

# Privacy and Behavioral Advertising: Towards Meeting Users' Preferences

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## ABSTRACT

Online advertisers track Internet users' activities to deliver targeted ads. To study how different factors affect users' attitudes towards this practice, we conducted a between-subjects online study ( $n=1,882$ ). We elicited participants' comfort with sharing commonly collected types of information in scenarios with varying online advertisers' data practices. Quantitative analysis showed that participants' willingness to share information with online advertisers is not only based on the sensitivity of the information, but also on the scope of collection and use, relevance for advertising, and perceived benefits of disclosing specific data types. Qualitative analysis showed nuanced and individualized preferences, which suggest that personalized privacy agents have the potential to better assist users to control how advertising networks collect and use their information.

## 1. INTRODUCTION

Online Behavioral Advertising (OBA) aims to improve the effectiveness of online advertising by showing ads based on inferred Internet users' interests. Previous research has consistently found that users are concerned about online tracking and behavioral advertising [14, 18, 19, 22]. However, not much is known about what specifically shapes users' privacy concerns regarding behavioral advertising. A better understanding of these concerns can inform the design and personalization of systems that can assist users to control online tracking and the design of online advertising guidelines that align with users' expectations.

We conducted a 1,882-participant between-subjects online study using Amazon's Mechanical Turk to recruit participants. We investigated how different online advertisers' data practices affect participants' willingness to share different data types. Each participant was randomly assigned to a scenario outlining specific collection, use, and retention practices. Quantitative analysis confirmed that the scope of collection and use significantly affects participants' will-

ingness to share some data types and that users are generally less willing to share more sensitive data types such as credit score bracket, income bracket, and email address [14]. Furthermore, participants were significantly less willing to share information when they assumed that such information could be used for negative purposes such as selling it to third-parties, sharing it with the government, or sending them spam. Qualitative analysis showed more nuanced and individualized preferences which suggest the possibility of personalizing privacy agents to better assist users. Participants were reluctant to share information that they felt was irrelevant for advertising, was private, or did not reflect their purchasing interests.

## 2. BACKGROUND AND RELATED WORK

OBA contributes significantly to advertising revenue because of higher ad conversion rates compared to non-targeted ads [3]. However, whether OBA is always effective is questionable. Farahat and Bailey found that when pre-existing consumer interest is considered, OBA may not benefit the advertiser [6]. Lambrecht and Tucker analyzed data from a travel website and found that general-audience, non-targeted ads performed better on average than targeted ads [11].

Advertisers may share data with other entities such as affiliates and data brokers, and may retain data for varying periods of time and sometimes indefinitely [7]. Collected data may be used for advertising and other purposes such as website analytics, marketing research, and direct marketing. Privacy scholars have criticized the advertising industry for engaging in privacy invasive practices [5] and for the lack of transparency and effective user controls [12, 19].

Privacy scholars have consistently found that users are concerned about online tracking and behavioral advertising. In general, users do not want third parties to track and profile them online [8, 16, 19, 21]. Rao et al. investigated users' online behavioral profiles [19] and found that users were particularly concerned about the amount of data, the presence of sensitive information, and data from offline sources found in such profiles. Agarwal et al. found that users were sensitive to being shown embarrassing ads as a result of OBA [2]. Ur et al. found that participants saw potential benefits of OBA for both users and companies, but were concerned about the lack of transparency and control over OBA practices [22].

User studies have shown that online advertisers' data practices can influence users' willingness to share data for the purpose of OBA. Leon et al. found that the scope of use and

sharing as well as the retention period significantly affected participants’ willingness to share different types of information. They also found that almost half of their participants were unwilling to share any type of data, and, regardless of the online advertiser’s data practices, a very low fraction of participants would share sensitive information such as income bracket [14]. Studies have found that users are least willing to share sensitive financial data [9] and that users consider sharing credit card information for personalization most risky [20]. Kelley et al. studied parameters that influence people’s willingness to share location with advertisers [10]. They found that users have diverse preferences that vary based on factors such as where they are and the frequency with which location is shared. In this work we conducted both quantitative and qualitative analyses to understand users’ nuanced sharing preferences and privacy concerns under varying online advertisers’ data practices.

### 3. METHODOLOGY

For our IRB-approved between-subjects study, we recruited 1,882 adult U.S. residents on MTurk. Compensation was \$1.5 and average study completion time was 22 minutes.

#### 3.1 Study Design

Our goal was to understand how advertisers’ data practices impacted users’ willingness to share certain information when users were aware of such practices. (1) Does the type of data collected matter? For example, does willingness vary by personal, financial or predictive information? (2) Do variations in scope of collection and sharing affect users’ willingness to share information? For example, are users more comfortable when their data is collected and used on a single website versus on multiple websites? Does a shorter retention period make them more comfortable? (3) Is a limited purpose specification more conducive to sharing than a vague purpose?

To answer our questions, we assigned each participant to one condition that described a particular data practice scenario. We described our scenarios in the context of a hypothetical news website (AllNews) where an advertising company (Best Ads or Facebook) would collect and use data from visitors. We considered seven scopes of collection and use, and three retention periods (one week, three months, one year), resulting in 21 conditions in total. Table 1 shows an overview of our scenarios.

In the survey, we first collected participant demographics, Internet use, and opinions about online advertising. To signal that the survey required more than minimal effort, we asked an open-ended question regarding opinion about online advertising.

Second, we confronted participants with one scenario from Table 1. We first asked participants to visit the AllNews website, a static website we modeled after the CNN.com homepage with changed branding logos and text (see Appendix B). Hyperlinks and forms were disabled. To verify that participants were following instructions, we required them to identify the title of a news article that appeared on the AllNews homepage, presented among four decoy titles. Then we asked participants to imagine that they were users of the AllNews website. We provided a short explanation of how targeted ads work. We told them that the AllNews website had contracted with a company that was interested in showing users targeted ads and informed them about the

scenario-specific data practices. Appendix C shows the full survey script.

We asked participants to read the given scenario thoroughly and assessed their understanding with a follow-up question about the stated data practices. Participants who answered incorrectly were shown the correct answers, asked to read the scenario again, and then tested again. We then collected participants’ willingness to share the 10 different types of personal information shown in Figure 1. These data types were chosen based on what advertising companies typically collect or infer. For each item, participants rated their comfort with sharing that item on a 5-point Likert scale. This was followed by open-ended questions asking them to explain why they would or would not be comfortable with the advertiser collecting a specific data type. We presented these follow-up questions for at most four randomly selected data types to avoid fatigue.

Third, we showed participants a realistic example of a profile [19] and elicited participants’ opinions about it. Details of this part of the study are reported in an extended technical report on this study [13].

We ended the survey with eight questions from the Internet Users’ Information Privacy Concerns (IUIPC) instrument to gauge participants’ general privacy concerns [15].

#### 3.2 Analysis Approach

We cleaned the data by removing participants from outside the US (39) identified by IP address; those that completed the survey in <5 minutes (3); were inconsistent in whether they visited news websites regularly (27); or failed the AllNews website (120) or sample profile (13) content questions. We analyzed valid responses from 1,882 participants aged 18–79 (mean=34,  $\sigma=12.2$ ). Half the participants were female. Participants reported low (40%), medium (33%), high (20%) or null (7%) Internet literacy, and they exhibited a diverse range of occupations, and were well educated (31% some college, 10% Associate’s degree, 35% Bachelor’s degree, 15% Graduate degree). We did not observe any statistical differences between conditions concerning education, tech savviness, gender, age, or Internet literacy.

##### 3.2.1 Quantitative Analysis

We performed a Kruskal-Wallis test for each of the 10 assessed data types to determine for which data types the scenario and retention period had a statistically significant impact. We found that only scenario had a significant impact on willingness to share some types of information.

We then performed binary logistic regressions on all data types using the scenarios and retention periods (to verify its null effect) as independent variables. The willingness to share questions served as dependent variables with “strongly agree” and “agree” responses binned as “agreement,” and “neutral,” “disagree,” and “strongly disagree” responses binned as “non-agreement.” In addition to scope and retention, our regression models controlled for participants’ age and gender, and included indicator variables for privacy concerns, positive opinion of targeted ads, usage of ad blocking tools, positive opinion of the AllNews website, Facebook account, tech savviness, and whether participants answered correctly at least one of the scenario understanding questions.

##### 3.2.2 Qualitative Analysis

We qualitatively analyzed open-ended responses on par-

	Scenario	Description
S1	AllNews	Best Ads may collect information and show targeted ads only on the AllNews website.
S2	OtherPurposes	S1 + Best Ads may use the collected information for other purposes.
S3	Websites	Best Ads may collect information and show targeted ads on the AllNews and other websites.
S4	Offline	S3 + Best Ads may collect information from a local department store and give targeted coupons for the store.
S5	Websites&OtherPurposes-NoShare	S3 + Best Ads may use collected information for other purposes, but not share it with other parties.
S6	Websites&OtherPurposes	S3 + Best Ads may use collected information for other purposes, no restrictions given.
S7	Facebook	Facebook may collect information on the AllNews website and users' Facebook page to show targeted ads on Facebook.

**Table 1: Scenarios of the different conditions, each was tested with retention periods of one week, three months, and one year (21 conditions in total).**

Participants’ reasons for comfort or discomfort with sharing certain information types. Respective questions were shown dependent on a participant’s answers to preceding Likert-scale questions. For instance, we asked about their reasons for being concerned if they indicated concern about the sample profile. In addition, participants assigned to conditions mentioning “other purposes,” were asked what those might be, in order to understand whether they had positive or negative associations.

For each open-ended question, we randomly selected a 10% sample of the respective responses, drawn evenly from all 21 conditions, for qualitative data analysis. Considering the large total of participants, this provided us with a sufficiently large sample per question for qualitative data analysis (138–199 responses per question). Due to random sampling within each condition we were confident that the selected responses are representative of the whole dataset, which we confirmed with cursory inspection of the remaining responses. For the “other purposes” responses, all 792 responses were coded as *positive*, *negative*, or *ambiguous* in order to enable integration in the regression models.

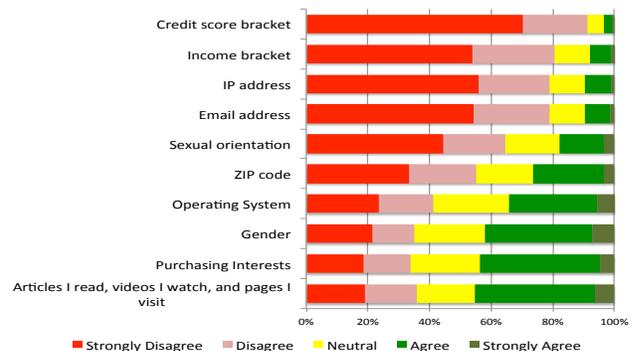
For each open-ended question, two researchers independently evaluated the same subset of responses to derive relevant codes from which a question-specific coding taxonomy was jointly developed. Next, they coded the full sample of responses. Initial inter-coder reliability was evaluated with Cohen’s Kappa coefficient. Coding disagreements were subsequently resolved on a per-statement basis in an iterative process between the two coders, resulting in fully reconciled response annotations for each open-ended question, which were used in subsequent analysis.

## 4. RESULTS

We discuss how different factors affected participants’ sharing preferences. We discuss our quantitative results showing general sharing preferences followed by qualitative ones, which uncovered participants’ more nuanced preferences.

### 4.1 Sharing Preferences

Overall, almost half the participants (45%) were comfortable sharing information with advertising companies. They were most comfortable sharing the pages visited, articles read, and videos watched on the news website (45%), the products they might be interested in purchasing (44%), gender (42%), computer’s operating system (35%), ZIP code from where they access the Internet (26%), as well as sexual orientation (17%). Only a small fraction of participants



**Figure 1: Participants’ responses to the statement, “I would be comfortable if [Best Ads / Facebook] collected or otherwise inferred the following information about me.” The green shades represent sharing comfort, while the red shades indicate discomfort.**

were comfortable sharing their email address (9.7%), IP Address (9.6%), income bracket (7.9%), or credit score (3.3%). Figure 1 shows overall willingness to share.

Participants’ sharing comfort did not only depend on the sensitivity of information, but also the scope of collection and use, necessity of collection, and perceived benefits and harms of disclosure. Furthermore, personal attitudes such as trust in the visited website, the opinion of targeted ads, and privacy concerns had a strong effect on willingness to share. We discuss how the elements in the tested scenarios impacted participants’ comfort with sharing different data types. First we present quantitative results based on participants’ Likert-scale ratings, followed by qualitative results from participants’ text responses; which provide further insights into participants’ decision making process. Overall, our results help to explain why participants might not be willing to share even apparently innocuous information under some circumstances, but they might be willing to share arguably more personal information under other circumstances. Finally, using results from our regression models, we discuss how personal attitudes towards targeted ads, trust perceptions, and privacy concerns affected participants’ sharing comfort.

#### 4.1.1 Factors Affecting Sharing Comfort

Statistical analysis suggested that participants took into account the scope of collection and purpose of use to make information sharing decisions. We found general differences

between scenarios for six information types: interactions with the AllNews website, purchasing interests, gender, ZIP code, sexual orientation, and email address. However, retention period was not a significant factor in predicting willingness to share for any information type. Regression models allowed us to investigate the particular direction of the effects. Detailed results from regression models are provided in Table 4 in the Appendix. Participants’ willingness to share their online interactions and purchasing interests decreased as the scope of collection and use increased, while their willingness to share their gender, email address, ZIP code, and sexual orientation was more nuanced.

**Online interactions.** Participants’ comfort sharing their online interactions was similar (49%-53%) in scenarios where this data type was exclusively used for targeted ads either on the first-party website (S1) or other visited websites (S3), as well as when it was used for targeted ads and other purposes only on the first-party website (S2). But, they were statistically less comfortable sharing ( $\beta$ s from -0.62 to -0.55,  $p < 0.001$ ) this data type (34%-41%) in scenarios where the information would be linked with offline data to receive coupons (S4), used on other websites for unspecified purposes (S5 & S6) and shared with Facebook (S7).

**Purchasing interests.** Participants’ comfort sharing their purchasing interests was similar (45%-51%) in scenarios where this data type was exclusively used for targeted ads either on the first-party website or other visited websites (S1 & S3, 46%), used for targeted ads and other purposes only on the first-party website (S2, 51%), and even when linked with offline data to receive coupons (S4, 45%). However, participants were statistically less comfortable sharing this data type (38%) in scenarios where the information was going to be used on other websites also for other unspecified purposes ( $\beta = -0.44$ ,  $p = 0.03$ ) and shared with Facebook ( $\beta = -0.35$ ,  $p = 0.07$ ).

**Gender.** None of the scenarios (35%-47%) were statistically different ( $\alpha = .05$ ) in our regression model from the baseline scenario (S1, 40%). However, a larger fraction of participants was comfortable sharing their gender with Facebook (S7, 47%) and when used for targeted ads and other purposes only on the first-party website (S2, 47%) compared with scenario S6 where the information would be used on other websites and for “unspecified purposes” (35%).

**ZIP code.** As in the case of gender, fewer participants (21%) in scenario S6 were willing to share this data type than participants in all other scenarios (25%-34%). This difference was significant ( $\beta = -0.64$ ,  $p = 0.005$ ) when compared with the baseline scenario (S1, 29%). For both gender and ZIP code, the “unspecified” purposes seemed to negatively impact willingness to share, likely because participants assumed more “negative” than “positive” purposes for these data types.

**Sexual orientation.** Participants’ comfort sharing their sexual orientation was low in scenarios where this data type was used for targeted ads either on the first-party website (S1, 13%) or other visited websites (S3, 16%), going to be linked with offline data to receive coupons (S4, 18%), and used on other websites for other unspecified purposes (S6, 13%). However, they were statistically more comfortable sharing their sexual orientation in scenarios where the information was going to be shared with Facebook (S7, 23%,  $\beta = 0.8$ ,  $p < 0.001$ ) or used on other websites for other unspecified purposes but without sharing it with third-parties (S5,

21%,  $\beta = 0.56$ ,  $p = 0.04$ ).

**Email address.** While only few participants (10%) were comfortable sharing their email address, a larger fraction of them were comfortable sharing it to receive coupons (S4, 13%,  $\beta = 0.56$ ,  $p = 0.07$ ) and with Facebook (S7, 16%,  $\beta = 0.88$ ,  $p = 0.002$ ) when compared to scenario S1 (8%).

**Computer’s and sensitive information.** None of the scenarios affected participants’ willingness to share either computer’s information such as IP Address and OS or more sensitive information such as income bracket of credit score.

**Effect of unspecified purposes.** For the scenarios that included uses for “other purposes” (i.e., S2, S5, and S6), we coded responses from all participants (i.e., not only 10% as was done for other open-ended questions). We categorized participants’ interpretations of those purposes into three groups: *positive* (e.g., suggesting content, measuring success of ad targeting, observing consumer trends), *negative* (e.g., selling information to other companies, creating mailing lists, sharing with the government), and *ambiguous* (e.g., participant uncertain or response unclear). The majority of participants assumed other purposes to be negative (52%), a third of participants assumed positive purposes (35%), and a smaller number were ambiguous (13%).

We included this variable in our regression models to evaluate whether opinions about “other purposes” had an impact on sharing comfort. A positive perception of “other purposes” had a positive impact on the level of comfort for sharing online activities ( $\beta = 0.32$ ,  $p = .07$ ), gender ( $\beta = 0.32$ ,  $p = .07$ ), and ZIP code ( $\beta = 0.46$ ,  $p = .002$ ).

Taken together, the quantitative results for the different data types suggest that participants paid attention to the tradeoffs presented in their given scenario.

#### 4.1.2 Other factors affecting disclosure

We explored the impact of participants’ personal characteristics such as gender, age, and attitudes towards privacy, targeted ads, and the AllNews website. Attitudinal variables showed a strong effect on sharing comfort for all explored data types. In particular, positive opinion about targeted ads and about the AllNews website significantly increased sharing comfort ( $\beta$ s ranged from 0.58 to 1.87,  $p < .001$ ). On the other hand, the more privacy concerned participants were, the less comfortable they were sharing any data type ( $\beta$ s ranged from -0.79 to -0.42,  $p < .002$ ).

Demographics had a milder effect. Participants’ gender was only significant for the ZIP code and gender data types. Male participants were more comfortable sharing ZIP code and gender than female participants (both  $p < .002$ ). We now turn to a qualitative discussion that provides further insights into the participants’ reasoning.

#### 4.1.3 Why people would share information

We asked participants open-ended questions to understand why they were comfortable sharing some data types with advertisers. We coded a random sample of 10% of participants responses for a total of 206 participant responses, resulting in 255 coded statements leading to the reasons shown in Table 2. The two main reasons why participants were willing to share data with advertisers were receiving relevant advertisements (25.8%), and feeling that the data was public rather than personal, or private (18.8%). The top data types that participants considered public were operating system information, gender and online activities.

Reason	Count	Percent
Receive relevant ads	66	25.8%
Not personal/secret/private	48	18.8%
Does not matter	32	12.5%
Not personally identifiable	23	9.0%
Required to provide relevant service	18	7.0%
No harm in sharing	12	4.7%
Easy to infer	8	3.1%
Technical aid	7	2.7%
Not embarrassing	7	2.7%
Receive better deals	7	2.7%
Location targeting	7	2.7%
Not privacy invasive	6	2.3%
Other	14	5.5%

**Table 2: Reasons why participants are willing to share data with advertisers. Participants could provide multiple reasons (255 codes=100%,  $n=206$ ).**

Others reasons why participants would share information was the perceived lack of importance of specific data types, e.g., gender and OS (12.5%); assuming that it could not be used to personally identify them, e.g., ZIP code and OS (9%); and seeing “no harm” in sharing (4.7%).

Participants also expressed data type-specific reasons for sharing. For example, participants wanted to share ZIP code to receive location-specific benefits, like local deals and news. Participants were comfortable sharing information about the articles, videos and pages they visit to receive better service, for example, recommendations for news articles. Participants wanted to share information about products they were interested in to receive discounts. A few participants assumed that OS information was required for the website to display properly on their computer. Interestingly, some participants indicated that they were proud of their sexual orientation and were not embarrassed to share it.

We investigated why participants were more comfortable sharing certain data types for specific scenarios. Recall that participants were significantly more willing to share email in the Facebook (S7) and offline (S4) scenarios compared to other scenarios. Participants in the offline scenario were willing to share email to get better deals and services. In the Facebook scope they thought that they had already voluntarily provided their email to Facebook. Participants were more willing to share gender in the Facebook scenario as some did not care if Facebook knew their gender, and others felt that their gender was not a secret. Participants were also more comfortable sharing their sexual orientation in the Facebook scenario (S7). They were also more comfortable when sexual orientation could be used for other purposes, but would not be shared with other parties (S5). Participants expressed that it was not a big deal, no harm would come of it, were not ashamed, or that sexual orientation did not point to their identity. They also felt that services could be tailored to their interests. One participant said, “they can’t do anything knowing that,” and another mentioned, “the ads and services could be tailored to feature products that are in line with my lifestyle.”

Participants were more comfortable sharing online interactions (articles, videos, and pages visited), gender and ZIP code for the scenarios that mentioned that participants’ data may be used for other unspecified purposes (S2, S5, and S6). As we discussed in Section 4.1.1, having a positive impres-

Reason	Count	Percent
Personal information	187	23.8%
None of their business	114	14.5%
Unnecessary for advertising	96	12.2%
Invasion of privacy	81	10.3%
Location tracking	50	6.4%
Ad spam	43	5.5%
Lack of consent	42	5.3%
Inference of information	24	3.1%
Personally identifiable	22	2.8%
General tracking	20	2.5%
Computer harm	20	2.5%
Unreliable information	18	2.3%
Other	68	8.6%

**Table 3: Reasons why participants would not share data with advertisers. (786 codes=100%,  $n=575$ ).**

sion of “other purposes” increased their comfort for sharing these data types. Participants who were comfortable sharing their interactions, gender, and ZIP code considered that other purposes may include understanding users interests, personalization of content, monitoring web trends, and providing promotions and discounts.

#### 4.1.4 Why people would not share information

We further investigated reasons for feeling uncomfortable with sharing information. In this case, the 10% sample analyzed consisted of 575 participant responses, yielding 786 coded reasons. The larger number of coded statements reflects the higher percentage of participants not willing to share information with advertisers. We extracted the reasons shown in Table 3. Overall, participants were not comfortable sharing data they considered personal information (23.8%), advertisers did not need to know (14.5%), or is unnecessary for advertising (12.2%). Note that the reasons for unwillingness to share are almost opposites of those for willingness to share discussed previously.

As with willingness to share, participants’ unwillingness to share varied by data types. Participants were mainly concerned about their location being tracked if they shared ZIP code or IP address. The main reason participants would not like to share their email address was not wanting to receive unsolicited emails. Some participants were unwilling to share IP address with advertising companies, because they believed this information could be used to identify them. Furthermore, certain data types such as gender, income bracket and online activities were not perceived as reliable indicators of their interests and therefore irrelevant for ad purposes. One participant stated, “I don’t see how what I read about accurately reflects any products or services that I would or could actually purchase or even be interested in.”

The majority of participants were not comfortable sharing credit score, income bracket, and sexual orientation because they considered these types of information personal, unnecessary for advertising, or thought it was nobody’s business. Some participants viewed the collection of these types of information as an invasion of their privacy. Some participants expressed concerns about discrimination based on price, gender or sexual orientation. Some did not trust Facebook and other advertisers. They thought that advertising companies might sell or share their data with third-parties. A few be-

lieved that their data may be stored insecurely, or that they may become victims of identity theft. Lastly, some participants thought that sharing data such as location or gender may increase the risk of assault or physical harm.

Participants considered their interactions on Facebook as personal and believed that they could not use Facebook freely if Facebook tracked their habits and activity history. For the offline scenario, participants were uncomfortable combining offline and online information. Participants in the “other purpose scenarios” considered collecting online activities as too much collection of information and compared it to spying on them. One of the participants said, “That is personal information. I feel like they are spying on me if they know that. That makes me feel uncomfortable.”

Participants were uncomfortable sharing purchasing interests in the Facebook (S7) and other purpose scenarios (S2, S5 & S6). Participants did not want Facebook to know too much of their browsing and shopping habits. They were concerned about Facebook hounding them with ads, and that Facebook could announce or share purchases that were deemed personal. Participants in the “other purpose” scenario were uncomfortable sharing purchase interests for several reasons including invasion of privacy, not relevant to their interests, unwilling to purchase from ads, and because they did not specifically give permission for collecting such information. Participants expressed that location could be inferred from ZIP code, and their location, or where they live, was personal information. They further thought that sharing such personal information was an invasion of privacy.

## 5. DISCUSSION

We investigated how participants perceive practices routinely used by advertisers in different scenarios. We find that those scenarios influence participants’ willingness to disclose different types of information. Next, we discuss the implication of our results, how they could assist advertisers in refining their practices, and the potential for personalizing privacy interfaces.

**Context Matters.** More than half (55%) of participants were not comfortable sharing any type of information. However, those who were comfortable sharing some data showed nuanced preferences. Participants were comfortable sharing information that they deemed necessary for advertising or delivery of a better service. For example, 49–53% of participants were comfortable sharing their online interactions when data was used for targeted ads on the visited website as well as other websites, but not if the data was used for other purposes outside the scope of the visited website, or combined with PII (e.g., Facebook and offline scenarios). They were also more comfortable sharing their email addresses to receive coupons (13%) and with Facebook (16%) than with other websites or for other purposes (7–9%). Participant’s were comfortable sharing their gender, ZIP code and other data types under some circumstances, but not always. These results suggest that binary approaches like Do-Not-Track or opt-outs, which do not consider the context of collection are less than optimal. Instead, advertisers and service providers need to recognize that the context impacts what Internet users consider acceptable practices and that practices should be limited accordingly.

**Meeting Users’ Expectations.** Users were more comfortable sharing some data types when they assumed that the “other purposes” for which companies would use that

data were positive. However, many users tended to assume the worst. This suggests that collection and use purposes should be clearly specified to ensure that the users’ expectations and consent align with the actual data practices rather than having erroneous assumptions drive their willingness to share and their perceptions of advertising practices.

Consistent with findings from previous studies [22], participants indicated that they were uncomfortable sharing data with companies that had not obtained proper consent to collect and use their data. Further, even users who recognized benefits in sharing remained uncomfortable sharing data types considered sensitive, such as income bracket, credit score bracket, sexual orientation, email address and even IP address. They considered them not necessary for advertising, and potentially harmful.

Many participants did not see the need of collecting extensive data for advertising purposes. Participants also voiced concerns about sharing information with third parties. However, participants were willing to share information that they thought would result in improved and more relevant ads, such as location when they were interested in learning about local deals, or gender or operating system which were considered not or less personal. Many (46%) were also comfortable sharing their purchasing interests directly.

These insights suggest that there is opportunity for interest-based rather than behavioral targeted advertising. Making it more transparent what information a displayed ad is based on and enabling users to influence and adjust these aspects would likely result in fewer violations of privacy expectations and an increase in perceived utility of ads as well as generally more positive attitudes towards advertising practices. Furthermore, if data collection and use practices were transparent, tools that allow users to specify sharing preferences or that can learn users’ preferences over time could help them to control online behavioral advertising.

**Personalized Privacy Interfaces.** The advertising industry has developed icons that indicate the use of targeted advertising on websites, and has provided tools and websites to enable consumers to opt-out of targeted advertising from individual or a list of advertising companies. However, these are “all or nothing” solutions that do not consider users’ nuanced preferences. Our results show that users willingness to share varies by data types and purposes for which data is used. A personalized interface could allow users to set their preferences based on data types and purposes. Such interfaces are also helpful as they enable users to change their preferences over time. Lastly, it may be possible to identify groups of users with similar preferences for sharing based on data types and purposes. Personalized interfaces could provide several default options based on such groups.

Our analysis is based on self-reported data. We acknowledge that participants’ actual behavior may differ from their stated preferences [4], and that they may not be fully aware of the implications of their preferences [1]. To account for these limitations, we asked participants to visit a news website to emulate a real Internet experience. Although not a perfect substitute for eliciting behavioral data, the fact that participants reacted differently to different scenarios and provided rich qualitative data suggests that the simulation was realistic. MTurk users have known demographic differences compared to the general Internet population; however, it has been shown that MTurk participants behave similarly to study participants recruited from other sources [17].

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## 6. REFERENCES

- [1] A. Acquisti, L. Brandimarte, and G. Loewenstein. Privacy and human behavior in the age of information. *Science*, 347(6221):509–514, 2015.
- [2] L. Agarwal, N. Shrivastava, S. Jaiswal, and S. Panjwani. Do not embarrass: re-examining user concerns for online tracking and advertising. In *Proc. SOUPS '13*. ACM, 2013.
- [3] H. Beales. The value of behavioral targeting. *Network Advertising Initiative*, 2010.
- [4] B. Berendt, O. Günther, and S. Spiekermann. Privacy in e-commerce: stated preferences vs. actual behavior. *Communications of the ACM*, 48(4):101–106, 2005.
- [5] P. Dixon and R. Gellman. The scoring of America: How secret consumer scores threaten your privacy and your future. World Privacy Forum, April 2014.
- [6] A. Farahat and M. C. Bailey. How Effective is Targeted Advertising? *WWW*, 2012.
- [7] Federal Trade Commission. Data brokers: A call for transparency and accountability, May 2014.
- [8] J. Gomez, T. Pinnick, and A. Soltani. KnowPrivacy. [http://www.knowprivacy.org/report/KnowPrivacy\\_Final\\_Report.pdf](http://www.knowprivacy.org/report/KnowPrivacy_Final_Report.pdf), June 2009.
- [9] A. N. Joinson, U.-D. Reips, T. Buchanan, and C. B. P. Schofield. Privacy, trust, and self-disclosure online. *Human-Computer Interaction*, 25(1):1–24, 2010.
- [10] P. G. Kelley, M. Benisch, L. F. Cranor, and N. Sadeh. When are users comfortable sharing locations with advertisers? In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pages 2449–2452. ACM, 2011.
- [11] A. Lambrecht and C. Tucker. When Does Retargeting Work? Information Specificity in Online Advertising. *Journal of Marketing Research*, 5:561–576, 2013.
- [12] P. Leon, B. Ur, R. Shay, Y. Wang, R. Balebako, and L. Cranor. Why Johnny can't opt out: A usability evaluation of tools to limit online behavioral advertising. In *Proc. CHI '12*, 2012.
- [13] P. G. Leon, A. Rao, F. Schaub, A. Marsh, L. F. Cranor, and N. Sadeh. Why people are (un)willing to share information with online advertisers. Technical Report CMU-ISR-15-106, Carnegie Mellon University, 2015.
- [14] P. G. Leon, B. Ur, Y. Wang, M. Sleeper, R. Balebako, R. Shay, L. Bauer, M. Christodorescu, and L. F. Cranor. What matters to users?: factors that affect users' willingness to share information with online advertisers. In *Proc. SOUPS '13*, page 7. ACM, 2013.
- [15] N. K. Malhotra, S. S. Kim, and J. Agarwal. Internet users' information privacy concerns (iupc): the construct, the scale, and a causal model. *Information Systems Research*, 15(4):336–355, 2004.
- [16] A. McDonald and L. Cranor. Beliefs and behaviors: Internet users' understanding of behavioral advertising. *TPRC*, 2010.
- [17] G. Paolacci, J. Chandler, and P. G. Ipeirotis. Running experiments on Amazon Mechanical Turk. *Judgment and Decision Making*, 5(5), 2010.
- [18] L. Rainie, S. Kiesler, R. Kang, and M. Madden. Anonymity, privacy, and security online. 2013. <http://pewinternet.org/Reports/2013/Anonymity-online.aspx>.
- [19] A. Rao, F. Schaub, and N. Sadeh. What do they know about me? Contents and concerns of online behavioral profiles. In *Proc. ASE Conference on Privacy, Security, Risk and Trust (PASSAT)*, 2014.
- [20] H. Treiblmaier and I. Pollach. Users' perceptions of benefits and costs of personalization. In *Proc. International Conference on Information Systems (ICIS)*, 2007.
- [21] J. Turow et al. Americans reject tailored advertising and three activities that enable it. *SSRN eLibrary*, 2009.
- [22] B. Ur, P. G. Leon, L. F. Cranor, R. Shay, and Y. Wang. Smart, useful, scary, creepy: perceptions of online behavioral advertising. *SOUPS*, 2012.

# APPENDIX

## A. REGRESSION MODEL

	Odds Ratio	95% CI	P> Z
<b>Dependent Variable: Articles Read, Videos Watched, and Pages Visited (Online Interactions)</b>			
S2: Only AllNews+Other Purposes	0.85	[0.58, 1.26]	0.42
S3: AllNews + Others	0.84	[0.58, 1.20]	0.33
S4: AllNews+Others+Offline	0.56	[0.39, 0.81]	0.002
S5: AllNews+Others+Other Purposes (No sharing)	0.54	[0.35, 0.82]	0.004
S6: AllNews+Others+Other Purposes	0.58	[0.39, 0.85]	0.005
S7: AllNews + FB	0.43	[0.29, 0.62]	<0.001
Purpose: Positive	1.38	[0.98, 1.94]	0.07
Purpose: Ambiguous	1.18	[0.74, 1.89]	0.48
Privacy Concerned: Yes	0.54	[0.41, 0.71]	<0.001
Targeted Ads Opinion: Positive	4.66	[3.47, 6.31]	<0.001
Opinion on AllNews	2.49	[2.03, 3.04]	<0.001
Has FB Account: Yes	1.39	[1.09, 1.79]	0.009
<b>Dependent Variable: Purchasing Interests</b>			
S2: Only AllNews+Other Purposes	1.07	[0.72, 1.60]	0.72
S3: AllNews + Others	0.99	[0.68, 1.43]	0.94
S4: AllNews+Others+Offline	0.95	[0.65, 1.37]	0.77
S5: AllNews+Others+Other Purposes (No sharing)	0.72	[0.47, 1.10]	0.13
S6: AllNews+Others+Other Purposes	0.64	[0.43, 0.95]	0.03
S7: AllNews + FB	0.71	[0.49, 1.03]	0.07
Purpose: Positive	1.24	[0.88, 1.76]	0.22
Purpose: Ambiguous	1.45	[0.90, 2.32]	0.13
Privacy Concerned: Yes	0.65	[0.49, 0.86]	0.002
Targeted Ads Opinion: Positive	6.48	[4.72, 9.04]	<0.001
AllNews Opinion: Positive	2.04	[1.66, 2.50]	<0.001
<b>Dependent Variable: Gender</b>			
S2: Only AllNews+Other Purposes	1.23	[0.83, 1.82]	0.29
S3: AllNews + Others	0.99	[0.69, 1.43]	0.96
S4: AllNews+Others+Offline	1.27	[0.88, 1.83]	0.20
S5: AllNews+Others+Other Purposes (No sharing)	0.95	[0.62, 1.44]	0.80
S6: AllNews+Others+Other Purposes	0.71	[0.48, 1.05]	0.09
S7: AllNews + FB	1.39	[0.97, 1.99]	0.08
Purpose: Positive	1.37	[0.98, 1.93]	0.07
Purpose: Ambiguous	1.37	[0.86, 2.18]	0.19
Privacy Concerned: Yes	0.66	[0.50, 0.86]	0.002
Targeted Ads Opinion: Positive	3.01	[2.29, 3.96]	<0.001
AllNews Opinion: Positive	2.05	[1.68, 2.52]	<0.001
Has FB Account: Yes	1.77	[1.37, 2.29]	<0.001
Age	0.99	[0.98, 0.99]	0.004
Gender: Male	1.33	[1.09, 1.64]	0.005
<b>Dependent Variable: ZIP code</b>			
S2: Only AllNews+Other Purposes	1.07	[0.69, 1.63]	0.77
S3: AllNews + Others	0.95	[0.64, 1.42]	0.81
S4: AllNews+Others+Offline	0.78	[0.52, 1.17]	0.23
S5: AllNews+Others+Other Purposes (No sharing)	0.67	[0.42, 1.08]	0.10
S6: AllNews+Others+Other Purposes	0.53	[0.34, 0.82]	0.005
S7: AllNews + FB	0.88	[0.59, 1.31]	0.53
Purpose: Positive	1.58	[1.08, 2.32]	0.02
Purpose: Ambiguous	1.48	[0.87, 2.49]	0.14
Privacy Concerned: Yes	0.48	[0.36, 0.63]	<0.001
Targeted Ads Opinion: Positive	3.23	[2.44, 4.28]	<0.001
AllNews Opinion: Positive	1.82	[1.45, 2.30]	<0.001
Age	1.03	[1.02, 1.04]	<0.001
Gender: Male	1.30	[1.04, 1.63]	0.02
<b>Dependent Variable: Sexual Orientation</b>			
S2: Only AllNews+Other Purposes	1.34	[0.79, 2.28]	0.28
S3: AllNews + Others	1.29	[0.79, 2.13]	0.31
S4: AllNews+Others+Offline	1.44	[0.89, 2.37]	0.14
S5: AllNews+Others+Other Purposes (No sharing)	1.76	[1.02, 3.05]	0.04
S6: AllNews+Others+Other Purposes	0.93	[0.54, 1.61]	0.80
S7: AllNews + FB	2.23	[1.40, 3.59]	<0.001
Purpose: Positive	1.23	[0.80, 1.89]	0.34
Purpose: Ambiguous	1.47	[0.81, 2.60]	0.19
Privacy Concerned: Yes	0.45	[0.34, 0.61]	<0.001
Targeted Ads Opinion: Positive	2.73	[2.04, 3.64]	<0.001

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	Odds Ratio	95% CI	P> Z
Has FB Account: Yes	1.34	[0.97, 1.89]	0.09
AllNews Opinion: Positive	1.79	[1.38, 2.33]	<0.001
<b>Dependent Variable: Email</b>			
S2: Only AllNews+Other Purposes	1.45	[0.75, 2.83]	0.27
S3: AllNews + Others	0.90	[0.46, 1.75]	0.77
S4: AllNews+Others+Offline	1.75	[0.97, 3.20]	0.07
S5: AllNews+Others+Other Purposes (No sharing)	0.83	[0.37, 1.79]	0.64
S6: AllNews+Others+Other Purposes	1.25	[0.64, 2.43]	0.51
S7: AllNews + FB	2.43	[1.39, 4.36]	0.002
Purpose: Positive	1.10	[0.63, 1.92]	0.74
Purpose: Ambiguous	0.61	[0.20, 1.51]	0.33
Privacy Concerned: Yes	0.56	0.39, 0.82	0.002
Targeted Ads Opinion: Positive	2.68	[1.87, 3.81]	<0.001
Has FB Account: Yes	2.78	[1.65, 5.01]	<0.001
AllNews Opinion: Positive	1.86	[1.32, 2.63]	<0.001

**Table 4: Logistic regression models of participants’ willingness to disclose.** In addition to the scenario treatment, we included the following co-variates: age, gender, whether or not a participant used Facebook, Internet literacy, privacy concerns, whether participants like targeted ads, opinion of the AllNews website, and whether or not a participant answered at least one of the scenario understanding questions correctly. Only variables significant at  $\alpha < 0.05$  are shown. If one or more levels of a categorical variable was significant, we show all the levels of that categorical variable. Scenarios were compared against the only AllNews scenario (S1). Baselines for the other categorical variables are, purposes: negative, privacy concerned: no, targeted ads and AllNews opinion: Negative, FB account: no, and gender: female.

**B. THE ALLNEWS WEBSITE**

**ALL news** SET EDITION: U.S. | INTERNATIONAL | MÉXICO | ARABIC  
 TV: AllNews | AllNewsI | AllNews en Español | HLN

Sign up | Log in  
 SEARCH  
 POWERED BY Google

Home TV & Video AllNews U.S. World Politics Justice Entertainment Tech Health Living Travel Opinion IReport Money

updated 4:42 PM EST, Tue February 4, 2014 Make AllNews Your Homepage

**ALLTRENDS** Rapist next door · Phillip Seymour Hoffman · Castaway · Paper airplane · Cancer · Hermione · Armless kicker · Super Bowl

# The Farm Bill on the table will decide what's on yours

**5 things about the \$1 trillion plan just passed by Senate**

It sets five years of food and farming policy in the United States, including what we grow, what you know about your dinner and how much the government spends in the process.

**FULL STORY**

- What's in the Farm Bill?
- Wal-Mart: Food stamp cuts hurt

**LIVE TV**  
**The Situation Room**  
 5pm ET / 2pm PT  
 Wolf Blitzer brings you the latest in political news and international events  
 Full Schedules: AllNews TV · HLN TV

**WEATHER**  
 Enter a U.S. Zip or Intl city GO  
**Atlanta, GA**  
 Shows 44°  
 Hi 48° | Lo 46°  
 10-day Feels

**MARKETS**  
**Markets Closed**  
 Updated 5:07 pm ET Feb 4  
 Indexes My quotes  
**Dow** 15,445.24 +72.4 (+0.47)  
**Nasdaq** 4,031.52 +34.5 (+0.86)  
**S&P** 1,755.20 +13.3 (+0.76)  
 Enter Symbol Get quotes  
 AllNewsMoney.com | NEW: My Portfolio

**THE LATEST**

- Phillip Seymour Hoffman's final hours
- Timeline of Hoffman's last day
- **NEW** How heroin kills you
- **NEW** Microsoft names its new CEO
- **NEW** GM's CEO pay race
- Rare, good news about U.S. deficit
- **NEW** Cheating on Navy nuke exam?
- Teacher sex charges after online vid
- WHO: Cancer cases to soar 57%
- Sugar in a daily soda can kill you
- 2 shootings, 2 sons dead
- Mom loses two sons in 19 days
- 10 most dangerous cities
- Brothers escape dad's massacre
- Biggest wave ever surfed?
- Bill Nye to debate Creationist
- Katy Perry most followed on Twitter

**READ THIS, WATCH THAT**

- Are these Alfred the Great's remains? 2:17
- Texan: I've tracked this 'chupacabra' 1:26
- Ex-TSA agent: We laughed at scans 1:55
- Twins' diet contest has shocking result 3:08
- Watch amazing 75-foot buzzer beater 1:09
- Illegal? A new way to cheat Netflix 1:44
- New to Netflix in February
- Surprising celebrity friendships
- 40 years since Patty Hearst's kidnapping
- Would you pay \$4 extra for this?
- 7 things we love about Bruno Mars
- Did Chili Peppers really play?

**MORE TOP STORIES**

- The Ice, man, cometh -- again
- Facebook just made a video about you
- Super Bowl not kind to gamblers
- Multilingual Coke ad sparks anger
- Super Bowl ads: Winners & losers
- Nemat's coat steals Super Bowl

Figure 2: The All News homepage. We asked participants to visit this webpage before providing them notice about [Best Ads / Facebook]’s OBA practices.

## C. SURVEY QUESTIONNAIRE

Important: Please think thoroughly before answering each question. Your precise responses are very important for us. We are not interested in what someone else thinks - we want to know what you think! You may give an incomplete answer or say you do not know.

1) We are interested in understanding how you experience things online. We will start with some questions that seek your views about website advertising. Here, "website advertising" refers to ads that are displayed on the web pages that you visit. In a sentence or two, please tell us what you think about website advertising.\*

2) Indicate how much you agree or disagree with the following statements.\*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Website advertising is necessary to enjoy free services on the Internet	<input type="radio"/>				
In general, I find website advertising useful	<input type="radio"/>				
In general, I find website advertising distracting	<input type="radio"/>				
In general, I find website advertising to be relevant to my interests	<input type="radio"/>				
I usually don't look at the ads that appear on the websites that I visit	<input type="radio"/>				

3) What's your age in years?\*

4) What's your gender?\*

- Male  
 Female

5) Which of the following best describes your primary occupation?\*

- Administrative support (e.g., secretary, assistant)  
 Art, writing, or journalism (e.g., author, reporter, sculptor)  
 Business, management, or financial (e.g., manager, accountant, banker)  
 Computer engineer or IT professional (e.g., systems administrator, programmer, IT consultant)  
 Education (e.g., teacher)  
 Engineer in other fields (e.g., civil engineer, bio-engineer)  
 Homemaker  
 Legal (e.g., lawyer, law clerk)  
 Medical (e.g., doctor, nurse, dentist)  
 Retired  
 Scientist (e.g., researcher, professor)  
 Service (e.g., retail clerks, server)  
 Skilled labor (e.g., electrician, plumber, carpenter)  
 Student  
 Unemployed  
 Decline to answer  
 Other (Please specify): \_\_\_\_\_\*

6) Which of the following best describes your highest achieved education level?\*

- No high school  
 Some high school  
 High school graduate  
 Some college - no degree  
 Associates/2 year degree  
 Bachelors/4 year degree  
 Graduate degree - Masters, PhD, professional, medicine, etc.

7) How would you judge your knowledge of the technical aspects that make the Internet work?\*

- I don't know any technical details  
 I have a vague idea of the technical details  
 I have a good idea of the technical details  
 I am very knowledgeable  
 I am an expert

8) Do you have a Facebook account that you use regularly?\*

- Yes  
 No

9) How often do you...?\*

	Never	A few times per month or less	A few times per week	Once per day	Several times per day
...use social networking sites (e.g., Facebook, Twitter, LinkedIn, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...make online purchases	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...visit news sites (e.g., CNN, BBC, WSJ, NY Times, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...visit entertainment sites (e.g., YouTube, Hulu, IMDb, reddit, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...do online banking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...use reference sites (e.g., Wikipedia, Stackoverflow, HowStuffWorks, Ask.com, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10) Do you use any ad blocking software?\*

- Yes  
 No

11) Which ad blocking software do you use?\*

12) Which news website do you visit most frequently?\*

<input type="radio"/> ABC News	<input type="radio"/> BBC News
<input type="radio"/> Bloomberg	<input type="radio"/> CBS News
<input type="radio"/> CNN	<input type="radio"/> Forbes

<input type="checkbox"/> Fox News	<input type="checkbox"/> Huffington Post
<input type="checkbox"/> Los Angeles Times	<input type="checkbox"/> MSN
<input type="checkbox"/> NBC News	<input type="checkbox"/> reddit
<input type="checkbox"/> Reuters	<input type="checkbox"/> The Guardian
<input type="checkbox"/> The New York Post	<input type="checkbox"/> The New York Times
<input type="checkbox"/> The Wall Street Journal	<input type="checkbox"/> The Washington Post
<input type="checkbox"/> USA Today	<input type="checkbox"/> Yahoo!
<input type="checkbox"/> I never visit news websites	<input type="checkbox"/> Other [Please specify]: _____ *

13) How often have you visited [News Site Name] in the last 12 months?\*

- Only once       A few times       A few times per month       A few times per week       A few times per day

14) Do you have a user account on the [News Site Name] website?\*

- Yes  
 No  
 I don't remember

15) Indicate how much you agree or disagree with the following statements.\*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I believe [News Site Name] has a good reputation	<input type="checkbox"/>				
I have a positive impression of [News Site Name]	<input type="checkbox"/>				
I believe [News Site Name] provides useful information	<input type="checkbox"/>				
I believe [News Site Name] protects my privacy	<input type="checkbox"/>				

Visiting a news website

AllNews is a news website. On allnews.com you can read articles and watch videos on breaking news, events, opinions, and interviews. allnews.com allows you to search for articles and videos.

Clicking on the link below will open a new tab or window in your browser displaying a version of the AllNews website homepage with links disabled. Please look through this page at your own pace and make sure to scroll down and look at the entire page. Then, answer the following questions. Feel free to review the opened tab as many times as you want to answer these questions.

[Click here to visit the AllNews homepage](#)

16) Please select from the list below one article that appears on the left-hand side of AllNews homepage.\*

- Bad news for Obamacare success story  
 Zimmerman agrees to go weaponless  
 Washington politics holding back growth  
 Ex-NFL player dies in high-speed crash  
 Rare, good news about U.S. deficit

17) Indicate how much you agree or disagree with the following statements.\*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I believe the AllNews website has a good reputation	<input type="checkbox"/>				
I have a positive impression of the AllNews website	<input type="checkbox"/>				
I believe the AllNews website provides useful information	<input type="checkbox"/>				
I believe the AllNews website protects my privacy	<input type="checkbox"/>				

**Logic: Hidden unless: Scope is equal to 6. Note: We only show scope 6 as example, other scopes have different practices.**

Please read this information carefully. Then answer the questions below.

Many websites, including AllNews, are able to offer free services to their visitors by contracting with online advertising companies. The advertising companies pay websites for every ad they show, allowing the websites to provide free services to users.

Imagine that you provided some information about yourself (e.g., email address, gender, etc.) when you signed up for an account with the AllNews website. Further imagine that AllNews has contracted with Best Ads, an advertising company that is interested in learning about you to show you ads that are most likely to be of interest to you. These ads are known as targeted ads.

For example, if you watch a video about the 2014 winter Olympic games on the AllNews website and then visit a traveling website and look up hotels near the Olympic venue, next time you visit the AllNews or any other news, entertainment, travel, or retail website, Best Ads could show you a targeted ad for a discounted hotel near the Olympic venue.

The following table summarizes Best Ads' data collection and use practices.

Best Ads may collect information from	<ul style="list-style-type: none"> <li>The AllNews website</li> <li>Other news, entertainment, travel, and retail websites you visit</li> </ul>
Best Ads may use information it collects to show you targeted ads on	<ul style="list-style-type: none"> <li>The AllNews website</li> <li>Other news, entertainment, travel, and retail websites you visit</li> </ul>
Best Ads may use information it collects for	<ul style="list-style-type: none"> <li>Targeted ads</li> <li>Other purposes</li> </ul>
Best Ads may retain information for	<ul style="list-style-type: none"> <li><b>[One week / 3 months / One Year]</b></li> </ul>

18) The information you just read states that **[Best Ads / Facebook]** may use the information it collects about you also for purposes other than targeted ads. What do you think these other purposes might be?\*

19) Based only on the information that you just read, for how long may **[Best Ads / Facebook]** retain the information it collects about you?\*

- One week
- One month
- Three months
- Six months
- One year
- Indefinitely

20) Based only on the information that you read in the description above, which of the following are examples of the types of targeted ads that might occur as a result of your visits to **[AllNews, AllNews and Other/ AllNews and Facebook]**? (Choose all that apply)\*

- You see ads for Olympics t-shirts on Facebook because you read about the Olympics on AllNews
- You see ads for Olympics t-shirts on AllNews because you read about the Olympics on AllNews
- You see ads for Olympics t-shirts on hoteldeals.com because you read about the Olympics on AllNews
- You get a coupon at your local department store for half-price Olympics t-shirts because you read about the Olympics on AllNews
- You see ads for hotels on AllNews because you visited a travel website

Logic: Hidden unless: Scope is equal to 6 and understanding question was incorrectly answered

Your responses to the previous question are not completely right. We are going to let you try again in the next page, but we need you to fully understand Best Ads' practices first. In particular, you missed at least one of the following three true statement(s). Please review them and make sure you understand them before continuing with the survey.

Statement	True/False?	Explanation
You see ads for Olympics t-shirts on AllNews because you read about the Olympics on AllNews	TRUE	Best Ads may show you targeted ads on the AllNews website based on what you do on the AllNews website
You see ads for Olympics t-shirts on hoteldeals.com because you read about the Olympics on AllNews	TRUE	Best Ads may show you targeted ads on AllNews and other entertainment, travel, and retail websites
You see ads for hotels on AllNews because you visited a travel website	TRUE	Best Ads may collect information from other websites you visit to show you targeted ads on AllNews

Logic: Hidden unless: Scope is equal to 6 and understanding question was incorrectly answered

Please review again **[Best Ads / Facebook]**'s practices. Then answer the question below.

Best Ads may collect information from	<ul style="list-style-type: none"> <li>• The AllNews website</li> <li>• Other news, entertainment, travel, and retail websites you visit</li> </ul>
Best Ads may use information it collects to show you targeted ads on	<ul style="list-style-type: none"> <li>• The AllNews website</li> <li>• Other news, entertainment, travel, and retail websites you visit</li> </ul>
Best Ads may use information it collects for	<ul style="list-style-type: none"> <li>• Targeted ads</li> <li>• Other purposes</li> </ul>
Best Ads may retain information for	<ul style="list-style-type: none"> <li>• <b>[One week / 3 months / One Year]</b></li> </ul>

21) Based only on the information that you just read, which of the following are examples of the types of targeted ads that might occur as a result of your visits to **[AllNews, AllNews and Other/ AllNews and Facebook]**? (Choose all that apply)\*

- You see ads for Olympics hats on Facebook because you read about the Olympics on AllNews
- You see ads for Olympics hats on AllNews because you read about the Olympics on AllNews
- You see ads for Olympics hats on car-rental.com because you read about the Olympics on AllNews
- You get a coupon at your local department store for half-price Olympics hats because you read about the Olympics on AllNews
- You see ads for car rentals on AllNews because you visited a travel website

Logic: Hidden unless: Scope is equal to 6

Suppose you use your personal computer to visit **[AllNews, AllNews and Other/ AllNews and Facebook]** and that nobody else uses this computer. Please answer the questions below indicating what information you would be comfortable with **[Best Ads / Facebook]** collecting or inferring. Remember Best Ads' practices are as follows:

Best Ads may collect information from	<ul style="list-style-type: none"> <li>• The AllNews website</li> <li>• Other news, entertainment, travel, and retail websites you visit</li> </ul>
Best Ads may use information it collects to show you targeted ads on	<ul style="list-style-type: none"> <li>• The AllNews website</li> <li>• Other news, entertainment, travel, and retail websites you visit</li> </ul>
Best Ads may use information it collects for	<ul style="list-style-type: none"> <li>• Targeted ads</li> <li>• Other purposes</li> </ul>
Best Ads may retain information for	<ul style="list-style-type: none"> <li>• <b>[One week / 3 months / One Year]</b></li> </ul>

27) I would be comfortable if **[Best Ads / Facebook]** collected or otherwise inferred the following information about me:\*

Strongly Disagree Neutral Agree Strongly

	disagree				agree
The type of operating system (e.g., Windows, Mac, etc.) of my computer	( )	( )	( )	( )	( )
The IP address of my computer (i.e., a computer identifier assigned by your Internet service provider)	( )	( )	( )	( )	( )
The articles I read, videos I watch, and pages I visit on the AllNews website	( )	( )	( )	( )	( )
My income bracket	( )	( )	( )	( )	( )
My gender	( )	( )	( )	( )	( )
The ZIP code from which I visit the [AllNews, AllNews and Other/ AllNews and Facebook] website	( )	( )	( )	( )	( )
My email address	( )	( )	( )	( )	( )
My credit score bracket	( )	( )	( )	( )	( )
My sexual orientation	( )	( )	( )	( )	( )
The products I may be interested in purchasing	( )	( )	( )	( )	( )

Logic: Hidden unless: Question (ID 27.1 – 27.10) contains any ("Agree", "Strongly agree")

28) Please explain why you would be COMFORTABLE with [Best Ads / Facebook] knowing your [Data Type]?\*

Logic: Hidden unless: Question (ID 27.1-27.10) contains any ("Strongly disagree", "Disagree")

29) Please explain why you would NOT be COMFORTABLE with [Best Ads / Facebook] knowing your [Data Type]?\*

Advertising companies create individual profiles based on the information they collect or infer from users' online activities. Some of these companies provide Internet users access to their profiles. The table below shows an example of what information such a user profile may include. The information has been taken from actual user profiles created by an advertising company. Please review this sample profile carefully and then answer the questions below.

Data Type	Value
Location	Region:[Participant's Region]
	City:[Participant's City]
	IP Address:[Participant's Computer IP Address]
Demographics-Individual	Gender:[Participant's Gender]
	Single
	[Participant's Age] years old
	Education: [Participant's Education]
	Type of Job:[Participant's Occupation]
Demographics-Household	Income: \$50K - \$75K
	Household size:1
	Number of Adults:1
	Children in Residence: No
	Home Type: Multifamily Dwelling
	Home Value: Less than \$100K
	Length of Residence: Fewer than 3 years
	Discretionary spending: \$30K-\$40K
	Voter Indicator: Republican
	Automobile: Less than \$20K
	Interest
Religion code: Tiers 1 - 3	
Video Games: Computer, PlayStation 3	
Travel Destinations>North America>US>New York>NYC	
Miscellaneous>News>Business and Finance	
Automobile:Coupes	
Online Activities: Research	
Activities	Past Purchase>Products>Clothing>Jeans
	Offline Purchases>P&G>Charmin Ultra Soft
	Student Loan Consolidation
	Volunteering: Tier 1 - 3
Attitudes	Buy American: Not likely
	Look at Me Now: Most likely
	Never Show Up Empty Handed: Most likely
	It's all in the Name: Most likely
Behavior	Green Living
	Eco Friendly Vehicle Owner
	Mass Market and Discount Shopper
	Gift buyer
	Prepaid wireless plan subscriber
	Premium channel viewer
Predictive	Credit card interest score: 16-17%
	Credit card appl. intent score: 10 -11%
	Auto insurance online buyer: High propensity
	Online Higher Education Enrollee: High propensity
	In-market: Cell phones and plans

48) Please select from the list below two items that appears in the sample profile.\*

- Married
- Credit card interest score 16-17%
- Income: \$75K - \$100K
- In-market: Jewelry
- Children in Residence: No

49) What do you see as benefits (if any) of users from having access to the profiles that advertising companies create about them?\*

50) Think about the information that is shown in the sample profile. How much do you agree or disagree with the following statements.\*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am comfortable with the information that such profiles may contain	<input type="radio"/>				
I am concerned about the information that such profiles may contain	<input type="radio"/>				
I am surprised about the information that such profiles may contain	<input type="radio"/>				

Logic: Hidden unless: Question (ID 50.3) contains any ("Agree","Strongly agree")

51) Please explain what exactly surprised you about the sample profile?\*

Logic: Hidden unless: Question (ID 50.2) contains any ("Agree","Strongly agree")

52) Please explain what exactly is concerning to you about the sample profile?\*

53) Indicate how much you agree or disagree with the following statements. In general, I am comfortable sharing the following information with advertising companies:\*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
My online activities	<input type="radio"/>				
My demographic information	<input type="radio"/>				
My interests	<input type="radio"/>				
My contact information	<input type="radio"/>				

54) Think about the ability to view and edit the information that advertising companies know about you. How much do you agree or disagree with the following statements.\*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
would be given the opportunity to view and edit the profiles that advertising companies create about me	<input type="radio"/>				
having access to the profiles that advertising companies create about me is beneficial to me	<input type="radio"/>				
being able to edit the profiles that advertising companies create about me allows those companies to serve me better	<input type="radio"/>				
being able to edit the profiles that advertising companies create about me provides those companies with more accurate information about me	<input type="radio"/>				
being able to edit the profiles that advertising companies create about me allows me to decide what advertising companies can know about me	<input type="radio"/>				
being able to edit the profiles that advertising companies create about me is beneficial to me	<input type="radio"/>				

Logic: Hidden unless: Question (ID 54.1) contains any ("Agree","Strongly agree")

55) You indicated that you would like to be given the opportunity to view and edit the profiles that advertising companies create about you. Please explain why you think having access to your profile is important.\*

56) In general, how do you feel about receiving ads that are targeted based on your online activities?\*

Strongly dislike  Dislike  Neutral  Like  Strongly like

This is the last page of the survey. Please answer these last questions as accurately as possible.

57) How much do you agree or disagree with the following statements:\*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
usually bothers me when online companies ask me for personal information	<input type="radio"/>				
am concerned that online companies are collecting too much personal information about me	<input type="radio"/>				
bothers me to give personal information to so many online companies	<input type="radio"/>				
when online companies ask for personal information, I usually think twice before providing it	<input type="radio"/>				
feel that as a result of me visiting online companies, others know more about me than I am comfortable with	<input type="radio"/>				
consumer online privacy is really a matter of consumer' right to exercise control and autonomy over decisions about how their information is collected, used, and shared	<input type="radio"/>				
consumer control of personal information lies at the heart of consumer privacy	<input type="radio"/>				
believe that online privacy is invaded when control is lost or unwillingly reduced as a result of a marketing transaction	<input type="radio"/>				

58) Do you have any further comments?

Thank you for taking the survey. Below is your confirmation code. You must retain this code to be paid - it is recommended that you store your code in a safe place (either by writing it down, or by printing this page).

REMINDER: You must correctly copy and paste the confirmation code into Mechanical Turk to be paid!

YOUR CODE IS  
[Code Inserted Here]