# Aiming at a More Cost-Efficient Census Via Online Data Collection: Privacy Trade-Offs of Geo-Location

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## Extended abstract (research in progress)

In an effort to reduce costs associated with data collection, the director of the Census Bureau announced in 2010 that the 2020 Census of the United States would take place via two channels: the classical paper questionnaire, mailed to each physical address recorded in the Census database (the Master Address File), and the online questionnaire – an option that will be offered for the first time to the whole US population. Besides an adequate awareness campaign, the success of the initiative will depend on addressing potential security and privacy concerns and providing adequate incentives for a sizable portion of US citizens to transition from the offline to the online format. In this research in progress, we analyze a specific incentive that the Census is considering – namely, pre-populating location information in the form, so to reduce completion time and effort. We study how individuals may react to this initiative, given the privacy concerns that pre-populating may arise. We describe two online experiments of geo-location (one on-going and one yet to be started) which investigate the impact of awareness of being geo-tracked on willingness to provide, among other pieces of information, Census-related personal information.

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## 1. Introduction

The most recent Census of the United States, Census 2010, cost approximately $13 billion dollars. The amount has roughly doubled in nominal terms each decade since 1970 (Economist, 2011) – a cost escalation that was not accompanied by a tantamount increase in accuracy of the count (Edmonston & Schultze, 1995). Given its mounting costs, a congressional panel has questioned the feasibility of the 2020 Census, expressing concerns over the US government's ability to afford it (Mervis, 2011). Reasons for the rise in costs include population growth, growth in the number of housing units, and a decline in the response rate to the mailed questionnaire (which triggers costly physical visits of Census personnel to non-responding households).

Cost inefficiencies have been at the center of various critiques to the Census Bureau, together with the perception of privacy intrusiveness of the questionnaire, especially in its long form (USA Today, 2012), which, differently from the short form, also includes questions about sensitive socio-economic information (such as marital status, education, citizenship, and disabilities).[2] In response, the Census has implemented a number of changes (for instance, more effective advertising campaigns and the exclusive use of the short form questionnaire), leading operational costs of the 2010 Census to fall below the $7 billion budget (Census Bureau, 2010a), and contributing to a higher than expected response rate (72%) to the mailed questionnaire (Census Bureau, 2010b).

These efforts notwithstanding, Census data collection as performed in its old format (mailed questionnaires followed up by interviews by phone or in person in case of non-response) remains costly. Given the cost-efficiencies and the remarkable enhancement of the connection between citizens and governmental institutions made possible by IT,[3] the first option the Census considered in order to make the data collection process more efficient is the completion of the questionnaire via the Internet – an option that is going to be provided for the first time in 2020.[4] But how can larger participation be guaranteed in the online versus the paper format of the questionnaire? Several issues need to be addressed in order for this initiative to generate the desired outcome. Privacy and security concerns of transmitting sensitive information through the Internet should be assuaged. Groups or areas where Internet penetration or computer literacy may be low should be reached. Each household should only be able to submit one form (either online or offline); and so forth. In this paper, we focus on the privacy trade-offs involved in the collection of data through the Internet. Specifically, we investigate reactions to geo-location, or the ability to identify the geographic location from which people are connecting to fill the online form.

One possible incentive that could be provided to people in order to be convinced to use the online form as opposed to the standard paper form is lower time and effort necessary for completion. Title 26 of the US Code allows the Census Bureau to receive certain information

[2] For a detailed comparison between the short and long form, see: http://www.census.gov/dmd/www/pdf/d3239a.pdf.
[3] For a much broader initiative (the Aadhaar project) regarding digital identities for Indian citizens, see Bapna and Sundararajan, 2010. Information on a 2011 survey for the Aadhaar project is available at: http://www.stern.nyu.edu/experience-stern/faculty-research/sundararajan-uid-results.
[4] See http://voices.washingtonpost.com/federal-eye/2010/05/2020_census_will_have_an_onlin.html. Back in 2000, only a small proportion of US households were offered an option to submit the Census form online, but since the operation was not successful, the Bureau returned to standard mail delivery for the 2010 Census: see http://www.cbsnews.com/8301-201_162-57559640/u.s-census-will-offer-online-option/.

about citizens from other entities. Such information could be used to pre-populate specific fields in the Census form, thus reducing the amount of time necessary to complete it. Similarly, the use of certain technological tools, such as GPS or IP-capture, could allow for location specific information to be provided automatically. Setting aside issues relating to technical feasibility and accuracy, geo-location may have unintended consequences, including the perception of being tracked by the government and, therefore, a sense of privacy intrusion. Especially at this point in time, when data collection programs carried out by the US government have been publicly exposed, and when private companies have been subject to scrutiny and critiques for their online tracking and behavioral advertising practices, US citizens may have become even more sensitive to the issue of being watched, monitored, or surveilled. Such a scenario may thus backfire and reduce, rather than increase people's online response rate.

In this paper, we analyze individuals' reaction to geo-location (their location being identified) in terms of their willingness to disclose personal information in an online questionnaire. In a first online experiment, we manipulate participants' awareness of their location being identified, and measure their willingness to reveal two types of personal information: engagement in unethical or somewhat compromising behaviors, and Census-related information (demographics and living arrangements). In a second online experiment (yet to be started), we test whether geo-location related privacy concerns are higher for government institutions as compared to other entities, and whether this is due to people feeling surveilled and monitored by the government.

## 2. Related literature

Reactions to location identification have been analyzed in different streams of research. The literature on ubiquitous computing acknowledges various possible privacy issues associated with environment-aware systems and location tracking technologies (Agre & Rotenberg, 1997; Barkhuus & Dey, 2003; Doheny-Farina, 1994; Garfinkel, 2001; Harper, 1995; Junglas & Spitzmuller, 2005; Kaasinen, 2003; Minch, 2004), but it doesn't always provide practical recommendations on how to address such concerns (Schilit et al., 2003).

One of the suggested solutions is user control: the possibility to hide one's location from certain people (or entities), or for specific places or points in time (Gruteser & Liu, 2004), or, similarly, interruptions in the transmission of one's location data (Huang, Matsuura, Yamane & Sezaki, 2005). A potential problem with these solutions is that the more sophisticated the control algorithms, the higher the probability that the average person may find them difficult to use, and the lower her confidence that her chosen settings reflect indeed her privacy preferences. An even less user-friendly approach may consist in location obfuscation techniques, such as mixing personal data with data related to other users or adding noise to one's location (Brush, Krumm & Scott, 2010). More generally, perceived self-efficacy, or the judgment of one's capability to execute certain tasks properly, has been shown to significantly affect IT adoption (Agarwal, Sambamurthy & Stair, 2000; Chau, 2001; Hong, Thong, Wong & Tam, 2001; Johnson & Marakas, 2000; Luarn & Lin, 2005). Moreover, a system that is dynamic but that interrogates the user on her location preferences at different places or points in time may become annoying and intrusive itself, thus affecting adoption (Myles, Friday & Davies, 2003; Weiser & Brown, 1996).

While much of this literature analyzes the effects of privacy concerns on the adoption of location-based services (e.g., Zweig & Webster, 2002), we attempt to reverse this relationship, and focus on what are the privacy concerns raised by geo-location, and what are the consequent

reactions. Related studies on the consequences of privacy concerns (more broadly defined, and not strictly related to geo-location) in the online world have shown that people may respond to privacy invasions in a similar way as they respond to unfair transactions (Ashworth & Free, 2006). Moreover, individuals may be more willing to complete a privacy-sensitive transaction (such as the purchase of somewhat sensitive items, such as condoms) if the website is more privacy-friendly (Gideon, Cranor, Egelman & Acquisti, 2006). People may also be willing to pay a premium for protecting their privacy if privacy-related information is explained in a simple, accessible way (Tsai, Egelman, Cranor & Acquisti, 2011). The exact time in which privacy-relevant information is made salient was also shown to affect consumer choices, and specifically, willingness to pay for privacy (Egelman, Tsai, Cranor & Acquisti, 2009). Targeted advertisements have been shown to backfire if they are perceived as too privacy intrusive or "too targeted" (White, Zahay, Thorbjørnsen & Shavitt, 2008). On the other hand, if consumers have high privacy controls, personalized ads seem more effective (Tucker, 2011).

A stream of studies have specifically investigated privacy concerns raised by location tracking. Some theoretical models have been proposed to account for the effect of various variables, such as the purpose of location data collection, the possible use by third parties, possible errors in storing the information, trust towards the requester, and usefulness of location data for the task at hand (Junglas & Spitzmuller, 2005). Some studies have analyzed the level of acceptance of location tracking by governmental institutions, but only in the special case of emergencies (Aloudat, Michael, Chen & Al-Debei, 2013). Particularly relevant to our case (the analysis of location tracking for the purpose of incentivizing online Census form collection) work by Thomas et al. (2013) has focused on specific sub-populations, such as older adults, who may be less prone to the understanding and use of such technologies. Research has also shown that location privacy is valuable to individuals (Cvrcek, Kumpost, Matyas & Danezis, 2006), and that the need for it varies according to many determinants, such as time and specific place, who requests the information, how often it is requested, how populated is the place one is at when the request reaches them, and so on (Sadeh et al., 2009; Toch et al., 2010).

## 3. Experiments

We designed two experiments to investigate individuals' perceptions of the privacy trade-offs raised by geo-location technologies, and their consequences in terms of willingness to disclose further personal information. Specifically, we investigated how people may react to geo-location in the context of online surveys, and whether they harbor specific reluctance to a government institution performing geo-location.

### 3.1 Experiment 1

In an effort to investigate possible differences in willingness to disclose personal information, for this experiment, we decided to address two different populations: users (workers) of Amazon Mechanical Turk (MTurk) and participants from a pool of students and non-students managed by a North Eastern American University. We refer to the MTurk experiment as Experiment 1A, and to the University experiment as Experiment 1B. Overall, the two samples provided consistent results. However, and perhaps not surprisingly, the university sample provided higher statistical significance (power) notwithstanding the smaller size. In order to investigate the mechanism behind the results, we also ran a follow-up study, which we refer to as Experiment 1C, for which participants were recruited from MTurk.

### 3.1.1 Experiment 1A

***Methods.*** Experiment 1A was a between-subjects, three-condition randomized experiment, in which we manipulated participants' awareness of their location being identified. In a Control condition, we geo-located participants but we did not mention it. In a Geo-Located condition, at the very beginning of the study (ostensibly a survey on ethical behaviors), participants were shown their current location (city, state, country, zip code) and asked to confirm that their location was correct and complete before proceeding. In a Requested Location condition, participants were explicitly asked to provide their location before proceeding. The remainder of the survey was identical for all participants, who were asked seven Census related questions and 16 privacy-sensitive questions regarding engagement in a series of unethical behaviors (a dependent variable that has been used in the disclosure literature to measure willingness to disclose and therefore, indirectly, privacy concerns; see Acquisti, John & Loewenstein, 2012; Brandimarte, Acquisti & Loewenstein, 2013; John, Acquisti & Loewenstein, 2011). Responses to this second set of questions were on a scale from 0 (Never) to 4 (Often), the last option (5) being "I prefer not to say." The order in which these two different types of personal information were asked was counterbalanced. We could not include Census questions that constituted personally identifiable information (PII), such as first name, last name and phone number, due to the terms of service of the platform we used to recruit participants. General questions about feeling tracked or monitored and about related privacy concerns concluded the survey (see the Appendix for the full list of questions).

We expected participants in the Control condition to have lower privacy concerns as compared to the other two conditions. Moreover, in line with the results in Brandimarte, Acquisti & Loewenstein (2013), where feeling of control over disclosure of personal information were shown to decrease privacy concerns, we predicted higher willingness to disclose and lower sense of being monitored in the Requested Location condition as compared to the Geo-Located condition, where participants may experience discomfort from the fact that someone knows where they are without them explicitly revealing it (people may feel monitored even way beyond what they truly are). If the data supported this hypothesis, they would suggest that time and effort reduction made possible by geo-location is actually outweighed by the perceived intrusiveness of the geo-location technology, and that simply presenting people with their location information being pre-populated in a Census form may not be an effective strategy to incentivize online participation.

***Results***. We invited 403 participants (37% female, $M_{age}$ = 29.8, SD = 9.4) from MTurk to participate in a "Survey on Ethical Behaviors," and paid them $0.3. A small percentage of participants preferred not to respond to at least one of the questions on sensitive behaviors (8.7%, 8.2% and 6.8% in the Control, Geo-Located and Requested Location conditions, respectively), and this percentage did not differ significantly across conditions (all p-values larger than .1), suggesting that the inclusion of the option "Never" as a possible response to these questions soothed concerns arising from admitting certain sensitive behaviors. Responses to the 16 sensitive behavior questions were averaged to an overall willingness to disclose score (Cronbach's $\alpha$ = .802) and compared across conditions.

Supporting our predictions, participants were more likely to answer questions on sensitive behaviors in the Control condition ($M_{disclosure}$ = 1.09, SD = .60) as compared to the Geo-Located ($M_{disclosure}$ = .96, SD = .59, p = .03) and the Requested Location ($M_{disclosure}$ = .97, SD = .61, p =

.04) conditions. However, contrary to our expectations, willingness to disclose was the same between the latter two conditions ($p > .1$). We suspect this could be due to some error in the detection of the location of participants. The percentage of correct zip codes as reported by participants in the Geo-Located condition is probably an over-estimation, since these participants had no incentive in truly reporting their location: out of the 132 participants in this condition, 40% reported that the captured zip code was correct. However, based on the correspondence between the captured zip code and the one provided by participants in the Requested Location condition, the software we used (geo-location tool provided by the Qualtrics company, leader in online survey development) only got the zip code exactly right in 25 out of 134 cases, was off by the last digit in 15 cases, and by the last two digits in 26 other cases. This implies that, for approximately half of our sample, the last three digits of the captured zip code were incorrect, which may have decreased the feeling of being tracked, reducing privacy concerns. In order to test this conjecture, we are building our own geo-location tracking tool. We will then re-run the study and collect data from a larger sample, and only analyze the data for which we are able to capture the correct geo-location.

As far as the Census-related questions go, we observed a ceiling effect: all participants answered all of them. We suspect that this result could be due to the perceived low sensitivity of these questions. In order to overcome this effect, in the next iteration of the experiment we intend to "make" these questions more intrusive. One way to do this could be to manipulate the identity of the requester: certain questions may be perceived as tame if taken in the context of a research study, run by a research institution, but they may be perceived as quite intrusive if requested by the Government, or by other entities (advertising companies, insurance companies, and so on). We test this conjecture in Experiment 1C.

In a future iteration of the study, we will also include different measures of privacy concerns (such as the General Privacy Concern Index; Westin & Louis, 1991) since the four items we used did not explain the effect we found on the sensitive behaviors questions (p-values > .1 for pairwise comparisons across all items). Namely, participants did not report different propensity to provide false responses, concerns about self-incrimination, concerns about data privacy or confidentiality. In hindsight, we realize that the last two questions may have been interpreted as a request to evaluate the trustworthiness of the researchers (in general, quite highly rated), rather than to report the discomfort due to the experimental manipulation.

### 3.1.2 Experiment 1B

***Methods.*** Experiment 1B was identical to Experiment 1A, but we collected data from a different population – namely, a pool of participants managed by a North Eastern American University.

***Results.*** We recruited 186 participants (60% female, $M_{age} = 26.8$, $SD = 10.8$) from a pool of students and non-students managed by a North Eastern American University. They were invited to take the same "Survey on Ethical Behaviors" used in Experiment 1A, and compensated with participation in a lottery for a $50 Amazon gift card. A minority of participants preferred not to respond to one or more of the questions on sensitive behaviors (15.9%, 9.4% and 9.8% in the Control, Geo-Located and Requested Location conditions, respectively). Although, perhaps surprisingly, slightly more participants preferred not to answer in the Control condition, this percentage did not differ significantly across conditions (all p-values larger than .1). Responses

to the 16 sensitive behaviors questions were averaged to an overall willingness to disclose score (Cronbach's $\alpha = .819$) and compared across conditions.

Again, confirming our hypothesis, participants were more likely to answer questions on sensitive behaviors in the Control condition ($M_{disclosure} = 1.21$, $SD = .75$) as compared to the Geo-Located ($M_{disclosure} = 1.00$, $SD = .69$, $p = .05$) and the Requested Location ($M_{disclosure} = .91$, $SD = .49$, $p < .01$) conditions. Unexpectedly, willingness to disclose seemed slightly higher in the Geo-Located condition as compared to the Requested Location condition, but the difference was not statistically significant ($p > .1$). The same ceiling effect found in Experiment 1A for Census-related questions was observed here, with all but three participants answering all of them. Furthermore, again replicating the results in Experiment 1A, participants across the various conditions did not report different propensity to provide false responses, concerns about self-incrimination, concerns about data privacy or confidentiality.

### 3.1.3 Experiment 1C

***Methods.*** In order to test whether the ceiling effect we observed for the Census-related questions in Experiments 1A and 1B was due to the low perceived sensitivity of such questions, we recruited 402 participants from MTurk to evaluate, on a scale from 1 (Not at all) to 7 (Very much), the level of intrusiveness of nine of the sensitive behaviors questions we used in the previous experiments, all the Census-related questions therein, and other PII requested in the 2010 Census form (see the Appendix for the full list of questions). We randomly assigned participants to one of four conditions, differing by the entity requesting the data (researchers, the U.S. Government, the Census Bureau specifically, and advertisers). Based on the results in Experiments 1A and 1B, we expected Census-related questions to be, in general, perceived as less intrusive than questions on sensitive behavior. Furthermore, due to recent media attention on acts of surveillance by the U.S. Government, we hypothesized that Census questions, and specifically PII, would be perceived as more intrusive if asked by governmental institutions or advertisers than by researchers.

We made it clear to participants that they were not to respond to the questions, but just to evaluate how sensitive they evaluated them. Therefore, in order to avoid confusion, we did not ask for age and gender, which were indeed present in the 2010 Census forms. Hence, we cannot report the demographics for this particular sample, but we have no reason to believe that they should be too different from the demographics of the MTurk sample used in Experiment 1A, since the recruiting procedures were identical.

***Results.*** We constructed two scores by averaging the sensitive behaviors questions (Cronbach's $\alpha = .906$) and the Census-related questions (Cronbach's $\alpha = .932$), respectively. Although we did find that Census-related questions are perceived as less intrusive ($M_{intrusive} = 3.12$, $SD = 1.31$) than sensitive behaviors questions ($M_{intrusive} = 4.74$, $SD = 1.66$, paired $t(401) = -15.971$, $p < .001$), the pattern for perceived intrusiveness as a function of the entity requesting the data was actually opposite to the one we predicted. Census-related questions were, on average, perceived as more intrusive if requested by researchers (or advertisers) than if requested by governmental institutions (irrespective of whether the requester was the Government in general or, more specifically, the Census Bureau; see Table 1 for descriptive statistics and Figure 1 for a graphical representation). Sensitive behaviors questions, on the other hand, were perceived as more

intrusive if the requester was a governmental institution than if it was a research institution (see Table 1 for descriptive statistics and Figure 2 for a graphical representation).

***Discussion***. Experiments 1A and 1B showed that willingness to disclose sensitive information decreases if people are aware that their location is being tracked. Although the experiments did not show an effect specifically for Census-related questions, this was possibly due to the perceived low sensitivity of the questions presented to participants, thus generating a ceiling effect by which everybody willingly responded to all questions. While Experiment 1C suggested that Census-related questions are not perceived as privacy intrusive, and are even perceived as relatively less intrusive when requested by governmental institutions as compared to research institutions or advertisers, this study was hypothetical, and it could not rule out the possibility that, when presented in real life with this set of questions coming from the Census Bureau, people may indeed find them intrusive (and therefore, subject to the effect found in Experiments 1A and 1B for sensitive behaviors questions). In fact, the result of Experiment 1C could be explained by the fact that the terms of service of the platform we used to recruit respondents does not allow researchers to request PII, which may have caused MTurk workers to rate PII as more sensitive if requested by researchers or advertisers than by governmental institutions. Future iterations of the experiment should address the ceiling effect seen for Census-related questions, for instance manipulating purpose of data collection and use of collected data; methods used to extract geo-location data; accuracy of geo-location data.

### 3.2 Experiment 2

In a second experiment (yet to be started) we plan to test whether privacy concerns raised by geo-location technology are specific or stronger for governmental institutions, or whether, on the other hand, trust toward such institutions dampens citizens' privacy concerns (Joinson, 2009). We plan to use the same dependent variables (sensitive questions, census-related questions, and questions about feeling monitored) and the same design to introduce geo-location as the one used in the Geo-Located condition of Experiment 1, We expect the former scenario to be supported by the data, especially at this point in time, when the U.S. Government has been at the center of media attention for data collection programs, such as PRISM, which may have heightened the feeling of being monitored. In order to test this conjecture, we plan to randomly assign participants to one of six conditions, in a 3x2 design where we manipulate the alleged entity requesting the data (government, academic or industry institution) and the presence of surveillance priming (e.g., by having them solve crossword puzzles either containing or not containing words related to surveillance). We expect willingness to disclose to be lower if the entity allegedly asking for the data is a government institution, and if a surveillance priming is used.

## 4. Preliminary conclusions

Experiment 1 showed that willingness to disclose what is perceived to be sensitive information depends on other information, namely geo-location, being already available to the requester. Specifically, willingness to provide sensitive information decreases if one is aware that one's location is being tracked and showed on the screen, or explicitly requested, as compared to a control condition in which location is not tracked. If our hypotheses are confirmed by Experiment 2, this would suggest that pre-population of location information in Census forms may not create an effective incentive to obtain a high participation rate to the online version of

the Census, as time and effort saved in completion of the form would be overridden by privacy concerns arising from location tracking.

Different strategies may be considered in order for the online Census initiative to become successful, such as campaigns focusing on the completion of the form as a duty, something that, one way or the other (online or offline) must be done, so the choice would be between a paper format that cannot come pre-populated in any field, or an online format, that could potentially be quicker to complete. Campaigns may also emphasize that geo-location is very different from location tracking: with geo-location, the government would be able to identify the location of a citizen at a specific point in time (when she is filling the online Census form), not to track her over time, with the two activities exposing the citizen to very different risks (Shokri, Theodorakopoulos, Danezis, Hubaux & Le Boudec, 2011). Another aspect to emphasize could be the reason why geo-location is used: citizens should have it very clear in their minds that the only purpose for the government to geo-locate them is to save them time while filling a form, and that such information will not be used for other purposes.

Besides location information, which could be easily obtained both in the case of completion of the Census form on a laptop (by capturing the IP address) or on a mobile device (using GPS data), other types of information could be pre-populated once the citizen identified herself with first name and last name. Through Title 26 of the US Code, the Census Bureau has access to administrative data, such as data from the Department of Motor Vehicles (DMV) of each State. DMV has data on date of birth (and therefore age) of anyone possessing a driver's license, thus allowing for these fields to be automatically filled. This may provide an additonal incentive for citizens to fill the Census form online as opposed to paper, but it may also be perceived as privacy intrusive if it is unexpected, and if it is not clear to individuals how the Census Bureau may have obtained that information.

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**Tables and Figures**

**Table 1. Descriptive Statistics for Experiment 1C**

| | condition | Mean | Std. Deviation | N |
|---|---|---|---|---|
| census_scale | Researchers | 3.292011 | 1.2671673 | 99 |
| | Government | 2.875223 | 1.2935118 | 102 |
| | Census | 2.931129 | 1.4425579 | 99 |
| | Advertisers | 3.387701 | 1.1733705 | 102 |
| | Total | 3.121664 | 1.3110152 | 402 |
| sensitive_scale | Researchers | 4.205387 | 1.5799324 | 99 |
| | Government | 5.071895 | 1.6026691 | 102 |
| | Census | 4.890011 | 1.7526926 | 99 |
| | Advertisers | 4.767974 | 1.5968970 | 102 |
| | Total | 4.736595 | 1.6596210 | 402 |

**Figure 1. Estimated mean for Census-related questions score – Experiment 1C**

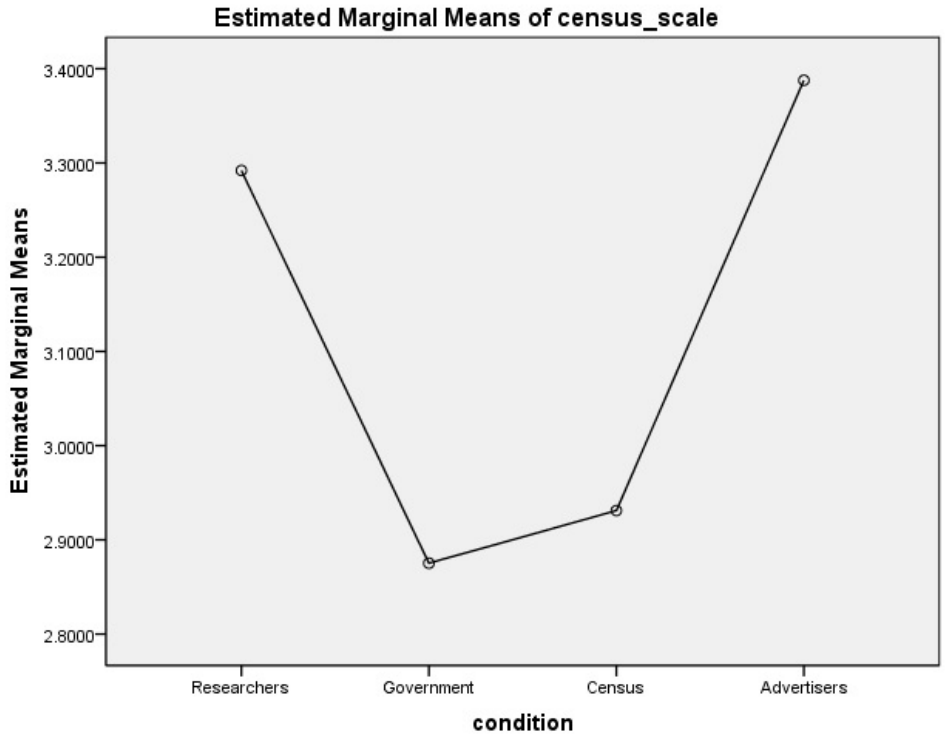
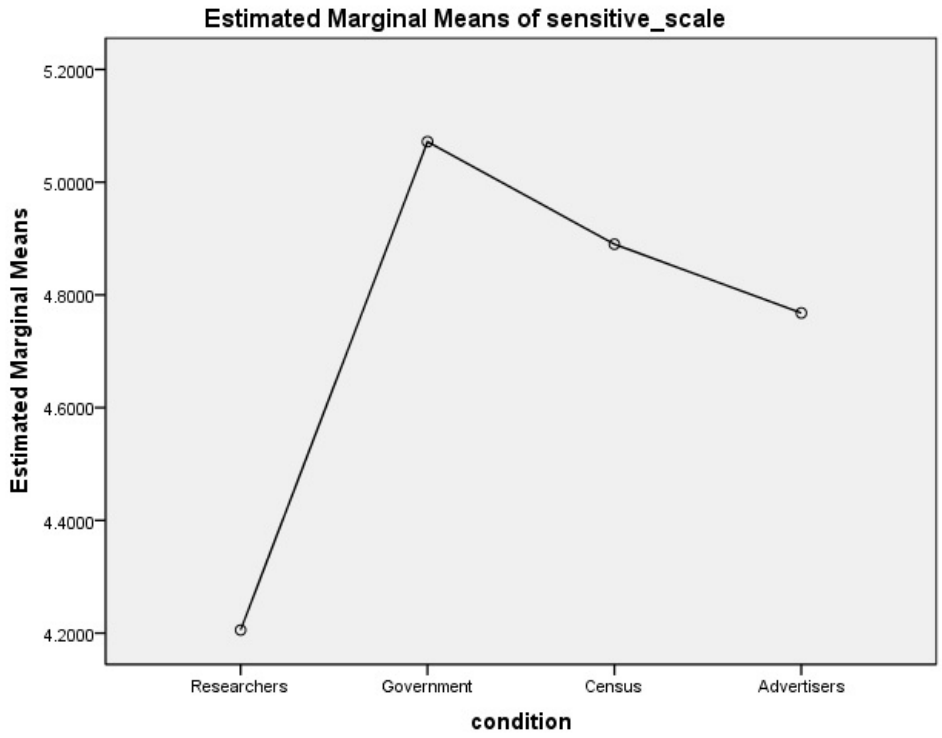


**Figure 2. Estimated mean for sensitive behaviors questions score – Experiment 1C**



**Appendix - Survey instrument used in Experiments 1A and 1B**

**Control condition**: no indication of location tracking

**Geo-Located condition**: "Before we begin with the actual questions, please first verify that you are currently in the following location:"

| | That's correct (1) | That's incorrect or missing (2) |
|---|---|---|
| City: ${loc://City} | ❍ | ❍ |
| State: ${loc://Region} | ❍ | ❍ |
| Country: ${loc://CountryName} | ❍ | ❍ |
| Zip code: ${loc://PostalCode} | ❍ | ❍ |

**Requested Location condition**: "Before we begin with the actual questions, please tell us your current location."

Current City (1)
Current State (2)
Current Country (3)
Current Zip code (4)

**All conditions**: the order was randomized for the block of sensitive behaviors questions. Also, the order of the two blocks was randomized. The possible responses were: Never, Once, Twice, Sometimes, Often, I prefer not to say.

**Sensitive behaviors** ((*) indicates that the question also appeared in Experiment 1C):

"In the next page, you will be shown a list of various behaviors that people sometimes engage in. We ask that you read each of those and indicate how often (if at all) you personally did each of the described behaviors.

For each of the following, please indicate how often (if at all) you personally did the described action. Have you ever:

(*) Had sex with the current partner of a friend? (1)

(*) Lied about your age? (2)

Cheated at sports or games? (3)

(*) Tried to gain access to someone else's phone or email without their knowledge or consent? (4)

(*) Made up a serious excuse, such as grave illness or death in the family, to get out of doing something? (5)

Called in sick when you were not sick? (6)

Stolen anything worth more than $25? (7)

Let a friend drive after s/he had too had much to drink or had used drugs? (8)

Masturbated in a public space, such as a public restroom? (9)

Looked at pornographic material? (10)

(*) Cheated on your tax return? (11)

(*) Fantasized about doing something terrible (e.g., torturing) to someone? (12)

(*) Encouraged someone to drink when you were trying to seduce them? (13)

(*) Smoked marijuana or an illegal drug? (14)

(*) Made a false insurance claim? (15)

Taken nude pictures of yourself or your partner? (16)

**Census-related questions**: (they all appeared in Experiment 1C, together with first name, last name, date of birth, and phone number)

What is your gender? (17)

What is your age? (18)

What is your race? (19)

Where do you currently live? (20) (House, Apartment, Mobile home, Other - please specify)

Do you currently live with other people? (21)

Do you own the place where you live? (22) (Yes, No - I'm renting, No - I'm living there without paying rent)

Do you have a mortgage or loan? (23)

**Final questions**:

Thank you for your responses. Now we would like to ask about your thoughts and feelings as you answered. Please indicate to what extent you personally agree or disagree with each of the following statements: (Likert scale from Strongly Disagree (1) to Strongly Agree (5))

Some of the responses I gave are actually not true (24)

I was concerned about incriminating myself (25)

I was concerned about whether my responses would truly be private (26)

I was concerned about whether my responses would be kept confidential (27)