# Smart, Useful, Scary, Creepy: Perceptions of Online Behavioral Advertising

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CyLab
Carnegie Mellon University
Pittsburgh, PA 15213

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Blase Ur, Pedro G. Leon, Lorrie Faith Cranor, Richard Shay, Yang Wang
Carnegie Mellon University
{bur, pedrogln, lorrie, rshay, yangwan1}@cmu.edu

## ABSTRACT

We report results of 48 semi-structured interviews about online behavioral advertising (OBA). We investigate non-technical users' attitudes about OBA, then explain these attitudes by delving into users' understanding of its practice. Participants were surprised that their browsing history is currently used to tailor advertisements. They were unable to determine accurately what information is collected during OBA, assuming that advertisers collect more information than they actually do. Participants also misunderstood the role of advertising networks, basing their opinions of an advertising company on that company's non-advertising activities. Furthermore, participants were unfamiliar with advertising industry icons intended to notify them when ads are behaviorally targeted, often believing that these icons were intended for advertisers, not for users. While many participants felt tailored advertising could benefit them, existing notice and choice mechanisms are not effectively reaching users. Our results suggest new directions both for providing users with effective notice about OBA and for the design of usable privacy tools that help consumers express their preferences about online behavioral advertising.

## Categories and Subject Descriptors

H.5.2 [**Information Interfaces and Presentation**]: Miscellaneous

## General Terms

Human Factors, Design

## Keywords

Privacy, User Perception, Online Behavioral Advertising, Tracking, Notice and Choice, Interviews, Advertising, Cookies

## 1. INTRODUCTION

In recent years, Internet advertising has become increasingly tailored to individual users. In the simplest case, *contextual advertising*, ad networks choose which ads to display on a webpage based on the contents of that page. In the more complex technique of *online behavioral advertising* (OBA), advertising networks profile a user based on his or her online activities, such as the websites he or she visits. Using this profile, constructed over time, advertising networks show ads most likely to be of interest to each user, charging a premium price to do so [1]. Targeting advertising based on web searches has been shown to increase ad click-through rates considerably when compared with untargeted ads [28].

OBA presents both benefits and downsides to users. If their interests have been accurately profiled, users will receive more relevant advertising. However, collecting data about users' online activities can potentially violate their privacy. Previous research has found that users have substantial privacy concerns about OBA [15, 19, 24], while marketing surveys have found that consumers like OBA and that discomfort with OBA is reduced when users are properly informed that non-personally identifiable information is used for OBA [12]. Prior work has employed surveys, which can sample a large number of individuals but are not conducive to open-ended questions or follow-up questions to explore attitudes and motivations. In this work, we use interviews to learn how past experiences, knowledge, and understanding factor into users' attitudes towards online behavioral advertising.

Gaining a deeper understanding of consumers' attitudes towards OBA is particularly timely since initiatives are currently in progress to bolster consumer privacy concerning OBA. In March 2012, the U.S. Federal Trade Commission released a report on consumer privacy, with OBA comprising a sizeable portion of the text. In this report, The FTC called on the advertising industry to "[give] consumers greater control over the collection and use of their personal data through simplified choices and increased transparency" [6]. In response, United States government hearings about Internet privacy are currently scheduled [26]. In this round of activity, having a thorough understanding of how consumers perceive behavioral advertising and how they make choices about their privacy enables both technologists and policymakers to provide options and interfaces that better support consumers' privacy wishes.

In this paper, we report results of 48 semi-structured interviews that unpack the factors fueling users' attitudes about OBA. Beyond asking participants their opinions, we investigated their knowledge of the current practice of OBA, their understanding of how profiles can be created, and the extent to which the circumstances of data collection and the identity of the advertising network influence their attitudes. We found that a majority of users find OBA useful, but are concerned about its privacy implications.

We found that current approaches for providing notice about OBA practices are ineffective. Many participants were aware that Internet ads are tailored in some way, and they found OBA simultaneously useful and privacy-invasive. However, icons intended to notify consumers when OBA occurs were unfamiliar to participants. Furthermore, many participants did not believe those icons

were intended for consumers, but rather advertisers. Participants were unsure how they are profiled and surprised when they learned that their browsing activity is currently being used for profiling. They could not accurately determine what information is collected for OBA purposes, or by whom, and they assumed the worst, leading them to oppose strongly a practice they expected would involve the collection of personally identifiable and financial information.

Our results also provide new directions for the design of privacy enhancing tools for OBA. Participants misunderstood the role of advertising networks, evaluating companies based on activities unrelated to advertising. However, most existing privacy tools expect consumers to express preferences on a per-company basis. Many existing tools also expect users to make decisions about different tracking technologies, the mechanisms of which were opaque to participants. Participants expressed a desire to control OBA based on the context of their browsing, not the identity of the company collecting information, leading us to conclude that participants' ideas about how to exercise control over OBA are generally unsupported by existing approaches.

We discuss related work in Section 2 and our methodology in Section 3. We report participants' attitudes about advertising in Section 4. In Section 5, we analyze factors influencing participants' decisions about OBA, while in Section 6, we report participants' understanding of notice and choice icons. We unpack the preceding results and discuss how to align notice and choice mechanisms with users' understanding of OBA in Section 7.

## 2. BACKGROUND AND RELATED WORK

Online advertisers track users as they traverse the Internet, constructing profiles of individuals to enable targeted advertising based on each user's interests. Tracking is typically implemented through third-party cookies set by advertising companies [11]. Surveys conducted by both academics and the advertising industry have found a range of positive and negative consumer attitudes about OBA, which we present in this section. Our interview results provide deeper insight into the genesis and interrelationship between the atittudes reported in these surveys.

OBA can benefit consumers. Since advertising networks can charge higher prices to serve targeted advertising rather than general ads, OBA is "a way to support the websites and products you care about" and also prevents consumers from seeing uninteresting ads [17]. Further, Google counsel Pablo Chavez stated that four times as many users modify the interest categories used by Google for OBA as opt-out of Google OBA entirely, suggesting that users "become more comfortable with data collection and use when they feel it happens on their terms and in full view" [3].

On the other hand, OBA can also lead to privacy concerns. For instance, the U.S. Federal Trade Commission noted that data collection can be invisible, privacy notices may be difficult to understand, consumer profiles are sometimes very detailed, and that there is a "risk that data collected for behavioral advertising – including sensitive data regarding health, finances, or children – could fall into the wrong hands or be used for unanticipated purposes" [5].

In response to consumer concern and FTC pressure, the advertising industry has adopted a strategy of self-regulation. The Digital Advertising Alliance (DAA) and Network Advertising Initiative (NAI) are industry organizations that have issued self-regulatory principles [4, 18]. The DAA claims that its members "comprise 85% of the OBA marketplace" [9]. Three of the eight DAA principles are particularly relevant to our study. The *education principle* "calls for entities to...educate consumers and businesses about online behavioral advertising." The *consumer control* principle requires that users be able to opt out of receiving targeted advertisements, but does not require that users be able to opt out of being tracked online. These opt-outs can be enabled via the DAA's opt-out website,[1] on which consumers can opt out with per-company granularity. The *transparency* principle requires that "enhanced notice" be given to consumers receiving OBA, providing "the ability to exercise choice regarding the collection and use of data for online behavioral advertising" via "common wording and a link/icon that consumers will come to recognize" [4]. In 2010, the industry selected the "Advertising Option Icon" to indicate a link to enhanced notice for behavioral ads [25], as shown in the top half of Figure 1. However, some advertisements still display an older icon, shown in the bottom half of Figure 1, or none at all [8].

Prior studies have examined different facets of user sentiment regarding online advertising generally. In a 2002 paper, Rodgers described two studies with 106 student and 38 non-student participants that looked at interaction between user motivation for using the Internet and the effectiveness of certain types of banner ads, finding that for at least some users, "ads that complement the user's motive may have more success at being noticed and clicked on than ads that do not" [21]. In a 2003 paper, Rettie et al. described a survey with 100 UK student participants, finding that only 13% enjoy Internet advertising, less than the 36% that enjoy television advertising. Fewer than 20% of participants found Internet ads informative or useful. Although 62% indicated that they prefer that websites not have ads, 69% agreed with accepting "ads as pay for content" [20]. In 2007, McCoy et al. described a study with 536 participants and found that online advertising caused users to report being both less likely to return to a website and less able to recall features of that website [14]. In 2008, Campbell and Wright described a survey study with 97 participants, and a laboratory study with 118 participants, finding that the personal relevance of ads increases users' positive attitudes toward repetitive online advertisements [2]. Taken together, this prior work suggests that users find online advertising annoying, yet targeted ad selection may reduce annoyance.

Other academic studies have looked at user perceptions of OBA and online tracking, finding significant privacy concerns about the practice among users. Turow et al. conducted a 2009 survey of 1,000 US adult Internet-users and discovered that 68% of Americans "definitely would not" and 19% "probably would not" allow advertisers to track them online, even anonymously [24]. In a study published in 2010 that included 14 in-person interviews and an online survey of 314 participants, McDonald and Cranor found that just one-fifth of their online respondents prefer targeted ads to random ads, and 64% think targeted ads are "invasive." The study found that "people understand ads support free content, but do not believe data are part of the deal" [15]. In an online study of 2,604 participants, Hastak and Culnan found in 2009 that 46% of respondents were uncomfortable with the websites they visit being used to target ads, although this number decreased to 30% of participants when the practice was transparent and offered participants the choice not to receive targeted ads [7]. A 2012 Pew telephone survey of 2,253 participants found that 68% of respondents were "not okay with targeted advertising because [they] don't like having [their] online behavior tracked and analyzed" [19].

Stakeholders from both the privacy-services and advertising industries have also surveyed consumers about OBA. TRUSTe conducted a 2011 survey with 1,004 United States residents, asking about perceptions of OBA. 53% of participants agreed that online privacy is "a really important issue that I think about often," and another 41% agreed that it is "a somewhat important issue that I

[1] `http://www.aboutads.info/choices/`

think about sometimes." Over a third of participants agreed with the statement: "I know how to protect my personal information online and consistently take the necessary steps to do so." Over half of participants indicated that they definitely or probably would not share their browsing behavior with advertisers, and only 15% indicated being willing or probably willing to consent to being tracked online for relevant ads. Only 8% of participants indicated liking OBA, and only 5% showed awareness of the Advertising Option Icon [23]. A 2011 marketing survey of 9,600 individuals across 31 countries found that 90% of respondents expressed concerns about the privacy of their personally identifiable information, yet 62% were willing to allow online advertisers to track their web usage "under the right circumstances" [10]. Our work fills in the gap of understanding how consumers are simultaneously privacy-concerned and willing to have their information collected. Furthermore, we explore these previously nebulous "right circumstances," identifying situations that cause particular concern for consumers.

Much of this past work has employed surveys to gauge the attitudes of a large number of participants. However, surveys are inherently limited in that they don't provide a way for consumers to discuss ideas and thoughts outside the questions asked, or for followup questions to be asked. As a result, surveys alone cannot fully explain how different nuances of attitude are connected to each other. Our research thus delves deeper than prior studies, employing 48 in-depth, in-person interviews. We gain an understanding of why users are hesitant to be tracked for OBA: privacy concerns and misunderstandings of OBA both appear to play roles. We also provide insight into how users make choices about tracking for specific companies and in specific scenarios, as well as how they understand industry-established OBA icons.

# 3. METHODOLOGY

In August 2011, we recruited 48 participants for a combination interview and usability study of privacy enhancing tools. This study was approved by the Carnegie Mellon University IRB. All participants were recruited from the Pittsburgh region using Craigslist, flyers, and a university electronic message board. Recruitment material directed prospective participants to a screening survey. For the purposes of the usability study, we required participants to be familiar with either Internet Explorer 9 or Firefox 5, be willing to test privacy tools, and have no previous experience with the tools tested. We screened out individuals who had a degree or job in computer science or information technology.

The study lasted approximately 90 minutes. In this paper, we report on the results of a semi-structured interview that took place in the first 30 minutes of each session. The second part of the study was a usability test, on which we have reported separately [13].

Interviews took place at the CyLab Usable Privacy and Security Laboratory on the Carnegie Mellon University campus. Each of the 48 interviews was moderated by one of two researchers who had jointly moderated 11 pilot interviews. We used audio recording to document each session. Participants were compensated $30 for participating in the combination interview and usability study.

## 3.1 Semi-structured Interview

Our semi-structured interviews consisted of two parts separated by an informational video about OBA. The appendix contains the full interview script. The first part of the interview gauged participants' opinions and knowledge of Internet advertising. After participants watched the video, we asked more detailed questions about participants' impressions and understanding of online behavioral advertising.

**Interview part one:** We began with general questions to explore participants' attitudes about Internet advertising. Then, we asked questions about tailored advertising and interviewees' knowledge of online tracking mechanisms. To evaluate participants' knowledge and perception of Internet icons, we showed two disclosure icons, both of which are depicted in Figure 1. These icons were the Advertising Option Icon, which the DAA has standardized,[2] as well as the older "Power-I" icon, which was still in use as of August 2011 [8].

The icons were first shown alone, and then "in context" on an ad with their accompanying taglines. The Power-I icon is usually displayed with the tagline "Interest based ads," while the DAA specifies that the Advertising Option icon should be displayed with one of three approved taglines [16], of which "AdChoices" is commonly used. We spent between five and ten minutes on this section.

**Informational video:** When piloting the interview, we noticed that participants were generally unfamiliar with OBA. To give participants a baseline understanding of OBA for the remainder of the questions, we showed participants an informational video produced by the Wall Street Journal.[3] The video lasted approximately 7 minutes. We selected this video because it clearly explains what behavioral targeting is and how cookies are used in the process of tracking online activities for the purpose of delivering tailored ads.

**Interview part two:** Following the video, we evaluated participants' understanding of behavioral advertising. Then, we asked questions about the benefits they perceived for users and other stakeholders. We also asked about any negative aspects they perceived in OBA activities. Next, we presented six hypothetical browsing scenarios, asking whether participants would be willing to have information collected about their browsing in each situation for the purpose of OBA. We further asked participants about their familiarity with advertising companies and willingness to allow these companies to collect information about their web browsing to tailor ads. Finally, we asked participants how they believed they could stop receiving targeted ads if they wanted to do so.

## 3.2 Analysis

The moderators audio recorded the interviews and took notes during the interview sessions. Once all interviews had been completed, we collaboratively developed a codebook of salient themes we identified in the moderators' written notes. We then coded the audio recording of each interview, transcribing quotes that were especially representative of participants' attitudes. If a response was not captured by existing codes, we added a new code to the codebook. Our coding strategy allowed us to identify both common and uncommon concepts that arose during each interview. We further investigated how concepts correlate between questions to capture mental models underlying participants' attitudes towards OBA.

Although our results are purely qualitative, we report the number of participants who fell into different coding categories. These numbers are intended to provide a sense of how frequently participants mentioned these concepts and do not imply statistical significance. We report representative quotes with the goal of illuminating the thought process captured by important codes.

## 3.3 Participants

Our 48 participants were fairly well-educated. They included 15 males and 33 females between the ages of 19 and 57 (mean age 29); eight were undergraduate students, 16 were graduate students, two were unemployed, and 22 were employed in a variety of occupations. As a result of our screening process, none had a back-

[2] http://www.aboutads.info

[3] http://online.wsj.com/video/92E525EB-9E4A-4399-817D-8C4E6EF68F93.html

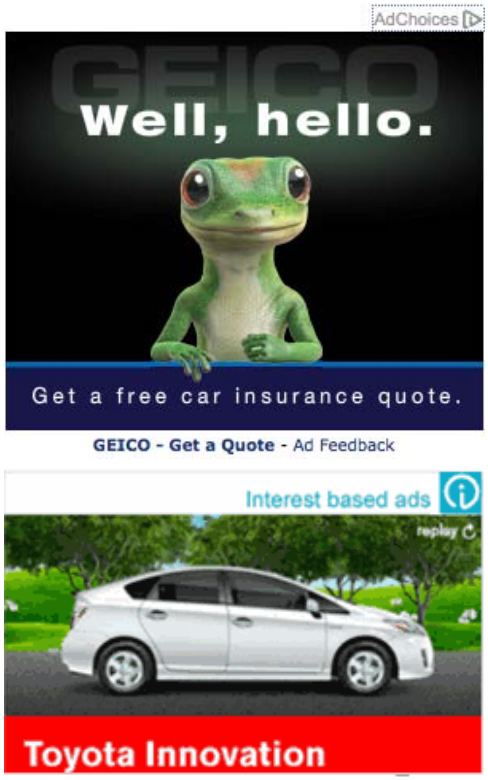


**Figure 1: OBA disclosure icons "in context" on an ad. The *AdChoices* icon is on top, and the *Interest based ads* icon below.**

ground in computer science or web development. We refer to our participants using codes representing the order in which they were interviewed (P-1 through P-48).

Due to the limited recruitment area, our participants are not representative of the general Internet population. We make no effort to draw statistically significant conclusions, but instead focus on collecting rich qualitative data that allow us to understand the mental models of laypeople, unpacking the rationale behind their attitudes and behaviors.

# 4. ATTITUDES ABOUT ADVERTISING

We begin by reporting participants' opinions of general Internet advertising. Next, we present participants' sentiment about and understanding of OBA.

## 4.1 Impressions of Internet Advertising

### *What is the first thing that comes to your mind when you hear 'Internet Advertising'?*

Overall, participants had negative impressions of Internet advertising, often associating ads with annoying and obtrusive pop-up windows. When asked, "What is the first thing that comes to your mind when you hear 'Internet Advertising'?" the most common response was "pop-ups" (21 of 48 participants). P-23 was representative in saying, "I think about those really annoying pop-up ads that always kind of pop up out of nowhere, and I just wanna get rid of them and block them, and they don't go away." The second most common response was "annoying" (7 participants). According to P-40, Internet advertising is "bothersome, not needed, distracting, potentially harmful or dangerous." The same participant explained that "it could be a rogue site trying to obtain information in a less than forthright manner." A number of participants recalled advertising techniques that have been discontinued. For instance, P-7 noted "a few bad experiences with late-90's spyware," mentioning both BonziBUDDY and Comet Cursor.

### *Is Internet advertising useful?*

While many participants had negative impressions of Internet advertising, 25 of the 48 participants said "yes" when asked, "Is Internet advertising useful?" Six participants noted that it helps them find new products. Five participants specifically stated that Internet advertising is useful because it pays for free online services, though most participants expressed a desire for it to be less obtrusive. For example, P-33 expressed, "I am OK with it as long as it does not interfere with what I am trying to do... I understand that a lot of sites are free for my use because of advertising." Five participants volunteered that they generally ignore advertising. For instance, P-40 explained, "I rarely pay attention to [Internet advertising]."

## 4.2 Tailored Advertising

### *Do you think that the ads you see when browsing the Internet are tailored to your personal interests?*

Before watching the OBA informational video, more than half of participants stated that at least some of the advertisements they see on the Internet are tailored to their interests. However, they did not differentiate between contextual and behavioral ads. 34 of 48 participants responded affirmatively when asked, "Do you think that the ads you see when browsing the Internet are tailored to your personal interests?" Of these 34, seven said that tailoring happens only on Facebook, five said only on Gmail, one referred to Amazon, and 24 did not mention a specific website. Although most participants appeared comfortable with Gmail and Facebook customizing ads based on the contents of their emails or their Facebook profile, a few did express discomfort. For example, P-46 said, "It kind of bothers me that the program they use is monitoring my email...It makes you wonder how much access someone else might have to your emails if a program's monitoring it." P-34 commented, "Just when I'm on Gmail, for instance, I notice that when I look at an email, the ad at the top seems to cater to what I'm looking at, and I just think that might be an invasion of privacy."

### *Is it useful for you to see ads that are tailored to your interests?*

Overall, participants found it useful to receive tailored ads; 31 of 48 participants responded in the affirmative to our question, "Is it useful for you to see ads that are tailored to your interests?" Non-obtrusive contextual ads were deemed particularly useful. Several participants mentioned Amazon.com as a site where they find tailored ads useful.

## 4.3 Beliefs About How Ads Are Tailored

### *How do you think online advertising companies decide which ads are more suitable for you?*

To gauge participants' awareness of how information is collected for OBA purposes before they saw the informational video, we asked, "How do you think online advertising companies decide which ads are more suitable for you?" Participants provided an array of responses, sometimes mentioning several mechanisms for profiling users. The two most popular responses were that ads can

be customized based on a user's browsing history (14 of 48 participants) and web searches (13 participants). P-46 explained, "If a website tracks your history, which I'm not comfortable with, it might know what website you constantly go to." Some of the participants who mentioned browsing history specifically noted that they thought this was a hypothetical technique. For instance, P-22 conjectured, "I guess if they were monitoring what I did on the Internet...But I'd hope they weren't doing that."

Other common beliefs of how advertisements were tailored included a user's Facebook account (10 participants) and "using cookies" (10 participants). However, none of the participants who mentioned cookies could explain how they were used, often assuming that cookies were repositories of information on a user's computer that advertisers could access. P-34 explained, "I guess they can get into the cookies. I don't know all the details or understand all the technical details about it." Other common responses were the contents or subject of emails (8 participants) and previous online purchases (5 participants). Furthermore, four participants volunteered that websites sell or share customers' information. In the words of P-32, "I imagine that if I bought something from a website, that information may be bought/sold/shared with other websites as well."

## 4.4 Opinions of OBA

After showing participants the informational video, we probed their attitudes towards OBA, focusing on expectations, as well as impressions of OBA's benefits and downsides.

### *Perceived benefits of behavioral advertising*

Participants felt that the main benefits of OBA were helping them to find things they were interested in (19 of 48 participants) and seeing more relevant ads (18 participants). Four participants mentioned that OBA could provide a better Internet experience, while four other participants thought OBA could help them get better deals. For example, P-18 thought that while a consumer is shopping for books and "a competitor suggests a cheaper price, it can help you to save money."

Participants were aware that OBA provides economic benefits for advertisers. 26 participants pointed out that advertisers could better target the right person, while 18 participants specifically mentioned that advertisers could make more money using OBA. Only five participants made a distinction between the company displaying an advertisement and the company whose product is advertised, noting that more merchants will advertise with a particular advertising network if it can better target potential customers. In addition, nine participants noted that OBA can command more money for websites on which ads are placed.

### *Are there any negative aspects of behavioral advertising?*

41 of the 48 participants expressed concerns related to privacy when asked, "Are there any negative aspects of behavioral advertising?" In particular, participants disliked the idea of being monitored (8 participants) and complained about lacking control (6 participants) over this practice. P-12 explained, "I don't really like the idea of someone looking at what I am looking at, and that kind of freaks me out. Also, I do not like the idea of them putting stuff on my computer without me knowing about it." P-20 was especially concerned with the lack of control, expressing, "The user should be able to decide what kind of ads the user wants to see. The user needs to be in control." Similarly, P-31 said, "It is a little creepy... because I feel that I should get to decide what is going in and out of my computer."

While many participants were concerned about their information being used to create accurate profiles of them, five participants also feared the creation of inaccurate profiles. P-5 was annoyed because she felt the ads she sees are supposed to be tailored to her, yet do not match her needs. She explained, "I feel that sometimes advertisers stereotype me. I find this to be offensive." Similarly, P-45 commented, "Sometimes you click things by accident and it takes you there... it's collecting all this information about you that doesn't even describe who you are, or it could be someone else using your computer." P-27 noted that after making Google searches for her job investigating sexual homicides, she started receiving explicit advertisements that were unrepresentative of her actual interests.

### *Overall, how do you feel about online behavioral advertising?*

After participants spoke about the benefits and downsides of OBA, we asked, "Overall, how do you feel about online behavioral advertising?" On balance, eight participants had primarily positive feelings about OBA, 19 viewed the practice negatively, and the remaining 21 were mixed. P-16 was representative of those who felt positively, stating, "I don't really see it as anything harmful unless I'm unaware of companies getting more personal information." She did note that she expects OBA to continue regardless of consumer sentiment, explaining that "all the companies are out to make money, so I don't see it stopping."

Many participants liked that OBA would show them more useful ads, yet they were concerned about privacy. P-41 was representative of this attitude when she said, "It seems like it can be helpful for the users, but at the same time it is also dangerous for the privacy problems." P-38 also had mixed feelings. She said, "I think the idea's good, but I don't like the fact that I feel like it's an invasion of your privacy. It makes me feel very insecure. Like if this is what people can figure out about me, then what else can they get off my computer?" P-43 was one of several participants who commented that OBA is a "smart strategy," while P-47 called OBA a "good advertising technique." P-31 synthesized positive and negative aspects of OBA, stating, "It is creepy but clever."

A number of participants suggested ways to make them more comfortable with OBA. P-20 suggested that he would "be more comfortable if the websites or the advertisers ask you directly what are your interests and what are the kinds of things that you like," as opposed to collecting data on user behavior. P-38 added, "I guess I would be more willing to do it if I had like a firmer understanding of how everything worked."

Many of the participants with negative opinions viewed OBA as scary or creepy, though they noted not being very familiar with how it works. For instance, P-14 said, "I don't think I really noticed it...but it definitely is kind of creepy when you think about it." P-45 concurred, relating a story about how she was searching for furniture the previous night and was confused when her advertisements started to feature those items. She stated, "It's scary. It makes me nervous. I was thinking about it last night when I was searching for stuff. Like I thought how do they know all this, how do they keep track of this, how do they do this?"

P-34 was unabashedly angry when she learned about OBA from the informational video. She said, "It makes me want to go home and delete all my cookies, but then I know that's not gonna help much. It makes me mad."

# 5. FACTORS INFLUENCING ATTITUDES

In our interviews, we investigated participants' knowledge of the OBA ecosystem. Participants had many different impressions of the types of information collected during OBA, potentially influencing their attitudes towards OBA. Participants also varied in the

situations in which they would like data to be collected for OBA purposes, as well as their opinions of companies that conduct OBA.

## 5.1 Concerns About Data Collection

Many participants believed that the information advertising networks collected included a user's mailing address, name, and potentially even financial information. 26 of the 48 participants stated that cookies could be used to collect their name and address. P-46 was concerned about "people using it for more malicious means, stealing your credit card information, identity, SSN." Participants also expressed concern about advertising networks collecting and sharing information without telling users. In P-1's words, "They are gathering information...without you knowing it, maybe even giving that data to another party."

Participants commonly said they were scared about being tracked and monitored. P-32 expressed, "It is kind of a creepy thought that you are being followed and monitored." While discussing data collection, P-22 said, "People shouldn't be able to do that. And I think if everybody knew that everything you were doing was being tracked, they wouldn't do half the things that they did." P-40 said she was so concerned with online tracking that she deletes cookies on a daily basis. In a closing thought, P-17 stated, "Following me around, that turns me off."

Many participants incorrectly believed that their personal information was stored in cookies on their computers. When asked to describe a third-party cookie, P-41 termed it "another cookie that's accessible to my computer history of the web browsing." After learning about OBA from the informational video, P-21 stated, "I've obviously heard of cookies, but I just thought they were temporary Internet files. I didn't know what it was that they were holding, so that's kind of surprising." P-34 hypothesized that to target advertisements, "I guess they can get into the cookies." P-18 described cookies as "little pieces of software that collect certain information about you."

## 5.2 Attitudes Depend on Situation

We presented participants with six different browsing scenarios and asked for each, "Would you like online advertising companies to collect information about your web browsing in order to deliver tailored ads?" Participants were nearly evenly divided about whether to allow or disallow data collection in scenarios about planning a vacation, shopping for a car and car loan, looking for a job, and shopping online for food and household goods. Most participants said they would allow data collection while they were reading the news, while only a few participants expressed a willingness to permit data collection while they searched for STD treatments for a friend.

Participants' preferences were complex. None of the participants said they would allow data collection in all six scenarios, and only five participants said they would not allow data collection in any scenario.

For many situations, participants said they were willing to allow data collection because it would be harmless and might result in cheaper prices for them. For instance, P-22 was willing to allow data collection while she shopped for food and household goods since "there may be a sale on something I wanted anyway."

Privacy concerns drove participants' unwillingness to allow the collection of information. For instance, when deciding whether she wanted her information collected while planning a vacation, P-14 explained, "I'm always looking for...cheaper flights." However, she considered the privacy risk that "you'll know when I'm not at home," before exclaming, "That's tricky!" Health records were a common source of privacy concern. When asked about a hypothetical STD-treatment search scenario, P-45 said she was unwilling to permit data collection. She explained, "That's really personal. The other stuff, it's just material things. That's your health, it's really private."

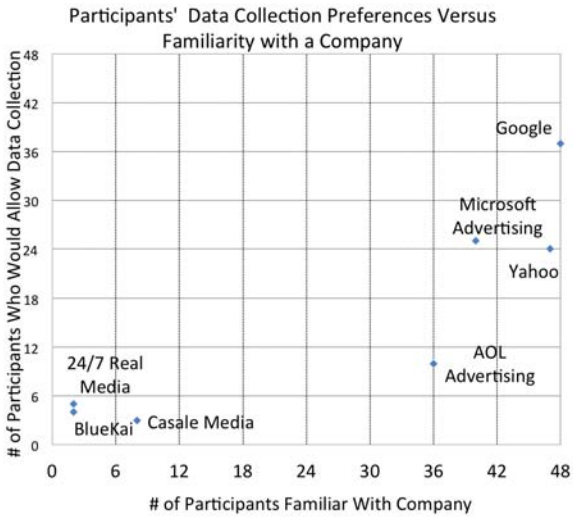


**Figure 2: Participant familiarity with seven advertising companies versus their willingness to allow each company to collect their browsing information for OBA. The cluster in the bottom left indicates companies that were unfamiliar to participants and with whom they did not want to share information.**

However, participants sometimes said they didn't want their data collected because they perceived no utility in receiving related advertisements. P-41 declined data collection while shopping for food and household goods, saying, "I know what I'm buying, and I don't want any other distraction to spend money." In other cases, participants sensed a disutility in giving any data to marketers in certain industries. For instance, P-18 felt that "in the travel business, there's a lot of spam," while P-23 didn't want "to be bombarded with car ads for the rest of my life."

## 5.3 Attitudes Depend Partially on Company

While participants were very willing to allow certain companies to collect information about their browsing for the purpose of tailoring advertisements, they were hesitant to allow others. For seven different advertising networks, we first asked, "Are you familiar with [name of company]?" Over 75% of participants were familiar with AOL Advertising, Google, Microsoft Advertising, and Yahoo, whereas fewer than 20% of participants had heard of BlueKai, Casale Media, or 24/7 Real Media. We then asked, "Would you permit that company to collect information about your web browsing to show tailored ads?" As shown in Figure 2, nearly all participants would permit Google to collect information about their browsing, while very few would permit the unfamiliar companies to do so. Participants were mixed about whether they wanted Yahoo and Microsoft Advertising to collect their information, while the majority of participants did not want AOL Advertising to do so.

Many of the 37 participants who were willing to grant Google access to their information explained their decision in terms of trust. P-11 was representative in stating, "Their motto is to not be evil, and so far they've shown that they're not." Most participants mentioned using Google products, explaining that they trust Google because of their positive experiences with these services.

Google's size and its preponderance of stored data factored into some participants' decisions. For example, P-21 laughed when asked about Google, saying he was willing to let them collect his information since "they have a lot already." P-41 recognized both benefits and downsides to Google's size, stating, "In good ways it's a really huge company that has a lot of information and it can be helpful. But at the same time, since they're a really big company, I don't know what they're gonna do with my information." P-31 was among those who felt the scope of Google's services was a disadvantage, stating, "Google is a bit worse because it is like your doctor has also been your drug dealer. Google is supposed to be my secure email provider and protect my documents...Where do they draw the line?"

Apart from trust, a common explanation for allowing Google to collect browsing information was that it would help in search. For instance, P-16 felt that Google collecting her information "would probably help if I put in a search, if they could tailor it even more towards my interests." P-20 seemed not to recognize Google's advertising activities, stating that "Google is a very good and a safe search engine." Similarly, P-23 was surprised that she was asked about Google advertising since, to her, Google is "not a company that I really associate with advertisements."

As with Google, a number of participants were willing to let Microsoft collect information about their browsing, making this judgment based on the company's non-advertising activities. For example, P-22 was willing to permit data collection, saying, "I know Microsoft has to do a lot of things on your computer if it's your operating system, and I assume that they would collect information that would help them update your operating system." P-44 had the opposite reaction, saying he would not permit data collection from Microsoft becase "I am a Mac guy." Many other participants also did not seem to distinguish between Microsoft as an advertising network and Microsoft as an advertiser. For instance, P-16 didn't want Microsoft to collect data "just because I really couldn't see myself buying Microsoft products on a regular basis."

In contrast to Google, Yahoo and AOL were viewed negatively by many participants. P-11 was concerned about Yahoo's viability as a corporation when he said he would not permit data collection, saying, "They're financially not so hot and I wouldn't trust what they would do if they got into a real pinch." P-18 felt that "Yahoo historically has had too many incidents where it made the media that their files were hacked into." When asked about AOL Advertising, P-34 began by stating, "I hate AOL." When asked if this attitude was the result of bad experiences, she continued, "That was a long time ago, and they're still on my list." P-23, who had also been unfamiliar with Google's advertising activities, stated, "I've heard of AOL, but I don't know that I knew that they had advertising."

Few participants wished to permit data collection by the three companies that were most unfamiliar, BlueKai, 24/7 Real Media, and Casale Media. Participants were potentially biased since we asked about their familiarity with each company before asking if they would allow that company to collect their information. However, P-45 was representative of interviewees in stating, "If I don't know the name...I don't trust them, just like you wouldn't trust a friend or doctor you don't know too well." Multiple participants falsely concluded that 24/7 Real Media is a music vendor, potentially confusing it with Real Media. For instance, P-46 said, "Sounds like if you could buy songs from them, I'd be uncomfortable with it, because that means credit card and all that."

# 6. NOTICE AND CHOICE

In general, the collection of data for OBA purposes is invisible to users in the absence of explicit notice. In Section 6.1, we investigate how users interpret the icons that are intended to both inform them about OBA and serve as a gateway for exercising choice. In Section 6.2, we report how participants thought they might limit targeted advertising if they chose to do so.

## 6.1 Interpreting OBA Icons

The DAA states that "a prominent feature" of self-regulation is to "clearly inform consumers about data collection and use practices through enhanced notice provided via an icon" [16]. We asked participants about their familiarity with both the DAA's Advertising Option Icon (with the text "AdChoices") and older "Power I" icon ("Interest Based Ad"). We further investigated what purpose participants thought these icons served, as well as what participants thought would happen if they clicked on the icon.

To gauge participants' familiarity with the icons themselves, we first presented enlarged icons with their corresponding taglines on a blank sheet of paper, lacking context. 41 of 48 participants responded that they had never seen either icon. One participant recalled having seen both icons, one participant recognized only the AdChoices Icon, and four participants stated they had seen the "Interest Based Ads" icon. The remaining participant was unsure.

When shown these icons in context, next to advertisements, 25 participants still stated that they had never before seen either icon, while 8 were unsure. 15 participants said they had seen the AdChoices icon, while 13 participants recognized the "Power I" icon and "Interest Based Ads" tagline. However, three participants misread the latter tagline as "*Internet* Based Ads," which P-45 felt represented "really great deals *online*."

The purpose of these icons eluded participants, even when shown in context. Only five participants thought either icon was intended to provide information to consumers. All five of these participants said the icon informed them that the advertisement was tailored to their interests. P-38 was representative of these participants, explaining that the icons "say that maybe these ads are chosen for you specifically based on your interests." However, no participants thought they were being informed about data collection, even though the DAA considers informing consumers about data collection a "prominent feature" of self regulation.

A common expectation was that the AdChoices icon would let users choose what categories of ads they'd like to receive. Ten participants expected that clicking on the icon would let users inform advertisers of their interests. P-21 was representative of these users, thinking that "maybe a list would come up of the topics or subjects. You could choose to either add or remove subjects from that list." P-11 expected he could refine advertisers' existing profile of his interests. He thought that after visiting a site unrelated to his interests, he could "[choose] that those kinds of ads aren't targeted to me since I have zero interest in them." On the other hand, P-22 expected that "you could click on something that would say what your interests were or what you were currently looking for, and then a certain number of ads would pop up that were relevant to that."

P-22 was one of eight participants who thought they would see additional, related ads after clicking on the icon. For instance, P-18 expected to "see some advertising" while P-41 anticipated being presented with "a list of ads." Eight other participants expected to be taken to the website of the product being advertised if they clicked the icon, while two others believed they would receive more information about that product. Some participants expressed surprise at the question itself when we asked what would happen if they clicked on the icon; they believed the icon couldn't be clicked. For instance, P-48 said, "I wouldn't imagine that you could click on it. I would just think it would be like part of the ad."

Other participants expected that clicking the icons would lead to negative consequences or pop-ups. Five participants believed that clicking on the icon would let advertisers track users, three participants believed that pop-ups would appear, and P-41 thought that the advertisement would expand. P-20 believed the icons "might be some kind of a scam, or different pop-ups would come up for the ad," while P-23 thought the icons were intended to "get more information about you somehow."

Ten participants thought the icons were not intended for consumers, but instead intended to solicit marketers to advertise in that spot. For example, P-21 said, "it looks like an icon advertising advertisements... A 'place ad here' kind of thing." Similarly, P-14 explained, "I imagine the purpose would be to offer you the option to be able to advertise yourself on webpages." Many other participants were unsure what the icons indicated, while P-06 thought that "because people are usually annoyed by ads, they want to let people know that they have choices. But I am not sure which kinds of choices."

## 6.2 Exercising Choice

At the end of the interview, we asked participants, "Are you aware of any ways that can help you stop receiving targeted ads?" "Deleting cookies" was the most common response by far, mentioned by 25 participants. However, a number of these participants mentioned that they learned about this technique from the informational video they watched earlier in the interview, suggesting that deleting cookies is overrepresented in our data.

Seven participants expected there to be an option built into their web browser for controlling OBA. However, these participants expressed uncertainty. For example, P-20 thought there "should be an option for that in the web browser... There should be a privacy section." Similarly, P-41 explained, "I think it's already embedded in the computer program, like the Microsoft one. And does the Google Chrome also block the ads?" Three participants specifically mentioned "Private Browsing" modes as a way to stop receiving targeted advertising. No participants were aware of any specific software or browser plug-ins for managing OBA preferences.

A number of participants expected that general computer security tools would limit behavioral advertising. For instance, ten participants thought that antivirus and anti-spyware programs, such as Norton or McAfee, would have options for blocking behavioral advertising. To limit OBA, three participants mentioned firewalls, and one participant suggested using Linux.

Some participants thought ignoring advertisements was the best strategy for not receiving targeted advertising. Four participants suggested using ad-blocking software, while three others suggested never clicking on ads to control OBA. They believed that companies would be unable to track them as long as they didn't click on advertisements. On the other hand, P-14 thought she should unsubscribe from email lists to limit OBA.

Three participants expected there to be some sort of website on which they could choose to stop receiving targeted advertisements. Two of these three participants were uncertain if such a website existed. For instance, P-34 "thought there were websites that could help you [stop receiving targeted ads], but I'm not sure." When asked to describe those websites, she said, "Same kind, I would assume, like you could choose your catalogs you want shipped at home. I have no idea, no idea, I'm just guessing." P-37 assumed that such a website might be part of the Norton Antivirus site. P-18 was the only participant who felt certain of the existence of such a website. She explained, "There's supposed to be [a national] agency that oversees marketing... There's a Do Not Call list. There's also, I've been told, a Do Not Email list."

No participants mentioned industry self-regulatory websites or opt-out programs at any point during the interviews. Similarly, no participants mentioned "Do Not Track" or "Tracking Protection List" efforts. In contrast, twelve participants felt they had no options at all for controlling targeted advertising.

# 7. DISCUSSION

In our interviews, we recorded not only participants' attitudes about OBA but also their knowledge of its practice. In this section, we discuss how participants' understanding and misunderstanding may have influenced their attitudes, filling a gap left by prior work employing surveys. We further discuss why many participants seemed unaware that their browsing activities are currently used for OBA purposes and felt unable to express their OBA privacy preferences. We conclude with suggested directions for improving notice and choice mechanisms.

## 7.1 Explaining Participants' Attitudes

Participants recognized benefits for consumers in behavioral advertising, as well as economic advantages for advertising networks. Annoyed by advertisements that distracted them with irrelevant solicitations, participants thought it would be useful to see advertisements targeted to their personal interests. Some participants also expected that marketers would use OBA to target special offers to consumers who were interested in a particular product.

However, privacy in the face of OBA was a major concern for users, preventing them from wholeheartedly embracing behavioral advertising. Although some participants had specific privacy fears, such as identity theft or being profiled inaccurately, it was mostly a general, abstract notion of privacy violations that bothered participants. Despite recognizing the potential benefits of OBA, participants stood mostly opposed to the concept because of non-specific fears about their privacy being violated.

Participants' reluctance to accept OBA also reflects a distrust of advertising born from poor past experiences. They are scarred by pop-ups and other aggressive methods to an extent that their most common free-association with "Internet advertising" is "pop-up." Whereas BonziBUDDY and other adware strategies mentioned by participants were discontinued more than half a decade ago, consumers remember these annoyances vividly. Furthermore, many participants still feel bombarded today by aggressive advertising techniques. Therefore, consumers have set a high bar to acceptance of behavioral advertising; they lack trust in the advertising industry unless they have evidence otherwise.

Although participants were aware that some advertisements are somehow targeted to them, many believed this tailoring occurred contextually on Gmail or based on their activities on Facebook. Participants' familiarity with contextual advertising is not surprising since the data used to select the advertisement is in clear view on the same page as the ad. Although many participants believed that advertisers could hypothetically choose advertisements based on which websites they had visited, they were less aware that this technique is currently practiced.

By its nature, behavioral profiling occurs over the long-term, temporally separating the presentation of an advertisement from the data that influenced its selection. Profiling based on browsing or search history also doesn't inherently provide consumers with obvious context clues. To combat this structural lack of notice, a core tenet of industry self-regulation is to inform consumers when an ad has been tailored based on browsing activities. However, from our interviews, the icons intended to provide this notice seem ineffective. Many participants saw these icons, which are intended to inform them about data collection and use, and assumed that they

could click the icon and place an advertisement themselves, or receive more information about the advertised product. Considering the failure of these icons, which are the primary vehicle for notifying consumers about OBA, it is not surprising that participants were unaware that behavioral profiling currently occurs.

When participants learned about behavioral advertising, they expressed surprise. Since OBA is not visible on its own, and industry icons for providing notice are ineffective, participants felt that OBA was a hidden practice. Consumers didn't notice the notice, and they felt like they had no choice. Participants' impression of OBA as surreptitious, combined with a pop-up-fueled mistrust of the advertising industry, led them to suspect that contact information and financial records were being collected during OBA. In part, participants might have feared the concept of OBA because they suspected that their personal information was being collected.

Had users understood the profiling technologies that underpin most behavioral advertising strategies, they would have realized that some of their worst fears about the collection of personal information were unfounded. However, users don't understand these mechanisms, nor should they. A consumer should not need to be a technologist to be empowered to control the use of his or her information. Participants had heard in the news, or from the informational video we presented, both that cookies enable advertisers to track their browsing history, and that cookies must be enabled for e-commerce shopping carts to function. Therefore, they seem to have constructed a mental model in which cookies on the computer store both their browsing history and their financial records. Following this incorrect mental model, when advertisers or hackers scoop up these cookies from the consumer's computer, they have access to a wide range of personal and financial information with which to target advertisements or steal identities.

While participants recognized the benefits of OBA, they were upset that it currently occurs without their knowledge. They assume that the same untrusted advertising companies that bombard them with pop-ups are likely violating their privacy in other ways, including identity theft. Participants were unaware of the types of data that are used for OBA profiling. They were also unaware that long-standing industry guidelines explicitly prohibit the merging of personally identifiable information with previously collected non-personally identifiable information for OBA purposes without explicit user consent [18]. On the other hand, participants might rightly be concerned if they have heard media reports about web sites accidentally leaking data to advertisers or about companies exploiting technical mechanisms to circumvent privacy protections [11, 22].

## 7.2 Why Notice and Choice Are Failing

Because the icons that supposedly provide notice and choice to consumers did not convey this information to participants, we unpack how participants parsed these icons. Given the large number of participants who thought the icon solicited potential advertisers to "place their ads here," the icon and its text could more clearly indicate that they are intended for consumers. The current text, "AdChoices," seems particularly unsuccessful at this goal. Data collection is an invisible process, so it is not surprising that consumers did not associate the icon with the practice of OBA.

Furthermore, the icon's location and presentation are a potential area for improvement. The icons are displayed near or within the advertisement itself, possibly causing participants to think the icon was part of the advertisement. Thus, it is not surprising that many participants expected that clicking the icon's "i" symbol would provide more information about the product advertised. Some participants did not expect to receive information from clicking the icon, and some were simply scared to click it at all. Consumers' hesitance may stem from their past experience with advertisements, in concert with the icon's location. Pop-up and pop-out advertisements often have a box in the corner of the ad intended to expand or collapse the ad, so this concern may have been consistent with participants' aversion to advertisements popping out or expanding.

To provide effective notice, it might be possible to distinguish more clearly both the provenance and purpose of the icon from the advertisement itself. The icon, its accompanying text, and its location are all potential areas for future investigation.

Participants' expectations about how to stop behavioral advertising bode poorly for existing industry opt-out mechanisms. Deleting cookies, the most common response to our question, would actually nullify existing cookie-based opt-out mechanisms. Although a number of participants stated that they were inspired by the informational video to delete their cookies, others stated that deleting cookies was common knowledge, suggesting that the video was not the only driver of this sentiment. When a participant states that learning about behavioral advertising "makes me want to go home and delete all my cookies," the idea of using cookies to record opt-out preferences seems problematic.

Furthermore, few participants thought about going to a website to manage their preferences, and none of the participants mentioned clicking on the icons. However, these are currently the two main opt-out vectors. Participants receive advertisements on websites, so it makes sense that they don't expect to go to other websites to exercise preferences. While it seems reasonable for an opt-out mechanism to be located near behaviorally targeted advertisements, unless consumers are clearly notified that this icon is not part of the advertisement and that they could exercise choice by clicking on it, they will not click it.

While it may seem that more effective opt-out mechanisms would benefit consumers to the detriment of advertisers, participants who suggested never clicking advertisements in order to limit OBA provide a counterexample. Participants didn't understand how their browsing is recorded, so some assumed they can only be tracked if they interact with an advertisement. In the absence of effective notice and choice about OBA, consumers may choose to disengage entirely from advertising. As a result, more effective notice and choice mechanisms may provide benefits to principals throughout the OBA ecosystem.

## 7.3 Effective Notice and Choice

The reactions, misbeliefs, and mental models of our 48 participants suggest potential directions for improved notice and choice mechanisms. In particular, empowering users in ways that match their existing expectations and understanding will likely be more effective.

Whereas few participants thought they could stop OBA by visiting websites and none were aware of existing cookie-based opt-out mechanisms, participants more commonly believed their web browser would contain built-in functionality to stop tracking. Although no participants stated familiarity with any specific features related to OBA or tracking (e.g. Do Not Track), participants' mental model of how to stop tracking lends support for tools built into browsers.

While participants' expectation that the Norton or McAfee antivirus suites contained a mechanism for limiting OBA might appear strange at first blush, it seems to indicate that they expect the software that already protects their privacy and security to extend to OBA. As with browsers' built-in tools, security suite software is a one-stop shop for protection from "the Internet." Users did not want to take separate action for each new threat to their privacy. There-

fore, opt-out mechanisms that would impose additional burdens on users or introduce new paradigms for protecting their privacy may be misaligned with user expectation. Furthermore, participants displayed a fear of being tracked online, and current opt-out mechanisms do not necessarily prevent tracking in all cases.

#### 7.3.1 Better AdChoices

Participants' common misunderstanding that they could click on the AdChoices icon to select interesting advertising categories is not surprising. They expected to be able to make *choices* about *ads*. While some participants had no idea what choices they could make, others reasonably assumed that they'd be able to choose which types of ads they would receive. A small number of advertising networks, including Google[4] and Yahoo,[5] already allow consumers to view and edit the categories of advertisements targeted to them. To align better with participants' expectations for the icon, the Advertising Option Icon could provide consumers similar functionality.

However, it is essential that this process be global; consumers cannot be expected to curate profiles for multiple advertisers. Giving consumers a reasonable set of choices that they can customize in a small amount of time could benefit both advertisers and consumers. Such a system would empower consumers to control the types of ads they receive and correct inaccurate profiles, as well as provide advertisers with potentially more accurate and actionable information about particular consumers' interests.

#### 7.3.2 Users Shouldn't Need to Evaluate Companies

While most currently deployed mechanisms for consumer choice focus on asking consumers to make company-specific decisions, participants' difficulty reasoning about companies reveals flaws in this approach. When we asked participants whether they'd permit particular companies to collect information about their browsing, their reasoning differed for companies that engage only in advertising and companies that have a variety of consumer-facing divisions. Companies that work primarily in advertising were unfamiliar to most participants, who said they would prohibit these unfamiliar companies from data collection since they felt unqualified to judge their trustworthiness.

For companies such as Google, Microsoft, and Yahoo, which engage in a variety of activities familiar to consumers, participants misunderstood the activities of these companies' advertising divisions. For instance, a number of participants assumed that Microsoft Advertising collected data primarily for advertising or updating the Windows operating system. In this mindset, participants made decisions using irrelevant information; these decisions would likely only weakly correlate with fully-informed opinions about those companies' OBA efforts. For Google and Yahoo, many participants assumed that these companies only advertised on Gmail or Yahoo, misunderstanding the role both companies take as advertising networks.

Overall, participants seemed to have great difficulty understanding the role of advertising networks within the OBA ecosystem. They felt uncomfortable allowing unfamiliar companies to collect their information, and judged familiar companies on activities unrelated to advertising. While a user's perception of a company's overall trustworthiness does seem a reasonable metric with which to make decisions regarding the collection of information, the extent to which users' decisions were based on unrelated information suggests that their decisions were not fully informed. If users could easily choose which advertising networks could collect their information for OBA, it is possible that only large companies such as Google and Yahoo would survive.

#### 7.3.3 Situational Choices

When asked whether they would permit information about their browsing to be collected for the purpose of OBA in different scenarios, participants displayed complex preferences. Users' variegated preferences suggest that many users who would not want their browsing tracked in general would be willing to have information collected in certain scenarios. Participants differed in which situations aroused concerns about privacy, and both privacy and utility guided their decisions about whether data could be collected.

The confluence of privacy and utility in participants' decision-making suggests an approach in which users specify interest categories. Such an approach would serve a dual purpose: users could prohibit the collection of data on particular topics for either privacy or utility reasons, while advertisers would have self-reported, potentially more accurate, data on a user's interests.

Investigating how a user might situationally control data collection is a potential direction for future work. Would such a system better empower users, or would even the most usable solution unnecessarily burden users? Would such a mechanism be built into browsers, and if so, what interface design would best help users express their potentially complex preferences?

## 8. CONCLUSIONS

Participants found behavioral advertising useful. They also found it privacy-invasive. The majority of participants were either fully or partially opposed to OBA, finding the idea smart but creepy. However, this attitude was influenced in part by their belief that more data is collected than actually is. Participants understood neither the roles of different companies involved in OBA, nor the technologies used to profile users, contributing to their misunderstandings.

Given effective notice about the practice of tailoring ads based on users' browsing activities, participants wouldn't need to understand the underlying technologies and business models. However, current notice and choice mechanisms are ineffective. Furthermore, current mechanisms focus on opting out of targeting by particular companies, whereas participants displayed faulty reasoning in evaluating companies. In contrast, participants displayed complex preferences about the situations in which their browsing data could be collected, yet they currently cannot exercise these preferences.

To exercise consumer choice, participants expected they could turn to familiar tools such as their web browser, or deleting their cookies. Mechanisms to exercise choice about OBA in browsers are limited and difficult to use [13]. Deleting cookies, participants' most common response in this study, would nullify consumers' opt-outs. A Do Not Track header has been designed to allow users to set a preference in their browser that does not disappear when cookies are deleted. A handful of companies, including Yahoo [27], have announced plans to implement this header, although efforts to define fully the meaning of Do Not Track are ongoing [26]. Regardless, it remains to be seen whether this mechanism will provide effective notice and choice. Future investigation is needed to test notice and choice mechanisms that better align with users' understanding of OBA.

## 9. ACKNOWLEDGMENTS

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[4] http://www.google.com/ads/preferences/

[5] http://info.yahoo.com/privacy/us/yahoo/opt_out/targeting/details.html

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# APPENDIX

## A. INTERVIEW SCRIPT

1. What is the first thing that comes to your mind when you hear “Internet advertising”?

2. How do you feel about Internet Advertising?

    a. Do you like Internet advertising?

    b. Is Internet advertising useful?

    c. Is Internet advertising distracting?

3. In general, do you find the advertisements you see on the Internet to be relevant to your interests?

4. Do you think that the ads you see when browsing the Internet are tailored to <u>your</u> personal interests?

    If yes:
    a. Is it useful for you to see ads that are tailored to your interests?

    b. How do you think online companies decide which ads are more suitable for you?

    If not:
    c. Would it be useful for you to see ads more tailored to your interests?

    d. How do you think online companies could know which ads are more relevant for you?

5. Have you heard of the term “targeted advertising”?

    If yes:
    a. What does targeted advertising mean to you?

    b. How do you think it works?

6. Have you heard of the term “behavioral advertising”?

If yes:
    a. What does behavioral advertising mean to you?

    b. How do you think it works?

7. When surfing the Internet, have you ever seen either of these icons?
    [A page with the two OBA icons and taglines is shown here]

    If yes:
    a. Where did you see it?

    b. Have you clicked on it?

        If yes:
        i. What happened when you clicked on it?

        If not:
        i. What do you think would happen if you clicked on it?

    c. What do you think is the purpose of this icon?

    If not:
    a. What do you think is the purpose of this icon?

***8.*** These icons usually appear on Internet ads. Here are two examples:
[A page with the ads containing these icons and taglines is shown here]

a. Do you remember having seen any ads with this icon?

If yes:

b. Have you ever clicked on the icon?

If yes:

i. What happened when you clicked on it?

If not:

ii. What do you think would happen if you clicked on it?

c. What do you think is the purpose of this icon?

If not:

a. What do you think is the purpose of this icon?

**[VIDEO was shown here]**

***9.*** What does behavioral advertising mean to you?

***10.*** In your understanding, what is a third-party cookie?

***11.*** What information do you think online advertising companies can collect about you?

***12.*** Do you think online advertising companies can have access to:

b. Your name?
c. Your address?
d. Your telephone number?
e. Your email address?
f. The city where you live?

***13.*** How do you think behavioral advertising can benefit Internet users?

***14.*** How do you think behavioral advertising can benefit online advertising companies?

***15.*** Is there any other party that could benefit from behavioral advertising?

g. Who?
h. How?

***16.*** Are there any negative aspects of behavioral advertising?

***17.*** Overall, how do you feel about online behavioral advertising? Why?

***18.*** Are there situations in which you would be more willing to let companies collect information about your web browsing in order to send you ads tailored to your interests?

***19.*** For each of the following scenarios, please indicate if you would like online advertising companies to collect information about your web browsing in order to deliver tailored ads. Please explain the reasoning behind your decisions

| Scenario | YES/NO | Reason |
|---|---|---|
| You are planning your next vacation using the internet. | | |
| You are shopping for a car and a car loan. | | |
| A friend of yours has an STD and asks you to help him to find some treatment alternatives. | | |
| You are job-hunting online | | |
| You are ordering all of your food and household goods for the week online | | |
| You are reading the news | | |

If the participant expressed any concern about OBA:

***20.*** Would your attitude towards behavioral advertising change if

a. The advertising companies notified you what information is being collected and how that information is used?

b. The company that is collecting information allows you to decide when to allow or block the data collection?

***21.*** For each of the following companies, please tell me a) if you're familiar with the company and b) if you would permit that company to collect information about your web browsing to show tailored ads.

| Company name | I am familiar with this company | I would like to let it collect data. Why? |
|---|---|---|
| Google Inc. | | |
| Yahoo! | | |
| 24/7 Real Media | | |
| AOL Advertising | | |
| BlueKai Inc. | | |
| Casale Media | | |
| Microsoft Advertising | | |

***22.*** Are there any circumstances in which you would NOT like online companies to collect data about your browsing in order to show tailored ads?

***23.*** Are you aware of any ways that can help you stop receiving targeted ads?
If yes:

If affirmative answer to previous question but the participant did not mention "software tools":

***24.*** Are you aware of any software designed to help users manage the targeted ads that they receive?

***25.*** Are you aware of any laws dealing with online behavioral advertising?

***26.*** Do you have any additional comments?