

Social Networks, Personalized Advertising and Privacy Controls: Web Appendix

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Abstract

This web appendix reports the results of a lab experiment which attempts to replicate the main findings of ‘Social Networks, Personalized Advertising and Privacy Controls’.

1 Further Evidence from an Experimental Setting

The main results presented in the paper ‘Social Networks, Personalized Advertising and Privacy Controls’, use variation from a natural experiment combined with a field test of different advertising techniques to explore how privacy controls mediate customers’ responses to advertising. This web appendix reports the results of a lab experiment that attempts to replicate the main findings from the field data.

We recruited 178 survey-takers from Amazon’s Mechanical Turk to take part in an online survey.¹ The survey takers were asked about their educational history. They were then taken to a simulated social networking website page where they saw an ad displayed that offered them a discount and were asked about their responses to the ad. The study has a 2×2 design, which varied how uniquely identifying the content of the ad was (Unique Information, Generic Information) and the level of privacy control that survey takers were told existed on the website. (No Privacy Controls, Privacy Controls).

In the ‘Non-Unique Data’ condition, users were offered a discount on the basis of the state of the high school they attended. In the ‘Unique Data’ condition, they were offered a discount on the basis of actual name of the high school they attended. We also varied users’ perception of privacy control. In the ‘Privacy Controls’ condition, they were told that ‘The website has been praised for the extent of control it gives its users over their personal information. To restrict access to personal information you need to use their easy-to-understand privacy settings. In the ‘No Privacy Controls’ condition, they were told that ‘The website has been criticized for the lack of control it gives its users over their personal information. To restrict access to personal information you need to use their hard to understand system of privacy-controls.’ This manipulation appeared to be effective. In a preliminary manipulation check,

¹We excluded 21 survey takers who failed to input their high school or state name correctly in the pre-survey. We also excluded one subject who was homeschooled. This is because we used their exact inputs as the text of our ads, and the misspellings detracted from the professionalism of such ads. The results are similar if not quite as precise when we include these subjects.

respondents reported that on a 7-point scale they were more likely to feel in control of their privacy in the privacy control condition in a two-sided t-test with equal variances (4.43 vs 3.23, $t=4.48$, $p\text{-value}=0.00$).

We then asked respondents seven questions designed to gauge their level of ‘reactance’ to the ad and the situation. These questions were based on the scales developed by Edwards et al. (2002); White et al. (2008) and Lamberton (2013), which in turn were based on the scale developed by Hong and Faedda (1996). This scale covers the extent to which the ad was considered to be interfering, intrusive, forced, unwelcome, discomforting, curtailing of freedom and manipulative, measured on a 7-point scale ($\alpha=0.89$). Column (1) of Table 1 reports the results. In line with the work of White et al. (2008), the mention of unique and personally identifying information increases reactance significantly. However, the introduction of privacy controls for users in the unique information condition reduces reactance significantly. There is no significant main effect of ‘Privacy Controls’ for respondents in the non-unique information condition where there was less reactance, which accords with the results reported in the main paper. We also use controls for age, education and use of Facebook as reported for survey takers, though the results are robust to their exclusion, as would be expected in a randomized design. None of these are significant, which is evidence against alternative explanations for the results of our natural experiment that are based on changes in user demographics.

We also asked respondents questions about how likely they were to respond positively to the ad. We asked them whether they were likely to click on the ad, visit the store website and use the discount coupon. Column (2) reports the results for click intent. As expected, the results reverse themselves from Column (1). Respondents report that they are less likely to react favorably to an ad using unique data in the absence of privacy controls. However, in the presence of privacy controls they are actually more likely to react favorably to an ad with unique data than to an ad using non-unique data. Column (3) analyzes whether

they are likely to visit the store website. The results are very similar to Column (3), though slightly less significant. Column (4) shows that the results echo (though less precisely) for the measure about whether or not the person was likely to use the discount coupon. In general, the main finding of the natural experiment is replicated. That is, after the introduction of privacy controls, respondents are more likely to click on an ad that uses unusual personal information. Also of interest is that in Column (2) the effect of privacy controls is negative for click intent. However, this significant estimate does not carry over for the other dependent variables. A potential explanation is that there were fewer people who contemplated clicking on the ad to investigate the ad due to privacy concerns when respondents were told that the privacy controls on the website had been praised.

One observation is that in contrast to the field experiment, in the lab experiment in a world of bad privacy controls the ads that used the non-unique information performed better, than they did in a world with good privacy controls. This is not something we observe in the natural experiment data. This difference is explained by the nature of the experiment. In the experiment, the subject gave both unique and non-unique information in the presurvey. They therefore were presumably happier to see an ad which did not use the unique information about them, given they knew that was a possibility as they had shared that data. This led them perhaps to feel a larger positive ‘affect’ towards the company who deliberately spurned using uniquely identifying information. The reason this may not be present in the natural experiment data, is that it is not salient to the Facebook user that an individual company had the option to use the uniquely identifying information and chose not to.

Table 1: Lab Experiment Results

	(1)	(2)	(3)	(4)
	Reactance	Click Intent	Visit Store	Use Discount
Unique Information × Privacy Controls	-0.797** (0.380)	1.664*** (0.569)	1.170** (0.592)	0.993* (0.538)
Unique Information	0.948*** (0.267)	-0.889** (0.399)	-0.703* (0.417)	-0.757*** (0.378)
Privacy Controls	0.267 (0.271)	-0.957** (0.407)	-0.621 (0.425)	-0.637 (0.385)
High School Grad	-0.0992 (0.372)	0.0963 (0.562)	-0.0868 (0.583)	-0.277 (0.532)
College Grad	-0.186 (0.362)	0.464 (0.546)	0.120 (0.568)	0.101 (0.517)
Post Grad	-0.429 (0.424)	0.512 (0.642)	0.423 (0.666)	0.381 (0.607)
Facebook User	0.599* (0.317)	-0.433 (0.468)	-0.673 (0.486)	-0.715 (0.443)
Age	-0.00372 (0.0107)	0.0143 (0.0157)	0.00406 (0.0163)	0.00305 (0.0148)
Constant	2.838*** (0.585)	3.047*** (0.877)	3.957*** (0.910)	4.033*** (0.830)
R^2	0.099	0.064	0.038	0.054

OLS Estimates. 178 Respondents. Dependent variable is a seven-point scale as shown for reactance in columns (1)-(3) and

various intent measures in columns (4)-(6).

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Results only include respondents who saw ads that contained piped text that contained no input errors.

There are obvious limitations about the generalizability of the results of any experiment in an artificial setting, but there are also some obvious advantages to having replicated the effect in a controlled experimental environment. First, we are able to explicitly measure reactance and how it is ameliorated by privacy controls and in turn how this interacts with how ‘personal’ the personal information used in a personalized ad is. Second, we ask questions about the purchase of an actual product, suggesting that the earlier results are not limited to the nonprofit sector. Last, and crucially, because we use a randomized between-subjects design, we are able to rule out alternative explanations for our results that involve endogeneity or selection.

2 Stimulus Materials

Consent

Thank you for choosing to participate in this research study by Catherine Tucker (cetucker@mit.edu).

We will ask you a few questions regarding using a social networking site. The total length of this study is approximately 5 minutes.

Your decision to participate in this study is voluntary. Please note that you are free to withdraw from the study at any time. Refusal to take part in this study, or withdrawing from it, will involve no penalty or loss of benefits that you would otherwise receive.

There are no risks involved in this study that you would not encounter in daily life.

Please note that our studies are purely for academic purposes. The results will be made available to the public in academic research journals. Your data will remain confidential and will be treated anonymously. In fact, we are only interested in aggregated responses and not individual responses.

If you have any questions pertaining to this research, or your rights as a participant, you can contact me at cetucker@mit.edu You will have an opportunity to receive a complete explanation of the research and its purposes following completion of the study.

If you are satisfied with the information outlined above and agree to participate in this research study, please select the yes option below.

- Yes
 No

Education

Did you go to High School in the United States?

- Yes
 No

What State did you go to High School in?

(Write in the name of the country where you went to high school if you did not go to school in the US)

What is the name of the last High School you attended?

What is the highest level of education you have completed?

- Did not finish high school
 Graduated high school
 Some College
 College
 Post-Graduate education

Common.privacy

Imagine that you have placed a lot of personal information on a social networking website much like Facebook.

The website has been praised for the extent of control it gives its users over their personal information. To restrict access to personal information you need to use their [easy-to-understand privacy settings](#).

How much in control do you feel of your?

	Not at all in control	Not in control	Somewhat not in control	Neither	Somewhat in control	In control	Very in control
Personal Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Internet Data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Privacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

While browsing the website, you notice an ad from your favorite clothing retailer.

The ad says:

 10% discount for \${q://QID542/ChoiceTextEntryValue} graduates

How likely are you to?

	Very Unlikely	Unlikely	Somewhat Unlikely	Undecided	Somewhat Likely	Likely	Very Likely
Click on the ad	<input type="radio"/>						
Visit the store webpage	<input type="radio"/>						
Use the discount	<input type="radio"/>						
Take notice of the ad	<input type="radio"/>						
Remember the ad	<input type="radio"/>						
Think about the store in the future	<input type="radio"/>						

How much do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
The ad is intrusive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ad is forced on me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ad is unwelcome	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ad makes me feel uncomfortable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ad forces me to respond	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ad infringed on my freedom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ad threatened by freedom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Last Click: 0 seconds.

Page Submit: 0 seconds.

Click Count: 0 clicks.

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While browsing the website, you notice an ad from your favorite clothing retailer.

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10% discount for \${q://QID543/ChoiceTextEntryValue} graduates

How likely are you to?

	Very Unlikely	Unlikely	Somewhat Unlikely	Undecided	Somewhat Likely	Likely	Very Likely
Click on the ad	<input type="radio"/>						
Visit the store webpage	<input type="radio"/>						
Use the discount	<input type="radio"/>						
Take notice of the ad	<input type="radio"/>						
Remember the ad	<input type="radio"/>						
Think about the store in the future	<input type="radio"/>						

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The ad is intrusive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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The ad infringed on my freedom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ad threatened my freedom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Rare.noprivacy

Imagine that you have placed a lot of personal information on a social networking website much like Facebook.

The website has been criticized for the lack of control it gives its users over their personal information. To restrict access to personal information you need to use their **hard to understand system of privacy-controls**.

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The ad forces me to respond	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ad infringed on my freedom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The ad threatened my freedom

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Privacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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The ad threatened my freedom	<input type="radio"/>						

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Last Click: 0 seconds.

Page Submit: 0 seconds.

Click Count: 0 clicks.

demographics

Please give us some information about yourself.

How comfortable are you communicating in English?

	1 (Very uncomfortable)	2	3	4	5	6	7 (Very comfortable)
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Your age?

Your gender?

- Male
- Female

Do you use Facebook?

- Yes
- No

thank you

Thank you for participating in this study. The study is part of a larger research effort that explores how likely consumers are to click on internet advertising.

Also, paste the word "rainbow elephant" into the HIT comments block, though please give me any other comments as well.

If you have any questions, please do not hesitate to email cetucker@mit.edu.

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