; Rice 2006; Hargittai 2003; 2002; Hargittai and Hsieh 2012). Prior work focused on social media has explored how sociodemographics influence adoption of different social platforms. Hargittai surveyed college freshman, finding that gender, race and ethnicity, and parents educational background (a proxy for socioeconomic status for young adults who do not yet have incomes) were all related to differing adoption rates on different social media platforms (Hargittai 2007). Hargittai and Litt subsequently examined adoption of Twitter by young adults, finding gender and racial differences in adoption, as well lower adoption correlated with lower Internet skill (Hargittai and Litt 2012).

Duggan and Brenner descriptively examined the demographic makeup of users of different social media platforms as part of the Pew Internet & American Life project. Using a large-scale, U.S. representative survey, they find gender and age differences in the overall adoption of social media (Duggan and Brenner 2013). Contrastingly, Ahn et al. analyzed the same Pew survey using more advanced statistical methods and focusing only on young adults, and found no evidence of a digital divide or sociodemographic influence on social network site adoption among young adults in the U.S. (Ahn 2011) and, similarly, boyd found a lack of demographic influence on social media adoption in her qualitative work with teens (Boyd 2007). Finally, Junco used a large sample of college students to investigate inequality in activities on Facebook, finding that women were more likely to use Facebook for personal communication, racial differences in using Facebook to check on friends, and socioeconomic differences in frequency of sharing (Junco 2013). Finally, our prior work investigated the socioeconomics and Internet access on online experiences and advice sources, but did not consider social media in specific (Redmiles, Kross, and Mazurek 2017).

### **New Impacts? Social Media, Privacy, and Parenting.**

Prior work on social media benefits primarily focuses on adoption of social network sites, social-capital gains (e.g., differentiated sharing behaviors), or young-adult-specific benefits (e.g., academic performance (Al-Rahmi and Othman 2013; Hargittai and Hsieh 2010; Pasek, Hargittai, and others 2009)). In this work, we explore two new potential social media benefits: learning of privacy-preserving behaviors and parental education of children in social media practices. While prior work has examined the privacy behaviors or concerns of social media users (Litt 2013; Vitak et al. 2015; De Wolf, Willaert, and Pierson 2014; Tsay-Vogel, Shanahan, and Signorielli 2016; Ellison et al. 2011) or the relationship between privacy and decisions to leave social media (Baumer et al. 2013), they have a) specifically focused on behaviors *on* the social networks or b) focused on privacy concerns rather than behaviors or knowledge, making it difficult to isolate any relationship between

social media use and learning of privacy-preserving behaviors and information seeking. We expand on this prior work by examining the role of social media in the development of online privacy-preserving behaviors on the Internet (e.g., use of private browsing and cookie blocking), not just use of in-platform privacy settings) and by examining both behaviors and privacy-related information-seeking practices and perceived ease.

Finally, while a significant body of prior work has studied the impact of social media on children (O’Keeffe, Clarke-Pearson, and others 2011; Buckingham and others 2008; Boyd 2007; Lenhart et al. 2010) and how parents attempt to control their children’s social media use (Yardi and Bruckman 2011; Hiniker, Schoenebeck, and Kientz 2016; Cranor et al. 2014; Yardi and Bruckman 2012), we instead examine the relationship between parents’ social media use and their interest and engagement in their children’s independent social media practices. That is, we model the relationship between parental social media use, parental sociodemographics, and their teaching of their children about these privacy-preserving practices in order to understand what inherited impact, if any, a digital divide in social media adoption or benefits may have on the next generation of Internet users.

In sum, we expand on prior work in two key ways: (1) we empirically examine the digital divide in social media-related social-capital benefits across the full U.S. population, not just in youth or with a non-representative sample and (2) we expand our consideration of benefits beyond social capital, examining the relationship, and inequalities in the relationship, between social media use and gains in off-platform digital behavior including privacy-related behaviors.

## Methodology

The survey data used in this analysis was collected from November 18 to December 23, 2015 by Princeton Survey Research Associates International (PSRAI). PSRAI conducted a computer-assisted-telephone-interview, RDD, census-representative survey of 3,000 U.S. residents on behalf of Data&Society (funded by the Digital Trust Foundation). We received the dataset through a Data Grant from Data&Society.

### Survey Development and Questions Analyzed

The survey was created by a senior researcher at Data&Society, who authored and pre-tested new items for the survey and also used pre-existing and pre-tested questions from previous Pew and Reason-Rupe surveys (pew a; b; ncs ; rea ). In this work, we analyze the following constructs using the questions described:

- *social media use*: “Do you ever use the Internet to use social media, such as Facebook, Twitter, or Instagram?”<sup>1</sup>
- *Internet benefits*: five categorical items assessing whether the Internet has had a “mostly positive,” “neutral,” or

<sup>1</sup>This is a validated question used on multiple Pew Internet and American Life surveys to assess current social media use such that results can be validated against trends over time. Due to the phrasing of the question, social media users in our dataset are *current* users.

“mostly negative effect” on their: ability to meet others who share their interests, find jobs or people who can help them get a job, ability to share ideas and opinions with many different people, ability to share private information with people they trust, and their ability to keep their personal information secure. We bin the answers such that ‘mostly positive’ is in one class and ‘neutral’ and ‘mostly negative’ are in the other. We also include an item assessing the respondent’s sources of advice for protecting their personal information online; the possible sources were: a friend or peer, a family member, a co-worker, a librarian, a government website, a website run by a private organization, and/or a teacher.

- *interest and involvement in their children’s social media use*: (these three items were only asked to respondents who are the parent or guardian of someone under the age of 18 who “lives in their household”) a Likert item assessing how important the respondent thinks it is for their children to know: how to manage privacy settings for information they share online, understand the privacy policies of the websites and applications they use, and use the Internet without having their online behavior tracked; and two boolean items querying whether the respondent had ever helped their children set up privacy settings for a social media site and whether they had ever talked with their child because of a concern about something the child posted online.
- *privacy-preserving behavior* related items, including:
  - *behavior*: a set of five boolean items querying the respondent: “while using the internet have you ever: ” given inaccurate or misleading information about yourself, turned off cookies or set your browser to notify you before receiving a cookie, used an ad blocking service, avoided communicating online when you had sensitive information to share, or used privacy settings to limit who can see what you post.
  - *knowledge and information-seeking*: a set of three boolean items about whether they “already know enough” or “would like to learn more” about managing privacy settings for information they share online, understanding the privacy policies of websites and apps that they use, and using the Internet without having their behavior tracked; and a 4-point Likert item about how easy they think it would be for them to find information about tools and practices that they could use to protect their personal information online
  - *perceived information control*: a 4-point Likert item (from “A lot of control” to “No control at all.”) that asks: “Let’s think about a typical day in your life as you spend time at home, outside your home, and getting from place to place. As you go through a typical day, how much control do you feel you have over how much personal information is collected about you and how it is being used?”
- *demographics and Internet resources*: age, race, income, education, gender, the type of device they primarily use to access the Internet, and whether they have high speed

Internet access at home.

Question order was randomized and demographic questions were asked at the end of the survey to minimize bias (Krosnick 2010; Schaeffer and Presser 2003). Additionally, to ensure high validity the questionnaire was extensively pretested by experienced PSRAI interviewers.

Professionally trained interviewers administered the interviews in English and Spanish. To ensure good sampling coverage, calls were made at multiple times of day and on multiple days to both landline and cell phones. As this was a probabilistic survey (Krosnick 2010), every person in the United States had a non-zero chance being selected.<sup>2</sup>

### Analysis Procedures

To weight the survey responses using the weights calculated by PSRAI<sup>3</sup>, we used the R ‘survey’ library (Lumley 2016); the 95% confidence interval for the findings after this weighting is 2.7%, meaning that the findings reported in this paper are accurate within 2.7% of the true prevalence in the U.S. population. For binary variables we construct binomial logistic regression models, for ordinal variables we use ordinal logistic regression. In all models we include social media use as well as demographics – gender, age, income, and education – as input variables. To evaluate model fit, we perform 5-fold cross validation (Hastie, Tibshirani, and Friedman 2009) and calculate the Akaike Information Criterion (AIC) (Akaike 1974) across five folds for each model, finding that the AIC values for each fold are within an average of 4.3% of each other. For brevity, in some cases we include the results of Wald tests (a variation of the  $X^2$  test designed specifically for weighted sample data such as ours (Rao and Scott 1981)) rather than the full regression results contrasting social media users and non-users across the variable of interest; in these cases we note whether the relationships remain significant when controlling for demographics in the full regression.

### Limitations

Respondents in surveys may under- or over-report, misremember experiences (recall bias), select a socially desirable rather than true answer (desirability bias), or misinterpret items. These limitations can be mitigated by carefully developing and testing questions, as was done for this survey (Holbrook, Green, and Krosnick 2003). It is important to note that all questions analyzed other than the trust question are binomial or categorical, thus we do not know, for example, how often respondents used social media nor can we disambiguate different social media platforms. Additionally, while we include measures of access (e.g., primary device of internet access) and socioeconomics, we do not include measures of Internet skill due to survey space constraints. Skill is also an important component of the digital divide (Hargittai 2007), which may covary with demographics but is also importantly distinct. Thus, our results should be taken in context with other digital divide work on social media, which includes

<sup>2</sup>Those who did not have a telephone were contacted via mail and, if interested, were provided with a phone to use for the survey.

<sup>3</sup>See (Redmiles, Kross, and Mazurek 2017) for a more detailed description of the weighting procedure

Metric	Unweighted	Weighted	Census
Male	52.4%	48.7%	48.2%
Female	47.6%	51.3%	51.8%
Caucasian	58.1%	62.8%	65.8%
Hispanic	18.6%	15.6%	15%
African American	14.0%	11.8%	11.5%
Other	6.7%	7.4%	7.6%
LT H.S.	12.8%	12.6%	13.3%
H.S. grad	27.4%	27.8%	28.0%
Some college	24.0%	30.0%	31.0%
B.S. or above	34.6%	28.7%	27.7%
18-29 years	16.3%	20.1%	20.9%
30-49 years	24.6%	32.6%	34.7%
50-64 years	28.8%	25.4%	26.0%
65+ years	27.0%	18.6%	18.4%
<\$20k	20%	NA	32%
\$20k-\$40k	21%	NA	19%
\$40k-\$75k	18%	NA	18%
\$75k-\$100k	10%	NA	11%
\$100k-\$150k	8%	NA	12%
\$150k+	7%	NA	8%

Table 1: Sample demographics, percentages may not add to 100% due to non-response. Income was the unweighted variable of interest.

skill but may have a more limited participant sample or not have included the same spectrum of possible benefits. Finally, like most survey research, we apply regression analyses to a dataset collected at a single point in time; as such, we cannot draw causal conclusions and merely report *relationships* between social media use and our constructs of interest.

## Results

Below, we describe the survey sample and the factors that relate to users’ security and privacy experiences.

### Sample

In Table 1 we report our sample demographics in comparison with the U.S. census (cen 2014). The unweighted sample was nearly representative of the U.S., including with regard to number of adults in the household, geographic region, population density, and household phone usage (not shown in the table). The weighted sample is representative of the population with a 95% confidence interval of 2.7 points, computed using the survey design effect, which accounts for the loss in statistical efficiency that results from a systematic non-response and other survey biases.

### U.S. Social Media Users: Sociodemographics and Geographics

Overall, 73% of our sample uses social media. To better understand the factors related to social media use in the U.S., we model the relationship between sociodemographics (gender, education, age, and income), Internet resources (primary device of Internet access and access to high speed Internet), and social media use (Table 2). In line with prior work, we find that older users are less likely to report using social media and men are also only 54% as likely as women to report using social media. In contrast with some prior findings that social media use does not vary with income (Duggan and Brenner 2013; Ahn 2011), we find that those who earn less than \$20,000

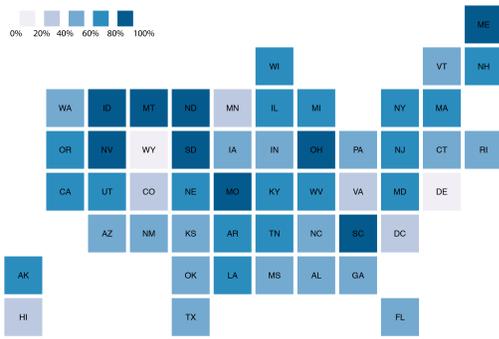


Figure 1: The proportion of people who report using social media use in each state, divided into quintiles; chart created with the statebins R package (Rudis 2015).

a year are actually  $3.16 \times$  more likely to report using social media.

**Geographic Equity.** We find no relationship between the device on which people access the Internet nor whether they have high speed Internet access at home and whether they use social media; we also find no relationship between whether the user is in an urban, rural, or suburban location and their propensity to be a social media user. While urban/suburban/rural dwelling was not significant, we do include a figure illustrating the distribution of social media users across the U.S. (Figure 1) for context; the standard deviation for social media use across states is 14%.

Factor	O.R.	C.I.	p-value
Age	0.97	[0.96, 0.98]	< 0.001*
Gender: Male	0.54	[0.34, 0.87]	0.012*
Edu.: H.S. or less	0.39	[0.12, 1.22]	0.106
Edu.: Some College	1.26	[0.74, 2.12]	0.395
Income: <\$20k	3.16	[1.16, 8.55]	0.024*
Income: \$20k - \$40k	1.12	[0.65, 1.93]	0.695
Internet: Primary Cell	1.31	[0.79, 2.18]	0.291
Internet: Home High Speed	1.51	[0.75, 3.03]	0.248
Suburban	1.69	[0.93, 3.06]	0.083
Urban	1.14	[0.63, 2.06]	0.671

Table 2: Binomial logistic regression results with social media use as the outcome variable and age, gender, education, income, primary device for Internet access, availability of high speed Internet at home, and rural/suburban/urban living location as input factors. O.R. is the log-adjusted regression coefficient (odds ratio), C.I. is the 95% confidence interval for the OR (moderated by the survey design effect (Kish 1965)), and p-values are considered significant at 0.05.

### Perception of Internet Benefits

Next, we examine whether there is a relationship between social media use and perceptions of the benefits of the Internet (Table 3). We find that users of social media report a  $2.66 \times$  higher likelihood of feeling like the Internet has had a positive impact on their ability to meet others with shared interests. We also find that social media users are  $2 \times$  as likely to report that the Internet has had a positive impact on their ability to share private information with the people they trust. Further, social media users are  $4.5 \times$  as likely as non-users

to report a positive benefit from the Internet on their ability to share their ideas and opinions with many different people. However, we observe no relationship between social media use and people’s perception of the impact of the Internet on their ability to keep their personal information secure or their ability to find jobs or people who can help them to find jobs.

**Social Media and Advice Sources.** We also examine the relationship between social media use and sources of advice for protecting personal information. We find that, even when controlling for demographics, social media users are 9% more likely ( $p = 0.009$ ; binomial logistic regression controlling for demographics) to cite their friends as a source of advice for protecting personal information, perhaps because it is easier for them to reach out to those friends via social media. We find no significant relationships between social media use and any of the other advice sources that were reported (coworkers, teachers, librarians, government websites, and other websites).

**A Divide in Social Capital.** Across each of these benefits (including advice sources), we also observe demographics covariance. Those who are older are less likely to report a benefit in each area: 4%, 2%, 4%, and 1% less likely to report a positive impact on ability to connect with others, share private information, share ideas with different people, and reach out to friends for advice on protecting digital information, respectively, for every year of age. Additionally, those with a high-school education or less are 56% less likely to report a benefit from the Internet for meeting others with shared interests, 72% less likely to report a positive impact on their ability to share private information, and 72% less likely to report a positive impact of the Internet on their ability to share ideas and opinions with different people. Finally, those who are male are 4% less likely to report reaching out to friends for advice about how to protect their information.

### Privacy Behaviors & Information Seeking

We were also interested in understanding the relationship between social media use and privacy-preserving online behaviors: using an ad blocking service, blocking cookies, providing deceptive information online, using privacy settings (including on social media sites, but also including mobile application permissions and settings on websites such as Dropbox), and avoiding communicating online when sharing sensitive information.

**Privacy Benefits: Cookie Blocking, Privacy Settings, and Careful Information Sharing.** We find that those who use social media are  $2.25 \times$  more likely to turn off cookies, use private browsing, or set their browser to notify them before delivering a cookie, are nearly  $4.5 \times$  more likely to have used privacy settings, and are nearly twice as likely to report avoiding communicating online when they had sensitive information to share. We find no relationship between social media use and providing inaccurate or misleading information about yourself online or using ad blockers. Interestingly, these findings illustrate a dichotomy between two ad related behaviors: private browsing/cookie blocking and ad blockers. We find that 56% of social media users block cookies or use private browsing, while only 26% report using ad blockers. Future work may wish to explore

	Connecting	Private Sharing	Idea Sharing	PII Security	Jobs
Social Media	2.66* [1.71, 4.12]	2.05* [1.3, 3.23]	4.50* [2.84, 7.14]	1.31 [0.85, 2]	1.53 [0.97, 2.43]
Age	0.96* [0.95, 0.97]	0.98* [0.97, 0.99]	0.96* [0.95, 0.98]	0.99 [0.98, 1]	0.94* [0.93, 0.95]
H.S. or Less	0.46* [0.22, 0.94]	0.28* [0.13, 0.6]	0.28* [0.13, 0.61]	1.04 [0.5, 2.15]	0.35* [0.16, 0.73]
H.S. to B.S.	0.80 [0.54, 1.19]	0.64 [0.44, 0.95]	0.65 [0.42, 1.01]	0.93 [0.62, 1.38]	0.77 [0.5, 1.17]
Gender	1.23 [0.86, 1.77]	0.95 [0.67, 1.35]	1.08 [0.75, 1.55]	0.86 [0.61, 1.21]	1.06 [0.74, 1.52]
<\$20K	1.07 [0.63, 1.82]	1.16 [0.71, 1.9]	0.67 [0.39, 1.14]	0.79 [0.49, 1.26]	1.06 [0.65, 1.75]
\$20-\$40K	1.06 [0.68, 1.67]	1.05 [0.69, 1.62]	0.89 [0.58, 1.39]	0.79 [0.52, 1.21]	0.92 [0.58, 1.47]

Table 3: Regression results for the relationship between social media use, demographics, and five areas on which the Internet may have made an impact. Regression input factors on listed in the first column, regression output variables are listed in the first row. Each numeric cell lists first the odds ratio (OR), and on the next line, the 95% CI for that OR. OR that are significant are indicated with a \*, where  $p < 0.05$  is represented by \*,  $< 0.01$  is represented by \*\*, and  $< 0.001$  is represented by \*\*\*.

the cause of this difference: do users appreciate some of the advertisements they see (Goldfarb and Tucker 2011; Plane et al. 2017) and want to avoid broad blocking?; are people less aware of ad blockers?; are ad-blockers used less because, while they provide privacy benefits against third-party tracking, they are not marketed as privacy tools?, or are there other barriers to adoption such as complex installation or high cost?

**Privacy Benefits Divide.** We again find demographic covariates with these behaviors. Men are nearly  $1.5\times$  more likely than women to turn off cookies. For use of privacy settings and avoidance of sharing sensitive information we see a gender covariance relationship in the opposite direction: men are only 36% as likely as women to report using privacy settings and only 64% as likely to report avoiding sharing sensitive information online. This is in line with prior findings that men and women engage in different protective behaviors, with some studies showing that women are more likely to engage in privacy behaviors that protect their content, whereas men may be more likely to engage in defensive behaviors against marketing and advertising such as cookie blocking (Sheehan 1999; Hoy and Milne 2010; Youn and Hall 2008). Further, we see that older users are less likely to report blocking cookies and using privacy settings, but no less likely than younger users to report avoiding sharing sensitive information online. Additionally, those who have a high school diploma but no college degree are 62% as likely than those with a college degree to turn off cookies, and those who have a high school diploma or less are 53% as likely. Table 4 summarizes the demographic covariate relationships for the behaviors unrelated to social media use.

**Use Unrelated to Knowledge, Control, Information-Seeking.** Despite differences in privacy behavior due to social media use, we find that social media use is not related to differences in reported interest in learning more about how to use privacy settings ( $p = 0.065$ , binomial regression controlling for demographics) or remaining untracked

online ( $p = 0.082$ , binomial regression controlling for demographics). Further, social media use is not related to reported differences in perception of information-seeking ease: there is no significant difference between how easy social media users and non-users think it would be to learn more about protecting their personal information online and find tools and strategies that would help ( $p = 0.081$ , binomial regression controlling for demographics). Finally, there is no significant difference between the day-to-day degree of control over their personal information reported by social media users as compared to non-users ( $p = 0.273$ , ordinal regression controlling for demographics).

Thus, in summary we find that users and non-users report no differences in perception of their own knowledge, information-seeking ease around these topics, or perceived control over their information. This is surprising, as we would anticipate higher behavior adoption correlating with increased self-efficacy and perceived safety (Bodford 2017; Lee, Larose, and Rifon 2008). As self-efficacy and confidence is key to sustaining behavior change and continuing to learn new behaviors, future work may wish to explore this disconnect between privacy-preserving behavior adoption and confidence in privacy-knowledge and data control.

## Parenting and Social Media Use

Finally, we examine whether parents who use social media place more importance on their children’s knowledge of how to manage privacy settings, how to interpret privacy policies, and how to avoid behavior tracking. We find no relationship between social media use and these three factors ( $p = 0.366, 0.514, 0.645$ , respectively; ordinal logistic regression controlling for demographics) and we also find no significant demographic covariates, suggesting that all parents place relatively equal importance on their children’s knowledge of these topics.

**Social Media Users Educate Children About Privacy.** We also examine whether parents who use social media are

	Cookies/Private Browsing	Privacy Settings	Offline Sens. Info.	Deceptive Info.	AdBlock
Social Media	2.25* [1.46, 3.46]	4.47* [2.8, 7.16]	1.94* [1.24, 3.02]	1.62 [0.86, 3.04]	1.34 [0.81, 2.23]
Age	0.98* [0.97, 0.99]	0.97* [0.96, 0.98]	0.99 [0.98, 1]	0.97* [0.95, 0.99]	0.98* [0.96, 0.99]
H.S. or Less	0.53* [0.25, 0.91]	0.75 [0.32, 1.76]	0.52 [0.24, 1.12]	0.56 [0.2, 1.54]	0.57 [0.23, 1.45]
H.S. to B.S.	0.62* [0.42, 0.93]	0.71 [0.46, 1.1]	0.67 [0.44, 1]	0.61* [0.37, 0.99]	0.92 [0.6, 1.42]
Gender	1.46* [1.03, 2.06]	0.36* [0.24, 0.52]	0.64* [0.45, 0.92]	1.51 [0.98, 2.35]	0.94 [0.64, 1.37]
<\$20K	0.69 [0.43, 1.1]	0.59 [0.34, 1.03]	0.64 [0.39, 1.05]	1.48 [0.8, 2.72]	1.27 [0.74, 2.19]
\$20-\$40K	0.85 [0.54, 1.34]	0.88 [0.52, 1.47]	0.66 [0.42, 1.03]	0.93 [0.52, 1.69]	1.00 [0.61, 1.64]

Table 4: Regression results for the relationship between social media use, demographics, and privacy-preserving behaviors. See Table 3 for full caption.

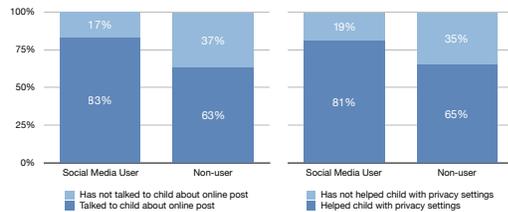


Figure 2: The proportion of parents who report helping their child set up privacy settings for a social media platform and who report discussing with their child a concern they had about something the child posted online.

more likely to help their children set up social media privacy settings or talk with their children because of a concern about something their child posted online. Using a Wald test for weighted surveys we see that social media-using parents are more likely to help their children with privacy settings ( $p = 0.038$ ) and to talk with their children about an online post ( $p = 0.005$ ). Figure 2 illustrates these results.

**Perhaps, An Inherited Divide.** These relationships remain significant even in a binomial logistic regression controlling for demographics, when controlling for demographics we also note that lower income parents (those with incomes less than \$20,000) are only 34% as likely as higher income parents to report helping their children with privacy settings, and those with some college education are  $3.2\times$  more likely to report helping their children with privacy settings; no demographic covariates were observed for discussions about online posts (regression tables omitted for brevity).

## Discussion

Social media is often framed or perceived as a privacy-threatening space: a set of platforms on which users share information that is then sold to advertisers or shown to an audience that could include anyone on the internet (Sánchez Abril, Levin, and Del Riego 2012; Gritzalis et al. 2014; Ellison et

al. 2011; Fuchs 2011). Yet, our findings show that social media use, perhaps because of these privacy threats, is associated with an increased adoption of privacy-preserving and tracking-avoidance behaviors. Some of the behaviors, such as blocking cookies/using private browsing, have significant non-social media-related social and economic benefits such as mitigating the risk that shopping websites will adjust pricing based on knowledge of user data (Mikians et al. 2012). Our results suggest that the privacy-sensitive nature of social media may make it a good privacy training-ground; and as such, we observe an interplay between the inherent privacy risks to which social media users are exposed and potential privacy-behavior adoption benefits of social media use.

Our findings and the results of prior work also establish a positive relationship between social capital and social media use. The relationship between social media use and these social-capital and privacy-behavior gains implies that there may be some inherent social good to the ongoing push by social media companies to connect new users (e.g., Facebook’s Free Basics), especially those in other low-internet-access countries to their platforms. Additionally, we find a relationship between social media use and seeking out advice on how to protect personal information from friends. However, we find that social media users are no more likely than others to receive advice about protecting digital information from online resources. This is perhaps surprising and suggests that people may find these resources through channels other than social media or, even if social media users do access these resources through social media, non-social media users do so at equal rates through other channels.

While we have established the *perceived* benefits of social media, and examined one information seeking benefit, further work on the functional utility of social media may be useful to fully examine and ensure equity. As an example, enhanced job connections and employment access are key benefits associated with social-capital in prior sociological research (Lin 2000; McArdle et al. 2007; Burke and Kraut 2013). Yet, in our analysis we find that so-

cial media users do not report significantly more employment access or connections. This may be due to misperceptions, survey methodological issues, or, more concerning, due to a potential disconnect between social-capital gained on social media and utility for other purposes. Thus, as a next step, we must attempt to measure the connection between different types of social capital and benefits. Such analysis can move us toward an examination the social media cost-benefit balance: e.g., how do measured losses from security breaches, privacy risks, and/or cyberbullying compare to economic, privacy-protection, or mental-health gains, if present?

In addition to working toward achieving cost-risk balance, we also must work toward equity in perceived benefits. Our findings show that there is a divide in the degree and direction of these gains: older and less educated users report lower levels of social-capital and privacy-behavior related benefits, while women report lower levels of two privacy-behavior-related benefits. We hypothesize that older users report less social-capital benefit as they may have less dense social graphs, thus providing them fewer opportunities for connection. Additionally, we hypothesize that less educated and older users may have lower levels of Internet skill making it more difficult for them to fully benefit from the platform. Further, we hypothesize that privacy-preserving behavior divides may exist due to a lack of surfacing of relevant content through ranking algorithms, which have been shown to be demographically biased (Bozdag 2013; Datta, Tschantz, and Datta 2015), and/or due to a demographically-driven gap in skills that may inhibit privacy-behavior acquisition (Litt 2013). We suggest that future work should consider qualitatively exploring these and other hypotheses in order to develop new social media features to facilitate the gain of benefits equally across all users.

Finally, we find potential evidence of an inherited divide: children of social media users are significantly more likely to have parents who report giving them guidance on privacy settings and appropriate content posting practices. This is especially true for those from lower-socioeconomic backgrounds, as we find that lower-income parents, including those who use social media, are less likely to engage with their children on these two topics; while parents who have higher educations are more likely to do so. This potentially suggests a passing-down of the digital divide: with those from lower-resource backgrounds being less likely to receive the benefit of their parent's social media use on influencing their own improved privacy on social media. While it is possible that children in lower-resource situations are receiving guidance from peers or teachers, this sociodemographic discrepancy in parental discussions around privacy is worrying, especially as social media companies such as Facebook work to develop child-focused platforms (ISAAC and SINGER 2017). Children are at especially high privacy-risk given the threat of cyberbullying and digital child exploitation (O'Keeffe, Clarke-Pearson, and others 2011; Mitchell et al. 2010). Further, as these children grow up to become the next generation of social media users, any inherited divide may exacerbate the divide in social media benefits we already observe among their parents.

Future work should focus on two thrusts: (1) further vali-

dating the existence of an inherited divide, potentially through longitudinal study and (2) development of interventions. Such interventions should address barriers to parents educating their children, rather than motivating parents to care about their children knowing these behaviors, as we find that parents at all socioeconomic levels are equally interested in making sure their children are educated on these topics. While prior work has extensively focused on designing parental-controls and other methods for parents to mediate children's technology use (Rode 2009), the findings presented here suggest that parents are not only interested in controlling children's activities but rather ensuring that their children are able to act autonomously, but knowledgeably online. We also encourage a push toward educational interventions that can be directly deployed with children (Zhang-Kennedy, Abdelaziz, and Chiasson 2017). Finally, we encourage further research examining children's non-parental privacy advice sources, such that those children from lower-resource backgrounds will have exposure to high-quality social media education, even if not through their parents.

## Summary

In summary, we provide a population-representative look at the socioeconomic factors related to social media benefits in the U.S. Our results are the first to provide a generalizable examination of the relationship between privacy-preserving-behavior adoption, socioeconomics, and social media use and between parental social media use, socioeconomics, and parents engagement with their children about privacy-related social media topics. We establish a set of new social media-related benefits: adoption of privacy-preserving behaviors and education of children about privacy practices on social media (RQ2); and confirm—with a more representative sample—that social media use is related to three of four social capital benefits: ability to connect with others who share their interests, ability to discuss and share ideas with different people, and ability to share privately with close friends. We observe a digital inequality in these benefits: less educated and older users report lower levels of nearly all the aforementioned benefits (RQ1). Finally, we also observe a potential inherited inequality, with social media users who have lower incomes or education reporting lower likelihood of teaching their children about good privacy practices on social media (RQ3). We encourage future work toward closing the gap in social media benefits, as well as new research focused on quantifying the utility of social media benefits in an effort to work toward optimizing the balance between risk and benefit.

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