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**Article**

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Games

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Article

# Generalized Trust, Need for Cognitive Closure, and the Perceived Acceptability of Personal Data Collection

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**Abstract:** This vignette-based study examines how generalized trust and the need for cognitive closure relate to the perceived acceptability of contemporary business methods of personal data collection. Subjects are exposed to four scenarios that describe a method of personal data collection, involving either brand-name companies or generic descriptors of companies. After each scenario, subjects rate how acceptable they find the practice of data collection, along with the frequency and quality of experiences that they have had with the company (for brand names) or type of company (for generic descriptors). Judgments of perceived acceptability are analyzed, both across the portfolio of judgments and within each separate scenario. While analyses of each separate scenario point to the context-dependency of the perceived acceptability of data collection, several results stand out when analyzing the subjects' portfolios of responses in the aggregate. Higher generalized trust is linked to a higher average acceptability rating, and the effect is stronger when companies are described with brand names rather than generic descriptors. Uniformly, however, no relationship is found between need for cognitive closure and perceived acceptability. Additionally, positive experiences are found to be a stronger predictor of perceived acceptability of data collection than frequency of use.

**Keywords:** privacy; trust; personal data; branding; data collection

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## 1. Introduction

With the omnipresent usage of e-commerce and social media, and with the increased reliance of companies and governments on “big data”, there are growing concerns about the ways that personal information is collected and utilized. Both online activities (e.g., social media usage, online shopping, and internet browsing) and offline activities (e.g., shopping with loyalty cards, credit card usage, GPS monitoring, and fitness tracking) involve personal data collection. Moreover, personal data often reflects an implicit payment in order to receive benefits, like the “free” usage of social media and other internet sites, or discounts in stores where customers volunteer to have their usage tracked.

To the extent that it exists, anxiety from data collection is likely to stem from both uncertainty and perceived vulnerability. Once data is collected, consumers face uncertainty regarding how their data will be put to use. They are, therefore, vulnerable to the actions of parties that collect it. Data can be hacked, sold to third parties, or used for practices that range from nefarious (like identity theft) to annoying (like an abundance of unwanted customized advertisements). Anxiety over data collection can pose problems for entities that collect personal data, to the extent that consumers who know of and fear collection avoid such entities [1], and journalists publicize perceived maleficence in data collection, and turn public opinion away from the offenders [2,3].

In light of the potential for feelings of vulnerability and uncertainty to be generated by novel and adapting methods of collecting personal data, it is important to understand how consumers react to

these methods, and what factors affect their reactions. The study presented in this paper uses vignettes to explore the relationship between (1) the perceived acceptability of contemporary business practices that collect and utilize personal data, and (2) two psychological phenomena—generalized trust and the need for cognitive closure—that are commonly measured in social science research, are linked to uncertainty and vulnerability, and have demonstrated social and economic effects. “Generalized trust” refers to a person’s tendency to trust unknown individuals; it can be distinguished from someone’s tendency to trust specific people, organizations, or systems. Since trust involves an exposure to vulnerability [4–8], one could also reasonably conjecture that someone who tends to be generally trusting of other people will be more comfortable sharing personal data. The “need for cognitive closure” (hereafter, NFC), which was popularized by Holmes (2015) [9], is defined as the desire for “an answer on a given topic, any answer . . . compared to confusions and ambiguity” [10]. As described in a recent review article, “NFC represents a motivational tendency whose magnitude is determined by the (perceived) benefits and costs of closure relative to the benefits and costs of lacking closure” [11] (p. 223). Given the connection between the need for closure and an aversion to situations with unknown outcomes, one could reasonably conjecture that someone with a high NFC will be less comfortable with sharing personal data, given that the consequences of doing so are necessarily ambiguous.

Since much earlier research has pointed to the context-dependency of privacy preferences [12–20], this study examines respondents’ perceived acceptability of data collection across a portfolio of scenarios, and links acceptability scores to generalized trust and need for closure scores, as well as to the frequency of use and the quality of experience associated with a company or product. Moreover, in light of a robust connection between trust and the establishment of brand names [21–24], the study also addresses the extent to which the perceived acceptability of data collection is affected by whether companies are identified with a generic descriptor (e.g., a pharmacy chain store or a social media site) or a known brand name (e.g., CVS or Facebook); effects of generalized trust and NFC are also conditioned on whether companies are described with generic descriptors or brand names.

Previewing the results, the study shows that a greater tendency to trust others is linked to greater perceived acceptability of personal data collection, and the effect is strongest when companies are known brands rather than unnamed, non-specific companies. NFC, however, does not affect the perceived acceptability of data collection. Moreover, quality of experience is more likely to be associated with perceived acceptability of data collection, compared to the frequency of use.

## 2. Information Privacy, Trust, and the Need for Closure

The literature examining information privacy is extensive and interdisciplinary; Acquisti et al. (2015) [25], Morando et al. (2014) [26], and Smith et al. (2011) [18] provide general reviews. Given the economic tradeoffs involved with the decision to share personal information, one subset of studies has explored whether, and how much, people are willing to pay for privacy [12,27–31]. While the results of these studies point to privacy having measurable values across individuals, the context-dependence of privacy concerns complicates the view that the value of privacy can be assessed like a more simple good [12–15,17–20,32,33].

In their review of information privacy research, Smith et al. [18] stress the importance of better understanding antecedents to privacy concerns (e.g., personality, demographic, cultural, and experience-driven differences); theoretical frameworks laid out by Bandyopadhyay (2011) [34] and Phelps et al. (2001) [16] reinforce the importance of understanding such antecedents. Age [35], perceptions of vulnerability [36], desire for information control [16,33,36], personality traits [37], social awareness [38], internet literacy [38], gender [39], income [39], and psychology of ownership [40] have all been identified as drivers of privacy concerns. Additionally, several studies have examined the role that trust in particular companies or online communities plays as an antecedent. Chellappa and Sin (2005) [41] find that consumers are more likely to share information with vendors who build up trust through familiarity and experience. Culnan and Armstrong (1999) [42] find that privacy concerns do not predict willingness to share data for targeted advertisements when trust in an organization is

enhanced through the disclosure of fair information practices. Milne and Boza (1999) [43] find that improved trust in a specific industry (e.g., banks, credit card issuers, insurance companies, employers, drugstores) is more effective in encouraging the sharing of information than reducing concern felt toward information sharing in that industry, while Belanger et al. (2002) [44], find that security features matter more to e-commerce consumers than trust indices that are designed to enhance the trustworthiness of specific online marketers. Taylor et al. (2009) [45] find that increased trust in travel websites reduces privacy concerns when using a particular travel website, while Bart et al. (2005) [46] find that the relationship between trust in specific websites and purchase intent is itself context-specific.

While these studies have generated insight into how trust in particular entities affects privacy concerns, generalized trust, to my knowledge, has not been explored as an antecedent to privacy concerns. A great deal of research, however, has identified connections between generalized trust and important economic variables; higher levels of generalized trust have been linked to higher GDP growth [47–50], lower inflation [51], more trade [52–55], less corruption [56], greater stock market participation [57,58], more venture capital investment [52], more foreign direct investment [52,55], and more volunteering/charity [59]. Schudy and Utikal (2017) [17], while not studying generalized trust, explore the relationship between privacy concerns and social distance. They find that willingness to share personal data does not depend on social distance, as participants' willingness to share data is unaffected by whether the recipients of the data live in the same or a different city. Given that generalized trust has been found to decrease as social distance increases [50,60,61], this result may point to an absence of a relationship between generalized trust and privacy concerns.

As described by Webster and Kruglanski (1994) [62], NFC as a stable individual trait manifests in a preference for order and structure, discomfort with ambiguity, decisiveness, a preference for predictability, and closed-mindedness. A high NFC has been linked to inhibited acculturation in a foreign country in the presence of strong co-ethnic ties in that country [63,64], in-group favoritism [65,66], nationalism [67], less creativity [68], stronger preferences for conflict [69], cultural conformity [70], difficulty coping with organizational change [71], and greater reliance on heuristics [72,73]. While need for closure has not been studied in consumer contexts extensively, there are some relevant earlier findings. In a purchasing experiment run by Vermeir et al. (2002) [74], high-NFC people rely more on decision rules and seek more product information prior to forming a decision rule, and less information afterwards; in another experiment, Vermeir and Van Kenhove (2005) [75] find that NFC affects search efforts for prices and promotions. Disatnik and Steinhart (2015) [76] find that a high NFC is associated with an unwillingness to update one's investment portfolio, due to a lack of openness to new information. Jung and Kellaris (2004) [77] find that consumers with a high NFC are more likely to have their purchasing decisions affected by perceptions of a good's scarcity. Amichai-Hamburger et al. (2004) [78] find that, when free to browse at their preferred pace, people with a high NFC prefer websites with fewer hyperlinks. While NFC has not previously been linked to privacy concerns, Acquisti et al. (2015) [25] and Acquisti et al. (2016) [79] have highlighted the inherent uncertainty involved with sharing personal information. Given constantly evolving information technology, people often do not understand what personal information is being collected, and what the ultimate consequences of that data collection will be. It is natural, therefore, to wonder to what extent the acceptance of data collection relates to one's comfort with making decisions that have ambiguous outcomes.

A final subset of the literature that is worth considering involves examinations of the "privacy paradox" [80], a term used to describe the tendency for revealed behaviors to not match stated privacy concerns. While several studies have identified a privacy paradox [31,40,80–84], other studies have found a connection between expressed preferences or concerns and revealed behaviors [85–87]. Moreover, as noted by Acquisti et al. (2016) [79], differences between expressed preferences for privacy and revealed behavior may result from the context-dependence of privacy preferences.

The study presented in this paper neither measures purchasing behavior nor asks whether examples of data collection would affect purchasing decisions; it instead asks whether respondents

find particular practices, which are common in commerce and symptomatic of the types of approaches that businesses use, to be acceptable. It seems reasonable to assume that the perception that a particular company is behaving unacceptably would increase the chances that a consumer purchases from a competitor. Moreover, given the likelihood that practices that are considered to be unacceptable will be publicized and have an adverse effect on a company's public relations, how observers feel about the practice, above and beyond whether specific individuals are likely to act out their stated concerns through their purchasing behavior, provides valuable information.

### 3. Methods and Design

Only people living in the United States were eligible to participate in the study. Participants were recruited and paid through Amazon Mechanical Turk (MTurk), an online platform for connecting suppliers and demanders of simple labor tasks. After agreeing to participate on the MTurk website, respondents were directed to a Qualtrics survey that implemented the study. After completing the study, participants received a completion code that had to be entered into the MTurk website to allow payment. MTurk workers have been found to be more representative than typical convenience samples that tend to be used in academic research [88–90]. MTurk samples have also consistently replicated established findings from the psychology literature [88,91,92].

The study includes four scenarios (social media, car insurance, pharmacy, and electronic payment) whose word-for-word descriptions are provided in Table 1. At the start of the study, after providing informed consent and indicating how many Mechanical Turk assignments they complete in a typical week<sup>1</sup>, respondents are assigned to either the generic or brand condition, which determines whether the data-collection scenarios describe generic companies or specific, known brands. The second and third columns of Table 1 distinguish, in bold font, the differences across the generic and brand conditions. For the social media/Facebook scenario, the site is collecting users' browsing activity, using it to customize advertisements, and hiding notification of the practice in a long statement of terms and conditions that users seldom read. The car insurance/Geico scenario, which is a modified version of a vignette used in a Pew survey [93], describes a company offering a discount to drivers who voluntarily place a device on their car that monitors driving speed and location; further discounts may be given depending on the data that are collected. In the pharmacy/CVS scenario, the store is offering a free loyalty card that saves customers money, but also keeps track of shopping habits and sells the data to third parties. Finally, in the electronic payment/Venmo scenario, the service allows users to transfer money electronically with a default setting that makes purchases public and accessible to other users; users can change their settings, but the process is time-consuming and complicated.

Each scenario was presented as part of a block of stimuli, with the block including the scenario and three follow-up questions. The order that the blocks were presented was randomly determined, but the same sequence of stimuli, shown in Table 2, was presented for each block. First, respondents read the scenario and rated how acceptable they found the method of data collection to be. Second, they responded to a comprehension check that simply asked them to indicate, with a multiple-choice question, the type of company that was described in the vignette. It was determined, a priori, that all responses from anyone who answered one of these questions incorrectly would be omitted from the data analysis. Third, respondents indicated how frequently, using a five-point scale that ranged from "never" to "very frequently," they have used or interacted with the company (if presented with a brand) or the type of company (if presented with a generic company). Finally, respondents rated the quality of their experience with the company or type of company on a 0–100 scale that allowed a "not applicable" option if they had no experience. These tests for frequency of use and experience

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<sup>1</sup> Responses to this question were collected in order to determine whether participants with more experience were more or less likely to possess certain attitudes toward the collection of personal data. Results uniformly show no relationship between MTurk experience and attitudes toward data collection.

rating allow an examination of how personal history with a company or type of company affects the perceived acceptability of data collection.

**Table 1.** Scenarios presented word-for-word.

Scenario	Generic Condition	Modification with Branding
Social media	Suppose that a <b>social media site</b> earns income by selling information about users' browsing activity to advertisers. Advertisers then use this information to deliver ads that they think will appeal to each user.	Facebook
	When signing up, <b>users</b> agree to this condition as part of a long statement of the site's terms and conditions, which very few users take the time to carefully read.	Facebook users
Car insurance	Suppose that a <b>car insurance company</b> is offering a discount to drivers who agree to place a device on their car that allows monitoring of their driving speed and location.	Geico, the insurance company
	After <b>the company</b> collects data about customers' driving habits, it may offer them further discounts to reward them for safe driving.	Geico
Pharmacy	Suppose that a <b>pharmacy chain store</b> is offering customers a free loyalty card that will save them money on their purchases.	CVS, the pharmacy chain store
	In exchange, <b>the pharmacy</b> will keep track of customers' shopping habits and sell the data to third parties.	CVS
Electronic payment	Suppose that a <b>service that allows users to transfer money electronically</b> has a default setting that causes users' purchases to be made public and accessible to other users of the service.	Venmo, a service that allows users to transfer money electronically
	Users can change their privacy settings, but the process is time-consuming and complicated.	

**Table 2.** Scenarios and follow-up questions (repeated for each scenario).

Order	1.	2.	3.	4.
<b>Information presented</b>	Scenario	Comprehension check	Measure of frequency of use	Measure of negative or positive experience
<b>Wording</b>	Descriptions from Table 1	"Who was collecting data from users?"	"On the scale below, indicate how frequently you use . . . "	"Using a scale that ranges from 0 to 100, with 0 being extremely negative and 100 being extremely positive, indicate how you would rate your experience with . . . If you do not have experience, select 'Not Applicable.'"
<b>Type of response</b>	Select "completely unacceptable," "somewhat unacceptable," "somewhat acceptable" or "completely acceptable."	Multiple-choice question	Select "never," "very infrequently," "somewhat infrequently," "somewhat frequently" or "very frequently."	Sliding scale between 0–100, or select "not applicable."

Following the presentation of the four blocks of scenarios and questions, respondents saw a series of questions, whose answers were used to generate trust and NFC scores. All trust questions were presented as one block, while all NFC questions were presented as a second block; the order that respondents saw these two blocks, as well as the sequence of questions within each block, was randomly determined. A six-question generalized trust scale, created by Yamagishi and Yamagishi (1994) [94], was used to generate trust scores. Each question, listed in Table 3, required a response on a five-point Likert scale that ranged from "strongly disagree" to "strongly agree", with agreement indicating a tendency to trust. Numbering these choices from 1–5, respondents' trust scores were simply the sum total of their responses to these six questions. An abridged 15-question NFC scale, developed



and tested by Roets and Van Hiel (2010) [95], was used to generate NFC scores.<sup>2</sup> These questions, also listed in Table 3, required responses on a six-point Likert scale that ranged from “completely disagree” to “completely agree”, with agreement indicating a high NFC. Numbering these choices from 1–6, respondents’ NFC scores were simply the sum total of their responses to these 16 questions.

**Table 3.** Trust and need-for-closure questions.

Trust Questions	Response
1. Most people are basically honest.	Select “strongly disagree,” “disagree,” “neutral,” “agree” or “strongly agree.”
2. Most people are trustworthy.	
3. Most people are basically good and kind.	
4. Most people are trustful of others.	
5. I am trustful.	
6. Most people will respond in kind when they are trusted by others.	
Need-for-closure questions	
1. I don’t like situations that are uncertain.	Select “completely disagree,” “disagree,” “somewhat disagree,” “somewhat agree,” “agree” or “strongly agree.”
2. I dislike questions which could be answered in many different ways.	
3. I find that a well ordered life with regular hours suits my temperament.	
4. I feel uncomfortable when I don’t understand the reason why an event occurred in my life.	
5. I feel irritated when one person disagrees with what everyone else in a group believes.	
6. I don’t like to go into a situation without knowing what I can expect from it.	
7. When I have made a decision, I feel relieved.	
8. When I am confronted with a problem, I’m dying to reach a solution very quickly.	
9. I would quickly become impatient and irritated if I would not find a solution to a problem immediately.	
10. I don’t like to be with people who are capable of unexpected actions.	
11. I dislike it when a person’s statement could mean many different things.	
12. I find that establishing a consistent routine enables me to enjoy life more.	
13. I enjoy having a clear and structured mode of life.	
14. I do not usually consult many different opinions before forming my own view.	
15. I dislike unpredictable situations.	

The last set of questions gathered demographic information that included age, gender, income, education, and political orientation. The age of respondents ranged from 18 to 84, with the average age being 34.7. Of the 1214 respondents used in the analysis, 684 identified as male (56.3 percent), 523 identified as female (43.1 percent), and 7 (0.58%) identified as other. With respect to income, 15.4 percent of respondents reported earning an annual income above \$66,000, while 66.8% earned an annual income below \$48,000 and 42.9% earned an annual income below \$30,000. With respect to education, 77.8 percent of respondents had some college experience, while 43.1 percent were college graduates. For political preferences, 57.2 percent of subjects identified as liberal (extremely liberal, liberal, or slightly liberal), 21.6 percent identified as conservative (extremely conservative, conservative, or slightly conservative), 18.6 percent identified as middle of the road, and 2.6 percent specified that their views cannot be categorized along the liberal–conservative spectrum.

Finally, at the conclusion of the study, respondents were provided with debriefing information, which summarized the goal of the study, and were given a confirmation code to ensure payment. They were paid \$0.50 for completing the study, which took an average of 6 min and 59 s. No other measures, aside from those described above, were elicited from participants. As a result, the analysis below includes all elicited measures rather than a selective sample.

#### 4. Results

A total of 1314 respondents completed the study, and 100 observations were omitted from the analysis, due to there being at least one error on the comprehension checks.<sup>3</sup> The generic version included a total of 601 responses, while the brand version included 613. Means and standard deviations of acceptability ratings for each scenario, as well as overall across all of the scenarios, are presented in Table 4. Statistics are presented separately for the generic and brand versions of the vignettes. Within

<sup>2</sup> Roets and Van Hiel (2010) [95] revised the 42-question scale derived by Webster and Kruglanski (1994) [62].

<sup>3</sup> Results do not substantively change when these 100 observations are also included in the analysis.

each scenario, the perceived acceptability of data collection is greater when companies are identified with brands, but *t*-statistics that compare brand and generic mean ratings in the table's rightmost column show that differences between generic and brand responses—both overall and for each specific scenario—are not statistically significant. The results show that respondents, on average, found the electronic payment's default condition of sharing information to be the most problematic example (mean ratings of 1.31 and 1.35 for generic and brand versions, respectively), while the car insurance company's offer to let them track driving habits was found to be the least problematic (mean ratings of 3.02 and 3.03 for generic and brand versions, respectively).

**Table 4.** Descriptive statistics (two-tailed *t*-tests comparing responses across generic and brand conditions).

Scenario	Company Type *	Mean Rating #	Standard Deviation	Two-Tailed <i>t</i> -Test
All Combined	Generic	2.19	0.56	<i>t</i> = 1.11
	Brand	2.23	0.57	<i>p</i> = 0.27
Social media	Generic	2.17	0.89	<i>t</i> = 0.35
	Brand	2.19	0.88	<i>p</i> = 0.73
Car insurance	Generic	3.02	0.97	<i>t</i> = 0.20
	Brand	3.03	0.98	<i>p</i> = 0.84
Pharmacy	Generic	2.27	0.92	<i>t</i> = 1.38
	Brand	2.34	0.92	<i>p</i> = 0.17
Electronic payment	Generic	1.31	0.60	<i>t</i> = 1.10
	Brand	1.35	0.70	<i>p</i> = 0.27

\* All scenarios in the generic (brand) version included 601 (613) respondents; # Acceptability ratings range from 1 (completely unacceptable) to 4 (completely acceptable).

Table 5 presents results from ordinary least squares (OLS) regressions that use the average acceptability rating across the four scenarios as the dependent variable. Each individual participant is treated as one observation, with their average acceptability score across the four scenarios being regressed on subsets of person-specific measures that vary across the different specifications. OLS regression is used because the average acceptability score is treated as a continuous variable. The first specification regresses each respondent's average acceptability rating on a binary independent variable that is set equal to 1 for responses to the brand version, a trust score that totals the responses to the six trust questions, and an NFC score that totals the responses to the 15 NFC questions. A second specification adds demographic information and the number of Mechanical Turk tasks completed in a typical week. The third specification adds variables for positive experience count (the number of scenarios with which a respondent reports having a positive experience<sup>4</sup>) and frequent use score (the sum total of Likert responses on the 1–5 scale across the four measures of frequency of use). These variables are included, in order to see how they affect the perceived acceptability of data collection, as well as to examine whether any identified effects remain when these variables relating to personal histories are controlled for. A fourth specification adds interactions between (1) the brand binary variable and the individual's trust score, and (2) the brand binary variable and the individual's need-for-closure score.

<sup>4</sup> A positive experience was set equal to 1 if the response to the measure of negative or positive experience was greater than 50, and the "positive experience count" variable totaled the number of positive experiences that each respondent reported. Due to the possibility that respondents might have no experience with a particular company (or type of company), it was not possible to derive a continuous score for positive or negative experiences. All reported results are robust to alternative thresholds for defining positive experiences of 60 and 75.



**Table 5.** Ordinary least squares regressions for all scenarios, with brand scenarios and generic scenarios merged.

VARIABLES	(1)	(2)	(3)	(4)
	Acceptability Score	Acceptability Score	Acceptability Score	Acceptability Score
Brand Version	0.0360 (0.0322)	0.0393 (0.0314)	0.177 *** (0.0379)	0.0806 (0.262)
Trust Score	0.0145 *** (0.00425)	0.0169 *** (0.00428)	0.0120 *** (0.00427)	0.00825 (0.00548)
NFC Score	0.000122 (0.00160)	0.000164 (0.00156)	$7.68 \times 10^{-5}$ (0.00150)	0.000595 (0.00216)
Trust X Brand				0.00763 (0.00825)
NFC X Brand				−0.00108 (0.00302)
Positive Experience Count			0.0926 *** (0.0179)	0.0936 *** (0.0179)
Frequent Use Score			0.0118 (0.00772)	0.0112 (0.00771)
Male		0.0864 *** (0.0320)	0.0992 *** (0.0314)	0.0978 *** (0.0315)
Age		−0.00950 *** (0.00135)	−0.00919 *** (0.00131)	−0.00922 *** (0.00132)
College Grad		−0.0133 (0.0333)	−0.0184 (0.0329)	−0.0205 (0.0331)
Income < \$30,000		−0.0499 (0.0337)	−0.0102 (0.0336)	−0.00980 (0.0337)
Liberal		−0.0453 (0.0327)	−0.0455 (0.0321)	−0.0466 (0.0325)
MTurk Experience		$-2.79 \times 10^{-7}$ ( $3.24 \times 10^{-5}$ )	$-4.67 \times 10^{-7}$ ( $3.05 \times 10^{-5}$ )	$3.58 \times 10^{-7}$ ( $3.06 \times 10^{-5}$ )
Constant	1.884 *** (0.139)	2.164 *** (0.146)	1.818 *** (0.166)	1.875 *** (0.215)
Observations	1214	1214	1214	1214
R-squared	0.012	0.060	0.102	0.103

Robust standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 6 provides separate OLS regressions that test the second and third specifications from Table 5 separately for generic (specifications one and two) and brand (specifications three and four) versions. Specifications one and three of Table 6 (like specification two of Table 5) omit positive experience count and frequent use score; specifications two and four of Table 6 (like specification three of Table 5) include them. This analysis is conducted in order to more fully explore how the existence of known brand names affects relationships between the perceived acceptability of data collection and the other variables.

**Table 6.** Separate regressions for generic and brand scenarios.

VARIABLES	(1)	(2)	(3)	(4)
	Acceptability Score: Generics	Acceptability Score: Generics	Acceptability Score: Brands	Acceptability Score: Brands
Trust Score	0.0129 ** (0.00576)	0.00798 (0.00559)	0.0203 *** (0.00650)	0.0159 ** (0.00657)
NFC Score	0.000414 (0.00230)	0.000527 (0.00216)	$7.52 \times 10^{-5}$ (0.00215)	-0.000227 (0.00212)
Positive Experience Count		0.103 *** (0.0226)		0.0847 *** (0.0301)
Frequent Use Score		0.0165 (0.0104)		0.00741 (0.0120)
Male	0.0827 * (0.0453)	0.110 ** (0.0446)	0.0844 * (0.0455)	0.0870 * (0.0449)
Age	-0.00935 *** (0.00187)	-0.00996 *** (0.00178)	-0.00976 *** (0.00195)	-0.00874 *** (0.00192)
College Grad	-0.0628 (0.0456)	-0.0663 (0.0450)	0.0318 (0.0496)	0.0275 (0.0492)
Income < \$30,000	-0.0472 (0.0469)	-0.0161 (0.0466)	-0.0528 (0.0486)	-0.00739 (0.0488)
Liberal	-0.0657 (0.0466)	-0.0625 (0.0453)	-0.0267 (0.0472)	-0.0319 (0.0466)
MTurk Experience	$-9.07 \times 10^{-7}$ ( $4.70 \times 10^{-5}$ )	$-1.44 \times 10^{-5}$ ( $4.58 \times 10^{-5}$ )	$5.00 \times 10^{-7}$ ( $4.62 \times 10^{-5}$ )	$1.47 \times 10^{-5}$ ( $4.24 \times 10^{-5}$ )
Constant	2.266 *** (0.213)	1.847 *** (0.241)	2.111 *** (0.199)	1.943 *** (0.218)
Observations	601	601	613	613
R-squared	0.059	0.117	0.066	0.094

Robust standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Five results are organized and described below.

Result 1: Analyzing the portfolio of scenarios, generalized trust is associated with a greater perceived acceptability of personal data collection, while the need for closure shows no connection to perceived acceptability.

Specifications one through three of Table 5 show that, when pooling the generic and brand versions and controlling for the existence of brands, the relationship between generalized trust and the perceived acceptability of data collection is positive and significant.<sup>5</sup> In specification three, which controls for positive experiences and frequency of use, a one-unit increase in a respondent's trust score is associated with an increase of 0.012 in average acceptability rating ( $p = 0.005$ ). To quantify the magnitude of this effect, a 1-standard-deviation increase in trust score is associated with an increase in average acceptability score of 0.088 standard deviations. In contrast, however, there is no relationship between a respondent's NFC and average acceptability rating ( $p = 0.96$  in specification three of Table 5).<sup>6</sup>

<sup>5</sup> Variance inflation factors across all specifications are insignificant for all variables, except for interactions, indicating that there are no issues with multicollinearity in the analysis.

<sup>6</sup> Additional regressions, which are omitted for the sake of brevity, included specifications that added interactions between (1) NFC and frequency of use, and (2) NFC and the number of positive experiences. Given an earlier finding that NFC leads to more information seeking when initial confidence is low, but not when initial confidence is high [96], these interactions were tested in order to determine if one's NFC had differential effects depending on whether respondents had frequent or positive experiences with the product/company. NFC was found to have no effect on perceived acceptability, regardless of respondents' frequency of use or quality of experiences.

Result 2: The relationship between trust and the perceived acceptability of personal data collection is stronger when the companies are known brands.

When adding an interaction between brands and trust score in specification four of Table 5, neither the coefficient on the trust score nor the coefficient on the interaction between brands and trust is significant ( $p = 0.133$  for trust score;  $p = 0.355$  for brand  $\times$  trust score). The analysis that merges trust and generic conditions, however, masks relationships between generalized trust and branding that emerge when the brand and generic conditions are analyzed separately. Table 6, which provides separate regressions for the generic and brand versions, shows that the relationship between generalized trust and the perceived acceptability of generic companies' data collection is only significant when positive experience and frequency of use are not controlled for. In the specification for the generic version that controls for these personal history variables, a unit increase in a respondent's trust is associated with only a 0.008 increase in the average acceptability rating ( $p = 0.15$ ). Quantifying the magnitude of this effect, when company descriptions are generic, a 1-standard-deviation increase in trust score is associated with an increase in average acceptability score of 0.059 standard deviations. Specifications three and four, however, show that the relationship between generalized trust and the perceived acceptability of brand-name companies' data collection is significant, regardless of whether the personal history variables are controlled for. When controlling for personal history variables in specification five, a unit increase in a respondent's trust score is associated with an increase of 0.016 in the average acceptability rating ( $p = 0.016$ ). Quantifying this effect, a 1-standard-deviation increase in trust score is associated with an increase in average acceptability score of 0.118 standard deviations. It can therefore be concluded that the relationship between generalized trust and the perceived acceptability of data collection is roughly twice as large when known brands are collecting data, compared to when nameless companies are doing it.

Result 3: Positive experiences show a stronger relationship with the perceived acceptability of data collection than frequency of use.

Across both the pooled regressions presented in Table 5 and the separate regressions for generic and brand versions in Table 6, an additional positive experience with a company or type of company is associated with a significant increase in average acceptability rating ( $p < 0.01$  across the four specifications that test the variable across Tables 5 and 6); an increase in the frequent use score shows no significant association ( $p > 0.11$  across the four regressions). To further quantify these effects, using the results from specification three in Table 5, a 1-standard-deviation increase in positive experience count (frequent use score) is associated with a 0.198 (0.064) standard deviation increase in the average acceptability rating.

Additional evidence of the greater importance of positive experiences compared to frequent use is provided across Tables 7 and 8, which present results from eight logistic regressions—one for each scenario, both generic and brand versions. In these regressions, since each scenario is examined separately, the dependent variable is set equal to one if the respondent found the method of collecting data in the particular scenario to be completely acceptable or acceptable. Without having to pool variables across multiple responses, these regressions include a "frequent use" binary variable that is set equal to 1 if the respondent, for the particular scenario, reports using the product somewhat frequently or very frequently. A "positive experience" variable is set equal to 1 if the respondent rates the quality of experience with that particular company/type of company above 50 on the 1–100 scale<sup>7</sup>; a "no experience" variable is set equal to 1 if the respondent selects "not applicable" on the quality of experience scale. Table 7 includes the two scenarios, with generic companies and brand names, that describe data collection by an entity whose business does not fundamentally involve the Internet (car insurance and pharmacies); Table 8 includes the two scenarios that describe data collection that

<sup>7</sup> Results remain substantively unchanged when 60 or 75 are used as alternative thresholds for defining a positive experience.

takes place over the internet (social media and electronic payments). In these regressions, whose coefficients are presented in terms of odds ratios, the positive experience variable is associated with a significant ( $p < 0.05$ ) increase in the likelihood that a respondent finds data collection to be acceptable for all scenarios, except for the generic and brand versions of the e-pay/Venmo scenario. In contrast, the odds ratio attached to the frequent use variable, while greater than 1 across all eight regressions, meets the same threshold for statistical significance only for the scenarios that describe data collection done by CVS or a nameless social media company.

Result 4: Out of the demographic variables, only age and gender affect the perceived acceptability of data collection.

Across Tables 5 and 6, consistent with Hoofnagle et al. (2010) [35], the coefficient on age is consistently negative ( $p < 0.01$ ), indicating that older individuals are less likely to find examples of data collection to be acceptable. To quantify the magnitude of this effect, a 1-standard-deviation increase in age (which corresponds to 11.54 additional years of age), is associated with a 0.184 standard deviation increase in the average acceptability rating, an effect that is slightly more than twice as large as the effect of a 1-standard-deviation change in generalized trust addressed in Result 1 (0.088). Regarding gender, while significance levels vary across specifications, males consistently show an increased likelihood of finding data collection to be acceptable. Using the coefficient from specification three in Table 5, identifying as male is associated with a 0.176 standard deviation increase in the average acceptability rating.

**Table 7.** Logistic regressions for scenarios involving non-online interactions (coefficients presented as odds ratios).

VARIABLES	(1)	(2)	(3)	(4)
	Car Insurance Acceptable?	Geico Acceptable?	Pharmacy Acceptable?	CVS Acceptable?
Trust Score	0.983 (0.0251)	1.016 (0.0234)	1.015 (0.0208)	1.024 (0.0220)
NFC Score	1.001 (0.00908)	0.996 (0.00918)	0.995 (0.00769)	1.007 (0.00802)
Frequent Use	1.515 * (0.358)	0.585 * (0.177)	1.101 (0.195)	1.533 ** (0.296)
Positive Experience	3.042 *** (0.675)	2.469 *** (0.766)	1.856 *** (0.438)	1.630 ** (0.358)
No Experience	1.105 (0.383)	1.212 (0.331)	0.246 (0.256)	1.737 (0.675)
Male	0.818 (0.168)	1.008 (0.195)	1.304 (0.231)	1.559 ** (0.271)
Age	0.974 *** (0.00863)	0.981 ** (0.00780)	0.970 *** (0.00767)	0.974 *** (0.00767)
College Grad	0.903 (0.188)	1.097 (0.217)	0.947 (0.170)	0.993 (0.178)
Income < \$30,000	1.177 (0.259)	0.936 (0.190)	0.935 (0.173)	1.247 (0.230)
Liberal	0.953 (0.197)	0.955 (0.187)	1.053 (0.184)	0.987 (0.171)
MTurk Experience	1.000 (0.000233)	1.000 (0.000209)	1.000 * (0.000142)	1.000 (0.000138)
Constant	5.758 * (5.633)	3.890 (3.308)	1.202 (0.931)	0.333 (0.256)
Observations	601	613	601	613
Pseudo R-squared	0.061	0.027	0.043	0.042

Robust standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table 8.** Logistic regressions for scenarios involving online interactions (coefficients presented as odds ratios).

VARIABLES	(1)	(2)	(3)	(4)
	Social Media Acceptable?	Facebook Acceptable?	E-Payment Acceptable?	Venmo Acceptable?
Trust Score	1.052 ** (0.0229)	1.021 (0.0246)	1.030 (0.0388)	1.079 ** (0.0404)
NFC Score	1.001 (0.00796)	0.994 (0.00851)	1.006 (0.0169)	1.004 (0.0129)
Frequent Use	2.001 *** (0.529)	1.040 (0.249)	1.706 (0.709)	3.169 * (2.106)
Positive Experience	1.884 *** (0.458)	3.057 *** (0.720)	1.458 (0.875)	1.050 (0.649)
No Experience	1.390 (1.277)	1.747 (0.824)	0.897 (0.807)	0.482 * (0.183)
Male	1.679 *** (0.306)	1.508 ** (0.288)	0.841 (0.308)	0.729 (0.232)
Age	0.990 (0.00762)	0.995 (0.00808)	0.952 *** (0.0157)	0.948 ** (0.0201)
College Grad	0.811 (0.151)	1.317 (0.251)	1.033 (0.391)	0.636 (0.228)
Income < \$30,000	0.898 (0.171)	0.749 (0.149)	1.026 (0.376)	0.397 ** (0.163)
Liberal	0.711 * (0.129)	0.917 (0.169)	0.475 * (0.182)	0.710 (0.227)
MTurk Experience	1.000 (0.000158)	1.000 (0.000138)	0.999 (0.000611)	1.000 (0.000291)
Constant	0.0967 *** (0.0821)	0.208 * (0.173)	0.108 (0.196)	0.271 (0.371)
Observations	601	613	601	613
Pseudo R-squared	0.058	0.065	0.057	0.115

Robust standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Result 5: Systematic effects typically cannot be detected when looking at individual scenarios in isolation.

With the exception of positive experience with a company or type of company, the results from Tables 7 and 8 suggest that no other variable systematically predicts the likelihood that a respondent will find data collection fair across all of the scenarios. Looking at individual scenarios, the relationship between generalized trust and the likelihood that a respondent finds data collection to be acceptable is significant in only two of the eight instances. Males are significantly more likely to find data collection acceptable for the methods described in the CVS scenario and the social media/Facebook scenarios, but not in the e-payment/Venmo scenarios, the generic pharmacy scenario, or the car insurance/Geico example. Such results are consistent with earlier studies that found privacy preferences to be highly context-dependent [12–20].<sup>8</sup>

<sup>8</sup> Similar to the robustness checks run under result 2, NFC was interacted with frequency of use and quality of experience for all of the separate regressions run across Tables 7 and 8. Since none of the interactions approached significance, the results were omitted from the analysis for the sake of brevity.

## 5. Discussion

Motivated by companies' increased reliance on the collection of personal data, and by societal anxiety surrounding contemporary examples of personal data collection, this study examines, across a portfolio of assessments, whether the perceived acceptability of personal data collection is affected by an individual's generalized trust and need for closure. When averaging perceived acceptability across the four scenarios, the results point to a statistically significant relationship between perceived acceptability and generalized trust, but not between perceived acceptability and need for closure. Separate from previous studies that identified a connection between trust in a specific entity and a willingness to share data [41–43,45,46], this study identifies a link between generalized trust and acceptance of personal data collection, which suggests that societies that have greater levels of generalized trust may be expected to be more accepting of data collection.

The absence of a connection between NFC and the acceptability of personal data collection suggests that a general discomfort with unspecified or uncertain outcomes is not a strong determinant of discomfort when judging methods of personal data collection. Across each specification of both pooled regressions and individual-scenario regressions, a respondent's NFC score is never even a marginally significant predictor of perceived acceptability. The lack of an effect of NFC also extends to regressions (not included in the results) that include interactions between (1) NFC and use frequency, and (2) NFC and quality of experience.

When disaggregating the responses to the various scenarios, the results are consistent with earlier work that points to responses to the collection of personal data being context-specific. Looking at each scenario in isolation, there is no variable that is universally linked to the perceived acceptability of data collection, though age is negatively related to perceived acceptability, and having a positive experience with the company/product is positively related to perceived acceptability in six out of eight conditions spread across Tables 7 and 8. When analyzing the aggregated and disaggregated results collectively, one can conclude that, while each case of data collection has unique properties that affect people in different ways, general trends can be identified when looking at the cases as a portfolio.

The finding that the connection between generalized trust and the perceived acceptability of data collection becomes stronger when companies are identified by brand names likely has business and marketing implications. It suggests that businesses that are known brand names, which seek to collect personal information from their customers, may be exposed to variations in societal levels of generalized trust. When relying on one's brand, higher generalized trust may increase acceptance of data collection, while lower trust may decrease acceptance. Extending this logic, companies that are less reliant on a known brand name would be less likely to benefit from increases, or suffer from decreases, in societal levels of trust. In addition, the results imply that, if a company detects conditions of higher generalized trust, investments in branding may lead to an increased ability to collect data without pushback. Conversely, when trust becomes lower, the payoff of brand investment in terms of the ability to collect personal data may decrease.

In addition to uncovering links between generalized trust and the perceived acceptability of data collection, the results also imply that a company seeking to make data collection more palatable is better served improving the quality of interactions with customers, rather than maximizing the frequency of interactions with customers. Companies and websites concerned with perceptions toward their data collection, who possibly face a tradeoff between maximizing the quality and quantity of customer or user interactions, may be better served focusing on the quality of their interactions with customers, rather than the quantity of interactions with them.

In closing, it is important to note that the results presented here can be expanded upon in several ways. First, additional studies can solicit responses from a sample acquired outside of MTurk; despite the finding that there is no relationship between the frequency of MTurk experience and the perceived acceptability of data collection, it is possible that the privacy preferences of MTurk workers differ from those of the general population. One might logically expect, however, that if generalized trust impacts the privacy preferences of a sample that is highly familiar with online interactions (like MTurk



workers who earn income working online), then the effect of generalized trust would be at least as strong among a sample that is less familiar with online interactions. Second, this study examined only four examples of data collection, and compared generic descriptors of companies to only one branded company within each of these four examples. Future work can study how generalized trust relates to the perceived acceptability of data collection across additional examples and brands, perhaps incorporating emergent technologies. Third, the present study examined intuitive feelings of acceptability, given no information about consequences or potential consequences attached to data collection. Future studies can explore whether the connection between generalized trust and perceived acceptability of data collection is mediated by consequences by either eliciting respondents' perceptions of consequences, or by explicitly varying the consequences as part of the experimental design. Fourth, while it is valuable to understand public perceptions toward methods of personal data collection, it is also important to understand how these perceptions affect both the intent to purchase and actual purchasing decisions. Future work can extend the results found in this study and draw connections between generalized trust and purchasing decisions, in light of contemporary examples of personal data collection.

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