What is privacy worth?

Alessandro Acquisti, Leslie John, and George Loewenstein

Abstract. We investigate individual privacy valuations in a series of experiments informed by behavioral economics. In both field and online experiments, we find evidence of strong order and endowment effects, and non-normal distributions of valuations. Specifically, our results indicate that individuals assign markedly different values to the privacy of their data depending on a) whether they consider the amount of money they would accept to disclose otherwise private information, or the amount of money they would pay to protect otherwise public information; and b) the order in which they consider different offers for that data. Moreover, the gap between such values is larger than that observed in comparable studies of other private goods. We also find evidence that privacy valuations are not normally or uniformly, but instead bimodally distributed, clustering around extreme, focal values. These results paint a more nuanced and detailed picture of privacy valuations than the one currently in the literature, and highlight how sensitive those valuations can be to contextual effects.

1. INTRODUCTION

Understanding the value that individuals assign to the protection of their personal data is of great importance to policy makers, businesses, and researchers. It is important to policy makers, who are often required to choose between policies that trade privacy off against other desirable goals. For example, the Health Insurance Portability and Accountability Act of 1996 (HIPAA) gave patients greater privacy protections than they had before, but at the cost of increased administrative cost and bureaucracy; whether the changes wrought by HIPAA are worth their cost depends, at least in part, on the value that people place on privacy. It is important to businesses because, by estimating how much consumers value the protection of their personal data, they can predict which privacy-enhancing initiatives may become sources of competitive advantage, and which intrusive initiatives may instead trigger adverse reactions. Finally, it is important to researchers, who are interested in measuring the value that individuals assign to privacy, so as to better understand the drivers of information disclosure and information protection.

In recent years, there has been no shortage of empirical studies attempting to precisely quantify individual privacy valuations in diverse contexts (such as online data privacy: Hann *et al*. [2007]; location data privacy: Cvrcek *et al.* [2006]; or removal from marketers' call lists: Varian *et al.* [2005]). Some of these studies - as well as anecdotal evidence based on the growing popularity of blogs, online social networks, and other information-sharing social media - suggest that even ostensibly privacy conscious individuals are likely to share sensitive information with strangers (Spiekermann *et al*. [2001]). Applying the economics principle of "revealed preferences," some have concluded that our society, quite simply, does not place much value on privacy (Rubin and Lenard [2002]). Has "less privacy" truly become the new social norm, as a prominent Web 2.0 CEO has recently claimed (Gonsalves [2010])?

In this manuscript, we show that privacy valuations are extremely sensitive to contextual effects, and argue that revealed preferences arguments do not necessarily support the conclusion that people no longer care for privacy. In a series of experiments inspired by behavioral economics, we find a dramatic gap between subjects' "willingness to pay" to protect the privacy of their data and their "willingness to accept" money (Kahneman and Tversky [1979]) in order to give up privacy protection. Moreover, we

show that this gap is significantly larger than those observed in similar studies on ordinary private goods. We also provide evidence of substantial order effects (Schwarz [1999]) in privacy valuations. Combined, these results extend the existing literature on estimates of the value of privacy, by showing how significantly such valuations can be affected by contextual effects that arguably should play little role in decision making. In addition, our results provide a more detailed understanding of individual privacy preferences, by exploring the underlying distribution of privacy valuations; we find that valuations are not normally or uniformly distributed, but U-shaped, clustered around extreme, focal points.

2. BACKGROUND AND HYPOTHESES

Empirical studies of privacy valuations can be classified into two groups. The first and larger group includes studies that either explicitly or implicitly measure the amount of money or benefit a consumer considers sufficient to give away her personal data - their willingness to accept (WTA) to give away their data (examples include Spiekermann *et al.* [2001], Chellappa and Sin [2005], Wathieu and Friedman [2005], Huberman *et al.* [2006], Cvrcek *et al.* [2006], Hui *et al.* [2007]). A second, smaller group includes studies of the tangible prices or intangible costs consumers are willing to pay (WTP) to protect their privacy (Rose [2005], Acquisti and Grossklags [2005], Varian *et al.* [2005], Png [2007], Tsai *et al.* [2011]). No published study has, however, directly contrasted WTA for personal data and WTP for privacy. For instance, Hann *et al.* (2007) used conjoint analysis to quantify the value individuals put on website privacy protection, and concluded that "among U.S. subjects, *protection against* errors, improper access, and secondary use of personal information is worth US$30.49-44.62" (emphasis added). Hann *et al.*'s study is a seminal contribution in this area. However, conjoint analysis cannot distinguish between how much people will pay to protect their data, and how much they will accept to give their data away. Therefore, it cannot determine conclusively the value of "protection against errors" or the "true" estimate of the value that individuals assign to data - if it was established that those values do differ.

The distinction between valuations of personal data and valuations of privacy, WTA and WTP, is of significant theoretical and practical importance. As Hui and Png (2005) noted in their seminal review

of the economics of privacy, "[t]he difference between WTA and WTP for personal information could help explain the disparate findings from opinion polls […] and behavioral experiments […] Rigorous experiments are necessary to gauge the actual value that people attach to their personal information under various circumstances." Real-life privacy decisions come in both varieties. Analogous to WTP, every day we are faced with opportunities to pay to prevent our personal data from being disclosed – for example, using an anonymous web browsing application, such as Tor, hides one's online behavior, but incurs the cost of slower downloads. Analogous to WTA, in other situations we are asked to reveal personal information that we otherwise keep to ourselves, in exchange for some financial benefit – for example, the Internet data company comScore offers its panelists a bundle of products in exchange for monitoring the panelists' Internet behavior.

Outside the realm of privacy, economic experiments have uncovered a dichotomy between the *maximum* price a person would be willing to pay to acquire a good she did not own (her WTP) and the *lowest* price she would be willing to accept to part with the same good if she initially owned it (her WTA). Numerous studies have replicated the finding that WTA tends to be larger than WTP (Hammack and Brown [1974], Kahneman [1986], Knetsch [1989], Kahneman, Knetsch, and Thaler [1990], Kahneman, Knetsch, and Thaler [1991]) for a vast array of both tangible and intangible goods (see, for instance, Dubourg, Jones-Lee, and Loomes [1994]). Various explanations have been proposed for such WTP/WTA discrepancy (Hanemann [1991]; Hoehn and Randall [1987]); by far, the best supported accounts of the discrepancy are the endowment effect and loss aversion: the differential treatment of gains and losses (Kahneman and Tversky [1979], Thaler [1980]).

Considering how amorphous, uncertain, and complex are costs associated with violations of privacy and benefits associated with privacy protection (Acquisti [2004]), the WTP/WTA discrepancy could have significant implications in the privacy domain. Applied to privacy, the endowment effect explanation of the WTP/WTA discrepancy would predict that someone who enjoyed a particular level of privacy, but was asked to pay to increase it, would be deterred from doing so by the prospect of the loss of money; whereas someone who was asked to sacrifice privacy for a gain in money would also be

reluctant to make the change, deterred in this case by the loss of privacy. This led us to predict, and test in our experiments:

(Hypothesis 1) Willingness to pay and willingness to accept for privacy: *The fraction of consumers who will reject an offer to obtain money in exchange for reduced privacy (WTA) is larger than the fraction of consumers who will accept an economically equivalent offer to pay money in exchange for increased privacy (WTP).*

Another aspect of privacy valuations worth considering is that, if privacy costs and benefits are difficult to estimate with any precision, individuals may form their valuations of privacy based on contextual cues with little normative justification. Consider, specifically, the fact that consumers' decisions are often affected by the order in which offers are presented (Brookshire *et al.* [1981], Schwarz [1999]; in related work, Johnson et al. (2002) studied default effects in privacy decision making). Applied to privacy, this anomaly would suggest that consumers' privacy valuations depend on the order in which they are asked to reveal privacy-sensitive information. Hence, we predicted that presenting a privacy-enhanced option prior to one that is relatively less privacy protective may be interpreted as a signal that the former is inherently more valuable:

(Hypothesis 2) Order effects in privacy valuations: *Faced with the choice between offers with different monetary values and privacy features, the fraction of consumers who will choose a privacy enhanced offer is larger when that offer is presented before its (less privacy-protective) alternative.*

Finally, empirical research on privacy, to date, has examined mean valuations across individuals, but not the *distribution* of those valuations. Uncertainty and ambiguity associated with privacy trade-offs, coupled with the idiosyncrasy of privacy concerns, may again produce unusual distributions of privacy valuations. For instance, John et *al.* (2011) have found that individuals, in the absence of environmental cues that trigger privacy concern, fail to take privacy risks into account in their decision making. This leads to some surprising effects – for example, assurances of anonymity can, contrary to their typical purpose, cause people to 'clam up' and resist sharing information because they trigger, but do not fully allay, concern about privacy. If people don't ordinarily think about privacy, but when they do tend if

anything to overweight it, then, contrary to the usual finding that valuations of goods tend to be normally distributed across people, it is quite likely that valuations of privacy could, instead, be better approximated by a bimodal distribution. Based on this line of thinking, we conjectured that:

Non-normality of valuations: *Unlike ordinary private goods, privacy valuations are likely to be bimodally distributed.*

3. THE EXPERIMENTS

We tested our hypotheses in a series of experiments that shared a common design: subjects were asked to choose between gift cards that varied with respect to their privacy features and monetary values. Across all experiments, we operationalized informational privacy concerns as concerns over the treatment of one's purchase data (Tsai *et al.* [2011]). We investigated subjects' willingness to keep versus exchange gift cards as a function of a) their initial endowment and b) the order in which choices were presented. Experiment 1 tested Hypotheses 1 and 2 in the field, with real gift cards. Experiment 2 was a hypothetical survey that replicated the results of Experiment 1 but enabled us to examine individual privacy valuations to test whether, as conjectured, they are bimodally distributed. Experiments 3a-d were follow-up studies that tested robustness and boundary conditions for the findings of the prior two Experiments.

3.1 Experiment 1: Endowment and order effects

Experiment 1 was a field experiment in which subjects were offered real VISA gift cards that could be used to purchase goods from any online or offline store where debit cards are accepted. Shoppers at a Pittsburgh shopping mall were stopped by research assistants (blind to the hypotheses of the study) and offered gift cards in exchange for participating in a survey. In reality, the survey was a decoy, intended to create a credible explanation for (and distract attention from) the gift card that subjects were given as reward. Across all conditions, subjects had to choose between the same two alternatives: a "$10 anonymous card" and a "$12 identified card." For the former card, subjects were told that their "name will not be linked to the transactions completed with this card." For the $12 identified card, they were told

that their "name will be linked to the transactions completed with this card." What differed between the experimental conditions was the way that the choice was framed.

The study was a five condition between-subjects design. In two "endowed" conditions, subjects were either endowed with the $10 anonymous card or the $12 identified card, before being offered the option to swap one card for the other. Those conditions were used to test whether, and how significantly, the endowment effect played a role in privacy valuations. In two "choice" conditions, subjects were not endowed with a particular card before choosing, but were simply asked to choose between either a "$10 or $12 gift card" or a "$12 or $10 gift card" (in one condition the anonymous $10 card appeared first, and in the other condition the identified $12 card appeared first). The choice conditions allowed us to test the role of order effects in privacy valuations, but were also included to situate the impact of the WTA and WTP conditions relative to more neutral conditions that did not incorporate a *status quo*. Finally, we included one "rationality check" control condition, in which the choice was between a "$10 identified card" and a "$12 anonymous card." In this condition, the latter card was both more valuable ***and*** more privacy-preserving than the $10 card, thus forming a clearly dominant choice. This condition was included to ensure that people understood and paid attention to the task. We summarize the four main conditions below:

1. *[$10 Endowed] Keep the anonymous $10 card or exchange for an identified $12 card*
2. *[$12 Endowed] Keep the identified $12 card or exchange for an anonymous $10 card*
3. *[$10 Choice] Choose between an anonymous $10 card (appearing first) and an identified $12 card*
4. *[$12 Choice] Choose between an identified $12 card (appearing first) and an anonymous $10 card*

Note that all subjects in the first four conditions, regardless of the condition to which they had been randomly assigned, faced the exact same alternatives: a $10 anonymous card or a $12 identified card. However, the gift card endowment in two of the conditions generated a different framing of the choice faced by the subjects: for those in the [$10 Endowed] conditions, the question was framed as an implicit choice to *sell* one's future purchase data to the researchers for $2; for those in the [$12 Endowed] conditions, the question was framed as an implicit choice to *pay* $2 in order to *avoid* having one's future

purchase data made available to the researchers. Since subjects across those conditions faced exactly the same two alternatives, the percentages of people choosing the anonymous card over the identified one should remain the same, regardless of the framing. If those percentages differed, this would provide evidence of a WTP/WTA dichotomy, and/or order effects.[1]

3.1.1 Procedure

The experimental procedure is summarized in this section (complete details are available in the online Appendix). Experiment 1 took place on three weekend days at a Pittsburgh shopping mall. Female research assistants stood at the entrance of two women's clothing stores and approached female shoppers as they entered, asking them to complete a brief survey. To make the decoy survey realistic, shoppers were told that the survey was designed to assess people's attitudes toward spending money. Interested shoppers were given a coupon valid for a gift card upon completion of a short survey. After completing the survey and upon exiting the store, each subject gave her coupon to the experimenter, who then asked the subject (regardless of the condition) to print her name at the top of a receipt for the gift card. The experimenter then called the subject by her name, informing her that the coupon was valid for a gift card. Subjects were addressed by their names to increase the salience of the name-identification feature of the identified gift cards. Next, the experimenter gave the subject a sheet of paper, noting that it outlined the "features of the card." Experimenters were trained to avoid words such as "tracked" and "privacy" that may have alerted subjects to the purpose of the study. Until this point, subjects across the five conditions had been exposed to the same experience, and all had provided the same amount of personally identifying information to the researchers. Thereafter, subjects in the endowed conditions were given a sheet that described the features of the card with which they were to be endowed. The subject then selected a card

[1] Naturally, if a subject's valuation of her personal data were, for instance, 50 cents, it would be rational for her to switch to a trackable card for $12 (from a $10 untrackable card) in one condition and to accept to keep a $12 trackable card in a different condition. But since subjects with various heterogeneous privacy valuations were randomly assigned to the conditions, we can expect *ex ante* privacy valuations to be also similarly distributed. In such case, the proportion of people who choose the trackable card over the untrackable card should also remain the same across conditions.

from the appropriate bin, be it the $10 or $12 gift card bin. Next, the experimenter gave the subject a second sheet of paper describing the privacy features of the other card. The subject was then asked whether she would like to exchange her $10 anonymous [$12 identified] card for the $12 identified [$10 anonymous] card. In the *choice* conditions, subjects were only presented with one description sheet that listed and described both cards, one after the other, with order of description presentation manipulated between-subjects. Subjects then indicated which card they would like and selected their card from the appropriate bin. Subjects were then asked to provide their email address.

Note that, across all conditions, subjects had the same amount of time to reflect on how to use their respective cards *in the future*. Specifically, all subjects could have mentally compared choosing the trackable card to purchase non-sensitive items, versus choosing the anonymous card to purchase more privacy-sensitive items.

3.1.2 Results

Three-hundred and forty-nine female subjects participated in the study (*M* age=35, Median=35; *M* and Median income= $40,001-$50,000/year, Mode= $0-$10,000; 83.6% Caucasian, 8.5% African American; all not significant between conditions). Upon exiting the store, the majority (92.3%) of subjects returned to the experimenter to redeem their gift card coupon. Subjects were more likely to redeem their coupon if they completed the survey upon entry (95.4%) versus upon exiting the store (88.9%) (χ^2 (1) = 5.14, p = 0.023). However, the likelihood of completing the survey upon entry versus exit did not differ between conditions (χ^2 (4) = 3.71, p = 0.447), nor did redemption rates (χ^2 (4) = 2.35, p = 0.673).

Gift card choice. Virtually everyone in the "rationality check" control condition (95.7%) selected the $12 anonymous card, suggesting that subjects understood and took the task seriously. This condition is excluded from the rest of the analyses.

The proportion of people choosing the $10 anonymous card was highest when subjects had been endowed with it (52.1%); followed by the choice condition in which the $10 card was listed first (42.2%); followed by the choice condition in which the $10 card was listed second (26.7%); and lowest (9.7%) for those endowed with the $12 identified card (see Figure 1). Subjects in the endowed conditions displayed a

tendency to keep the card they had been endowed with; however, while 90.3% of subjects in the $12 endowed condition kept the $12 card, only 52.1% of those in the $10 endowed condition kept the $10 card. In other words, significantly more subjects in the $12 endowed condition kept their card than those in the $10 endowed condition χ^2 (1) = 27.24, p < 0.0005). More importantly, a majority of subjects in the $10 endowed condition (52.1%) rejected an offer of $2 (WTA) to switch to an identified card in exchange for giving away their future purchase data. However, only a small minority of subjects (9.7%) paid 2 dollars for privacy (WTP), by switching from the $12 identified card to the $10 anonymous card to protect the same data.

The two choice conditions – differing only in the order in which the cards were described– are marginally significantly different from each other (χ^2 (1) = 3.64, p = 0.056): subjects seemed more likely to choose the card that was described first. Specifically, when the $12 identified card was listed first, 73.3% of subjects chose it, whereas when it was listed after the description of the $10 anonymous card, only 57.8% of subjects chose it.

Table 1 presents the results of two logistic regressions in which we regressed age and dummy variables representing the experimental conditions over a dichotomous dependent variable representing the selection of the traditional $12 gift card (1) over the privacy enhanced $10 gift card (0).[2] We ran one regression for the two endowed conditions (second column) and one for the two choice conditions (third column). We used a dummy variable *($10Card*) to control for which card the subject was endowed with (or presented first): the $10 card (1) or the $12 card (0). Both models are significant. In the endowed conditions, *$10Card* is strongly significant and negative (p < 0.0005): subjects endowed with a $10 card were less likely to choose to give away their data for $2. This result strongly supports Hypothesis 1. In the choice conditions, *$10Card* is negative and weakly significant (p = 0.10), providing mild support for Hypothesis 2 (presenting a privacy enhanced option before the less privacy enhancing one sends a signal

[2] Sheehan (1999, 2002) has highlighted age and gender differences in privacy concerns. We do not use a dummy for gender in this regression since, as noted, Experiment 1 focused on a female population.

that the former is inherently more valuable), but also indicating that order effects are less strong than endowment effects.

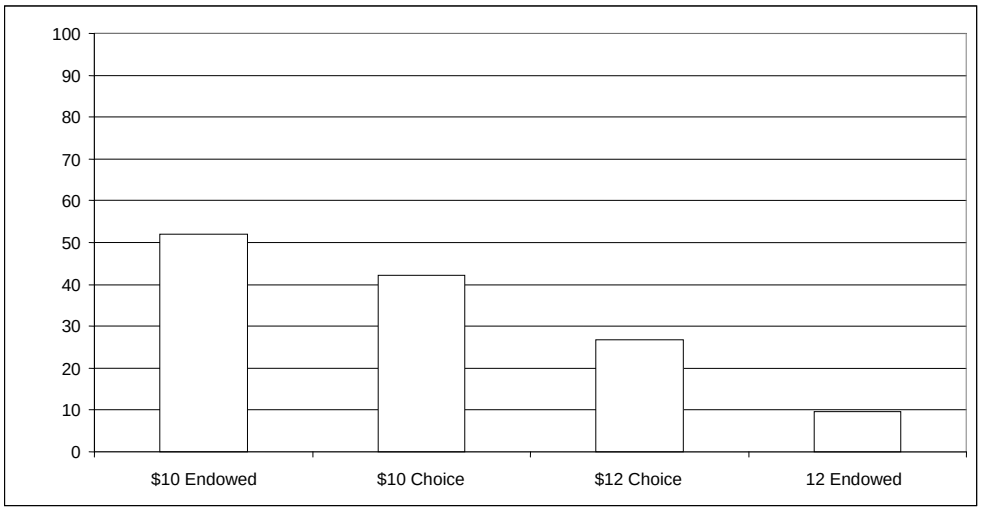


Figure 1 - Percentage of subjects who chose, chose, kept, or switched to the $10 anonymous card in Experiment 2 (vertical axis).

Card usage. We tracked the stores at which subjects used their gift cards to make purchases (although we could not ascertain what products they purchased). One month after the study, the majority of subjects (87.7%) had used their cards. Subjects who had chosen the more valuable card were slightly more likely to have used it (90.7% of those with $12 cards versus 81.8% of those with $10 cards; Pearson $\chi^2(1) = 4.25$, $p = 0.039$). There were no significant differences in the propensity to use the card depending on the initial conditions of assignment (whether the subject had been *initially* endowed with, or had to initially choose, a card; Pearson $\chi^2(1) = 0.16$, $p = 0.688$), or whether the subject had been initially assigned an anonymous or identified card (Pearson $\chi^2(1) = 1.28$, $p = 0.258$).

We investigated whether subjects used their cards at different types of stores, depending on card identifiability. Stores were classified as potentially privacy sensitive (e.g. lingerie stores such as "Victoria's Secret") or not (cafes, convenience stores, supermarkets). There was modest anecdotal evidence of differences in store patronage depending on card identifiable. For instance, all of the eight purchases recorded at Victoria's Secret were completed with the more valuable but less privacy protected card. This evidence should be considered as merely suggestive: store selection was not designed as part of the controlled experiment, since subjects could use their cards at any online or offline store.

Table 1 - Probit regression, Experiment 1. The dependent variable represents the card selection (0=$10 anonymous card, 1= $12 identified card)

	Endowed conditions	*Choice Conditions*
Constant	2.4379***	1.1130***
	(0.4880)	(0.3608)
Age	-0.0304***	-.0102
	(0.0104)	(0.0082)
$10Card	-1.4400***	-0.6210*
	(0.2917)	(0.2417)
	N = 123	*N = 128*
	Prob > chi2(3) = 0.0000	*Prob > chi2(3) = 0.0180*
	Pseudo R^2 = 0.23	*Pseudo R^2 = 0.05*

Notes: * $p < .1$, ** $p < .05$, *** $p < 0.01$. Standard errors in parentheses.

Subject's decision making. In the exit questionnaire, we asked subjects to explain why they choose one card over the other. Explanations provided by subjects who chose the $10 card often referenced privacy concerns, and specifically a resistance to being tracked: "Didn't want to give name … Didn't want to be linked … [Wanted] privacy … Didn't want to disclose my information … Would rather it be anonymous; …" Only one subject referred to actual risks by noting that "[the $10 card] seemed to be safer." In contrast, subjects who chose the $12 card mostly explained their choice using variations of the following concepts: "More money to spend! … Because it was more money!" or even referred specifically to not fearing being tracked: "I don't mind if people know what I buy … It doesn't bother me if you know where I spend it … I don't mind if you know where I spend my money."

Analysis. In Experiment 1, subjects across experimental conditions chose gift cards in different proportions merely depending on the framing of the choice. In doing so, they implicitly assigned, and revealed, dramatically different values to the privacy of their data. Valuations in the two endowed conditions were different from the choice conditions, and the valuations in the choice conditions differed based on which option was presented first. For example, more than half of subjects in the anonymous $10 endowed condition rejected an offer of $2 to reveal their future purchase data (that is, an increase of 20% of their initial endowment): these subjects decided that $2 was *not enough* to give away their privacy, even though they could have planned to use a trackable card in the future for non-privacy sensitive

transactions. Within the context of the experiment, their WTA was therefore larger than (or at best equal to) $2. Evidently, these subjects felt endowed with the protection of their information (naturally, this is not an absolute statement about the subjects' universal privacy preferences: the $2 amount is itself function of various factors held constant across the experiment's conditions, including – for instance – switching costs). By contrast, fewer than 10% of subjects endowed with the identified $12 card chose to give up $2 (a 17% decrease in their initial endowment) to protect future purchase data. The overwhelming majority of those subjects refused to pay $2 to protect their future purchase data – they decided that $2 was *too much* to protect their privacy. These results imply that subjects were *five times* more likely to choose privacy in one condition over the other, even though all subjects faced exactly the same choice. These patterns stand in stark contrast to results in the literature purporting to measure objective, true valuations of privacy.

Making various simplifying assumptions, we can compare the privacy WTA/WTP ratio to similar ratios estimated in the literature for other private goods. Let us assume that *ex ante,* subjective privacy valuations were clustered at $0 for those who opted to share information and $2 for those who did not (note that choosing values higher than $2 would merely increase estimated differences between conditions). Then, the *ex-post* mean valuation in the [$10 Endowed] condition could be calculated at roughly $1.04 (0.52*$2 + 0.48*$0), and that in the [$12 Endowed] condition at roughly 19 cents. This represents a WTA/WTP ratio of 5.47 – markedly larger than the average ratio observable for ordinary private goods (which Horowitz and McConnell [2002] report as 2.92).

Such gap between privacy WTP and WTA is notable because, while ordinary private goods (whose valuations can also be affected by the endowment effect) are directly traded in markets where objective prices are formed, privacy transactions are most often bundled with other primary transactions, making the estimation of privacy valuations for the benefits of public policy and decision making even more challenging. These findings, therefore, call for caution in the interpretation of market based experiments and analyses of privacy valuations that do not explicitly control for the framing of privacy vs. cash trade-offs: context is the key, and contextual factor can radically change individuals' valuations.

In particular, the results challenge the reliance on "revealed preferences" arguments to conclude, from the fact that few users take advantage of available protective solutions, that they do not care for privacy (Rubin and Lenard [2002]). In our experiment, the number of subjects willing to reject cash offers for their data was both significant in absolute terms and much larger in relative terms when they felt that their data was, by default, protected ([$10 Endowed] condition), than when they believed that their data would be, by default, revealed ([$12 Endowed] condition). The latter condition is arguably more likely to reflect consumers' actual beliefs and fears about the current state of privacy protection (surveys repeatedly find that most U.S. residents do not think their privacy is adequately protected; see, for instance, Kelsey and McCauley [2008]). Experiment 1 therefore suggests that when consumers feel that their privacy is protected, they value it much more than when they feel their data has already been, or may be, revealed.

3.2 Experiment 2: The distribution of privacy valuations

Experiment 2 was a two-part survey-based experiment. In the first part, subjects were asked to imagine receiving a gift card as payment for participating in a research study. After reading about the value and the characteristics of the card, subjects were asked whether they would like to exchange it for a card of different value and with different privacy features. This first part was similar to Experiment 1, but differed in that subjects – depending on the experimental condition - were asked to choose between $10 cards with privacy, and $12 *or* $14 cards without privacy (hence, Experiment 2 allowed us to test whether the WTP/WTA dichotomy found in Experiment 1 would extend to cases where the differential cash value in the card was larger than $2). Beyond this difference, Experiment 2 also included a second part, the purpose of which was to estimate subjects' *distributions* of privacy valuations. After stating their card choice, subjects were presented with follow-up choices, based on increasing or decreasing differences in the values of the card, and were asked to repeat their selections.

3.2.1 Procedure

The experiment was a 2x2 between-subjects factorial design. Subjects were randomly assigned to experimental conditions that differed by the type of card they were initially offered. We manipulated a) whether subjects were (hypothetically) initially endowed with a trackable (WTP) or an untrackable card

(WTA), and b) the difference in the value between the two cards (trackable card worth $2 or $4 more than untrackable card). We refer to conditions in which subjects were assigned a trackable card as "WTP" since they relate to the question of how much (if anything) subjects would be willing to pay back to protect their data, and conditions in which subjects were assigned an untrackable card as "WTA" since they relate to the question of how much (if anything) subjects would be willing to accept to give away their data. Therefore, the tradeoff in each of the four conditions was as follows:

1. *[WTA/Δ2] Keep $10 card which cannot be tracked, or exchange for $12 card which will be tracked*
2. *[WTA/Δ4] Keep $10 card which cannot be tracked, or exchange for $14 card which will be tracked*
3. *[WTP/Δ2] Keep $12 card which will be tracked, or exchange for $10 card which cannot be tracked*
4. *[WTP/Δ4] Keep $14 card which will be tracked, or exchange for $10 card which cannot be tracked*

In addition, we used a fifth condition ([WTA/Δ2 Control]) to test whether subjects may be sensitive to slight changes in the description of the cards. In this condition, subjects were asked to choose between keeping the $10 card which cannot be tracked (as in condition [WTA/Δ2]), or exchange it "for the $12 card which *may* be tracked" (emphasis added).

Experiment 2 was run at cafeterias in hospitals in Pittsburgh. Subjects were recruited on site; each was offered a chocolate bar for completing the questionnaire. Two hundred and forty subjects participated in the study (46.2% female; *M* age=33, sd=15, Median=35, range=19-83; 75.0% Caucasian); each was randomly assigned to one of the five experimental conditions (50 subjects participated in condition [WTA/Δ2], 45 in condition [WTA/Δ4], 51 in condition [WTP/Δ2], 44 in condition [WTP/Δ4], and 50 in the [WTA/Δ2 Control] condition). Except for a slight overrepresentation of females in Condition [WTA/Δ2], there were no other significant demographic differences between conditions (we did not find any gender effect on card choice).

The first page of the questionnaire stated that there were two types of gift cards: trackable and untrackable (Appendix B). Purchases made with a trackable card would be "tracked by researchers" and "linked to the name of the participant." Purchases made with an untrackable card would "not be tracked by researchers" and therefore would "not be linked to the name of the participant." Subjects were then

asked whether they would like to keep the card they were initially offered, or exchange it for the other card. After answering this question, subjects were instructed to turn the page and answer the follow-up questions that allowed us to estimate their distribution of privacy valuations. On the final page of the questionnaire, subjects answered demographic questions.

3.2.2 Results

In the conditions in which we asked subjects to choose between a $10 anonymous card and $12 trackable card (conditions [WTA/Δ2] and [WTP/Δ2]), we found, as hypothesized, a significant effect of card endowment on card choice.[3] When endowed with the $10 untrackable card, 60.0% of subjects claimed they would keep it; however, when endowed with the $12 trackable card, only 33.3% of subjects claimed they would switch to the untrackable card (χ^2 (1) = 6.76, p = 0.009). We found a similar pattern in the conditions in which we asked subjects to choose between a $10 anonymous card and a $14 trackable card (conditions [WTA/Δ4] and [WTP/Δ4]): 60.0% of subjects endowed with the $10 card claimed they would keep that card, but only 41.5% of the subjects endowed with the $14 card indicated that they would switch to the $10 card. In this case, however, the difference was only marginally significant (χ^2(1) = 2.95, p = 0.086).

Table 2 - Probit regression, Experiment 2. The dependent variable represents the card selection (0=$10 untrackable card, 1= $12 or $14 trackable card)

Constant	0.9853***	0.9404***
	(0.3222)	(0.3453)
Age	-0.0185***	-0.0181***
	(.0065)	(0.0066)
Gender	-0.0235	0.0115
	(0.1962)	(0.1990)
WTA	-0.6093***	-0.5360*
	(0.1942)	(0.2817)
Δ2	0.1105	0.1844
	(0.1954)	(0.2844)

[3] In the [WTA/Δ2 Control] condition 45.8% of subjects claimed they would keep the $10 card, compared to [WTA/Δ 2], where 60.0% said they would keep their card. Although this suggests that a subtle difference in wording (i.e. cannot be tracked vs. will not be tracked) may have mattered, the difference between the conditions was not statistically significant (Pearson χ2 (1) = 1.97, p = 0.16). To continue the analysis of the experiment as a 2x2 factorial design, the [WTA/Δ2 Control] condition is excluded from the statistical analyses that follow.

WTA* Δ2		-0.1420 (0.3972)
	N = 179	*N = 179*
	Prob > chi2(4) = 0.0008	*Prob > chi2(4) = 0.002*
	Pseudo R^2 = 0.08	*Pseudo R^2 = 0.08*

Notes: * $p < .1$, ** $p < .05$, *** $p < 0.01$. Standard errors in parentheses.

To control for age and gender effects, we ran logistic regressions on the binary choice variable using a probit model. We included data from the four comparable conditions and regressed age, gender, and dummy variables representing the conditions over a dichotomous dependent variable, representing the selection of the traditional gift card (1) over the privacy enhanced gift card (0) (see Table 2). We used one dummy variable to control for the conditions which contrast \$10 and \$12 cards (*Δ2*=1) versus \$10 and \$14 cards (*Δ2*=0), and another dummy to control for the conditions in which the subjects were endowed with the untrackable card and were offered to accept more money to switch to the tracked card (*WTA*=1). Age is a discrete variable and gender is a binary dummy (1=female). The model is significant, and the WTA/WTP effect is strongly significant: subjects in the WTA conditions are much less likely to switch to the trackable cards than subjects in other conditions. These results are consistent with those of Experiment 1, and show that the endowment effect extends to larger value differences across the card than those examined in Experiment 1.

However, and importantly, we found no effect of the difference in card values (i.e. Δ\$2 vs. Δ\$4) on subjects' card choice. We also found that the interaction between card value and endowment is not significant (last column in Table 2). In fact, there was no difference in the percentage of subjects who kept the untrackable \$10 card when offered to exchange it for a \$12 or a \$14 trackable card (in both cases, 60.0% of subjects claimed they would keep it; Pearson χ^2 (1) = 0.00, p = 1). Similarly, there was no difference in the number of people who claimed they would switch to a \$10 untrackable card *from* a \$12 or \$14 trackable card (33.3% in the former case, and 41.5% in the latter case claimed they would switch; Pearson χ^2 (1) = 0.91, p = 0.339). These results suggest that privacy valuations, within the context of the

experiment, did not vary significantly in the [$2-$4] interval. For instance, some individuals may have valued privacy protection a lot ($4 or more, so their choice would not change depending on whether they are offered $2 or $4 for their data); other individuals may not have valued such protection at all (less than $2, so being offered $2 or $4 would not make a difference to them either); but very few individuals valued the privacy of the purchase data considered in Experiment 2 *exactly* $x (with $2 < x < 4$). Hence, the lack of difference in selection patterns in the $10 versus $14 conditions over the $10 versus $12 conditions in Experiment 2. This interpretation is compatible with the conjecture that privacy valuations are not uniformly or even normally distributed, but instead, clustered around focal points. The follow-up questions in the second part of Experiment 2, which were designed to elicit a distribution of privacy valuations, allowed us to examine such conjecture.

The distribution of privacy valuations. The follow-up questions in Experiment 2 focused on whether the subject would have chosen the same or an alternative card if the values of those cards had been different. The alternative values presented in the follow-up questions depended on the subject's card choice as specified on the first page, and incremented (or decremented) by as little as 25 cents or as much as a few dollars (see Appendix B). Based on the responses to the follow-up questions, we constructed a variable representing "brackets" of privacy valuations – the approximate monetary range that individuals assigned to the untrackable card. For instance, consider the subjects who chose to keep a $10 untrackable card (rather than switching to a $12 trackable card). We define their "privacy valuation" to be at least $2 (once again, we note that this is not an absolute statement about the subjects' universal privacy preferences, as the various amounts are themselves function of other factors held constant across the conditions, such as switching costs). Suppose that the same person then indicated that she would have also kept the untrackable card if it had been worth $9, but *not* if it had been worth $8. We would then infer a (self-reported) valuation for the privacy of her purchase data to be *at least* $3 (the difference between the offered $12 and the hypothetically endowed $9), but *less than* $4 (the difference between the offered $12 and the hypothetically endowed $8). We then took the lower boundary of each bracket, and constructed the histograms presented in Figure 3 (for instance, if the subject's valuation was calculated to lie within

the 0c to 0.25c bracket, we used a value of 0 for the histogram; if it was between 0.50 and 0.75, we used 0.50; and so forth).

Figure 2 presents brackets of values for each of the five experimental conditions, as well as the values aggregated across conditions (bottom right quadrant). Consistent with Conjecture 1, all distributions (with the exception of the WTP/Δ2 condition) are bimodal (also, consistent with Hypothesis 1, the bimodality is more accentuated in the conditions in which subjects were endowed with the privacy enhanced card). We used non-parametric rank sum Mann-Whitney tests to compare the distributions of valuations across conditions, and found statistically significant differences when contrasting the two $10 vs. $12 conditions ($z = 3.67$, $p < 0.0005$) and the two $10 vs. $14 conditions ($z = 2.647$, $p = 0.008$). In both cases, the conditions endowed with the more valuable but unprotected card tend to assign less value to the privacy enhanced card, which is consistent with Hypothesis 1 and the results presented in Section 3.1. The modal valuation is one of the extreme points for all five conditions (specifically, it is "between 0 and 25 cents" for three conditions, and "larger than $11" for the other two); the *second* modal valuation is the *other* extreme for four out of five conditions.[4] Shapiro-Wilk, Shapiro-Francia, and Skewness-Kurtosis tests on the bracket data all strongly rejected the hypothesis of normality of distribution of valuations ($p < 0.05$ within each condition). Hartigan and Hartigan (1985)'s dip test for unimodality also rejected the hypothesis of unimodality (and uniformity) for conditions [WTA/Δ2] and [WTA/Δ4] and the Control condition ($p < 0.0005$), implying bimodality, and was borderline for the [WTP/Δ4] condition ($p = 0.11$). It was not rejected, however, for condition [WTP/Δ2] ($p = 0.26$), where the lowest possible valuation was the dominant choice for most subjects.

[4] While the response options presented to the subjects were, necessarily, not evenly spaced, subjects nevertheless had to make discrete choices for each interval. Hence, such spacing cannot explain, alone, the modal points of the distribution, and it does not affect the statistical tests which we present further in the text and that we used to test for normality and unimodality.

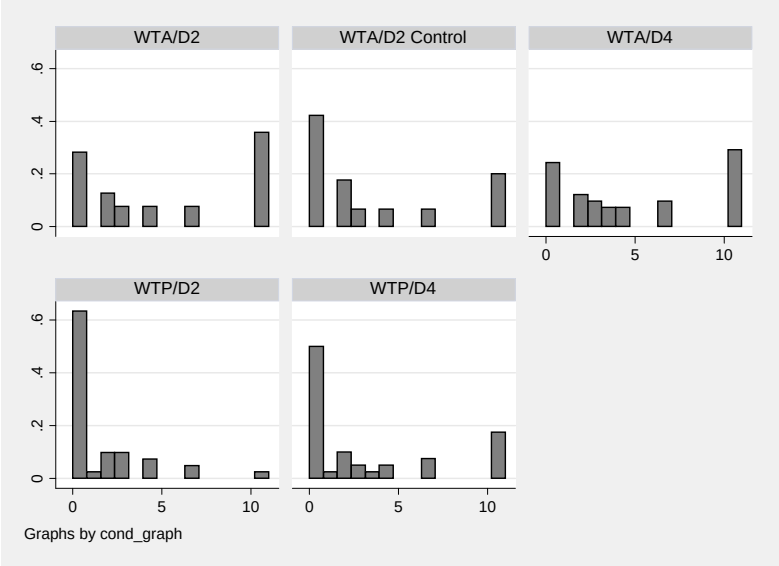


Figure 2 - Distribution of point-wise valuations of purchase data protection based on the results of Experiment 2. The vertical axis represents the fraction of observations in each range of valuations. The horizontal axis represents identical value across the quadrants: the lower boundary (in dollar terms) of each valuation bracket, from $0 to $11.

Falsification tests of bimodality result. As a falsification test of the bimodality result, we ran a new battery of surveys using the exact same language in the [WTA/Δ2] and [WTP/Δ2] conditions. In this new set of surveys, we first asked subjects to hypothetically choose between a $10 gift card *plus a physical good*, and a $12 card *with no such good*. In other words, we applied our experimental design to a scenario where WTP and WTA were estimated for an ordinary private good, instead of privacy. Next, following the design of Experiment 2, we posed follow-up questions in order to estimate the distribution of valuations of the goods. Specifically, in separate falsification tests, we measured subjects' valuations for three goods whose average eBay price fell in the $2 to $3 range: an eraser, a desktop aluminum calendar, and an IKEA umbrella. At least 80 subjects were recruited online and used for each falsification test. When testing WTP and WTA for these physical goods using the design of Experiment 2, the bimodality of the distributions disappears. As an example, consider Figure 3: the left quadrant represents the aggregate distribution of *privacy* valuations, combining the familiar results of Experiment 2's conditions [WTA/Δ2] and [WTP/Δ2]; the bimodality is readily apparent. The right quadrant represents the aggregate distribution of valuations for an IKEA umbrella, as determined from the subjects' choices between a $10

card and an IKEA umbrella or a $12 card without such umbrella (n=82). The distribution is no longer U-shaped, but skewed and unimodal (diptest$_{[WTP/umbrella]}$: p = 0.28; diptest$_{[WTA/umbrella]}$: p = 0.10).

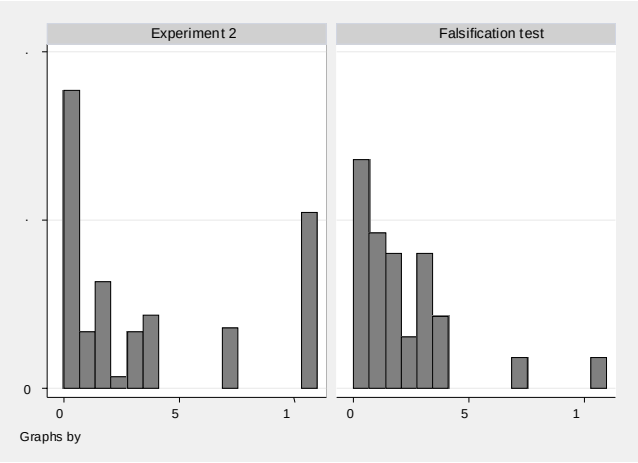


Figure 3 - Distribution of point-wise valuations: comparison between Experiment 2 conditions (trading privacy for money) and the falsification test conditions (trading an umbrella for money).

3.3 Follow-up WTP/WTA Experiments

We conducted four additional experiments to test the robustness and boundary conditions of the WTP/WTA privacy gap observed in Experiments 1 and 2. Whereas Experiment 1 and 2 pertained to informational privacy (i.e. concerns over the treatment of one's personal data, as operationalized by purchase information; see Tsai *et al.* [2011]), in Experiment 3a we tested whether the endowment effect would extend to another type of privacy concern (namely, location privacy; see Cvrcek *et al*. [2006]). Experiment 3b tested whether the effects in Experiments 1 and 2 were unique to privacy features included on a gift card, or whether other gift card features (such as convenience) also elicit endowment effects. Finally, Experiments 3c and 3d tested boundary conditions of the endowment effect in privacy valuations.

All subjects in the follow-up experiments were recruited from an online platform (MTurk) managed by Amazon.com. Subjects were offered a small fixed payment to participate in a "short online survey." They had to be at least 18 years old and have an "approval rate" (based on their history of tasks completed on the platform) of at least 99% to participate in the study. Subjects who chose to take the survey were randomly assigned to one of eight experimental conditions (two conditions each for Experiment 3a, 3b, 3c, and 3d). Summary results of these experiments are presented in the rest of this

section. For brevity, we only report the results of χ^2 tests of the proportion of gift cards chosen across the conditions.

3.3.1 Experiment 3a

Experiment 3a was designed to establish whether the endowment effect found in our experiments would hold for a different form of privacy concern – namely, location privacy (Cvrcek *et al.* [2006]). Similar to Experiment 2, subjects were asked to imagine having received a small payment and a VISA gift card for participating in a research study. However, instead of choosing between different valued gift cards that would or would not allow researchers to track *purchases* made with that card (as in Experiment 2), subjects in Experiment 3a had to choose between: 1) a $18 card, on the condition that their *location* would be recorded by the researchers for one day via the subjects' cell phone GPS; and 2) a $12 card, which came with no such condition. Therefore, the trackable card was $6 more valuable than its alternative. We chose a larger monetary differential than in Experiments 1 and 2 because we predicted that subjects would consider location data to be more sensitive than purchase data.

In Condition 1, subjects (n=78) were asked to imagine having been given the $12 card and then having been offered the $18 card. In Condition 2, subjects (n=77) were asked to imagine having been given the $18 card and then having been offered the $12 card. The results confirmed the existence of a privacy endowment effect: in Condition 1, 64.1% of subjects chose to keep the $12 card, but only 35.9% of subjects made that decision in Condition 2 (χ^2 (1) = 13.07, $p < 0.0005$). Experiment 3a therefore suggests that the endowment effect also arises for the valuation of physical privacy, in addition to informational privacy valuations examined in Experiments 1 and 2.

3.3.2 Experiment 3b

Experiment 3b tested whether the results of Experiment 2 are unique to the privacy features of a gift card. Instead of choosing between differently-valued gift cards with various privacy features, subjects had to choose between cards of different value and *convenience*. Subjects in Condition 1 (n = 45) imagined having received a $10 card that could be used both in stores inside the mall and online, and then being offered a more valuable but less convenient $12 card that could only be used in stores inside the mall.

Subjects in Condition 2 (n = 57) faced the reverse proposition (we kept the values of the card at $10 and $12 in order to make the results directly comparable to Experiment 2). Unlike in the case of privacy (that is, Experiment 2), no endowment effect was found: both in Condition 1 (57.8%) and in Condition 2 (66.7%), the relative majority of subjects opted for the more valuable card (χ^2 (1) = 0.85, p > 0.3), even though a significant portion of subjects in both conditions found the more convenient card desirable (more than 40% in Condition 1 and more than 30% in Condition 2). Experiment 3b therefore suggests that not all intangible gift card features elicit the same endowment effect that we observed for privacy.

3.3.3 Experiments 3c and 3d

The design of Experiments 3c and 3d was identical to Experiment 2: subjects had to choose between two differently-valued gift cards that would or would not allow the researchers to track purchases made with the card. However, to test the boundary conditions of the privacy endowment effect, we varied the differential in the values of the two cards, making it very large - $15 - in Experiment 3c, and very small -- 25 cents in Experiment 3d.

Subjects in Experiment 3c, Condition 1 (n = 52), imagined having been given a $10 privacy-enhanced card and then being offered to replace it with a $25 card without privacy protection. Subjects in Condition 2 (n = 41) faced the reverse choice (from $25 to $10). In both conditions, a majority of subjects chose the more valuable (but less private) card (69.2% in Condition 1 and 80.5% in Condition 2). The endowment effect is no longer significant (χ^2 (1) = 1.52, p > 0.2): when the difference in the two gift cards' values is too large, most subjects choose the most valuable card because the monetary advantage trumps the privacy concerns. This confirms the existence of an upper ceiling to individuals' privacy valuations.

Subjects in Experiment 3d, Condition 1 (n = 51), imagined having been given a $10 privacy-enhanced card and then being offered to replace it with a $10.25 card without privacy protection. A majority of them (72.5%) kept the privacy enhanced card. Subjects in Condition 2 (n = 46) faced the reverse choice (from $10.25 to $10); of them, 52.2% kept the $10.10 card, and 47.8% chose the privacy enhanced card. While the endowment remains significant at the 5% level (χ^2 (1) = 6.10, p = 0.013), the

results indicate that when the monetary benefit of giving away one's purchase data is so small (25 cents), the $10 card becomes an appealing option also for close to half of subjects in the "WTP" condition (that is, those endowed with the $10.25 card). In fact, the proportion of subjects that replaced a more valuable card with a less valuable but privacy enhanced card was significantly larger in Experiment 3d (47.8% when delta between the two cards is 10 cents) than in Experiment 3c (19.5% when the delta between the two cards is $15) ($\chi 2$ (1) = 7.69, p = 0.006).

4. DISCUSSION AND LIMITATIONS

We found consistent results across a variety of experimental conditions: field experiment with real incentives (Experiment 1), survey-based hypothetical experiment (Experiment 2), and online experiments (Experiments 3a,d). However, our findings are also defined by a number of limitations that we highlight in this section.

A first limitation of Experiment 1 consists in the fact that its subjects volunteered to participate in a survey while wandering in a shopping mall. The decision to participate in a survey may signal limited privacy concerns, and the public location may have further lowered subjects' privacy thresholds. Such selection bias implies that the valuations we found in our sample may not necessarily generalize to other populations. On the other hand, selection bias does not pose a threat to the *internal* validity of the experiment (such as the significance of order and endowment privacy effects), because subjects across conditions faced the same circumstances prior to being randomized to an experimental treatment. If anything, selection bias may play a lower influence in our experiment than in previous attempts in the literature to pinpoint the value of privacy by directly eliciting subjects' valuations through multiple discrete choices or auction mechanisms: in our design, subjects were presented with a simple, one-shot choice, ostensibly as part of their payment - almost as an afterthought, after their attention had been captured by an unrelated survey.

Another limitation of Experiment 1 is that its subjects experienced a utility gain (the monetary value of the card they had been given) before being asked to trade-off their personal data. Such gains are

common both in the privacy valuations literature (see, e.g., Tsai et al [2011]), and in the endowment effects experimental literature. Although the utility gain is likely to have affected subjects' absolute valuations of the cards, however, it did not compromise the internal validity of the experiment, because all subjects were endowed with gift cards and experienced such gains (Experiments 2 and 3a provided results consistent with Experiment 1 even in absence of utility gains).

A broader limitation of our experiments is that we provided evidence of order effects and WTP/WTA discrepancies in privacy valuations, but did not attempt to investigate their causes. Numerous explanations have been proposed in the literature to explain the gap between WTP and WTA: lack of substitutability between goods (Hanemann [1991]), uncertainty about a good's value and bounded rationality (Hoehn and Randall [1987], Eisenberger and Weber [1995]), and loss aversion (Kahneman and Tversky [1979], Thaler [1980]). These and other factors certainly impacted our subjects' card choices. For example, *status quo* bias would predict that subjects may have tended to stick to the options to which they are initially assigned, even when the cost of switching to a (better) option is trivial (Samuelson and Zeckhauser [1998]); default bias would predict that the initial endowment may have been interpreted by subjects as the option that most people take (Johnson and Goldstein [2003]); and trade-off avoidance would predict that experimental subjects may have disliked the idea of trading-off their cards (Luce [1998]). These explanations do not account for the results in the *choice* conditions, and may not fully account for the markedly different proportions of subjects, across different conditions, who in fact stuck with the *status quo* gift card they had been assigned (90.3% in the [$12 Endowed] condition vs. 52.1% in the [$10 Endowed] condition). However, all these explanations are indeed consistent with, and may play a role in, the phenomenon we have documented in this paper: very large discrepancies between the amount individuals are willing to pay for privacy, when by default their data would be public; and the amount they are willing to accept to give away the same data, when by default their data would be protected.

An additional limitation is that we did not try to disentangle the many, heterogeneous factors that affect privacy valuations. Individual privacy preferences are undeniably idiosyncratic; however, individual heterogeneity is an unlikely explanation for our results. Certainly, each of our subjects had

their own unique and inscrutable motivations for choosing one card over the other: Some subjects may have focused on the monetary benefits of the cards, and others on their privacy features; some may have worried about privacy merely as a matter of principle or right; others may have focused on the specific consequences associated with third parties knowing their purchasing habits; furthermore, some other subjects may have decided in advance to use the gift cash for sensitive (or non-sensitive) purchases, and chose the card accordingly; some others may have not had such foresight. However, these different motivations, perceptions, and mental processes cannot explain our results: because of randomization, subjects with different motivations (and different personal privacy valuations) would be similarly distributed across experimental conditions. Therefore, even though each individual's subjective preferences remain unobservable, statistically significant differences in aggregate behavior allows us to test our hypotheses.

Finally, we should note that some authors have dismissed the very existence of an endowment effect, arguing that the effect is an artifact of incentive-incompatible mechanisms and experimental designs in which subjects have no opportunity to learn (see Plott and Zeiler [2005]). The design of Experiment 1, however, provides a possible counter-argument to these criticisms. Subjects traded cash for an actual, if eminently subjective and intangible, privacy cost: the concerns associated with sharing their purchase data with a third party. Furthermore, while Plott and Zeiler (2005) recommend testing endowment effects via sequences of repeated valuations, our one-off selection of a real gift card is a more realistic representation of the privacy decisions made in daily life: Privacy trade-offs, although increasingly frequent and ubiquitous, are unique, because of the ever-changing contextual conditions in which they are made. Consumers are rarely able to negotiate the price of their data: they are typically given binary choices, including take-it-or-leave it options.

5. CONCLUSIONS

In their review of the economics of privacy, Hui and Png (2005) noted how important it has become to "recognize the likely gap between WTA and WTP, and assess the benefits of allocating property rights

accordingly." Our results provide evidence of strong endowment and order effects in privacy valuations, and paint a more nuanced and granular picture of privacy valuations than that which is currently accepted. The implication of the research reported here is that privacy valuations, while not arbitrary, are significantly subject to subtle framing effects and are anchored around extreme focal points. The "price" people assign to protect a piece of information is very different from the price they assign to sell the same piece of information. Furthermore, valuations are not normally or uniformly distributed, but tend to be bimodal.

Such results have implications for both empirical and theoretical economic analyses of privacy. Let us consider first the empirical implications. In their paper on coherent arbitrariness, Ariely *et al.* (2003) noted that "demand curves estimated from market data need not reveal true consumer preferences, in any normatively significant sense of the term." Similarly, our findings cast doubt on the ability to infer consumers' *exact* evaluations of personal privacy from market experiments: What people decide their data is worth depends critically on the context in which they are asked, and specifically on how the problem is framed. While this is true of other ordinary private goods, the gap we observe between WTP and WTA for privacy is much larger than that observed for ordinary consumer goods. Our findings should, therefore, caution against the uncritical use of valuations of privacy that have used single methods – e.g., *only* WTP or *only* WTA. Such, often surprisingly precise, valuations should be interpreted with extreme caution: failing to differentiate between how much an individual would pay versus accept for her private data conceals the reality of how malleable and mutable these valuations can be. The answers to questions such as "What is privacy worth?" and "Do people really care for privacy?" depend not just on whom, but *how*, you ask.

From a theoretical standpoint, we show that the assumption that privacy valuations are independent of endowment is empirically questionable. Since economic models are used to influence and direct public policy initiatives, our empirical results carry a practical lesson to guide our efforts as modelers: our models should account for the fact that estimated valuation of privacy depend on the

direction of the cash-for-privacy exchange: they are larger when individuals consider trading personal data for money, and smaller when people pay money for privacy.

Finally, and perhaps most importantly, this research raises the issue of individuals' abilities to rationally navigate issues of privacy. From choosing whether or not to join a grocery loyalty program, to posting embarrassing personal information on a public website, individuals constantly make privacy-relevant decisions which impact their well-being, and this research suggests that they do so inconsistently. The finding that endowment effects powerfully influence individual privacy valuations, may help to justify the introduction of policy interventions that protect people from their own suboptimal decisions. Individuals' decisions about their data are sometimes taken as representing true and final preferences towards protection or revelation of personal data, and therefore become an instrument for the assignment of societal resources to privacy issues. For example, the observation that individuals give away their personal information for small rewards has permeated the policy debate and has been used to argue against privacy regulation (e.g., Rubin and Lenard [2002]), on the grounds that if consumers wanted more privacy they would ask for it and take advantage of opportunities to protect it. However, as we have shown, revealed preferences arguments should not, alone, justify the uncritical conclusion that privacy conscious consumers will never pay for privacy. If individual decisions regarding privacy are so malleable to endowment and order effects, such arguments lose their normative standing.

REFERENCES

Acquisti, A. 2004. Privacy in Electronic Commerce and the Economics of Immediate Gratification. *Proceedings of ACM Electronic Commerce Conference (EC '04)*. New York, NY: ACM Press, 21-29.

Acquisti, A. and J. Grossklags, 2005. "Privacy and Rationality in Decision Making," IEEE Security and Privacy, 3(1), 26-33.

Ariely, D., G. Loewenstein, and D. Prelec, 2003. "Coherent Arbitrariness: Stable Demand Curves Without Stable Preferences," *Quarterly Journal of Economics*, 118(1), 73-105.

Brookshire, D.S., R.C. d'Arge, W.D. Schulze, and M.A. Thayer, 1981. "Experiments in valuing public goods," in V.K. Smith (Ed.) A*dvances in Applied Microeconomics: Volume 1*.Greenwich CT: JAI Press.

Chellapa, R. and R.G. Sin, 2005. "Personalization Versus Privacy: An Empirical Examination of the Online Consumers' Dilemma," *Information Technology and Management*, 6(2-3), 181-202.

Cvrcek, D., M. Kumpost, V. Matyas, and G. Danezis, 2006. "A Study On The Value Of Location Privacy," *Proceedings of Workshop on Privacy in the Electronic Society (WPES '06)*, 109-118.

Dubourg, W.R., M.W. Jones-Lee, and G. Loomes, 1994. "Imprecise preferences and the WTP-WTA disparity," *Journal of Risk and Uncertainty*, 9(2), 115-133.

Eisenberger, R. and M. Weber,1995. "Willingness-To-Pay And Willingness-To-Accept For Risky And Ambiguous Lotteries," Journal of Risk and Uncertainty, 10(3), 223-233.

Gonsalves, A. 2010. "Facebook CEO: Less Privacy is Social Norm," InformationWeek, January 12.

Hammack, J. and G.M. Brown, 1974. *Waterfowl and Wetlands: Toward Bioeconomic Analysis*, Baltimore, Maryland: John Hopkins University Press.

Hanemann, M.W., 1991, "Willingness to Pay and Willingness to Accept: How Much Can They Differ?," *American Economic Review*, 81, 635-647.

Hann, I.H., K. L.Hui, T. Lee, and I. Png, 2007. "Overcoming Information Privacy Concerns: An Information Processing Theory Approach," *Journal of Management Information* Systems, 24(2), 13-42.

Hartigan, J. A. and P. M. Hartigan, 1985. "The Dip Test of Unimodality," *Annals of Statistics* 13(1), 70-84.

Hoehn, J.P. and A. Randall, 1987. "A Satisfactory Benefit Cost Indicator from Contingent Valuation," *Journal of Environment, Economics and Management*, 14, 226-247.

Horowitz, J.K. and K.E. McConnell, 2002. "A Review of WTA / WTP Studies," *Journal of Environmental Economics and Management*, 44, 426-244.

Huberman, B., E. Adar, and L. Fine, 2006. "Valuating Privacy," *Proceedings of the Workshop on the Economics of Information Security (WEIS '06)*.

Hui, K-L. and I. P. L. Png, 2005. Economics of Privacy. In *Handbook of Information Systems and Economics*, Terry Hendershott (ed.), Elsevier.

Hui, K.-L., H-H. Teo, S.-Y. Lee, 2007. "The Value of Privacy Assurance: An Exploratory Field Experiment," *MIS Quarterly,* 31(1), 19-33.

Kahneman, D., 1986. ''Valuing Environmental Goods: An Assessment of the Contingent Valuation Method,'' in *Valuing Environmental Goods: An Assessment of the Contingent Valuation Method*, R. Cummings, D. Brookshire, and W. Schulze (eds), Totowa, NJ.

Kahneman, D., J.L. Knetsch, and R. H. Thaler, 1990. "Experimental Tests of the Endowment Effect and the Coase Theorem," *Journal of Political Economy*, 98(6), 1325-1348.

Kahneman, D., J.L. Knetsch, and R. H. Thaler, 1991. "Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias," *Journal of Economic Perspectives*, 5(1), 193-206.

Kahneman, D. and A. Tversky, 1979. "Prospect Theory: An Analysis Of Decision Under Risk," *Econometrica*, 47(2), 263-292.

Kelsey, J. and M. McCauley, 2008. "Consumer Reports Poll: Americans Extremely Concerned About Internet Privacy - Most Consumers Want More Control Over How Their Online Information Is Collected & Used," Consumerunion.org, September 25.

Knetsch, J.L., 1989. "The Endowment Effect and Evidence of Nonreversible Indifference Curves," *American Economic Review*, 79(5), 1277-1284.

John, L.K., A. Acquisti, and G. Loewenstein, 2011. "The Best of Strangers: Context Dependent Willingness to Divulge Personal Information." Forthcoming, Journal of Consumer Research.

Johnson, E., S. Bellman, and G. Lohse, 2002. Defaults, Framing and Privacy: Why Opting In-Opting Out (2002). *Marketing Letters*, 13(1), 5-15.

Johnson, E. and D. Goldstein, 2003. "Do Defaults Save Lives?" *Science*, 302(5649), 1338-1339.

Luce, M.F., 1998. "Choosing to Avoid: Coping with Negatively Emotion-Laden Consumer Decisions," *Journal of Consumer Research*, 24 March, 409-433.

Plott, C.R. and K. Zeiler, 2005. "The Willingness to Pay/Willingness to Accept Gap, The 'Endowment Effect,' Subject Misconceptions and Experimental Procedures for Eliciting Valuations," *American Economic Review*, 95(3) 530-545.

Png, I.P.L., 2007. "On the Value of Privacy from Telemarketing: Evidence from the 'Do Not Call' Registry," available at SSRN: http://ssrn.com/abstract=1000533

Rose, E., 2005. "Data Users versus Data Subjects: Are Consumers Willing to Pay for Property Rights to Personal Information?" *Proceedings of the 38th Hawaii International Conference on System Sciences*.

Rubin, P.H. and T. M. Lenard, 2002. *Privacy and the Commercial Use of Personal Information.* The Progress & Freedom Foundation, Washington, DC, USA.

Samuelson, W. and R. Zeckhauser, 1988. "Status Quo Bias In Decision Making," Journal of Risk and Uncertainty, 1, 7-59.

Schwarz, N., 1999. "Self-reports: How the questions shape the answers," *American Psychologist*, 54(2), 93-105.

Sheehan, K.B., 1999. "An Investigation of Gender Differences in On-Line Privacy Concerns And Resultant Behaviors," *Journal of Interactive Marketing* 13(4), 24-38.

Sheehan, K.B., 2002."Toward a typology of Internet users and online privacy concerns," The Information Society, 18(1), 21-32.

Spiekermann, S., J. Grossklags, and B. Berendt, 2001. "E-privacy In 2nd Generation E-Commerce: Privacy Preferences Versus Actual Behavior." *Proceedings of the ACM Conference on Electronic Commerce*, 38–47.

Thaler, R. 1980. "Toward A Positive Theory Of Consumer Choice," *Journal of Economic Behavior & Organization*, 1(1), 39-60.

Tsai, J., S. Egelman, L. Cranor, and A. Acquisti, 2011. "The Effect of Online Privacy Information on Purchasing Behavior: An Experimental Study," *Information Systems Research*, forthcoming.

Varian, H.R., F. Wallenberg, and G. Woroch, 2005. "The demographics of the do-not-call list," IEEE Security & Privacy, 3(1), 34-39.

Wathieu, L. and A. Friedman, 2005. "An Empirical Approach to Understanding Privacy Valuation," *Proceedings of the Fourth Workshop on the Economics of Information Security (WEIS '05)*.

APPENDIX

In this Appendix we present additional methodological details about Experiment 1, as well as the materials used in the experiments described in the main manuscript. Note that the definition of the gift cards was consistent within each experiment, but was slightly different across experiments (trackable vs. untrackable, OR identified vs. anonymous), in order to test the robustness of the findings to different (but equivalent) descriptions of the cards.

In Experiment 1, 10 subjects gave contradictory answers to the follow-up valuations questions, and were conservatively excluded from the analysis. In Experiment 2, 18 participants did not complete the follow-up questions, and nine subjects gave irrational or inconsistent answers (i.e., accepting dominated offers and rejecting dominant offers). They were conservatively excluded from the analysis. A separate set of additional follow-up questions was not used in the analysis, since it was not consistently completed by participants.

Appendix A

Experiment 1, Additional methodological details

Experiment 1 took place on three weekend days at a Pittsburgh shopping mall. Female research assistants were located at the entrance of two women's clothing stores and approached female shoppers as they entered, asking them to complete a brief survey. To make the decoy survey realistic, shoppers were told that the survey was meant to assess people's attitudes toward spending money. Interested shoppers were given a coupon valid for a gift card upon completion of a short survey. Coupon redemption and subsequent gift card distribution always took place as subjects exited the store. The two endowed conditions and the $10 choice condition were run during the first weekend. The $12 choice and the control conditions were run the following weekend. There were five different coupons, each corresponding to a study condition (see Appendix A). To avoid making the different conditions salient, the experimenters distributed coupons for a single condition at a time, rotating the coupon type (and therefore the experimental condition) every hour. Our results (and in particular the card selection) were *not* affected by the time of day when the experiment was conducted, the store in front of which subjects were recruited, or whether the unrelated survey was completed before or after entering the store.

After completing the survey and upon exiting the store, each subject gave her coupon to the experimenter, who then asked the subject (regardless of the condition) to print her name at the top of a receipt for the gift card. The experimenter then called the subject by her name, informing her that the coupon was valid for a gift card. Subjects were addressed by their names in order to increase the potency of the privacy-laden gift card value manipulation. Because the $10 and $12 gift cards looked identical, they were each labeled with a small, removable sticker that said either "$10" or "$12", as appropriate. The stickers also enabled each card to be tracked. Each card had a unique card number and security code which were recorded in advance. Each card number was then assigned a unique 3-digit number which was written on the sticky side of the label stickers. Once a subject had selected a gift card, the sticker was removed and stuck onto the receipt. Thus, the sticker validated the receipt amount, while also enabling us

to track every card's purchases (subjects could not notice this, since the information was printed on the reverse, sticky side of the sticker).

Next, the experimenter gave the subject a sheet of paper, noting that it outlined the "features of the card." Experimenters were trained to avoid words such as "tracked" and "privacy" that may have alerted subjects to the purpose of the study. Note that, up until now, subjects across the five conditions had been exposed to the same experience, and all had provided the same amount of personally identifying information to the researchers.

Then, subjects in the endowed conditions were given a sheet that described the features of the card with which they were to be endowed. The subject then selected a card from the appropriate bin, be it the $10 or $12 gift card bin. In the $12 endowed, identified condition, the experimenter recorded the card's number and security code on the receipt that also contained the person's name. Next, the experimenter gave the subject a second sheet of paper describing the privacy features of the other, $10 [$12] card. The subject was then asked whether she would like to exchange her $10 anonymous [$12 identified] card for the $12 identified [$10 anonymous] card. If so, she placed her initial card back into the bin from which she had drawn it, and chose a new one from the other bin. For those in the $10 endowed condition who exchanged their card, the experimenter recorded the card number and security code of the new, $12 identified card. In the *choice* conditions, subjects were only presented with one description sheet that listed and described both cards, one after the other, with order of description presentation manipulated between-subjects. Subjects then indicated which card they would like, and selected their card from the appropriate bin. The experimenter recorded the card number and security code for those who chose the $12 identified card. Once the subject had made her card choice, the experimenter peeled off the sticker label (also containing the link to the card's number on the sticky side) and stuck it on the receipt. The subject then signed to indicate that she had indeed received the gift card in the value indicated on the sticker. Subjects were then asked to provide their email address.

Appendix B

Experiment 1, Receipts – Choice condition

Date

Name (*Please Print Clearly*): _____

*****Please stop and wait for experimenter instructions!*****

****

I received a $ ◯ Visa Card in a study managed by Cynthia Cryder and Rachelle Emard.

I also agree to the following terms

1) I will not participate in this study a second time, including at other locations in the mall
2) I will not tell other potential shoppers about the opportunity to participate in this study and earn the gift card. I understand that the researchers are trying to observe natural shopping behavior and that encouraging others to participate who would not otherwise come to this store would ruin their efforts.

Signature _____

As a token of appreciation for participating in this study, we would like to give you a gift card. Please select one of the two options below:

**Please Note: Both gift cards can be used *anywhere credit cards are accepted*. (i.e. you are not restricted to using it at Ross Park mall).

☐ **Anonymous $10 gift card.** Your name *will not* be linked to the transactions completed with this card. If you choose this option, you will pick a gift card at random and we will not record the number of your specific card.

☐ **Identified $12 gift card.** Your name *will* be linked to the transactions completed with this card. If you choose this option, we will record your name and the number of your specific card along with your transactions. Card number: _____

Would you be willing to participate in future online surveys that we conduct?

- ☐ No
- ☐ Yes → Please write your e-mail address here:
  _____

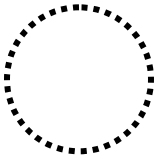
Experiment 1, Receipts – $10 Endowment condition

Date

Name (*Please Print Clearly*): _____

*****Please stop and wait for experimenter instructions!*****

****

I received a $  Visa Card in a study managed by Cynthia Cryder and Rachelle Emard.

I also agree to the following terms

3) I will not participate in this study a second time, including at other locations in the mall
4) I will not tell other potential shoppers about the opportunity to participate in this study and earn the gift card. I understand that the researchers are trying to observe natural shopping behavior and that encouraging others to participate who would not otherwise come to this store would ruin their efforts.

Signature _____

As a token of appreciation for participating in this study, we would like to give you a **Anonymous $10 gift card**. Your name *will not* be linked to the transactions completed with this card. Therefore, you will pick a card at random and we will not record the number of your specific card.

The card can be used *anywhere credit cards are accepted*. (i.e. you are not restricted to using it at Ross Park mall).

After you have selected a card, please go to the next page.

Now, we would like to give you the opportunity to exchange this card for a card with a different value and different features:

Identified $12 gift card: Your name *will* be linked to the transactions completed with this card. If you choose this option, we will record your name and the number of your specific card along with your transactions.

**Please Note: Both gift cards can be used *anywhere credit cards are accepted*. (i.e. you are not restricted to using either one at Ross Park mall).

Please make your selection:

☐ I would like to *keep* the $10 Anonymous gift card

☐ I would like to *exchange* the $10 Anonymous gift card for the $12 Identified gift card.
Card Number: _____

Would you be willing to participate in future online surveys that we conduct?

- ☐ No
- ☐ Yes → Please write your e-mail address here:
  _____

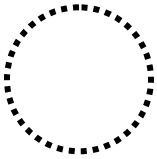
Experiment 1, Receipts - $12 Endowment conditions

Date

Name (*Please Print Clearly*): _____

*****Please stop and wait for experimenter instructions!*****

****

I received a $  Visa Card in a study managed by Cynthia Cryder and Rachelle Emard.

I also agree to the following terms

5) I will not participate in this study a second time, including at other locations in the mall
6) I will not tell other potential shoppers about the opportunity to participate in this study and earn the gift card. I understand that the researchers are trying to observe natural shopping behavior and that encouraging others to participate who would not otherwise come to this store would ruin their efforts.

Signature _____

As a token of appreciation for participating in this study, we would like to give you a **Identified $12 gift card**. Your name *will* be linked to the transactions completed with this card. Therefore, we will record your name and the number of your specific card along with your transactions.

Card Number: _____

The card can be used *anywhere credit cards are accepted*. (i.e. you are not restricted to using it at Ross Park mall).

After you have selected a card, and the experimenter has recorded the number of your card, please go to the next page.

Now, we would like to give you the opportunity to exchange this card for a card with a different value and different features:

Anonymous $10 gift card. Your name *will not* be linked to the transactions completed with this card. If you choose this option, you will pick a gift card at random and we will not record the number of your specific card.

**Please Note: Both gift cards can be used *anywhere credit cards are accepted*. (i.e. you are not restricted to using either one at Ross Park mall).

Please make your selection:

☐ I would like to *keep* the $12 Identified gift card.

☐ I would like to *exchange* the $12 Identified gift card for the $10 Anonymous gift card.

Would you be willing to participate in future online surveys that we conduct?

- ☐ No
- ☐ Yes → Please write your e-mail address here:
  _____

Appendix C

Experiment 2, Condition [WTA/Δ2]

Imagine that you received a VISA gift card as payment for participating in a research study. You can use the card at any store of your choice. It is worth $10 and it is an anonymous card: your name will not be linked to the transactions completed with this card, and its usage will not be tracked by the researchers. The card is shown below:

Card Value: $10

However, the researchers give you the option to exchange your card for a $12 card which is identified: your name will be linked to the transactions completed with that card and its usage will be tracked by the researchers. **Would you like to exchange the $10 card whose usage will not be tracked for the $12 card whose usage will be tracked?**

Select one:

Keep the $10 card whose usage will not be tracked: ____

or

Exchange for the $12 card whose usage will be tracked: ____

If, on the first page, you chose to *keep* the $10 card that will not be tracked, please answer ALL the questions on this page:
(if you chose to exchange, please skip to the next page =>)

Would you have also **kept** the card you were originally given if…

if it had been a $9.75 card that will not be tracked?	no___ yes___
if it had been a $9.50 card that will not be tracked?	no___ yes___
if it had been a $9.25 card that will not be tracked?	no___ yes___
if it had been a $9 card that will not be tracked?	no___ yes___
if it had been a $8 card that will not be tracked?	no___ yes___
if it had been a $5 card that will not be tracked?	no___ yes___
if it had been a $1 card that will not be tracked?	no___ yes___

If, on the first page, you chose to *exchange* the $10 card for the $12 card that will be tracked, please answer ALL the questions on this page:

Would you have also **exchanged** the card you were originally given for…

for a $11.75 card that will be tracked?	no___ yes___
for a $11.50 card that will be tracked?	no___ yes___
for a $11.25 card that will be tracked?	no___ yes___
for a $11 card that will be tracked?	no___ yes___
for a $10.75 card that will be tracked?	no___ yes___
for a $10.50 card that will be tracked?	no___ yes___
for a $10.25 card that will be tracked?	no___ yes___

Experiment 2, Condition [WTP/Δ2]

Imagine that you received a VISA gift card as payment for participating in a research study. You can use the card at any store of your choice. It is worth $12 and it is an identified card: your name will be linked to the transactions completed with this card, and its usage will be tracked by the researchers. The card is shown below:

Card Value: $12

However, the researchers give you the option to exchange your card for a $10 card which is anonymous: your name will not be linked to the transactions completed with that card and its usage will not be tracked by the researchers. **Would you like to exchange the $12 card whose usage will be tracked for the $10 card whose usage will not be tracked?**

Select one:

Keep the $12 card whose usage will be tracked: ____

or

Exchange for the $10 card whose usage will not be tracked: ____

If, on the first page, you chose to *keep* the $12 card that will be tracked, please answer ALL the questions on this page:
(if you chose to exchange, please skip to the next page =>)

Would you have also **kept** the card you were originally given if…

if it had been a $11.75 card that will be tracked?	no___ yes___
if it had been a $11.50 card that will be tracked?	no___ yes___
if it had been a $11.25 card that will be tracked?	no___ yes___
if it had been a $11 card that will be tracked?	no___ yes___
if it had been a $10.75 card that will be tracked?	no___ yes___
if it had been a $10.50 card that will be tracked?	no___ yes___
if it had been a $10.25 card that will be tracked?	no___ yes___

If, on the first page, you chose to *exchange* the $12 card for the $10 card that will not be tracked, please answer ALL the questions on this page:

Would you have also **exchanged** the card you were originally given for…

for a $9.75 card that will not be tracked?	no___ yes___
for a $9.50 card that will not be tracked?	no___ yes___
for a $9.25 card that will not be tracked?	no___ yes___
for a $9 card that will not be tracked?	no___ yes___
for a $8 card that will not be tracked?	no___ yes___
for a $5 card that will not be tracked?	no___ yes___
for a $1 card that will not be tracked?	no___ yes___

Experiment 2, Condition [WTA/Δ4]

Imagine that you received a VISA gift card as payment for participating in a research study. You can use the card at any store of your choice. It is worth $10 and it is an anonymous card: your name will not be linked to the transactions completed with this card, and its usage will not be tracked by the researchers. The card is shown below:

Card Value: $10

However, the researchers give you the option to exchange your card for a $14 card which is identified: your name will be linked to the transactions completed with that card and its usage will be tracked by the researchers. **Would you like to exchange the $10 card whose usage will not be tracked for the $14 card whose usage will be tracked?**

Select one:

Keep the $10 card whose usage will not be tracked: ____

or

Exchange for the $14 card whose usage will be tracked: ____

If, on the first page, you chose to *keep* the $10 card that will not be tracked, please answer ALL the questions on this page:
(if you chose to exchange, please skip to the next page =>)

Would you have also **kept** the card you were originally given if…

if it had been a $9.75 card that will not be tracked?	no___ yes___
if it had been a $9.50 card that will not be tracked?	no___ yes___
if it had been a $9.25 card that will not be tracked?	no___ yes___
if it had been a $9 card that will not be tracked?	no___ yes___
if it had been a $8 card that will not be tracked?	no___ yes___
if it had been a $5 card that will not be tracked?	no___ yes___
if it had been a $1 card that will not be tracked?	no___ yes___

If, on the first page, you chose to *exchange* the $10 card for the $14 card that will be tracked, please answer ALL the questions on this page:

Would you have also **exchanged** the card you were originally given for…

for a $13.75 card that will be tracked?	no___ yes___
for a $13.50 card that will be tracked?	no___ yes___
for a $13.25 card that will be tracked?	no___ yes___
for a $13 card that will be tracked?	no___ yes___
for a $12.75 card that will be tracked?	no___ yes___
for a $12.50 card that will be tracked?	no___ yes___
for a $12.25 card that will be tracked?	no___ yes___
for a $12 card that will be tracked?	no___ yes___
for a $11.75 card that will be tracked?	no___ yes___
for a $11.50 card that will be tracked?	no___ yes___
for a $11.25 card that will be tracked?	no___ yes___
for a $11 card that will be tracked?	no___ yes___
for a $10.75 card that will be tracked?	no___ yes___
for a $10.50 card that will be tracked?	no___ yes___
for a $10.25 card that will be tracked?	no___ yes___

Experiment 2, Condition [WTP/Δ4]

Imagine that you received a VISA gift card as payment for participating in a research study. You can use the card at any store of your choice. It is worth $14 and it is an identified card: your name will be linked to the transactions completed with this card, and its usage will be tracked by the researchers. The card is shown below:

Card Value: $14

However, the researchers give you the option to exchange your card for a $10 card which is anonymous: your name will not be linked to the transactions completed with that card and its usage will not be tracked by the researchers. **Would you like to exchange the $14 card whose usage will be tracked for the $10 card whose usage will not be tracked?**

Select one:

Keep the $14 card whose usage will be tracked: ____

or

Exchange for the $10 card whose usage will not be tracked: ____

If, on the first page, you chose to *keep* the $14 card that will be tracked, please answer ALL the questions on this page: *(if you chose to exchange, please skip to the next page =>)*

Would you have also **kept** the card you were originally given if…

if it had been a $13.75 card that will be tracked?	no___ yes___
if it had been a $13.50 card that will be tracked?	no___ yes___
if it had been a $13.25 card that will be tracked?	no___ yes___
if it had been a $13 card that will be tracked?	no___ yes___
if it had been a $12.75 card that will be tracked?	no___ yes___
if it had been a $12.50 card that will be tracked?	no___ yes___
if it had been a $12.25 card that will be tracked?	no___ yes___
if it had been a $12 card that will be tracked?	no___ yes___
if it had been a $11.75 card that will be tracked?	no___ yes___
if it had been a $11.50 card that will be tracked?	no___ yes___
if it had been a $11.25 card that will be tracked?	no___ yes___
if it had been a $11 card that will be tracked?	no___ yes___
if it had been a $10.75 card that will be tracked?	no___ yes___
if it had been a $10.50 card that will be tracked?	no___ yes___
if it had been a $10.25 card that will be tracked?	no___ yes___

If, on the first page, you chose to *exchange* the $14 card for the $10 card that will not be tracked, please answer ALL the questions on this page:

Would you have also **exchanged** the card you were originally given for…

for a $9.75 card that will not be tracked?	no___ yes___
for a $9.50 card that will not be tracked?	no___ yes___
for a $9.25 card that will not be tracked?	no___ yes___
for a $9 card that will not be tracked?	no___ yes___
for a $8 card that will not be tracked?	no___ yes___
for a $5 card that will not be tracked?	no___ yes___
for a $1 card that will not be tracked?	no___ yes___