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Why Privacy Is All But Forgotten

An Empirical Study of Privacy & Sharing Attitude

Abstract: Privacy and sharing are believed to share a dynamic and dialectical tension, where individuals have competing needs to be both open and closed in contact with others [8]. Online, technology can impact this dynamic process [68]. Indeed, a number of researchers observed that users' stated privacy attitude do not match their behavior [2, 3, 23, 30, 64, 81]. In these studies privacy attitude is compared with behavior via a number of concepts related to privacy. While it is known in psychology that attitudes are multidimensional constructs [10, 15, 76], the question arises whether the user ambivalence with regards to privacy is due to different or contradictory cognitive and affective components of privacy and sharing attitude.

We conducted an empirical study to investigate the difference between privacy attitude and sharing attitude. A US sample of $N = 60$ MTurk workers was assigned to two groups and asked to describe in a 250-word free-form response what [privacy/sharing] online means for them. Responses were coded in quantitative content analysis. The presence and frequency of codes were compared across conditions. Emotions and relationships to other parties were evaluated as predictors for a discriminative logistic regression classifying both attitudes.

We found that privacy and sharing attitude differ significantly across a number of the extracted codes. Participants in privacy attitude were significantly more likely to express fear and significantly less likely to express happiness. For sharing attitude the reverse is true. We found that a discriminant logistic regression on a tone analysis of the participants' responses offers excellent discrimination between privacy and sharing attitude. We cross-validated this classifier with another sample of $N' = 54$. The observed differences contribute an understanding of user states in privacy (and sharing) situations online and has implications for both privacy research and practice.

Keywords: privacy, sharing, attitude, behavior, discriminative analysis, privacy paradox

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1 Introduction

Social psychology depicts a view of privacy within social interactions as a dynamic process of interpersonal boundary control [7] with classical theories proposing a dynamic interplay between privacy and sharing [7, 85]. Within this view, individuals self-disclose while struggling to balance the oppositional needs such as being both open and closed to contact with one another [61]. Self-Disclosure [50] refers to the willful, deliberate sharing of something personal to another [27]. Online, technology can impact this process, spanning privacy boundaries or establishing new ones [68].

A number of studies [2, 3, 23, 30, 64, 81] observed that users' privacy attitudes do not match their behavior—a phenomenon which researchers coined the *privacy paradox*. We found that a number of those studies have compared privacy attitude to behavior via a number of concepts related to privacy, for example, attitude is measured via concern for data collection [3], concern for data use [81], concern for identifying information [23], concern about what others know [11] and concern about identity theft or access by others [30] while privacy behavior is observed via revelations to an online bot [81], Facebook membership [2] or revelations in a bank and pharmaceutical scenario [64] or measured via self-reported behavior [3, 11, 30]. In addition, the privacy paradox has also been observed in online Social Network Sites (SNS) where users' sharing (willful self-disclosure) are in conflict with their privacy concerns [2, 43, 65].

At the same time, we know from psychology literature that attitudes are multidimensional and consist of cognitive, affective and behavioral components [10,

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15, 67, 76], where emotions are an important aspect of attitudes [6, 31, 35, 62]. Emotions are also thought to be related to attitudes via a biphasic system of motivation, namely a defensive and an appetitive system [14, 29, 56, 57]. Consequently, it stands to reason that the dynamic interplay between privacy and sharing results in users experiencing ambivalence due to competing needs, in particular induced by different cognitive and affective components of privacy and sharing attitudes.

We study the hypothesis that privacy and sharing online are two different attitudinal constructs, activated by opposing forces. As a result, we set out to investigate: RQΔ *How does privacy attitude (*PA*) differ from sharing attitude (*SA*)?*

We report on a quantitative content-analysis, based on $N = 60$ free-form MTurk responses on privacy and sharing attitude. After a systematic coding, we compared the presence and frequency of codes across conditions and found significant differences between privacy and sharing attitude. In addition, we established discriminative logistic regressions to answer two lines of inquiries: (a) To what extent do privacy and sharing attitude differ across the emotions of fear and happiness? (b) To what extent do privacy and sharing attitude differ across codes on adversaries and close connections? While the study was not poised to measure the involvement of motivational systems directly, the results on these questions are instructive for future research.

Contributions. We are the first to investigate empirically to what extent privacy and sharing attitudes differ. First, we find that privacy attitude and sharing attitude are significantly different across a series of codes extracted from participants' evaluation of privacy and sharing.

Second, a causal logistic regression shows that the attitude conditions predict the presence of emotion codes. Privacy attitude significantly increases the likelihood of fear and decreases the likelihood of happiness. Sharing attitude significantly increases the likelihood of happiness and decreases the likelihood of fear.

Third, a discriminative logistic regression shows that happiness, measured by both extracted codes and emotional tone of participant response, implies a greater likelihood to be in sharing condition. Fear implies a greater likelihood to be in privacy attitude. We also find that participants referring to close connections are more likely to be in sharing attitude, whereas those referring to adversaries are more likely to be in privacy attitude. The discriminant logistic regression on emotional tone was cross-validated on another sample with $N' = 54$ and showed an excellent discrimination of 93%.

Outline. We first provide an exposé of the privacy - sharing dialectic and of the attitude - behavior link (A – B) in literature, followed with a review of the measurement of A – B in privacy paradox research. We introduce the motivational organization of emotion before describing a pretest covering creation of a codebook. Next we describe a quantitative content analysis and results for the main study. We proceed with the discussion and evaluate our method in the limitations section before concluding the paper.

2 Background

2.1 Privacy – Sharing

Social-psychology provide classical theories depicting a dynamic interplay between privacy and sharing [7, 85]. For example, Altman et al. [8] contribute to the dialectical view of self-disclosure whereby individuals struggle to balance the oppositional needs such as being both open and closed to contact with one another in order to regulate privacy [61]. Self-disclosure as defined by Jourard [50] can be willful, where individuals deliberately share something personal to another [27]. In contrast, involuntary disclosures are those revelations that may expose something unique about the individual, but are not willful, such as jewelry or tattoos [50]. Altman places privacy within social interactions with the environment providing the mechanisms for regulating privacy via a temporal and dynamic process of interpersonal boundary control [7]. His position was the foundation for the communication privacy management theory, which conceptualizes privacy with respect to the rules partners in a relationship rely upon for boundary regulation, in particular for control, ownership and co-ownership of private information [72].

More recently and linked with online systems, Palen and Dourish [68] also propose a view of privacy that is dynamic and dialectical, defined by a set of tensions between competing needs. They explain that technology can impact privacy by disrupting boundaries, spanning them or establishing new ones [68].

2.2 Attitude vs. Behavior (A-B)

Expression of Attitude. Despite the debates on a definition for attitude, scholars mostly agree that an attitude involves a positive or negative evaluation of a particular entity [32, 33, 40, 71], where the attitude object includes anything the person holds in mind. Evaluation can be expressed via thoughts, feelings, intentions to behave and behavior. Thus together with cognitive responses (individuals' belief and knowledge about an attitude object) and affective responses (individuals' feelings and emotions about an attitude object), behavioral responses (the way the attitude influences how individuals act or behave) form the three main classes of responses [76].

Structure of Attitudes. Social psychology distinguishes important characteristics within the structure of attitudes [9]. These are (a) accessibility of attitude which refers to the ease with which an available attitude may be retrieved from memory [38], (b) activation of attitude which refers to whether an available attitude is associated with an object or issue to enable its evaluation [37], and (c) ambivalent attitude which refers to unstable attitudes because of multiple cognitive and affective components [32].

2.2.1 General Discrepancy

Attitude-behavior (A − B) discrepancy and relation have been the subject of much debate and research since decades [4, 12, 39, 58].

The incongruence between A − B has been the subject of research reviews [4, 5], identifying(a) evaluative inconsistencies where general attitudes are compared to specific behavior [5, 86], (b) incompatibility where A − B measures do not involve exactly the same action, target, context, and time elements, whether defined at a very specific or at a more general level [4, 5], (c) literal inconsistencies where intention to behave is measured instead of actual actions [19].

However, it is still believed that attitudes can predict behavior and that the observed relationship is dependent on strength and accessibility of attitudes [36] and consistency of the measures of attitude and behavior [4, 5, 19].

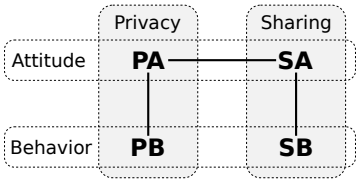


Fig. 1. Relationship of privacy and sharing attitude and behavior.

2.3 The Privacy Paradox

In privacy research, a *privacy dichotomy* or *privacy paradox* is well known. It refers to users' privacy concerns or attitudes not matching their self-reported or actual behavior [3, 64, 81].

2.3.1 Measurement of Privacy A − B

Preibusch [73] discussed the privacy paradox, debating whether it is an accurate interpretation of observable phenomena or highlighting sampling biases. Dienlin and Trepte [30] conducted an in-depth analysis of the paradox, seeking to understand whether it still exists and offering a multidimensional operationalization across informational, social and psychological privacy, and measurements across concerns, attitudes, intentions and behaviors. Kokolakis [51] reviewed the methodological framework for research on the paradox, finding that those observing the paradox mostly adopt a survey or experimental methodology where the privacy of a variety of personal information is involved. We offer an additional perspective on the topic with an analytical conceptualization of paradox research.

We first define PA, SA, PB and SB as:

- PA is privacy attitude measured via concern, preferences or attitude towards protection, collection, access to and control of information about the person.
- SA is sharing attitude measured via concern, preferences or attitude towards voluntary sharing of information about the person.
- PB is privacy behavior measured via self-report or observation of protection to or controlling access to information about the person.
- SB is sharing behavior measured via self-report or observation of voluntary sharing of information about the person.

Figure 1 contains a conceptual overview of these four terms.

We note that research observing the privacy paradox include those that exhibit and report on A − B in-

Table 1. Review of measurements in relation to the privacy paradox.

Paper	Measurement				A – B	PP
	Attitude A	Instrument	Behavior B	Instrument		
Spiekermann et al. [81]	concern about the use of data PA willingness to disclose SA	adaptation from Ackerman et al. [1]	personal revelations SB	disclosure on online bot	PA/SA – SB	✓
Acquisti & Grossklags [3]	general concerns PA	concern w.r.t. collection of offline id. info	signing up for loyalty card SB	self-report of SB	PA – SB	✓
Acquisti & Gross [2]	general PA	adaptation from Westin's indexes [54]	usage of Facebook(FB) SB	FB membership/reported use	PA – SB	✓
Chellappa & Sin [23]	general PA & SA for a specific context	concern w.r.t. id. info & comfort for disclosing			PA - SA	✓
Barnes [11]	general PA	concern w.r.t. what others know	usage of Facebook SB	reported disclosure	PA – SB	✓
Norberg [64]	intentions to disclose info SI	intention w.r.t 16 pieces of info	actual disclosure SB	bank & pharma scenario	SI – SB	✓
Dienlin & Trepte [30]	online privacy concerns PA	10 items from Buchanan [16]	frequency & content of disclosures SB	reports of behavior	PA – SB	✓
Dienlin & Trepte [30]	specific SA	attitude w.r.t. giving info on FB	amount of info disclosed SB	reports of behavior	SA – SB	✗
Dienlin & Trepte [30]	specific PA	attitude w.r.t. restricting access to profile	actual access restriction PB	reports of behavior	PA – PB	✗
Grossklags & Acquisti [44]	privacy concerns PA & value PV	attitude w.r.t. threats & value w.r.t info			PA – PV	✗
Malheiros et al. [60]	willingness to disclose SA	perceptions w.r.t. 4 factors	freely entering of one's data SB	disclosure in web form	SA – SB	✗
Utz & Kramer [84]	general PA	concerns wrt. info abt. self online	privacy settings on social networks PB	reports of behavior	PA – PB	✗
Taddicken [83]	willing to disclose SA & concern PA	psych. dimension of self [18] & APCP [82]			SA – PA	✗
Joinson et al. [46]	general privacy concerns PA	16 items from Buchanan [16]	privacy protection behavior	reports of technical protection	PA – PB	✗

Note: PP = Privacy paradox was observed. SI = Sharing intentions. PV = Privacy Value (derived from observed behavior).

consistencies and/or incompatibility:(a) Spiekermann et al. [81] explicitly state the measurement of privacy preferences PA against disclosure behavior SB. Measurement of privacy preferences was built from Ackerman et al.'s [1] general measure of online privacy (concern about the use of data PA and willingness to disclose SA) that enabled differentiation between privacy fundamentalists, marginally concerned, profiling averse or identity concerns. PB was measured from SB as proxy in the form of personal revelations within a sales dialogue and participants' address. (b) Acquisti & Grossklags [3] measured general concerns toward the collection of offline identifying information PA against whether individuals signed up for supermarket loyalty card, that is specific SB. (c) Acquisti & Gross [2] compared general PA adapted from Westin's indexes [54] with reports of usage (SA) of Facebook and attitude towards Facebook. (d) Chellappa & Sin [23] measured concern towards identifiable and non-identifiable information and sensitivity to preferences (PA) against comfort in providing information to a particular firm in return for personalized services (specific SA) and in using the web for purchases. (e) Barnes [11] measured general PA such as "whether everybody should know everything about anyone else" against SB, using Facebook. (f) Norberg [64] measured behavioral intentions/willingness to disclose information such as name, email, gender, age, address, hobbies, car and shopping preferences and family income in general, against actual disclosure of information for a bank or pharmaceutical organization SI. (g) Dienlin & Trepte [30] compare online privacy concerns PA with frequency and content of disclosures on social network (name, address, phone number, religious political views), SB as proxy for PB.

It is however also important to note research that do not observe an incongruence between A and B in the privacy context:(a) Grossklags & Acquisti [44] found that individuals with stronger concerns (PA) place higher values on the privacy of information transactions (privacy value PV observed from PB). (b) Malheiros et al. [60] found that higher willingness to disclose (SA) is linked with freely entering of one's data (SB). (c) Utz & Kramer [84] found that concerns about information available about participant on the Internet that PA, predict stronger privacy settings PB on social networks. (d) Taddicken [83] found a negative impact of general willingness to self-disclose SA on concern for online privacy PA. (e) Dienlin & Trepte [30] found that attitude towards giving information on Facebook (SA) is related to how much information is disclosed (SB), and that attitude towards restricting access to one's profile (PA) is related to actual access restriction (PB). (f) Joinson et al. [46] found correlations between privacy concern measured from Buchanan et al. [16] (PA) and protection behavior (PB) in a study investigating the mediating effects of trust in mediating non-disclosure.

We observe from the above review and Table 1 that the privacy paradox is mostly observed when PA - SB are compared and not when PA - PB or SA - SB are compared.

2.4 Emotion & Motivation

This work touches upon how attitudes relate to emotions and the motivational systems. The tripartite model proposes a multiple-component construct to attitude comprising of affect, behavior and cognition [10, 15, 67, 76]. Dolan [31] proposed that emotion modulates cognition whereas Allen et al. [6] found that while cognition explains a large part of the variance in predicting attitude, emotions (in particular fear, joy and sadness) offer incremental prediction. Morris et al. [62] found that affect dominates over cognition for predict-

ing conative attitude and action in advertising. Farley and Stasson [35] found that affect instructions helped distinguish attitudes of blood donors' from non-donors'. Affect is also known to have impact on decisions [79] as well as to influence individuals [28, 80].

On motivational systems, Lang et al. [56] argued that brain systems employ a biphasic organization of affects according to two types of adaptive response to stimulation, namely *appetitive* or *defensive*. Similarly, there is a line of research in psychology considering approach and avoidance motivation [34]. Such motivational models account for the valence or direction of emotions (pleasant-appetitive) and the arousal or intensity (degree of motivational activation) [14]. Bradley et al. [14] state that judgments of pleasure or displeasure indicate which motivational system is active and judgment of arousal indicate the intensity of motivational activation. The model has been widely investigated and used as incentive for research such as in the context of reactions to picture processing [14].

Unpleasant emotions such as fear are believed to be characteristic of a defensive response, whereas pleasant emotions such as happiness are believed to be characteristic of an appetitive response [14, 29, 57].

3 Codebook Creation

We ran a pretest with the aim to create a codebook a priori. We extracted a set of codes which pertain to participants' PA and SA.

3.1 Participants

A sample of $N = 18$ Amazon Mechanical Turk (MTurk) workers was distributed evenly into two groups. The participants were sampled without constraints on the Mturk population or control of demographical data.

3.2 Procedure

Participants were asked an open free-form question, only constrained in the number of words (minimum: 250, no maximum). Group 1 received PA *What does privacy online mean to you?*. Group 2 received SA *What does sharing online mean to you?* with no further instructions given. Hence for each group, 9 response units of free-form text were obtained.

3.3 Open Coding

We facilitated a *conventional line-by-line* coding of all response units, where each unit was independently coded by two coders. The aim of the open coding was to *extract concepts* from the free-form text. The coding assignments were done asymmetrically, with one of the authors coding all units. A coding pool of three coders was distributed evenly over the samples to give an independent code. All the coders were post-doctoral RAs.

As a result, we obtained a set of 43 concepts that are grouped across 7 categories. We provide an overview of the identified concepts and categories in Table 9 in the appendix.

3.4 Codebook Generation

We used the set of concepts derived to develop a codebook. First categories were refined to follow best practice guidelines for codebook development that is that categories are mutually exclusive, exhaustive and independent [63]. Second another group of two coders was trained on sample units and the codebook was refined.

Coder Training. For the second group of two coders, two local PhD students were recruited. They were trialled on a sample of four units and trained in content analysis. Training and revisions happened in two rounds: (a) the two coders were first trained on the initial codebook, inter-rater agreement was checked, the coders and the researcher discussed and revisions were made to the codebook; (b) after a second round of training on the revised codebook, agreement check, discussions and codebook revision, the codebook was refined to six categories and 52 codes.

Codebook refinement. As refinements to the codebook: (a) codes for 'protection activities' were included in the *self activities* and *other's activities* categories. (b) a category *who others are in specific* was added, (c) the category *control of access* was removed as it has dependence within components of *participants' activities* and *others' activities*.

We gained a codebook with a set of six categories and a total of 52 codes, given in the Appendix. The categories elicited for content analysis were the participant referring to: (a) himself (SEL), (b) who others are in specific (SPE), (c) his emotions or moods (EMO), (d) others' activities (ACO), (e) his own activities (ACS), (f) data or information (DAT).

4 Method

In this section we describe our experimental methodology following the guidelines described by Coopamootoo & Groß [25]. We define hypotheses and variables, design a valid measurement approach and develop re-usable components such as a codebook.

4.1 Aim

In an between-subjects design, we induce the independent variable (IV) attitude, with two levels: privacy and sharing. On participants' free-form statements on their privacy or sharing attitude, we measure the presence and frequency of codes found (DV) according the codebook described in Section 3.

4.1.1 Difference Between Privacy & Sharing Attitude

First, we investigate differences in code occurrence across the two conditions privacy and sharing.

Research Question 1 (RQΔ). *How does privacy attitude (*PA*) differ from sharing attitude (*SA*)?*

- $H_{\Delta,0}$*:* There is no difference between PA and SA across each of the codes
- $H_{\Delta,1}$*: There is a significant difference between* PA *and* SA *across each of the codes.*

4.1.2 Caused Emotions

Emotions are thought to be organized according to two systems of adaptive response to stimulation, namely a defensive system (characterized,e.g., by fear) and an appetitive system (characterized,e.g., by happiness) [14, 29, 56, 57]. We, therefore, investigate fear and happiness as observable affects and seek to establish to what extent PA and SA *cause* these affects..

Research Question 2 (RQ$\models$E). *How does privacy attitude (*PA*) differ from sharing attitude (*SA*) in causing fear or happiness?*

$H_{F,0}$/$H_{H,0}$ *:* PA *and SA do not impact the likelihood of the presence of [fear/happiness] codes.*

- $H_{F,1}$*:* PA *causes a greater likelihood of fear codes.*
- $H_{H,1}$*:* SA *causes a greater likelihood of happiness codes.*

4.1.3 Discriminating Between PA and SA

Finally, we investigate how well discriminative classifiers can distinguish between PA and SA texts. This question entails an evaluation of established classifiers in terms of their accuracy and performance.

First, we consider emotions fear and happiness as explanatory variables.

Research Question 3 (RQΛE). *How well do emotions fear and happiness discriminate* PA *and* SA*?*

- $H_{Emo,0}$*: Neither fear nor happiness impact the likelihood to be either in privacy or sharing attitude.*
- $H_{Emo,1.1}$*: Participants with fear are more likely to be in a privacy attitude and less likely to be in a sharing attitude.*
- $H_{Emo,1.2}$*: Participants with happiness/joy are more likely to be in sharing attitude and less likely to be in privacy attitude.*

We evaluate these hypotheses on coded emotions and computationally derived emotional tone. We expect the results of both analyses to agree in order to accept the alternative hypotheses.

Second, we investigate codes on the user's relationships are possible discriminators. Hence, inquire for differences in entities to move away from (adversaries) and entities to move towards to (close connections) as an indication of defensive or appetitive behavior.

Research Question 4 (RQΛR). *How well do coded relationships on adversaries and close connections discriminate between* PA *and* SA*?*

- $H_{R,0}$*: The presence of adversaries or close connections codes does influence the likelihood to be either in privacy or sharing attitude.*
- $H_{R,1.1}$*: Participants naming adversaries are more likely to be in a privacy attitude and less likely to be in a sharing attitude.*
- $H_{R,1.2}$*: Participants naming close connections are more likely to be in a privacy attitude and less likely to be in a privacy attitude.*

4.2 Participants

A sample of $N = 60$ MTurk workers were evenly assigned to two groups. The subjects were sampled on the US population MTurk workers. The mean age was 38.02 years ($SD = 11.236$), 22 female and 38 male.

4.3 Procedure

The experiment was designed as a between-subject study to compare the induced attitude across groups. Given that an attitude is an evaluation of an object, person, place or issue that influences thought and action [32, 40, 71], we elicit PA and SA by participants' own evaluation of privacy and sharing.

4.3.1 Core Procedure

The core procedure consisted of (a) a pre-task questionnaire for demographics, (b) a manipulation to induce a personal evaluation of [privacy/sharing], (c) a manipulation check on whether the evaluation was focused on [privacy/sharing], and (d) a coding of the response units by two coders. We give an overview of the entire experiment including its analysis in Figure 2.

4.3.2 Questionnaire Design

We asked participants the question "*What does [privacy/sharing] online mean to you?*" We asked for a free-form answer of at least 250 words. Participants were allocated a maximum of 30 minutes to answer the question.

4.3.2.1 Paradigm.

Participants were explicitly asked to evaluate privacy or sharing, because we aim to investigate how these two attitudes differ. While there are vetted questionnaires on privacy attitude, a number of them are reported to query for concerns [73] and, thereby, to introduce a priming. As an alternative to these instruments, we focused on *direct questioning*. It is an approach used in social psychology to ask respondents openly about their opinions, values, belief and attitudes [41]. The questions were set on a conceptual level rather than specific to a privacy context. We thereby draw on a social sciences approach for conceptual clarification and interpretation of the meaning of themes in respondents' life [26, 55].

4.3.2.2 Open Questions.

We decided for an open-question design, based on three lines of reasoning in the literature. First, Schuman and Presser [78] stated that open questions in attitude surveys provide a rich dataset with a wider spread of responses. This property is important in this study as it ensures that possible similarities between PA and SA come to light and are not curtailed by the questionnaire. Second, Oppenheim [66] supported open questions for testing hypotheses about ideas and awareness as well as to inquire about non-factual statements related to the participants' state of mind. Consequently, open questions are deemed useful to elicit participants' attitudes. Payne [70] judged that open questions elicit a wide variety of non-directed and unstructured responses that enable respondents to freely express themselves. Our question style can be related to Payne's category of argumentative-type questions, "solicit[ing] ideas from respondents regardless from which side they take on the issue." We, thereby, anticipate open questions to allow participants to freely deliberate over their attitude.

4.3.2.3 Framing.

We framed both the privacy and sharing questions in affirmative form—rather than using a negation as in *not* sharing—for three reasons. First in terms of study goal, the study is aimed at privacy and sharing attitudes, their cognitive and affective components, and their differences. Second in terms of questionnaire design, Oppenheim [66] expressed reservations about the precise meaning of negatively framed questions as well as the ambiguity of negative responses to such questions. Third in terms of neurology, negation and affirmation are stated by Christensen [24] to activate in different areas of the brain. There is evidence that negative questions can increase response time, lead to errors or render answers more difficult than the affirmative counterpart [20, 21, 24, 45]. This is because negative questions require additional syntactic computation and introduce two propositions (the proposition itself plus its cancellation).

4.3.2.4 Sharing vs. Disclosure.

The SA condition could be either framed as sharing or as disclosure. We follow Jourard's consideration [50] to investigate *willful* self-disclosure, that is, situations in which individuals deliberately share something personal to another [27]. For us, "sharing" is thereby an expression of willful self-disclosure. Notably, Jourard's widely used 60-item self-disclosure questionnaire [49] does not use the word "disclosure" in the instructions to participants and rather describes the act in concrete, everyday words. We do the same. By Payne's list of most familiar

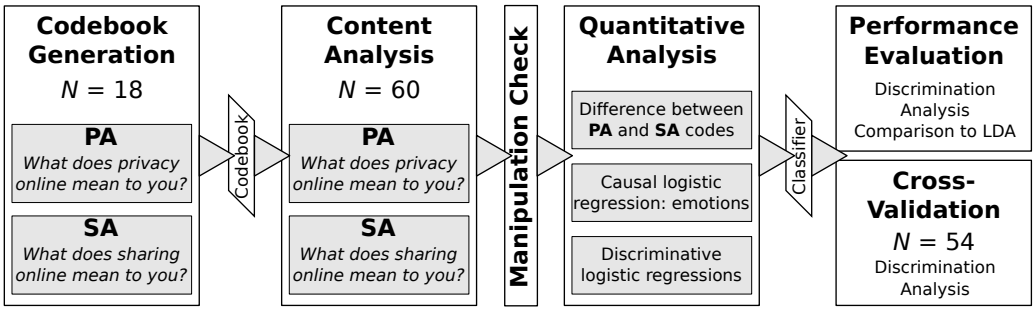


Fig. 2. Experiment design including codebook generation, main experiment and subsequent analyses.

and frequently used words [70], "sharing" is a safe word to do so.

4.4 Measures

The response units were checked and 60 units were prepared for coding.

4.4.1 Manipulation Check

We gathered 41 responses for the privacy condition and 37 for sharing. We assessed the quality of participant responses based on whether participants answered the question on [privacy/sharing]. We checked whether the responses were consistently about [privacy/sharing] rather than a response that wanders off to another topic. We also excluded those that were clearly copy-pastes (hence not personal) and those that were less than 200 words. After evaluating the responses, we ended up with 30 responses in each condition. We note that consistency is a measure of dependability, an aspect of reliability for qualitative inquiry [59].

4.4.2 Units

The mean response unit size was 264.33 words (SD = 17.524), with 30 units for each for privacy and sharing.

4.4.3 Coding

The two trained coders from the second group of coders, described in Section 3.4, were given the codebook and the 60 units of participant response. They were instructed to read each of the units and to identify the codes described. They highlighted the section in the text that pertain to the codes and wrote the codes in the right margin. To balance out a shift in coding style, the coders were also asked to switch conditions after each batch of 10 units were coded.

After the coding, the 'other' codes of SPE and EMO categories were further examined leading to more refined codes from SEL04, SPE04, SPE05, EMO08, AC013 and DAT10. We provide the significant codes in Table 3 and the full set in the Appendix in Table 8.

5 Analysis

The response units were analyzed via *quantitative content analysis* [63, 75] where our goal was to produce counts on occurrence and frequency of codes within response units. Content analysis has previously been used in a variety of contexts to extract human perceptions and opinions [63, 75], in particular to measure attitudes [53] and in empirical research [13, 47, 52].

The difference in code occurrence across PA and SA was analyzed via independent samples t-tests. The extracted codes were also analyzed with a causal analysis from induced IVs PA and SA to DVs emotional codes, fear and happiness. In addition, we use discriminative classifiers with logistic regressions to discriminate between PA and SA based on the emotional content and connections with others.

6 Results

6.1 Inter-Rater Reliability

We evaluate inter-rater reliability via %-agreement and Cohen κ on 50 units across the 52 codes. We find that the coders were on agreement 88.2% of the time. There

was a substantial agreement between the two coders' judgment, $\kappa = .666$, 95% CI $[.630, .670]$, $p < .001$.

Figure 3 illustrates the agreement for all codes as well as across categories.

Fig. 3. Agreement between coders in percent. The white circles represent Cohen's κ on a percentage-scale.

6.2 Quantitative Differences

We ran a t-test on the frequency of each of codes across the two conditions to test $\mathsf{H}_{\Delta,0}$. Because of the repeated use of the t-test, there was an exposure to Type-I errors, which we took into account by reducing the significance level to $\alpha = .01$ and marking differences (†) that are maintained under Bonferroni-Holm correction.

We summarize the frequency results between the IVs PA and SA across 52 codes of the codebook and 36 finer codes showing significance in Table 3. We note that a negative ΔM implies the code is more present in SA, a positive ΔM implies that the code is more present in PA. Table 2 contains the entire codebook.

Appendix page 60 contains a visual overview of these results. Figure 11 displays a stacked barchart that highlights the prevalence of codes in PA and SA.

Consequently, we observe that reference to businesses and adversaries, fear, considerations of hacking, being targeted with adverts and other negative actions are statistically significantly more present in PA than in SA. At the same time, reference to other users (peers), close connections, happiness, joy, life improvement, and content upload or creation are statistically significantly more present in SA than in PA.

We observe that the differences are consistent with respect to their emotional valence, parties and actions considered. We thereby reject the null hypothesis $\mathsf{H}_{\Delta,0}$ on the named differences.

6.3 Qualitative Differences

6.3.1 View of others

We found that participants in SA referred more to close connections than participants in PA (48 total mentions compared to six), either without specificity (SPE04-close connections), such as expressed by P87 in *"I can share pictures [...] with my **family**."* or to certain specific relations (SPE04-certain people), for example with P53 stating *"[M]y **wife and son** bought me a Golden Retriever puppy for my birthday [...] I posted a BUNCH* [sic] *of pictures of him because I was so happy."* Similarly, we found that participants in SA referred more to relations as acquaintances and friends (SPE04-05-connection-acquaintances-friends, 24 total mentions) with for example, P64 stating *"I can use it to entertain **friends** by sharing funny videos or other things that might cheer them up [...] share some files via email with **people from work**."* Not a single participant in PA mentioned acquaintances or friends as parties related to.

At the same time, we found that participants in the PA condition referred more to other business or company than participants in SA, 39 total mentions compared to three when referring to others without specificity (SPE05-business/company in general) such as stated by P34 *"Online privacy is extremely important to me, but it isn't just in the hands of **online companies**. [...] On the **company or community side** of the online privacy issue, **organizations** need to be extremely careful of the information they collect."* Similarly, participants in the PA condition referred more to adversarial others (SPE04-05-adversaries) than participants in SA (23 total mentions compared to compared to five) as expressed by P35 with *"I think online privacy is not being at risk for **hackers** to come into my computer system and see my personal information or my search habits."* or by P37 talking about *"programs [...] that will keep **hackers and identity thiefs*** [sic] *away."* or by P40 with an unknown yet adversarial subject in *"Privacy online to me means that I will be safe to use the internet without worrying about whether **someone** is going to attempt to steal my password, my social security number, my address, my phone number, etcetera* [sic]*."*

6.3.2 Participants' Emotions

We found that participants in PA exhibited more fear, worry or concern (EMO-fear/worry/concern) than participants in SA. Virtually all participants in PA exhibited

Table 2. The 52 codes in the final codebook.

Code	Content	Code	Content	Code	Content
How Participant Views Himself		**Participant's Emotions**		**Data/Information**	
SEL01	as a customer	EMO01	annoyed, irritated, angry	DAT01	contact info, real name, phone # or addr.
SEL02	as a profile/online account	EMO02	fear, concern, worry or vulnerable, helpless	DAT02	online account, online identity
SEL03	as a customer and an online profile	EMO03	trust or hope	DAT03	bank accounts, cards or PIN
SEL04	other descriptions	EMO04	happy, pleased, good or that it's fun, enjoyable	DAT04	location data or geographic data
		EMO05	a sense of connection with others	DAT05	habits, hobbies or preferences
How Participant Views Others		EMO06	benevolent	DAT06	items purchased
SPE01	website or service providers in general	EMO07	an improvement in his life, value to life	DAT07	things uploaded: picture, thoughts
SPE02	ad agencies and marketing firms	EMO08	other moods or emotions	DAT08	online behavior, actions he does online
SPE03	specific businesses including Google or Facebook			DAT09	health data
SPE04	other users	**Participant's Own Activities**		DAT10	other types of data
SPE05	other organizations or businesses	ACS01	makes, follows friends, networks, stays in touch		
		ACS02	creates or contributes content		
Participant's View of Others' Activities		ACS03	researches, reviews, learns, read news		
ACO01	gain access, hack, track, collect participants' data	ACS04	offers help or support to others		
ACO02	target participant with adverts	ACS05	makes purchases		
ACO03	others can steal or commit fraud	ACS06	visits questionable, adult sites or content		
ACO04	reveal data to third party	ACS07	works online		
ACO05	collect financial data	ACS08	sets or has a password to protect information or account		
ACO06	put technical safeguards in place	ACS09	creates/has a fake profile, hides or conceals information		
ACO07	notify or warn participant	ACS10	opts out to providing information or being contacted		
ACO08	have laws to punish others	ACS11	gives consent to others		
ACO09	others share data/info with participant	ACS12	other actions		
ACO10	others judge participant				
ACO11	any other neutral actions of others				
ACO12	any other positive actions of others				
ACO13	any other negative actions of others				

Table 3. Component Differences between PA & SA, restricted to significance level $\alpha = .01$

Code	PA		SA		$t(58)$	p	Difference		95% CI		Cohen's d
	M	SD	M	SD			ΔM	SE	LL	UL	
Participant Views Others In Specific As											
8 SPE04-other users	2.270	2.196	7.330	3.763	-6.369	$< .001$***†	-5.067	.795	-6.667	-3.466	1.642
9 SPE05-other org./business	6.030	3.810	3.330	2.963	3.064	.003**	2.700	.881	0.934	4.466	0.791
Finer Details of SPE04 & SPE05											
53 SPE04.1-close connections	0.200	0.482	1.600	2.711	-2.784	.009**	-1.400	.503	-2.426	-0.374	0.719
54 SPE04.2-certain people	1.000	1.462	4.300	3.064	-5.324	$< .001$***†	-3.300	.620	-4.551	-2.049	1.375
56 SPE05.1-business/company in general	1.300	1.601	0.100	0.305	4.034	$< .001$***†	1.200	.297	0.593	1.807	1.041
58 SPE04-05.1-adversaries	0.767	1.040	0.167	0.461	2.889	.006**	0.600	.208	0.180	1.020	0.746
59 SPE04-05.2-connection-acquaintances-friends	0	0	0.800	0.887	-4.942	$< .001$***†	-0.800	.162	-1.131	-0.468	1.276
Participant's Emotions											
11 EMO02-fear/worry/concern	2.970	2.076	1.470	1.871	2.940	.005**	1.500	.510	0.479	2.521	0.759
13 EMO04-happy/pleased/fun/joy	0.130	0.346	1.100	1.296	-3.948	$< .001$***†	-0.967	.245	-1.465	-0.469	1.023
16 EMO07-life improvement	0.070	0.254	0.600	0.932	-3.024	.005**	-0.533	.176	-0.892	-0.175	0.776
Participant's View of Others' Activities											
18 ACO01-gain access/hack/track	1.930	1.893	0.070	0.254	5.355	$< .001$***†	1.867	.349	1.155	2.579	1.377
19 ACO02-target with adverts/advertise data	0.370	0.669	0	0	3.003	.005**	0.367	.122	0.117	0.616	0.782
21 ACO04-reveal to 3rd party/profit on/leak	0.670	0.922	0.070	0.254	3.436	.002**	0.600	.175	0.245	0.955	0.887
30 ACO13-other negative actions	3.570	2.569	1.270	1.946	3.909	$< .001$***†	2.300	.588	1.120	3.480	1.009
Finer Details of ACO13											
77 ACO13.1-passive threats	0.530	1.000	0	0	2.898	.005**	0.533	.184	.165	.902	0.750
78 ACO13.2-active threats	2.700	1.822	1.00	1.875	3.561	.001**	1.700	.477	.744	2.656	0.920
Participant's Reference to Data/Information											
49 DAT07-content uploaded or created online	0.370	1.033	3.000	3.434	-4.022	$< .001$***†	-2.633	.655	-3.954	-1.303	1.037
Finer Details of DAT10											
86 DAT10.2-specific content	0.130	0.434	2.130	2.300	-4.679	$< .001$***†	-2.000	.427	-2.872	-1.128	1.208

CI refers to the Confidence Interval, LL to the Lower Limit, UL to the Upper Limit.

Differences marked with a dagger † are statistically significant under Bonferroni-Holm correction for all comparisons made.

statements with worries or concerns (89 total mentions) compared to half of the participants in SA (with 44 total mentions), such as expressed by P12 with *"I feel like now when I search for things, especially on Google that they are keeping a record of what you look for and all the pages you may visit through Google. This is not online privacy. I think most websites are probably secretly logging your IP address. [...] This should be an infringement on your right to privacy."* or by P37 stating that *"I think that [privacy] is important in this day and age because it could literally cost you your life. So many people think that if they are online they cannot be taken advantage of."*

At the same time, we found that participants in the SA condition exhibited more happiness or pleasure (EMO04-happy/pleased/fun/joy) than participants in PA (33 total mentions compared to two), for example P60 expressed *"It's the **future I want to live in and enjoy** and the future I think everyone living now deserves because technology makes it possible to do for free."* Similarly, participants in SA condition expressed more statements about life improvement (EMO07-life improvement) than participants in PA (18 total mentions compared to two), such as P63 stating that *"Online sharing is a way to socialize [...] **in a way that has never been possible before**. People often feel a need to share their lives and doing so on social media or other online platforms [...] is a very easy and convenient way to do so."*

6.3.3 View of Others' Activities

We found that more participants in PA stated others' actions in a negative frame than participants in SA (196 total mentions compared to 42), for example participants referred to others gaining access (ACO01-gain access/hack/track, 58 total mentions compared to two) such as formulated by P4 with *"[O]bviously the spammers are **getting ahold of my** e-mail address somehow."* or targeting participants (ACO02-target with adverts/advertise data, eleven total mentions, not found in SA) as expressed by P3 in *"I am very much against the **practice of targeted marketing**, where sites use my personal information to **change webpages and add advertising that is specifically designed with my perceived interests, wants and needs in mind.**"* Similarly, more participants in condition PA referred to others' profiting on their data (ACO04-reveal to 3rd party/profit on/leak) than participants in SA (20 total mentions compared to two) with for example P1 expressing *"[F]or those I allow not to be able **to share, sell or do something otherwise with my information** that I don't know about or authorize."* or other types of negative actions (ACO13-other negative actions, 107 total mentions in PA compared to 38 in SA) such as expressed by P12 with *"[The government] probably [...] **analyzes just about every single thing people do** on their computers or smartphones. [T]ext messages on all phones are probably **stored** by the wireless service provider and **looked into** at a later date."*

6.3.4 Reference to Information

We found that more participants in SA referred to contents created online including picture, thoughts, opinions or insights (DAT07-content uploaded or created online). There was a total of 90 mentions in SA compared to eleven in PA. For example by P74 with *"Sharing **my sad moments, my happy times, my personal photos and videos**[.]"* or by P72 with *"In these type[s] of situations people might share **ideas, feelings, links to sources, and music and image files.**"*

6.4 Similarities

6.4.1 View of Own Activities

We found similarities across PA and SA when participants view their own activities as researching, reviewing services, learning or reading news online (ACS03-researches, reviews, learns, read news) with 5 mentions in PA compared to 3 in SA.

6.4.2 Reference to Information

We also found quite a low number of mentions for reference to an online account or online identity (DAT02-online account, online identity) with 2 mentions in PA and none in SA.

6.5 Causal Analysis

RQ⊨E asks whether induced PA and SA cause a difference in the likelihood of fear and happiness. We evaluated two binary logistic regressions with attitude as predictor and fear and happiness codes as DVs respectively. PA is coded as baseline.

The condition PA vs. SA predicted the occurrence of fear, $\chi^2(2, 60) = 10.116, p = .001$, the model explaining 16% (Hosmer & Lemeshow) to 23% (Nagelkerke) of the variance. A transition from PA to SA made participants 1/10th as likely to express fear, $p = .007$, $\exp(B) = 0.107$ $[0.015, 0.451]$. We reject the null hypothesis $\mathsf{H}_{\mathsf{F},0}$.

The condition PA vs. SA predicted the occurrence of happiness, $\chi^2(2, 60) = 13.079, p < .001$, the model explaining 17% (Hosmer & Lemeshow) to 27% (Nagelkerke) of the variance. A participant in the sharing condition SA was more than eight times as likely to express happiness than a participant in the privacy condition PA, $p = .001$, $\exp(B) = 8.5$ $[2.559, 34.456]$. We reject the null hypothesis $\mathsf{H}_{\mathsf{H},0}$.

6.6 Discriminative Analysis

We evaluate to what extent emotional content on the dimensions fear and happiness and consideration of adversaries or close connections discriminate between privacy attitude (PA) and sharing attitude (SA). In terms of method, we note that discriminative classifiers with logistic regressions are found to be preferable over generative classifiers [48]. Press and Wilson [74] made the case the logistic regression is to be preferred over discriminant analysis when explanatory variables do not follow a multi-variate normal distribution. Furthermore, their empirical analysis vouched for better classification accuracy with logistic regression. Consequently, we employ logistic regression as tool of choice for the discriminative analysis. We provide the model diagnostics in Appendix A.

6.6.1 Coded Emotion

A logistic regression was conducted to predict the likelihood of whether the attitude would be a privacy attitude PA or a sharing attitude SA. Privacy Attitude PA is the baseline. The predictor variables were the nominal values of presence or absence of fear and happiness.

The test of the full model in comparison to the model with the intercept only was statistically significant, $\chi^2(2, 60) = 21.447, p < .001$, indicating that the model was able to distinguish participants in PA versus participants in SA condition. The model explained between 26% (Hosmer & Lemeshow) and 40% (Nagelkerke) of the variance.

The model correctly classified 77% of the cases. It correctly classified participants who were in PA 80% of the cases and participants who were in SA 73% of the cases. Table 4 on page 51 gives an overview of the regression coefficients.

Holding fear constant, participants expressing happiness are roughly nine times as likely to be in a sharing attitude (SA) than in a privacy attitude.

Fearful participants are more likely to be in a privacy attitude (PA). Holding happiness constant, fearful participants are ten times as likely to be in a privacy attitude than in a sharing attitude.

We give an overview of all results on page 51. Figure 4 displays the likelihoods to be in a sharing attitude instead of a privacy attitude, depending on the predictors fear and happiness separately. Figure 5 shows the regression surface for both predictors combined.

We reject the null hypothesis $\mathsf{H}_{\mathsf{Emo},0}$.

6.6.2 Tone Analysis

While the previous section considered emotion as coded by our coders, here we employ IBM's Tone Analyzer (TA) as tool to evaluate the emotional tone of the participant's statements. The TA allows for a more fine-grained evaluation of the emotions.

We conducted a logistic regression to predict the likelihood whether the participant was in a sharing attitude (SA) as opposed to a privacy attitude (PA, with PA as the baseline. We investigate the tones *fear* and *joy*.

The model was statistically significant, $\chi^2(2, 60) = 39.357, p < .001$. The model explained between 47% (Hosmer & Lemeshow) and 64% (Nagelkerke) of the variance.

The logistic regression classified 81% of the cases with privacy attitude correctly. It classified 86% of the sharing attitude cases correctly. Overall the model classified 84% of the cases correctly. Table 5 on page 53 summarizes the the model's regression coefficients.

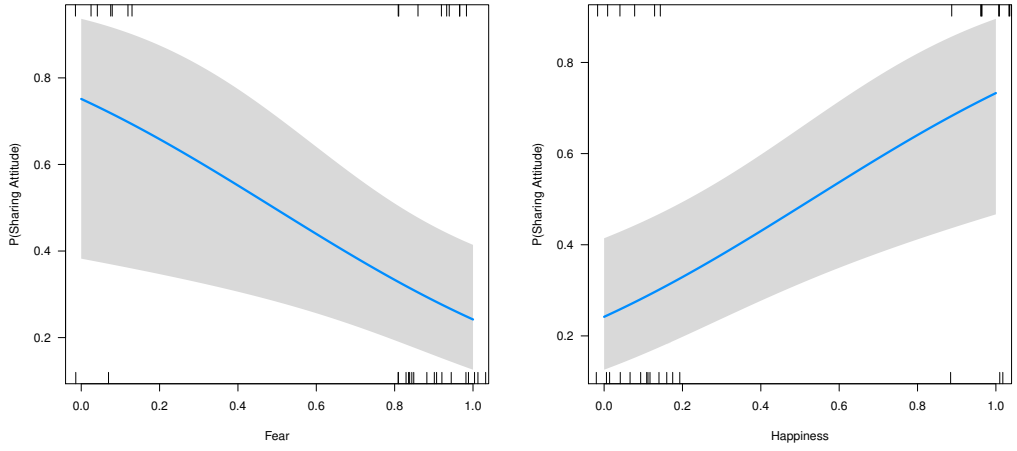
Joyful participants were more likely to be in a sharing attitude. Holding TA fear constant, for each percentage-point of joy the participant is more likely to be in the sharing attitude (SA) by a multiplicative factor of 1.105. Hence, an increase of joy by 10% means that the participant is more than twice as likely to be in a sharing attitude.

Participants with a tone of fear are more likely to be in a privacy attitude (PA). Holding TA joy constant, for each percentage point on the fear tone scale the participant is less likely to be in a sharing attitude by a multiplicative factor of 0.9. An increase of the fear tone

Table 4. Coefficients of the logistic regression with nominally coded emotions fear and happiness.

Predictor	B	SE	Wald χ^2	df	p	Odds Ratio	95% CI		R
							LL	UL	
Fear	−2.2482	0.8088	1.9	1	**.01***	**0.106**	0.014	0.505	.15
Happiness	2.1513	0.6937	6.6	1	**.002****	**8.596**	2.378	37.708	.28
Constant	1.1059	0.6937	9.6	1	.17	3.022	0.718	20.463	

CI refers to the Confidence Interval, LL to the Lower Limit, UL to the Upper Limit.
Note: $R^2 = .26$ (Hosmer & Lemeshow) .3 (Cox & Snell) .4 (Nagelkerke). Model $\chi^2(2) = 21.447, p < .001$.



(a) Likelihood by predictor fear

(b) Likelihood by predictor happiness

Fig. 4. Likelihood to be in a sharing attitude as opposed to a privacy attitude by predictors fear and happiness separately.

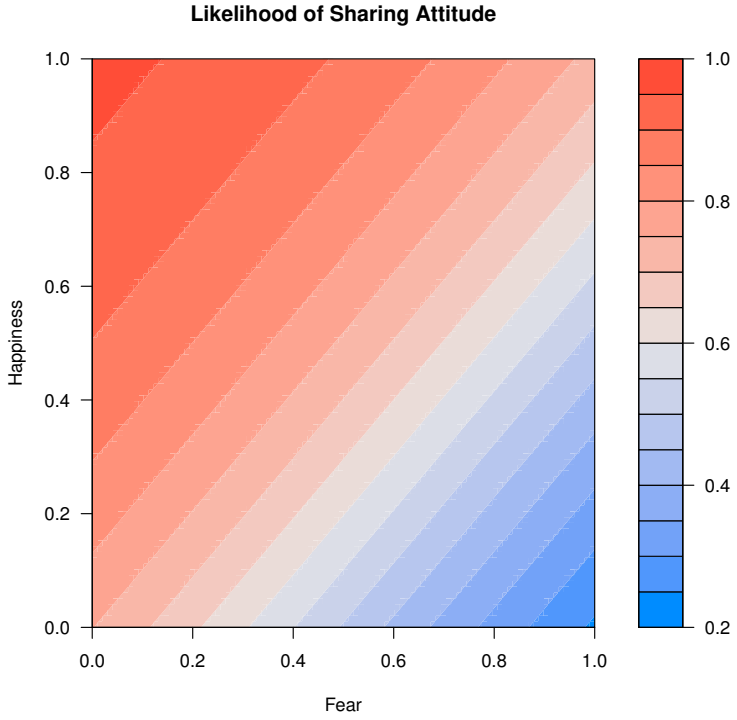


Fig. 5. Likelihood to be in sharing or privacy attitude depending on fear *and* happiness.

by 10% implies that the participant is less than half as likely to be in a sharing attitude.

Page 53 summarizes the results graphically. Figure 6 contains the likelihoods of a sharing attitude as opposed to a privacy attitude for the tone analysis predictors fear and joy separately. Figure 7 displays the regression surface for both predictors combined.

We reject the null hypothesis $\mathsf{H}_{\mathsf{Emo},0}$. Given that both the discriminative analysis on coded emotion and tone analysis agree, we accept the alternative hypotheses: $\mathsf{H}_{\mathsf{Emo},1.1}$ – Participants with fear are more likely to be in PA and less likely to be in SA. $\mathsf{H}_{\mathsf{Emo},1.2}$ – participants with happiness/joy are more likely to be in SA and less likely to be in PA.

6.6.3 Adversaries vs. Close Connections

We analyzed to what extent the kinds of parties the participants mention predict privacy attitude (PA) or a sharing attitude (SA). Privacy attitude is the baseline. We consider the codes adversaries and close connections.

The logistic regression model was statistically significant, $\chi^2(2, 60) = 10.985, p = .004$. The model explained between 13% (Hosmer & Lemeshow) and 22% (Nagelkerke) of the variance.

The regression classified 47% of the privacy cases and 87% of the sharing cases correctly. Overall, it achieved an accuracy of 67%. Table 6 on page 54 gives an overview over the regression coefficients.

Participants referencing adversaries are more likely to be in a privacy attitude. Holding the predictor close connections constant, participants are roughly five times as likely to be in a privacy attitude when they reference adversaries.

Participants talking about close connections are more likely to be in a sharing attitude. Holding the predictor adversaries constant, participants are nearly three times as likely to be in a sharing attitude when they reference close connections.

Page 54 displays all results for this regression. Figure 8 compares the likelihoods for a flip to sharing attitude depending on the predictors adversaries and close connections separately. Figure 9 displays the regression surface depending on both predictors.

We reject the null hypothesis $\mathsf{H}_{\mathsf{R},0}$.

6.6.4 Model Performance

We established the performance of the three models comparing between four cases: (a) coded emotion (based on same data), (b) tone analysis (based on same data), (c) tone analysis (cross-validation), and (d) coded parties (based on same data). Figure 10 contains a comparative Receiver Operating Characteristic (ROC) curve for the named cases. The cross-validation of the tone analysis model was done on a new MTurk dataset with 54 cases; 31 cases are in sharing attitude, 23 cases are in privacy attitude.

The logistic regression with coded emotions showed a performance measured in area under the curve (AUC) of 79%, on the borderline of a good discrimination.

The model based on tone analysis showed an AUC of 91%, an excellent discrimination. The cross-validation of the tone analysis model with a new dataset showed an equally excellent discrimination, with 93% AUC.

The model based on coded parties (adversaries and close connections) was found to have fair discrimination with an AUC of 72%.

We compared the logistic regressions against linear discriminant analyses (LDAs). The binary logistic regressions and LDAs (coded emotions and relationships) were equally accurate. For the tone analysis data, LDA predicted privacy attitude correctly 93% of the cases (as opposed to 81% in the logistic regression model). However, LDA was less accurate on sharing attitude predictions (correct 77% as opposed to 86% in the logistic regression model).

7 Discussion

7.1 Privacy and Sharing Attitudes Differ

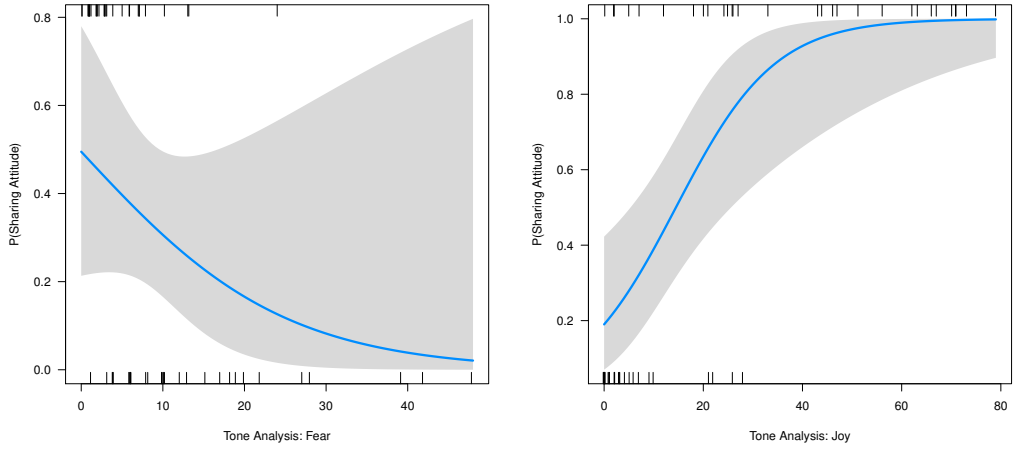
Privacy and sharing attitudes are significantly different across a series of codes including how the person thinks of others, his relation to others, his emotions, own and others' activities as well as data that comes to mind (RQΔ). We observed large effect sizes, measured in Cohen's d. We give a brief summary of the differences in Table 7 on page 55.

Given that PA and SA are different already, we expect that any comparison between privacy attitude and sharing/disclosure behavior will be impacted by the difference on attitudes. We also expect that the privacy paradox observed in PA − SB scenarios [2, 3, 23, 30, 81] is in parts explained by the difference in attitudes.

Table 5. Coefficients of the logistic regression on tone fear and joy as predictors.

Predictor	B	SE	Wald χ^2	df	p	Odds Ratio	95% CI		R
							LL	UL	
TA Fear	−0.07976	0.06586	1.5	1	.23	0.923	0.792	1.025	.13
TA Joy	0.10015	0.03275	9.4	1	**.002****	**1.105**	1.048	1.191	.34
Constant	−0.97164	0.81608	1.4	1	.23	0.378	0.070	1.813	

CI refers to the Confidence Interval, LL to the Lower Limit, UL to the Upper Limit.
Note: $R^2 = .47$ (Hosmer & Lemeshow) .48 (Cox & Snell) .64 (Nagelkerke). Model $\chi^2(2) = 39.357, p < .001$.



(a) Likelihood by predictor TA fear

(b) Likelihood by predictor TA joy

Fig. 6. Likelihood to be in a sharing attitude as opposed to a privacy attitude based on Tone Analysis fear and joy separately.

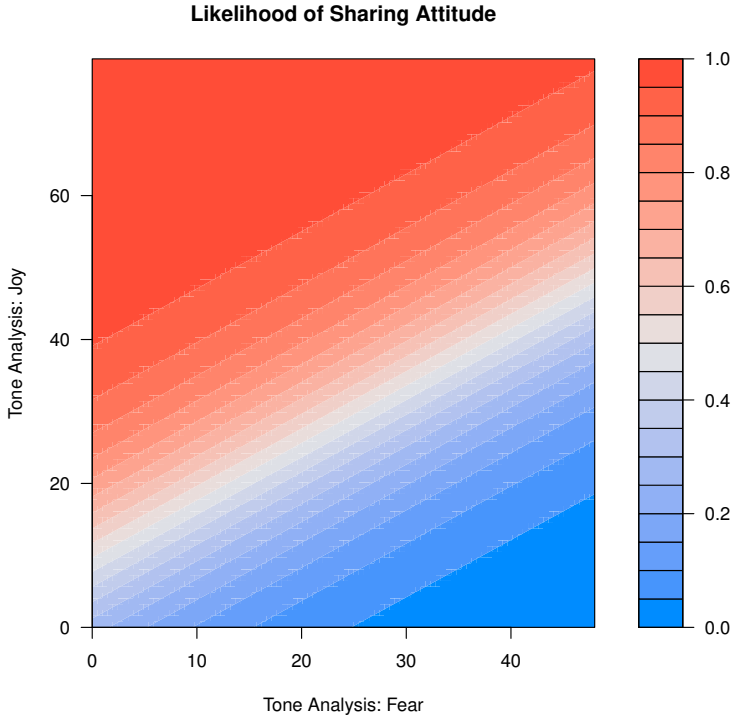
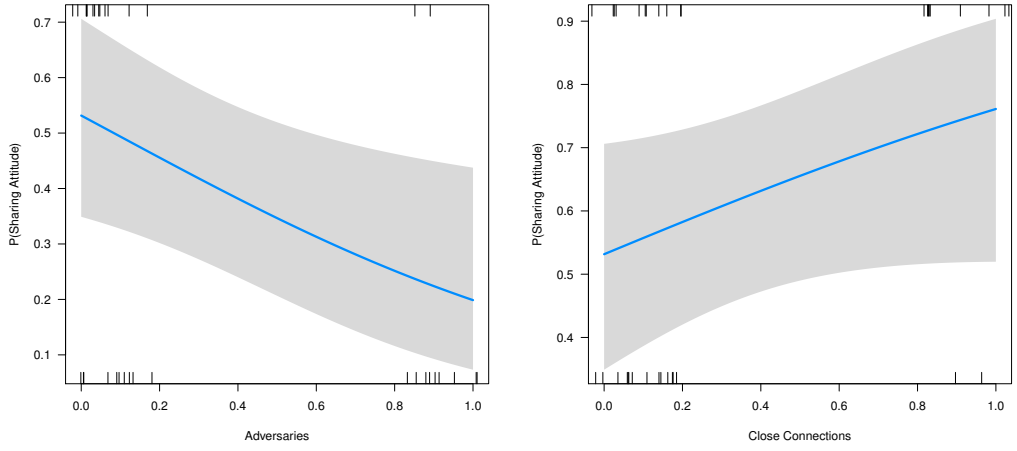


Fig. 7. Likelihood to be in sharing or privacy attitude depending on Tone Analysis fear *and* joy.

Table 6. Coefficients of the logistic regression on presence of codes on adversaries or close connections.

Predictor	B	SE	Wald χ^2	df	p	Odds Ratio	95% CI		R
							LL	UL	
Adversaries	−1.5210	0.6677	5.2	1	**.023***	**0.218**	0.053	0.762	.25
Close Connections	1.0327	0.6437	2.6	1	.11	2.809	0.821	10.632	.18
Constant	0.1265	0.3826	0.11	1	.74	1.135	0.535	2.438	

CI refers to the Confidence Interval, LL to the Lower Limit, UL to the Upper Limit.
Note: $R^2 = .13$ (Hosmer & Lemeshow) .17 (Cox & Snell) .22 (Nagelkerke). Model $\chi^2(2) = 10.985, p = .004$.



(a) Likelihood by predictor Adversaries **(b)** Likelihood by predictor Close Connections

Fig. 8. Likelihood to be in a sharing attitude as opposed to a privacy attitude based on adversaries or close connections codes.

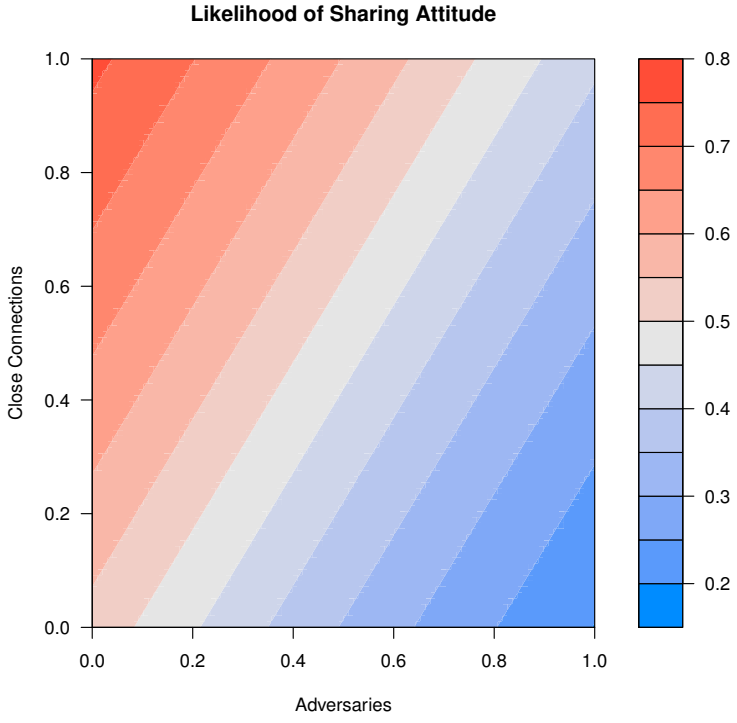


Fig. 9. Likelihood to be in sharing or privacy attitude depending on adversaries and close connections codes.

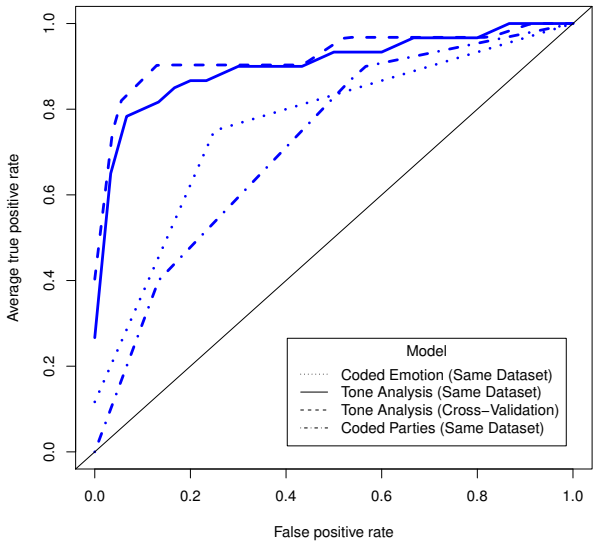


Fig. 10. Receiver Operating Characteristic for coded emotion, tone analysis, cross-validated tone analysis and coded parties.

Table 7. Significant differences between PA and SA.

	Privacy Attitude PA	Sharing Attitude SA
Others	org./business	other users (peers)
Relationships	gov./adversaries	close connections
Emotions	fear/concern	happiness/joy
Actions	others' negative actions	own content created

Methodologically, our research thereby highlights that it is important to consider PA and PB for pure privacy studies and to be aware of sharing attitudes SA when sharing behavior SB is considered.

7.2 PA and SA Cause Different Emotions

From the causal logistic regression on RQ⊨E, we know that the conditions PA and SA impact the emotions elicited in the participants' texts. The PA condition increases the likelihood of fear and decreases the likelihood of happiness. Similarly, the SA condition increases the likelihood of happiness and decreases the likelihood of fear.

It stands to reason that fear is also a factor when users deliberate privacy in real life and that happiness (or joy and pleasure) is a factor when users are in a sharing attitude.

7.3 Emotions and Relationships Can Discriminate PA vs. SA

We find that coded fear and happiness, tone analysis fear and joy and relationship codes for adversaries and close connections can all discriminate between privacy attitude PA and sharing attitude SA successfully.

The logistic regression with tone analysis fear and joy as predictors was especially accurate as discriminative classifier on PA and SA. Having cross-validated this model with another dataset with equally excellent accuracy of AUC 93%, we believe such a model could be reused in future research as a diagnostic instrument.

All investigated discriminative classifiers show a watershed between privacy and sharing attitude, in which a negative valence increases the likelihood of PA and decreases the likelihood of SA. A positive valence increases the likelihood of SA and decreases the likelihood of PA.

We perceive the classifiers as useful tools for future research. We note that the given classifiers will be applicable directly to a think-aloud protocol, in which users voice their current thoughts as they engage in HCI. The classifier on tone analysis operates on the same interface as psycho-physiological measurements of affect via face geometry (e.g., NOLDUS Face Reader or Microsoft Emotional Recognition). Whereas the accuracy of the classifiers on observed affect still needs to be validated in future work, the given results show great promise.

Example 1 (Classification in Experiments)**.** *Imagine an experiment in which users engage in their normal activities on Facebook, reporting their thoughts in a think-aloud protocol and being observed by a video camera feeding an affect recognition system. The classification system is setup to combine content and sentiment classification to mark sections of the HCI in which users are more concerned with* PA *or more concerned with* SA*. This enables the experimenter to control whether given stimuli affected the user and to focus human coding on sections that have been preselected by the tools.*

7.4 Ambivalent Privacy and Sharing Attitudes

This study shows that privacy attitude and sharing attitude differ significantly on a range of characteristics. When studies compare privacy attitude PA and sharing behavior SB in any form, we expect to see a dichotomy readily explained by the difference between the underlying attitudes.

However, this observation is not confined to the realm of lab-studies. When users consider their attitude to privacy, think about their concerns how adversaries might harm them, expose them to hacking, identity theft, targeted ads or disclosure to third parties, feel fear and worry, users are more likely to endorse privacy.

When the very same users are in a sharing situation with all the factors that characterize sharing attitude—communicating with close connections and friends, getting these little bursts of pleasure for content shared and liked, feeling happiness and joy—users are less likely to follow through with their privacy attitude. We believe that this is the case because a different attitude holds the reigns at the time.

7.5 Ethics

Our study received approval from the ethics board of our university. Our MTurk participants could provide the free-form text answering the PA/SA question in their own time. They were only instructed to provide an answer of at least 250 words. The MTurk participants were remunerated with $1.

Our pool of coders, three coders for the pretest and two coders for the main study were all remunerated at the local customary rate.

7.6 Limitations

Sample. Our sample was taken from a US population, but not sampled representatively. The responses were collected with MTurk. Whereas Buhrmester et al. [17], Paolacci et al. [69] and Goodman et al. [42] claimed high reliability with MTurk samples, Rouse [77] found lower reliability, however, for personality test scales. Casler et al. [22] found that distributions are similar to the ones obtained with social recruiting, however offer a greater diversity. We made provisions for the possibility of unreliable samples by introducing a manipulation check establishing that the participants had indeed answered our question, before the response was accepted for coding.

Catch-All Categories. While certain codes in the codebook received low occurrence, the 'other' codes of the different categories received a high number of hits. We provided a refined second-level coding of catch-all 'other' codes for SPE (views of others), ACO (others' actions) and DAT (data referred to by participant), SEL (how participant views himself) and EMO (participant's emotions).

Questionnaire Design. We note that our findings are limited to our question framing, that is with respect to privacy and sharing. Future studies designed to answer questions such as "What are the benefits and drawbacks of online [privacy/sharing]?" while re-using the same methodology and the codebook.

8 Conclusion

This study is the first to empirically investigate the difference between privacy attitude and sharing attitude. It shows that privacy attitude differs significantly from sharing attitude on a number of codes, such as expressed emotions or relations with others. The conflicting concepts between both attitudes indicate that it may be challenging for users to follow through on both attitudes at the same time.

This study vouches that privacy and sharing attitudes can be classified with excellent discrimination. Privacy attitude is found to be indicated by fear and the consideration of adversaries. Sharing attitude is found to be indicated by happiness and the consideration of close connections. In practice, this likely has implications for privacy designs. As future work, we are interested in investigating the impact of the differing attitudes on subsequent behavior.

In addition, the discriminative analysis classifiers are themselves useful components for further research in first instance as manipulation checks for experimentation on written free-form texts or think-aloud protocols. They can further help to preselect data for subsequent human coding. We believe that it is of independent methodological merit to show that discriminative logistic regression classifiers are performing well in usable-privacy scenarios.

The study is the first to offer a hint that privacy attitude might be governed by defensive motivation and that sharing attitude might be governed by appetitive motivation. This observation asks for future research into the impact of the motivational systems on privacy and sharing. We would expect that privacy and sharing attitudes are decoupled to some extent and, further, that the experience of pleasure and happiness (e.g., while sharing on Facebook) reinforces a sharing attitude. That would in parts explain why—when happily sharing with friends—privacy is all but forgotten.

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References

[1] M. S. Ackerman, L. F. Cranor, and J. Reagle. Privacy in e-commerce: examining user scenarios and privacy preferences. In *Proceedings of the 1st ACM conference on Electronic commerce*, pages 1–8. ACM, 1999.

[2] A. Acquisti and R. Gross. Imagined communities: Awareness, information sharing, and privacy on the facebook. In *Privacy enhancing technologies*, pages 36–58. Springer, 2006.

[3] A. Acquisti and J. Grossklags. Privacy and rationality in individual decision making. *IEEE Security & Privacy*, 2:24–30, 2005.

[4] I. Ajzen and M. Fishbein. Attitude-behavior relations: a theoretical analysis and review of empirical research. *Psychological bulletin*, 84:888–918, 1977.

[5] I. Ajzen and M. Fishbein. The influence of attitudes on behavior. *The handbook of attitudes*, 173:221, 2005.

[6] C. T. Allen, K. A. Machleit, S. S. Kleine, and A. S. Notani. A place for emotion in attitude models. *Journal of Business Research*, 58(4):494–499, 2005.

[7] I. Altman. *The Environment and Social Behavior: Privacy, Personal Space, Territory, and Crowding*. ERIC, 1975.

[8] I. Altman, A. Vinsel, and B. B. Brown. Dialectic conceptions in social psychology: An application to social penetration and privacy regulation. *Advances in experimental social psychology*, 14:107–160, 1981.

[9] M. Augoustinos, I. Walker, and N. Donaghue. *Social cognition: An integrated introduction*. Sage, 2014.

[10] R. P. Bagozzi. The construct validity of the affective, behavioral, and cognitive components of attitude by analysis of covariance structures. *Multivariate Behavioral Research*, 13(1):9–31, 1978.

[11] S. B. Barnes. A privacy paradox: Social networking in the united states. *First Monday*, 11(9), 2006.

[12] P. M. Bentler and G. Speckart. Models of attitude–behavior relations. *Psychological review*, 86(5):452, 1979.

[13] W. Bos and C. Tarnai. Content analysis in empirical social research. *International Journal of Educational Research*, 31(8):659–671, 1999.

[14] M. M. Bradley, M. Codispoti, B. N. Cuthbert, and P. J. Lang. Emotion and motivation i: defensive and appetitive reactions in picture processing. *Emotion*, 1(3):276, 2001.

[15] S. J. Breckler. Empirical validation of affect, behavior, and cognition as distinct components of attitude. *Journal of personality and social psychology*, 47(6):1191, 1984.

[16] T. Buchanan, C. Paine, A. N. Joinson, and U.-D. Reips. Development of measures of online privacy concern and protection for use on the internet. *Journal of the American Society for Information Science and Technology*, 58(2):157–165, 2007.

[17] M. Buhrmester, T. Kwang, and S. D. Gosling. Amazon's mechanical turk a new source of inexpensive, yet high-quality, data? *Perspectives on psychological science*, 6(1):3–5, 2011.

[18] A. Buss. *Psychological dimensions of the self*. Sage Publications, Inc, 2001.

[19] D. Campbell. Social attitudes and other acquired behavioral dispositions. *Psychology: a study of a science*, 6:94–172, 1963.

[20] P. A. Carpenter and M. A. Just. Sentence comprehension: A psycholinguistic processing model of verification. *Psychological review*, 82(1):45, 1975.

[21] P. A. Carpenter, M. A. Just, T. A. Keller, W. F. Eddy, and K. R. Thulborn. Time course of fmri-activation in language and spatial networks during sentence comprehension. *Neuroimage*, page 216, 1999.

[22] K. Casler, L. Bickel, and E. Hackett. Separate but equal? a comparison of participants and data gathered via amazon's mturk, social media, and face-to-face behavioral testing. *Computers in Human Behavior*, 29(6):2156–2160, 2013.

[23] R. K. Chellappa and R. G. Sin. Personalization versus privacy: An empirical examination of the online consumer's dilemma. *Information Technology and Management*, 6(2-3):181–202, 2005.

[24] K. R. Christensen. Negative and affirmative sentences increase activation in different areas in the brain. *Journal of Neurolinguistics*, 22(1):1–17, 2009.

[25] K. P. Coopamootoo and T. Groß. Evidence-based methods for privacy and identity management. In *Privacy and Identity Management. Facing up to Next Steps*, pages 105–121. Springer, 2016.

[26] N. K. Denzin and Y. S. Lincoln. *Handbook of qualitative research*. Sage publications, inc, 1994.

[27] V. Derlega, S. Metts, S. Petronio, and S. Margulis. Sage series on close relationships. self-disclosure, 1993.

[28] D. DeSteno, R. E. Petty, D. D. Rucker, D. T. Wegener, and J. Braverman. Discrete emotions and persuasion: the role of emotion-induced expectancies. *Journal of personality and social psychology*, 86(1):43, 2004.

[29] A. Dickinson and M. F. Dearing. Appetitive-aversive interactions and inhibitory processes. *Mechanisms of learning and motivation*, pages 203–231, 1979.

[30] T. Dienlin and S. Trepte. Is the privacy paradox a relic of the past? an in-depth analysis of privacy attitudes and privacy behaviors. *European Journal of Social Psychology*, 45(3):285–297, 2015.

[31] R. J. Dolan. Emotion, cognition, and behavior. *science*, 298(5596):1191–1194, 2002.

[32] A. H. Eagly and S. Chaiken. *The psychology of attitudes*. Harcourt Brace Jovanovich College Publishers, 1993.

[33] A. H. Eagly and S. Chaiken. The advantages of an inclusive definition of attitude. *Social Cognition*, 25(5):582, 2007.

[34] A. J. Elliot. *Handbook of approach and avoidance motivation*. Taylor & Francis, 2008.

[35] S. D. Farley and M. F. Stasson. Relative influences of affect and cognition on behavior: Are feelings more related to blood donation intentions? *Experimental Psychology*, 50(1):55, 2003.

[36] R. Fazio and C. Williams. Attitude accessibility as a moderator of the attitude-perception and attitude-behavior relations: an investigation of the 1984 presidential election. *Personality and social psychology*, 51:504–514, 1986.

[37] R. H. Fazio. *How do attitudes guide behavior?* Guilford Press, 1986.

[38] R. H. Fazio. On the power and functionality of attitudes: The role of attitude. *Attitude structure and function*, pages 153–179, 1989.

[39] R. H. Fazio and M. P. Zanna. Direct experience and attitude-behavior consistency. *Advances in experimental social psychology*, 14:161–202, 1981.

[40] M. Fishbein and I. Ajzen. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Addison-Wesley, 1974.

[41] L. Gideon. The art of question phrasing. In *Handbook of survey methodology for the social sciences*, pages 91–107. Springer, 2012.

[42] J. K. Goodman, C. E. Cryder, and A. Cheema. Data collection in a flat world: The strengths and weaknesses of mechanical turk samples. *Journal of Behavioral Decision Making*, 26(3):213–224, 2013.

[43] R. Gross and A. Acquisti. Information revelation and privacy in online social networks. In *Proceedings of the 2005 ACM workshop on Privacy in the electronic society*, pages 71–80. ACM, 2005.

[44] J. Grossklags and A. Acquisti. When 25 cents is too much: An experiment on willingness-to-sell and willingness-to-protect personal information. In *WEIS*, 2007.

[45] M. Hasegawa, P. A. Carpenter, and M. A. Just. An fmri study of bilingual sentence comprehension and workload. *Neuroimage*, 15(3):647–660, 2002.

[46] A. N. Joinson, U.-D. Reips, T. Buchanan, and C. B. P. Schofield. Privacy, trust, and self-disclosure online. *Human–Computer Interaction*, 25(1):1–24, 2010.

[47] M. J. Jones and P. A. Shoemaker. Accounting narratives: A review of empirical studies of content and readability. *Journal of Accounting Literature*, 13:142, 1994.

[48] A. Jordan. On discriminative vs. generative classifiers: A comparison of logistic regression and naive bayes. *Advances in neural information processing systems*, 14:841, 2002.

[49] S. M. Jourard. *Self-disclosure: An experimental analysis of the transparent self*. John Wiley, 1971.

[50] S. M. Jourard. *The transparent self*. Van Nostrand Reinhold (Trade), 1971.

[51] S. Kokolakis. Privacy attitudes and privacy behaviour: A review of current research on the privacy paradox phenomenon. *Computers & Security*, 64:122–134, 2017.

[52] R. H. Kolbe and M. S. Burnett. Content-analysis research: An examination of applications with directives for improving research reliability and objectivity. *Journal of consumer research*, 18(2):243–250, 1991.

[53] M. H. Kuhn and T. S. McPartland. An empirical investigation of self-attitudes. *American sociological review*, 19(1):68–76, 1954.

[54] P. Kumaraguru and L. Cranor. Privacy indexes: A survey of westin's studies. Technical report, CMU-ISRI Technical Report, 2005.

[55] S. Kvale and S. Brinkman. Interviews: Learning the craft of qualitative interviewing, 2009.

[56] P. J. Lang, M. M. Bradley, and B. N. Cuthbert. Emotion, motivation, and anxiety: Brain mechanisms and psychophysiology. *Biological psychiatry*, 44(12):1248–1263, 1998.

[57] P. J. Lang, M. M. Bradley, B. N. Cuthbert, et al. Motivated attention: Affect, activation, and action. *Attention and orienting: Sensory and motivational processes*, pages 97–135, 1997.

[58] R. LaPierre. Attitudes vs. actions. *Social Forces*, 13:230–237, 1934.

[59] Y. S. Lincoln and E. G. Guba. *Naturalistic inquiry*, volume 75. Sage, 1985.

[60] M. Malheiros, S. Preibusch, and M. A. Sasse. "fairly truthful": The impact of perceived effort, fairness, relevance, and sensitivity on personal data disclosure. In *International Conference on Trust and Trustworthy Computing*, pages 250–266. Springer, 2013.

[61] S. T. Margulis. On the status and contribution of westin's and altman's theories of privacy. *Journal of Social Issues*, 59(2):411–429, 2003.

[62] J. D. Morris, C. Woo, J. A. Geason, and J. Kim. The power of affect: Predicting intention. *Journal of Advertising Research*, 42(3):7–17, 2002.

[63] K. A. Neuendorf. *The content analysis guidebook*. Sage, 2002.

[64] P. A. Norberg, D. R. Horne, and D. A. Horne. The privacy paradox: Personal information disclosure intentions versus behaviors. *Journal of Consumer Affairs*, 41(1):100–126, 2007.

[65] A. Nosko, E. Wood, and S. Molema. All about me: Disclosure in online social networking profiles: The case of facebook. *Computers in Human Behavior*, 26(3):406–418, 2010.

[66] A. N. Oppenheim. *Questionnaire design, interviewing and attitude measurement*. Bloomsbury Publishing, 2000.

[67] T. M. Ostrom. The relationship between the affective, behavioral, and cognitive components of attitude. *Journal of Experimental Social Psychology*, 5(1):12–30, 1969.

[68] L. Palen and P. Dourish. Unpacking privacy for a networked world. In *CHI '03*, pages 126–136. ACM, USA, 2003.

[69] G. Paolacci, J. Chandler, and P. G. Ipeirotis. Running experiments on amazon mechanical turk. *Judgment and Decision making*, 5(5):411–419, 2010.

[70] S. L. B. Payne. *The Art of Asking Questions: Studies in Public Opinion, 3*. Princeton University Press, 2014.

[71] R. Perloff. *The dynamics of persuasion:communication and attitudes in the 21st century*, chapter Attitudes: definition and structure. Routledge, 2010.

[72] S. Petronio. *Boundaries of privacy: Dialectics of disclosure*. Suny Press, 2012.

[73] S. Preibusch. Guide to measuring privacy concern: Review of survey and observational instruments. *International Journal of Human-Computer Studies*, 71(12):1133–1143, 2013.

[74] S. J. Press and S. Wilson. Choosing between logistic regression and discriminant analysis. *Journal of the American Statistical Association*, 73(364):699–705, 1978.

[75] D. Riff, S. Lacy, and F. Fico. *Analyzing media messages: Using quantitative content analysis in research*. Routledge, 2014.

[76] M. J. Rosenberg and C. I. Hovland. Cognitive, affective, and behavioral components of attitudes. *Attitude organization and change: An analysis of consistency among attitude components*, 3:1–14, 1960.

[77] S. V. Rouse. A reliability analysis of mechanical turk data. *Computers in Human Behavior*, 43:304–307, 2015.

[78] H. Schuman and S. Presser. *Questions and answers in attitude surveys: Experiments on question form, wording, and context*. Sage, 1996.

[79] N. Schwarz. Emotion, cognition, and decision making. *Cognition & Emotion*, 14(4):433–440, 2000.

[80] N. Schwarz, H. Bless, and G. Bohner. Mood and persuasion: Affective states influence the processing of persuasive communications. *Advances in experimental social psychology*, 24:161–199, 1991.

[81] S. Spiekermann, J. Grossklags, and B. Berendt. E-privacy in 2nd generation e-commerce: privacy preferences versus actual behavior. In *Proceedings of the 3rd ACM conference on Electronic Commerce*, pages 38–47. ACM, 2001.

[82] M. Taddicken. Measuring online privacy concern and protection in the (social) web: Development of the apcp and apcp-18 scale. In *60th Annual ICA Conference (International Communication Association), Singapur (June 2010)*, 2010.

[83] M. Taddicken. The 'privacy paradox'in the social web: The impact of privacy concerns, individual characteristics, and the perceived social relevance on different forms of self-disclosure. *Journal of Computer-Mediated Communication*, 19(2):248–273, 2014.

[84] S. Utz and N. Kramer. The privacy paradox on social network sites revisited: The role of individual characteristics and group norms. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 3(2):2, 2009.

[85] A. F. Westin. Privacy and freedom. *Washington and Lee Law Review*, 25(1):166, 1968.

[86] A. W. Wicker. Attitudes versus actions: The relationship of verbal and overt behavioral responses to attitude objects. *Journal of Social issues*, 25(4):41–78, 1969.

A Model Diagnostics

A.1 Coded Emotion

We have a binary logistic regression with two nominal predictors and a binary dependent variable. There were no cases with large residuals. Seven cases had a higher than expected leverage, about twice the expected leverage. The variance inflation factor (VIF) was low for both predictors, at 1.016. The independence of errors was sufficiently given, Durbin-Watson at $1.75, p = .33$. We perceive the model as sufficiently accurate.

A.2 Tone

We consider a logistic regression with two interval predictors and a binary dependent variable. There were two cases with large standardized residuals, but well below 3 SD. There were three cases with roughly twice the expected leverage. For the independence of errors, we reject the hypothesis of autocorrelation, Durbin-Watson $1.92, p = .742$. The variance inflation factor (VIF) was close to 1 for both predictors. An inspection of the residuals histogram and QQ plot shows that the residuals are nearly perfectly normally distributed. We conclude that the model based on tone has a high accuracy.

A.3 Adversaries vs. Close Connections

We have a binary logistic regression with two nominal predictors and a binary dependent variable. There were no cases with large residuals. Two cases had a more than average leverage, but less than three times the average leverage. The model does not show autocorrelation, Durbin-Watson $1.78, p = .41$. We observe variance inflation factors close to 1. We perceive the model as sufficiently accurate.

A.4 Finer Codes

The 'other' codes in each category were further examined yielding more codes for SEL04, SPE04, SPE05, EMO08, AC013 and DAT10. Table 8 describes the finer codes.

Table 8. The finer codes derived from the 'other' codes defined in the codebook.

Code-Content	Code-Content	Code-Content	Code-Content
How Participant Views Others	**Participant's view of Others' Activities**	**Data/Information**	**How Participant Views Himself**
SPE04.1-close-connections	ACO13.1-passive-threats	DAT10.1-personal-identifiable-info	SEL04.1-victim
SPE04.2-certain-people	ACO13.2-active-threats	DAT10.2-specific-content	SEL04.2-the-product
SPE05.1-businesses/company in general	ACO13.3-others'-problems	DAT10.3-malicious-data	SEL04.3-the-email
SPE05.2-instituitions	ACO13.4-support	DAT10.4-my-information	SEL04.4-criminal
SPE05.3-specific-names		DAT10.5-meta-data-profiling	SEL04.5-sharer
SPE05.4-on/offline-SP	**Participant's Emotions**		SEL04.6-miserable-angry-loser
SPE05.5-technology-tools	EMO08.1-Satisfaction		SEL04.7-online-avatar
SPE04-05.1-adversaries	EMO08.2-Indifference		
SPE04-05.2-connection-acquaintainces-friends	EMO08.3-Jealousy		
SPE04-05.3-anyone-on/offline			

Table 9. Pretest superset of identified coded concepts grouped in themes.

Perception		3. Control of Access	4. Emotions & Effect on Life		Activities		7. Data
1. Self	2. Others		Negative Affect	Positive Affect	5. Others	6. Self	
customer victim profile/ online account	friends/family adversaries neutrals authority	self guarantee provided by others not to be broken right	annoyed, unfair, unjust vulnerable, helpless concern, worry, fear difficult, hard	trust, hope happy, pleased, good connection, closeness generous, benevolent improvement to life	track, collect spy, watch targeted by adverts steal, fraud reveal to others	make, follow friends life support research help others purchases visit SNS create content work image building	identifiable online identity financial location profiling purchases content creation auxiliary (e.g., geo-location)

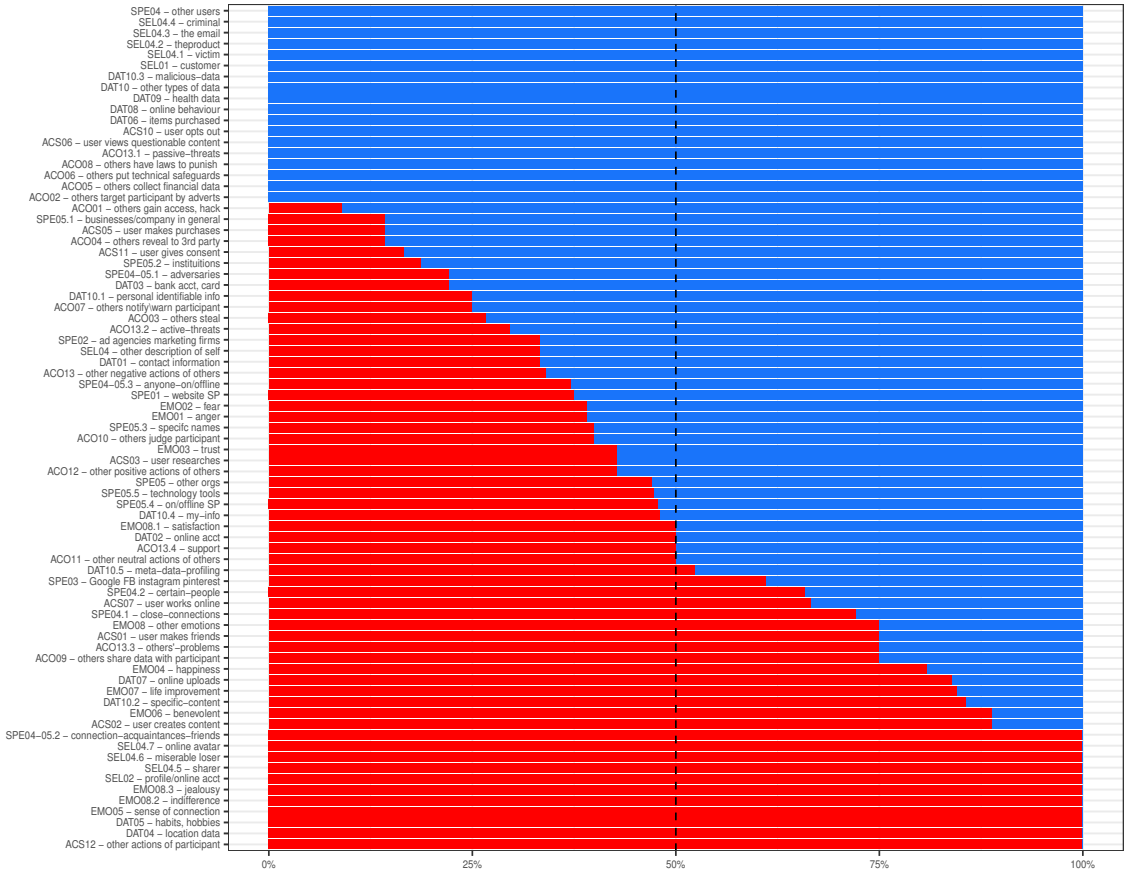

Fig. 11. Codes prevalent in privacy attitude (PA ■) and sharing attitude (SA ■).