

Smart, Useful,

Scary, Creepy

**Perceptions of
Online Behavioral Advertising**

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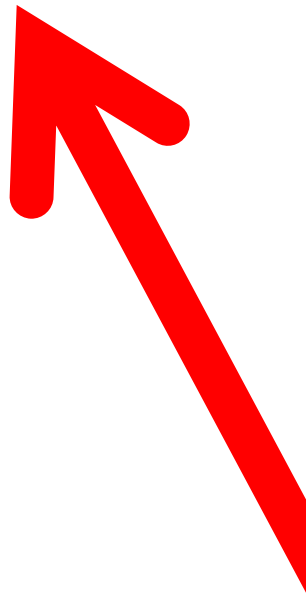
Carnegie Mellon

Introduction

- Online Behavioral Advertising (OBA):
Ads tailored based on websites you have visited


How OBA works


F2g7zAdMr3v
7%dw@vEbni



[TYPES](#) [BRANDS](#) [MOTOR](#) [SHOPS](#) [ACCESSORIES](#) [PARTS](#) [APP](#)

Bicycle.com





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AdChoices ▶

[Presentation interactive](#)
Interactive Projector, Interactive Classroom, One Simple Solution.
[epson.com/BrightLink](#)

[Stationary Bikes Sale](#)
The Top Rated Stationary Bike Site.

Types

The bicycle has been around since the 1800s : popular form of recreation, and are the primary types, from children's toys to adult fitness; the services, and appears in competitive sporting e

The bicycle can be broken down into four distir visit later. The four main types of bicycles are r has distinct characteristics that make each ty much differently than a bmx bike, and a mount

How OBA works

F2g7zAdMr3v
7%dw@vEbni



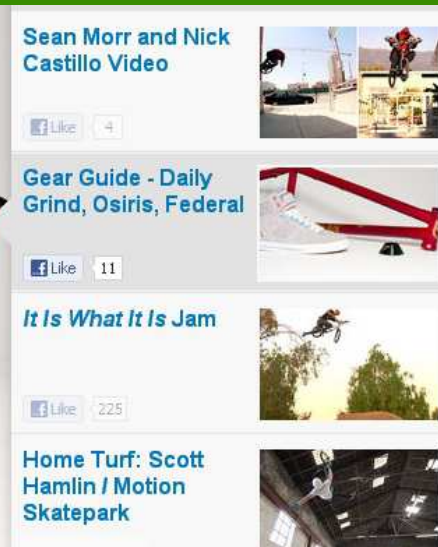
The screenshot shows the Vital BMX website. At the top, there's a navigation bar with 'Home' and 'Community' links. Below this is a banner for 'LXVI VANS' shoes, featuring a row of various shoe models and the text 'THE FUTURE. AVAILABLE NOW.' with the URL 'LXVI.VANS.COM'. A red rectangular box highlights this banner. Below the banner, there's a section for 'Gear Guide - Daily Grind Hub Guard, Osiris Shoes, Federal Frame' with a photo of a grey shoe and a red frame. To the right, there's a sidebar with 'Newest' and 'Most Popular' sections, listing videos like 'Sean Morr and Nick Castillo Video' and 'Gear Guide - Daily Grind, Osiris, Federal'. The bottom of the page has a footer with social media links and a search bar.

How OBA works

F2g7zAdMr3v
7%dw@vEbni



I think you
like bicycles!



How OBA works

- Later, on an unrelated site

F2g7zAdMr3v
7%dw@vEbni



The Weather Channel

Add a Location +

Weather Lifestyle Social Maps Video News TV

Search Zip, City or Place SEARCH

United States (English) °F °C Sign In

EXCLUSIVE THREAT LEVEL
TROPICAL STORM DEBBY

LOW MED HIGH EXTREME CATASTROPHIC

CHARLESTON
TALLAHASSEE JACKSONVILLE
TAMPA
FORT MYERS
MIAMI

► Extreme threat: Heavy rain & flooding
► Other threats: Storm surge, tornadoes

ADVERTISEMENT

On The Weather Channel

How OBA works

- Later, on an unrelated site

F2g7zAdMr3v
7%dw@vEbni



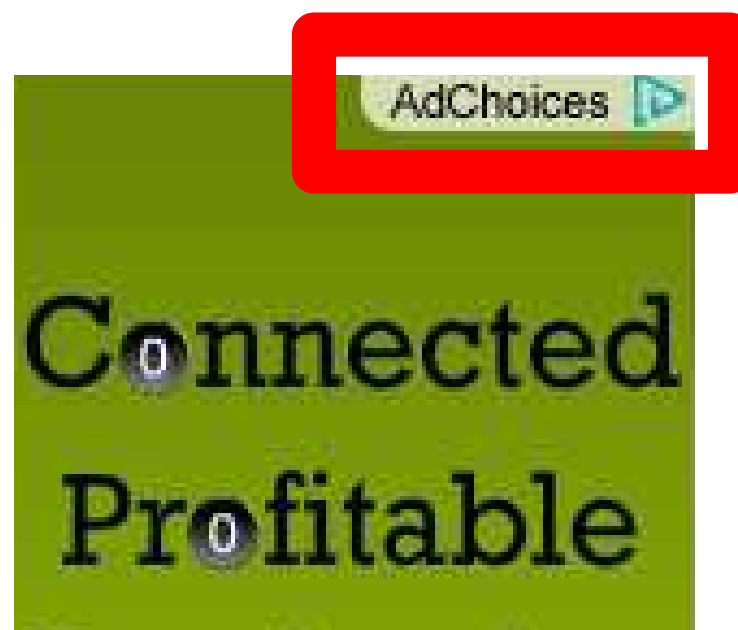
The screenshot shows the The Weather Channel website. At the top, there's a navigation bar with links for Weather, Lifestyle, Social, Maps, Video, News, and TV. Below this is a search bar. The main content area features a map of Florida with threat levels for Tropical Storm Debby. The threat levels are color-coded: LOW (yellow), MED (orange), HIGH (red), EXTREME (pink), and CATASTROPHIC (white). The map shows the storm's path from the Gulf of Mexico towards the Florida coast. A red arrow points from a search bar in the top right corner to a Google Shopping result for a bicycle. The search result is titled "Shop for bicycle on Google" and shows a "Classic Balance Bike" for \$56.24 on Amazon.com. The result is enclosed in a red box.

How OBA works

- Hundreds of advertising networks perform OBA
 - From  to 
- Cookies commonly used for tracking

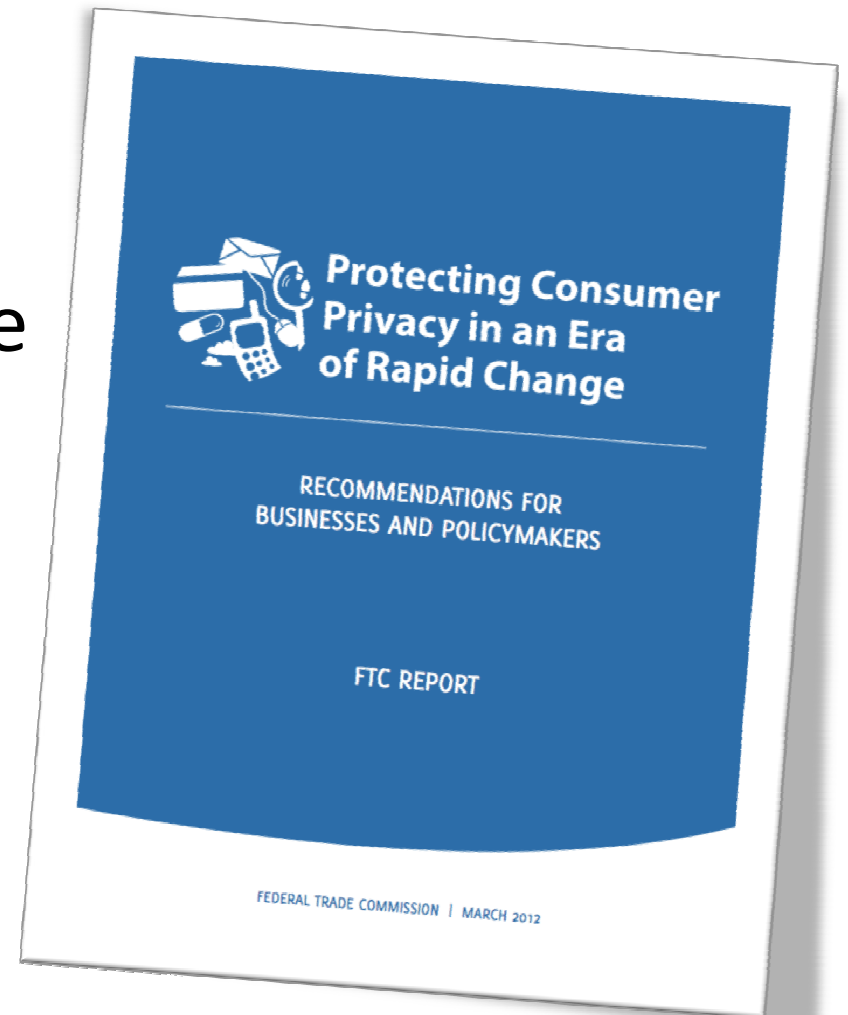
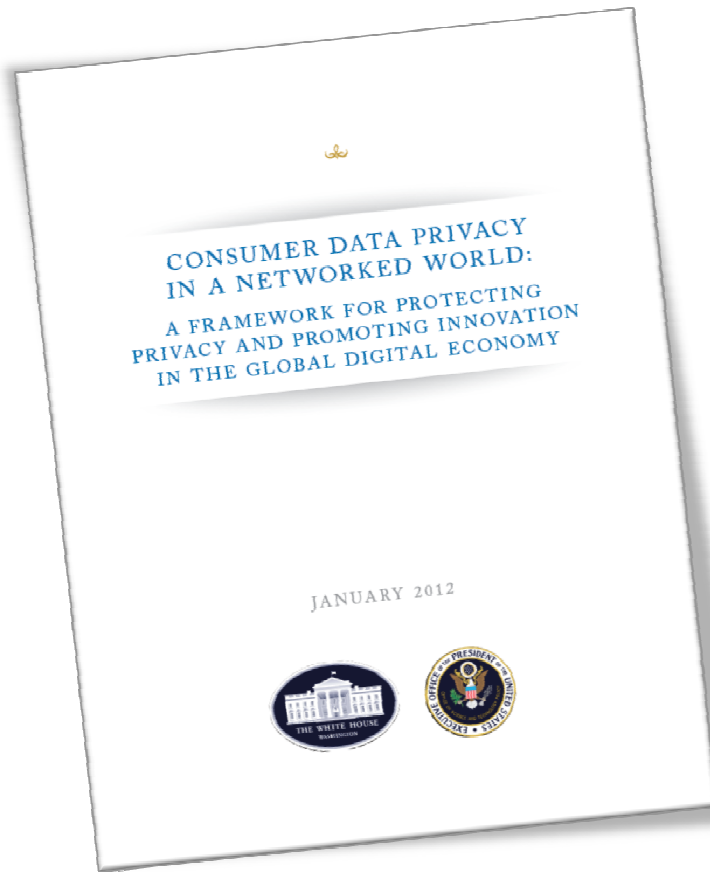
Tension between utility and privacy

- Advertising networks like OBA
 - Target ads to interested users
 - Charge a higher price
- Users might have privacy concerns
- Advertising industry provides disclosures



Media and government attention

- U.S. FTC and White House
- U.S. Department of Commerce multistakeholder meeting



Related work

- Privacy surveys have found privacy concerns while marketing surveys have identified benefits
- 87% of Americans definitely or probably would not allow advertisers to track them [Turow et al., 2009]
- 62% of respondents would allow advertisers to track them “under the right circumstances” [KPMG, 2011]

Research goals

- Gain insight into what users think about OBA
 - What factors influence these attitudes?
- Identify how participants' mental models correspond with notice and choice mechanisms
 - How can we best support users?

Overview of methodology

- 48 participants for combination semi-structured interview and usability study
 - One-on-one, single moderator
 - Participants compensated \$30
 - Usability study separate [Leon et al., 2012]
- Recruited from the Pittsburgh, PA, USA region
 - Non-technologists
 - Willing to test privacy tools

Interview structure

- Attitudes and knowledge about advertising
- Video from WSJ “What They Know” series



Interview structure

- Attitudes and knowledge about advertising
- Video from WSJ “What They Know” series
- Opinions and beliefs about OBA

Analysis

- Collaboratively developed codebook from researchers' notes
- Coded interviews from audio recordings
 - Codes could be added

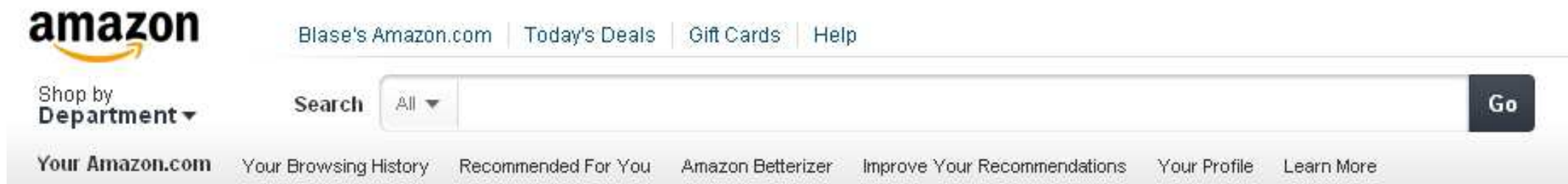
Overview of results

- Are people aware of OBA?
- What do privacy disclosures communicate?
- Opinion of OBA
- Beliefs about OBA that affect opinion
- Making choices about OBA

**Are people already
aware of OBA?**

Participants were unaware of OBA

- Participants believed ads were tailored, but only based on context or on a single site
 - Amazon, Gmail, Facebook



Your Amazon.com



Participants were unaware of OBA

- Participants believed ads were tailored, but only based on context or on a single site
 - Amazon, Gmail, Facebook
- Browsing could hypothetically be used
 - “I guess if they were monitoring what I did on the Internet...But I’d hope they weren’t...”

**What did privacy
disclosures communicate?**

Misconceptions about disclosures

- Express interest in product
- Purchase your own ads
 - “It looks like an icon advertising advertisements... a ‘place ad here’ kind of thing.”



Misconceptions about disclosures

- Express interest in product
- Purchase your own ads
- Go to product's website
- See related ads
- Track user



Opinions of OBA

Participants mixed about OBA

- Recognized benefits for advertisers and users
 - Advertisers target the right person
 - Users find things they're interested in
- Privacy was the primary concern

**What factors may have
influenced their opinions?**

Beliefs about OBA

- Advertisers collect information including name, financial information, and address
- This information, along with browsing history, is stored in cookies
 - “I guess they can get into the cookies.”

Making choices about OBA

Existing methods for choice

- Deleting cookies



Existing methods for choice

- Deleting cookies
- Websites that set opt-out cookies

The screenshot displays a web interface with three tabs at the top: "All Participating Companies (106)", "Companies Customizing Ads For Your Browser (0)", and "Existing Opt Outs (106)". The "Existing Opt Outs (106)" tab is selected. Below the tabs, a yellow callout box on the left contains the text: "These 106 companies have set an opt-out preference to interest-based advertising in your browser." and a link "Need help?". To the right, a table lists the names of the 106 companies. The table has a header "COMPANY NAME" and a column of minus signs. The companies listed are: 24/7 Media, 33Across, Accuen Inc., Axiom, Adap.tv, Inc., Adara Media, Inc., Adblade Premium Ad Network, AdBrite, Inc., Adchemy, Inc., and Adconion Media Group. The table is scrollable, as indicated by the scrollbar on the right.

COMPANY NAME	
24/7 Media	-
33Across	-
Accuen Inc.	-
Axiom	-
Adap.tv, Inc.	-
Adara Media, Inc.	-
Adblade Premium Ad Network	-
AdBrite, Inc.	-
Adchemy, Inc.	-
Adconion Media Group	-

Existing methods for choice

- Deleting cookies
- Websites that set opt-out cookies
- Browsers' Do Not Track feature



Tracking



Tell websites I do not want to be tracked

Existing methods for choice

- Deleting cookies
- Websites that set opt-out cookies
- Browsers' Do Not Track feature
- Third-party browser plugins (Ghostery, DNT+)



Participants' impressions of choice

- Deleting cookies
- Websites that set opt-out cookies
- Browsers' Do Not Track feature
- Third-party browser plugins (Ghostery, DNT+)

Participants' impressions of choice

- Deleting cookies



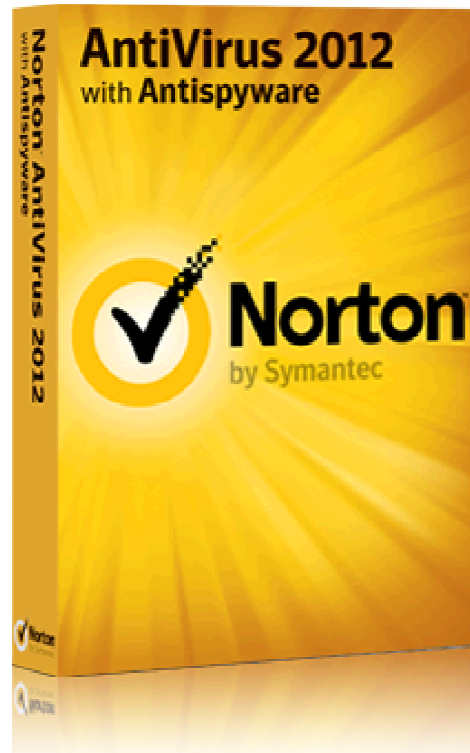
Participants' impressions of choice

- Deleting cookies
- No options



Participants' impressions of choice

- Deleting cookies
- No options
- Antivirus software suites



Participants' impressions of choice

- Deleting cookies
- No options
- Antivirus software suites
- Web browser



Decisions based on advertising company and context

Choice based on companies

Companies Customizing Ads For Your Browser (0)

Existing Opt Outs (106)

SHOW

SHOW

COMPANY NAME

24/7 Media

33Across

Accuen Inc.

Acxiom

Adap.tv, Inc.

Adara Media, Inc.

Adblade Premium Ad Network

AdBrite, Inc.

Adchemy, Inc.

Adconion Media Group

Blocking Options

☒ Enable web bug blocking

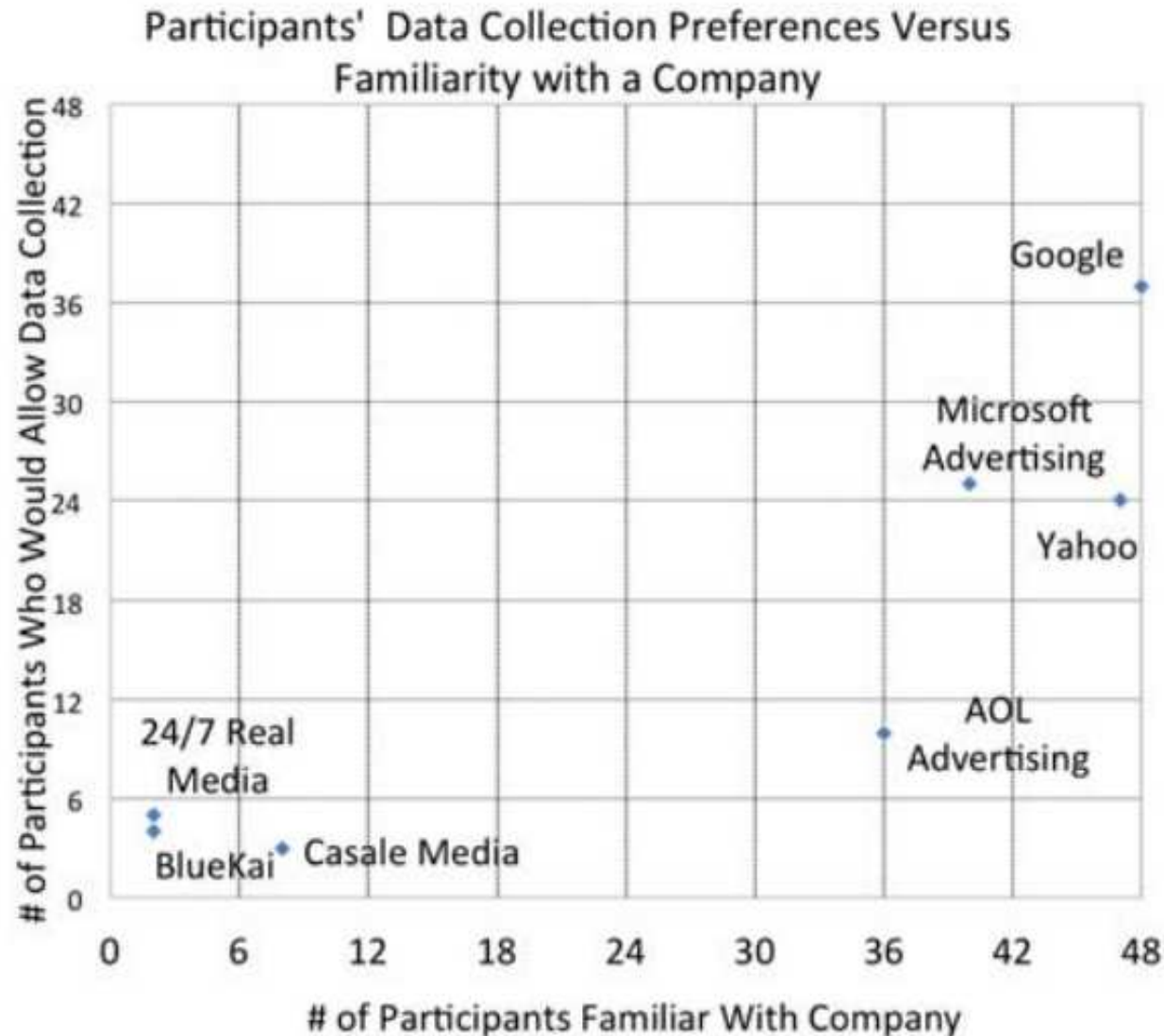
☒ Enable cookie protection [experimental]

Blocking **no** bugs. Blocking **no** cookies.

Bugs	Cookies	
<input type="checkbox"/>	<input type="checkbox"/>	659 bugs & 396 cookies (check to block, click for more info)
<input type="checkbox"/>	<input type="checkbox"/>	24/7 Real Media iab. NAI
<input type="checkbox"/>	<input type="checkbox"/>	2leep
<input type="checkbox"/>	<input type="checkbox"/>	33Across iab. NAI
<input type="checkbox"/>	<input type="checkbox"/>	3DStats
<input type="checkbox"/>	<input type="checkbox"/>	5min Media iab.
<input type="checkbox"/>	<input type="checkbox"/>	[x+1] NAI
<input type="checkbox"/>	<input type="checkbox"/>	Accelerator Media

Companies: Familiarity and trust

- Asked about seven companies



Opinions based on non-OBA activities

- Google is “not a company that I really associate with advertisements.”
- Microsoft “would collect information that would help them update your operating system.”

Preferences depended on context

- Asked about six scenarios
 - Planning a vacation, shopping for a car and car loan, researching STD treatments for a friend, job-hunting, ordering food, reading the news
- 5 participants said 'no' to all six
- 0 participants said 'yes' to all six
- Preferences based on both **privacy** and **utility**
 - “I don't want to be bombarded with car ads for the rest of my life.”

Conclusions

- Opinions about OBA mixed
 - OBA **Smart, Useful, Scary, Creepy**
 - Participants did not understand OBA technologies
 - Some of worst fears based on misconceptions
- Disconnect between mental models and existing notice and choice mechanisms
 - Privacy disclosures misunderstood
 - Meaningful choices?
 - Participants looked to familiar tools

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Thank you!

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