Can We Reliably Measure Observational Privacy as a Dimension of Privacy in a Romanian and German Population and Explain Various Privacy-Related Behaviors?

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Abstract

The concept of observational privacy is about the individual's control over being observed by others and the distinction between people they allow to observe them in different situations and those they exclude. Humans show differences in their concerns about observational privacy threats and seem to value this intimacy diversely. Privacy is not yet empirically measured as a universal human value, but first research suggests that it could fit into Schwartz's (2017) framework as an additional universal human value. This survey study (N = 230) aimed to reliably measure observational privacy as a dimension of privacy within the framework proposed by Schwartz and colleagues (2017) in a German and Romanian population. Next, it aimed to find observational privacy as a distinct dimension of informational and social privacy. It also investigated whether observational privacy as a value relates to various privacy-related behaviors. The study examined whether gender, age, and nationality are related to observational privacy as a value. Results indicate that observational privacy was reliably measured as a distinct dimension of privacy as a value in a Romanian and German population. In addition, the scale measuring observational privacy was partially validated. High scores on observational privacy as a value predicted some privacy-related behaviors. Observational privacy as a value was positively moderately correlated to the universal human value face and the dimensions of social and informational privacy. Furthermore, no gender, nationality, or age effects on observational privacy as a value were found.

1. Introduction

Human beings generally disclose personal information as part of interpersonal interaction. People are concerned to varying degrees about exposing themselves to others during different activities, for example, when changing clothes or going to the toilet (Conklin, 1976). Thereby, the following different attitudes can be observed. Some people place great importance on preserving their privacy in such situations, while others are unconcerned about being observed (Kokolakis, 2017). This can also be reflected in their behavior, for example, people may differ in the extent to which they reveal personal secrets or keep them to themselves and in which situations they reveal them to others (Vrij et al., 2003). Such complex interplay of preferences encompasses the concept of observational privacy, where individuals exercise control over being observed by others and distinguish between those they allow access to specific details and those they exclude from them (Conklin, 1976). The importance of this study lies in its focus on the growing privacy issues that accompany technological advancements, impacting personal autonomy and freedom (Steeves, 2016). Recently, Markink (2024) reliably measured observational privacy as a dimension of privacy as a value in an UK population. This research examines whether observational privacy can be measured as a dimension of privacy in Romanian and German citizens. Next to that, it tests the validity of the scale developed by Markink (2024) and Jansen (2023), measuring observational privacy as a value.

2. Theoretical Background

2.1. Privacy and Privacy Dimensions

Privacy is a basic human right that implies having the control to decide when and what personal information is transferred to others (Diggelmann & Cleis, 2014). It includes keeping private information to oneself, feeling comfortable, and keeping one's thoughts private (Westin, 1968). Privacy can be seen as "the right to be let alone" (Warren & Brandeis, 1890, p.195), as the control over personal information, or as the autonomy over personal matters (Moore, 2003). Altman (1975) defines privacy as "the selective control of access to the self" (p.24). Moore (2008) concluded that, on the one hand, there is physical privacy, which defines the control over physical objects or places, and on the other hand, there is information privacy, which describes the control over one's personal information. There are thus many different definitions of privacy.

Several approaches by researchers are explained to organize the concept of privacy into different dimensions. Burgoon (1982) theorized that privacy consists of four interrelated dimensions, namely physical, social, psychological, and informational privacy. Physical

privacy is the regulation of one's personal space, and psychological privacy defines the process of controlling cognitive and affective input and output. Social privacy is related to people's control over the degree of interaction with others, whereas informational privacy is defined as managing the acquisition and sharing of personal information (Burgoon, 1982).

Another researcher defined four different dimensions of privacy (Westin, 1968). These are solitude, intimacy, anonymity, and reserve. Solitude means having personal space and not being observed. Intimacy involves choosing seclusion to build strong connections with people in smaller groups. Anonymity describes having the freedom to keep your identity and actions private. Finally, reserve is about controlling how much information you share with others (Reynold, 1969). The dimensions of solitude, anonymity, and reserve partly contain aspects of the threat of being observed by someone. Namely, the dimension of solitude includes the control over external observation, and the dimension of anonymity includes remaining behaviors private and unrecognized by strangers. Furthermore, the dimension of reserve includes having control over who we allow to access personal information or observe behavior, as is the case with observational privacy (Vrij et al., 2003).

In contrast to Westin (1968), Conklin (1976) considered these aspects of solitude, anonymity, and reserve to belong to one single dimension of privacy and named this dimension observational privacy within his framework of privacy. Given this integration of observational privacy as a dimension into the concept of privacy, Conklin's (1976) framework is particularly noteworthy for this research. He concluded that there are four dimensions of privacy, namely informational privacy, remote observational privacy, direct observational privacy, and contact privacy.

Informational privacy is about controlling the disclosure of personal observation. Contact privacy is regulating physical contact with others and regulating the external influence of one's environment (Conklin, 1976). Observational privacy involves the power of controlling when and where one is observed in both real-world and non-physical settings (Conklin, 1976), which is why Conklin (1976) differentiates observational privacy into remote observational privacy and direct observational privacy. He describes remote observational privacy as the situation in which someone is being observed when the observer is not in the same physical location, for example, by using cameras. Direct observation means that the observer is in the same place as the person being observed and can obtain information about the person using his or her senses, such as sight, hearing, and smell.

Conklin (1976) argues that people value their privacy of observation because they see it as protection for their contact privacy, that is, the control over touch or interference by

others. The fear of interference is particularly high in the case of direct observation, which can be explained by the fact that people have direct contact in this situation and, therefore, "feel more nervous and more subject to immediate retribution" (Conklin, 1976, p. 264). The feeling of shame also plays a significant role in shaping individuals' reactions to potential observation, influencing their level of discomfort (Kämmerer, 2019). Due to the increasing use of technology in our private homes, such as smart-home devices or cameras, it is becoming more necessary to research the need for remote observational privacy as well (Beigi & Liu, 2018; Tan et al., 2022). Indeed, as technology becomes more integrated into our daily lives, exploring the need to protect observational privacy is essential to better understand and protect individual privacy in the modern world, making this study relevant.

In summary, the various definitions and conceptualizations of privacy demonstrate that privacy is a broad concept. It is crucial to recognize that the above frameworks are based on older research findings, which underlines the need for ongoing studies to capture evolving societal dynamics.

2.2. Cultural and Individual Factors

Researchers' divergent definitions and frameworks of privacy underscore the multidimensional nature of the concept, indicating its relevance across different situations. Additionally, privacy depends on individual and cultural factors and is hard to conceptualize with one dominant definition (Altman, 1975). Altmann (1975) explains that privacy is influenced by cultural aspects, implying that while every culture incorporates a concept of privacy, the manner in which individuals maintain this privacy varies across cultures. This suggests that people value privacy across cultures but differ in privacy-related behaviors. Privacy can have different meanings for individuals and is therefore described "as multidimensional, elastic, and dynamic" (Smith et al., 2011, p. 995). Conclusively, privacy is a diverse concept that can be relevant for individuals in various situations. Researchers argued that privacy is a significant value for people, impacting various aspects of their lives (Huijts & Haans, 2023; Jansen, 2023; Markink, 2024).

As demonstrated in the beginning, people differ regarding how much they value their privacy and how important it is to them personally to protect it. Schwartz (1994) extensively researched human values and motivations and studied how these moderate human behavioral patterns. He initially proposed ten universal values, which are "desirable transsituational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity" (Schwartz, 1994, p. 21). Later, he revised this and formulated 19 human values that are motivationally distinct and aim to explain human behavior (Schwartz et al., 2017).

More recently, researchers had the idea to add privacy as an additional value to Schwartz's value theory, as it fulfills the criteria to be a universal human value (Huijts & Haans, 2023; Jansen, 2023; Lammers, 2023; Markink, 2024). Empirical research is needed to integrate privacy into the framework proposed by Schwartz et al. (2017), which is why this research seeks to measure observational privacy as a value within the framework of universal human values (Schwartz et al., 2017). In a study with UK participants, Markink (2024) reliably identified three dimensions of privacy using a questionnaire. She reliably measured the dimensions of informational, social, and observational privacy within the framework proposed by Schwartz et al. (2017). Her findings gave insights into privacy as a general concept and into human behavioral patterns related to privacy (Markink, 2024). However, she only conducted this study with participants living in the UK, which questions the generalizability of the measurement in other populations. The questionnaire must be conducted across diverse populations to generalize the measurement and gather empirical data on whether privacy fits into Schwartz's framework of universal human values in countries beyond the UK.

2.3. Convergent, Predictive, and Discriminant Validity

The validity of the observational privacy as a value scale developed by Jansen (2023) and Markink (2024) has not yet been tested. The current study aims to test the validity of the scale measuring observational privacy by testing the convergent, predictive, and discriminate validity (Valkengoed et al., 2021).

Convergent validity describes when a measurement, in this case observational privacy, demonstrates connections with conceptually associated concepts (Walton & Jones, 2018). It could be that observational privacy is moderately positively correlated with the universal human value "face," which can be defined as "security and power through maintaining one's public image and avoiding humiliation" (Schwartz et al., 2012, p.669). In a multidimensional scaling analysis, Markink (2024) found that face and observational privacy can be categorized into the higher-order quadrant of conservation. Conservation includes values that reflect an individual's avoidance of change and self-restriction (Schwartz et al., 2012). Given that "face" revolves around safeguarding one's public image to avoid change and observational privacy pertains to individuals' capability to control observation, it is highly probable that these two concepts correlate positively. This can be explained as controlling observation, which helps individuals to manage and protect their public image, ensuring that only the desired aspects are revealed to others. This reinforces the link between face and observational privacy as a value (Markink, 2024; Schwartz et al., 2012). Markink (2024) indeed found this correlation

between observational privacy as a value and the universal human value of face in her study. The current study tested whether this correlation between face and observational privacy as a value is also found in Romanian and German populations.

Predictive validity is tested by assessing if the measure predicts the expected outcome (Rosenthal & Rosnow, 2007). The expected outcome of this research is that observational privacy as a value is positively related to observational privacy-related behaviors. This means, for example, only having private conversations when no one else can listen to them (Markink, 2024). This behavior is part of direct observational privacy because it involves being observed by someone nearby using their sense of hearing (Conklin, 1976). In the context of the rising use of technology, this could mean covering up one's laptop camera to ensure one is not being observed (Zheng et al., 2018). Observation by a camera is part of remote observational privacy, which carries the risk of being watched by someone not nearby and, therefore, makes use of technology for observation (Conklin, 1976). Another observational privacy-related behavior is ensuring one cannot be observed while undressing or changing clothes (Lammers, 2023). This behavior can be considered part of direct observation in which the observer uses his or her sense of sight (Conklin, 1976). These three behaviors are relevant for this research because they cover direct observational privacy through the two senses, hearing and seeing. Furthermore, they also address the dimension of remote observational privacy through observation via laptop cameras.

Discriminant validity between groups is analyzed by investigating if scores on a measure show variances among groups where distinctions are anticipated according to theory (Hattie & Cooksie, 1984). [1] Studies found that women display higher privacy concerns and behaviors than men (Lammers, 2023; McGill & Thompson, 2021; Tifferet, 2019; Rowan & Dehlinger, 2014). These studies did not specifically measure if observational privacy concerns are also higher in women but only focused on privacy in general or other dimensions. To address this research gap, this study measures if females' scores on observational privacy as a value are higher than that of men. Since women tend to generally show higher privacy concerns, it is expected to also find significantly higher observational privacy scores in female participants than male participants. Furthermore, Altman (1975) described privacy as a concept influenced by cultural factors. Therefore, one could expect differences in observational privacy measures between different nationalities. The results of different studies show varying results with regard to how much Romanians and Germans value their privacy and whether there are differences between these two nations. Prince and Wallsten (2022) argue that German participants score higher on the observational privacy scale than Romanian

participants, as they found that Germans value their privacy more compared to other nationalities. However, another study showed that 59% of Romanian citizens are very worried about the misuse of their personal data, whereas, in Germany, 57% of the participants answered accordingly (Cecere et al., 2015). Given the studies' inconsistent results, this study examines once more whether there are differences in observational privacy scores between Germans and Romanians. In addition, it seems that there are differences in privacy concerns based on people's age. Studies have shown that older individuals show higher privacy concerns than younger people (Steijn et al., 2016). This appears to be due to the fact that older people associate situations related to personal information with privacy more often than younger people do (Kezer et al., 2016; Steijn et al., 2016; Tabata et al., 2020). None of the studies specifically addressed the difference in observational privacy but focused on privacy in general. Since the studies suggest that older people value their privacy more generally, it is expected that they will also show higher observational privacy concerns.

In summary, the convergent, predictive, and discriminant validity must be tested to validate the scale developed by Markink (2024) and Jansen (2023). Convergent validity is investigated by researching the relationship between observational privacy as a value and the universal human value face. Predictive validity is assessed by studying if observational privacy as a value predicts specific privacy-related behaviors. Lastly, discriminant validity is examined by investigating how the importance participants attach to observational privacy as a value varies by age, gender, and nationality.

2.4. Research Aims and Questions

Conclusively, this research aims to measure observational privacy as a dimension of privacy in a different population and aims to validate the scale of observational privacy as a value. The validity of the scale is assessed by measuring predictive, convergent, and discriminant validity in accordance with the criteria outlined by Valkengoed and colleagues (2021), Walten and Jones (2018), Rosenthal and Rosnow (2007), and Hattie and Cooksie (1984). Besides the theoretical work of Conklin (1976), to my knowledge, there is no empirical research yet on observational privacy, which is why this research focuses on the privacy dimension of observational privacy. In addition, other gaps in the existing literature are addressed by this study as well. Specifically, it investigates whether there are gender, age, and nationality differences in observational privacy, and it tests the validity of the scale used to measure observational privacy. Additionally, this study aims to incorporate privacy as a value within Schwartz's framework. This inclusion could be important as it considers technological changes and the evolving societal values that come with them while also

meeting the criteria for a universal human value (Jansen, 2023; Huijts & Haans, 2022; Markink, 2024). The aim of this research is to answer the following research questions:

RQ1: *Can we measure observational privacy described by Markink (2024) as a distinctive dimension of privacy within the framework proposed by Schwartz in a German and Romanian population?*

RQ2: *Can we validate the observational privacy scale developed by Markink (2024) and Jansen (2023)?*

This corresponds to the following hypotheses:

Convergent Validity

H1: Observational privacy as a value has a positive correlation with the universal human value face.

Predictive Validity

H2: Observational privacy as a value has a positive relation to ensuring one is not being observed through a laptop camera, for example by covering up the camera.

H3: Observational privacy as a value has a positive relation to holding private conversations only when no one else can listen to them.

H4: Observational privacy as a value has a positive relation to ensuring one is not being observed while undressing or changing clothes, for example by closing the curtains.

Discriminant Validity

H5: Women show higher scores on observational privacy as a value than men.

H6: Older individuals show higher scores on observational privacy as a value than younger individuals.

3. Methods

3.1. Participants

To participate in this research, individuals needed to be above the age of 17 and to be German or Romanian. Participants were selected using a volunteer sampling technique from the student population of the University of Twente, and through a convenient sampling approach, the online survey was distributed among people known to the researcher. Participants could choose the language (German, Romanian, and English) in which they

wanted to complete the survey to ensure a comprehensive understanding of the survey questions. 266 people took part in the survey. 21 of these failed one or both attention checks, one person was under the age of 18, and three participants did not complete the survey, meaning that their answers were removed from the dataset. As only eleven participants answered the survey in English language, their answers were also removed from the dataset. The final dataset, therefore, consists of 230 participants (163 female, 67 male). The age of the participants ranged from 18 to 88 years (M = 35, SD = 16).

Participants' ages and genders per nationality can be seen in Table 1. The research was approved by the BMS Ethics Committee, and all participants gave informed consent to participate in the study.

Table 1

Descriptive Statistics of Participants

Baseline Characteristics	Total	German	Romanian
Nationality	230	132 (57%)	98 (43%)
Gender			
Female	163 (70%)	100 (76%)	63 (64%)
Male	67 (30%)	32 (24%)	35 (36%)
Mean Age	35	37	32

3.2. Materials

The survey was conducted using the Qualtrics program, an online platform for conducting survey studies, evaluations, and other data collection activities. In addition, participants from the University of Twente were recruited via the SONA system, which gives participants credits for taking part in the study. The statistical program RStudio was used to analyze the data, which allowed for effective data management. The corresponding R script can be found in Appendix B (R Core Team, 2021).

3.2.1 Measurements

The 19 refined Schwartz's value theory values

Participants answered the Portrait Value Questionnaire (PVQ-RR), consisting of 57 items describing a fictional person (Schwartz et al., 2012). The participants were assigned to either the female or male formulation of the items based on their stated gender, as was also the case in the questionnaire by Schwartz et al. (2017). Participants who did not wish to disclose their gender or identified as non-binary were randomly assigned to one of the two

versions, as carried out in a study by Schwartz et al. (2017). The questionnaire measures people's values in 19 different areas of motivation. The items assess the importance the fictional character attaches to certain things (such as honesty or security) and provide insight into people's guiding principles and priorities. A recent study by Schwartz and Cieciuch (2022) reported an average Cronbach's alpha of 0.70 for each of the 19 values, indicating acceptable internal consistency among the items of the questionnaire (Salkind, 2015). Participants answered the 57 items on how similar they are to the fictional person on a seven-point response scale: 1 (not like me at all), 2 (not like me), 3 (a little like me), 4 (moderately like me), 5 (like me), 6 (very much like me), and 7 (does not apply).

Privacy as a value

The 57 items were mixed up with nine items formulated by Jansen (2023) and Markink (2024) that measure privacy as a value within three distinct dimensions: observational privacy, informational privacy, and social privacy (see Table 2). Each of these dimensions was measured with three items to be coherent with the PVQ-RR. The nine items were measured with the same seven-point response scale, and participants' similarity with the person described in each item was measured. The internal reliability of the privacy items was assessed using cronbach's alpha. The observational privacy scale showed a cronbach's alpha of 0.62, indicating a low, questionable internal consistency (Salkind, 2015). The scale of informational privacy had a cronbach's alpha of 0.82, which suggests a high reliability of the scale and a high internal consistency of the items. The items measuring social privacy had an unacceptable internal consistency with a cronbach's alpha of 0.48 (Salkind, 2015).

Observational privacy as a value was, for example, measured by the statement, "It is important to him/her that others do not hear what he/she discusses with his/her best friend.". The items that measured observational privacy can be seen in Table 2. The items that measured informational privacy and social privacy are also listed in Table 2, as these are relevant for answering the first research question. The participants answered three items that measured the privacy dimension of solitude for future research but were not focused on in this current study and were therefore not included in the data analysis.

Table 2

Privacy Dimension Items coherent with the PVQ-RR Items

Item No.	Items
	Observational Privacy
16	It is important to him/her that others do not hear what he/she discusses with his/her best friend.
42	It is important to him/her to communicate with others without being overheard.
71	It is important to him/her to control who is able to see and hear when he/she interacts with close others.
	Informational Privacy
2	It is important to him/her to be aware of which data are collected about him/her while using the internet.
30	It is important to him/her to control which personal information is collected about him/her.
54	It is important to him/her to actively protect his/her online data.
	Social Privacy
20	It is important to him/her to be able to control when he/she has interactions with close others.
34	It is important to him/her to control how he/she interacts with others to meet his/her own needs.
50	It is important to him/her to have a space that is exclusively his/hers.

Privacy-related behaviors

In order to test hypotheses two, three, and four, nine items were included in the questionnaire that measures privacy-related behaviors. The behaviors were measured by a scale that was developed by the researcher based on literature (Conklin, 1976; Zheng et al., 2018; Lammers, 2023; Markink, 2024). The nine behavioral items can be found in Table 3. Three of these items are particularly important for testing the hypotheses and are listed as observational privacy-related behavioral items in Table 3. The scale aimed to measure the frequency of privacy-related behaviors. For example, participants were asked to respond to statements such as "I generally ensure that I am not observed while undressing or changing clothes, for example, by closing the curtains.", which measures an observational privacy-related behavior. The statements were answered based on their prevalence on a six-point response scale: (1) Never, (2) Rarely, (3) Regularly, (4) Often, (5) Always/Very often, and (6)

Does not apply. The three observational privacy-related behavioral items showed an unacceptable reliability due to a cronbach's alpha of 0.33 (Salkind, 2015).

Table 3

Privacy-related behavioral items

Item No.	Items
	Observational Privacy
3	I generally ensure that I am not observed through the camera of my laptop, for example by covering up the camera.
6	I generally hold private conversations only when no one else can listen to them.
9	I generally ensure that I am not observed while undressing or changing clothes, for example by closing the curtains.
	Informational Privacy
1	It is important to him/her to be aware of which data are collected about him/her while using the internet.
4	I actively select a more restricted setting when encountering cookies pop-ups (everything besides “Accept all cookies”).
7	I generally tend to store personal documents (e.g. important receipts, bank statements, medical records) safely so that others cannot access it.
	Social Privacy
2	I prefer to solve personal matters alone rather than asking people for help.
5	I generally choose carefully with whom I spend time.
8	I generally try to limit interactions with others at social events.

3.3. Procedure

Firstly, participants could decide in which of the three languages (Romanian, English, or German) they wanted to answer the questionnaire. They then received a brief written introduction explaining the research topic and the data processing procedures. Then, participants gave informed consent, which included information about data handling and their right to withdraw from the study at any time.

After giving consent to participate in the study, participants were asked about general demographic data (gender, nationality, and age). Then, participants answered 71 items, including the PVQ-RR questionnaire, the various dimensions of privacy, and two attention

checks (Appendix A). They then had to rank nine behavioral items according to their frequency.

After completing the questionnaire, participants received an explanation of the objectives of the study. They were then given the researchers' contact details in case they had any queries or wanted to be informed about the results of the study. Following their participation, participants' data was securely stored on a private device for later analysis in accordance with the General Data Protection Regulation (GDPR).

3.4. Data Analysis

To determine the necessary sample size for this research, a prior analysis using G*Power 3.1. was conducted (Faul et al., 2009). A medium effect size ($f^2 = 0.15$), a significance level of $\alpha = 0.05$, and a power effect of 0.80 was set. Based on the output generated by the statistical program, a sample size of 74 was required.

After the data was collected, it was transferred from Qualtrics to the statistical software R for analysis. Before starting with the analyses, all participants who failed one or both attention checks were excluded from the data set, indicating a possible lack of attention during the questionnaire. In addition, those who did not complete the whole questionnaire or did not give consent to the study's procedures or data handling were excluded from the analysis. Firstly, the descriptive statistics were analyzed in order to gain a comprehensive overview of the participants and their responses. This included the calculation of means and standard deviations of the age of the participants and the ratio of gender and nationality.

To answer the first research question, an explanatory factor analysis (EFA) was performed to test whether the three dimensions, observational, informational, and social privacy, were distinct from each other. Each dimension was measured with the three corresponding items. The EFA shows whether the three items of a dimension are all attributable to an underlying construct, which is the individual dimension, and whether they are different from the items of the other dimensions. In order to draw a comparison between Germans and Romanians, two additional factor analyses were carried out, one only including German responses and one only including responses of the Romanian sample.

To answer the second research question, predictive, convergent, and discriminant validity were tested with general linear model analyses. To conduct a general linear model analysis, it is first necessary to control for the four assumptions of linear regression, including normality of residuals, linearity, homoscedasticity, and independence of errors (Casson & Farmer, 2014). The assumption of normality was not violated, as demonstrated by histograms that showed a normal distribution of residuals (Appendix E). The assumption of linearity was

not violated as well as scatterplots showed linear relationships between the independent variables and the dependent variables. Additionally, the assumption of homoscedasticity was not violated, as indicated by the Breusch-Pegan test (Halunga et al., 2017). The test detected homogeneity of variance in the models incorporating age (*BP* = 0.20, *p* = .656), gender (*BP* = 0.06, *p* = .79), and nationality (*BP* = 5.45, *p* = .20). This implies that the variance of the residuals is constant across all levels of the independent variables. Finally, the assumption of independence of errors was assessed by the Durbin-Watson test (Bartels & Goodhew, 1981). The assumption was not violated for the variables age (*D-W* = 1.96, *p* = .37), gender (*D-W* = 1.94, *p* = .32), and nationality (*D-W* = 1.96, *p* = .36). Thus, the errors do not correlate with each other (Casson & Farmer, 2014). In conclusion, as all assumptions are met, the general linear model analysis fits the sampled data.

To examine all hypotheses corresponding to predictive validity, the scores for the three items measuring observational privacy as a value were summed and divided. Three general linear model analyses were conducted in which the calculated observational privacy as a value score is always the independent variable, and the three different privacy-related behaviors are all once the dependent variable.

To test the convergent validity, a correlation analysis was performed, testing the strength of the relationship between observational privacy and the universal human value face. The universal human value is tested by items 11, 31, and 62. In addition two correlational analyses were performed testing whether observational privacy is positively related to informational privacy and social privacy.

Finally, the discriminant validity was tested by one general linear model analysis with three predictor variables. Observational privacy as a value scores will be included as the dependent variable and the gender of participants, their age, and their nationality will be included as independent variables. It was also analyzed whether the three independent variables show an interaction effect. This was done to get a better idea of the interplay of the influence of age, gender, and nationality on the importance of observational privacy as a value.

4. Results

4.1.1. Dimensions of Privacy as a Value

The Kaiser-Meyer-Olkin measurement indicated that the sample data was factorial (*KMO* = 0.72), and Bartlett's sphericity test revealed that the correlations between items were large enough for conducting a factor analysis (χ^2 (36) = 458.9773, p<.001).

For the EFA, the oblimin rotation method was used, which is particularly suitable when the factors are conceptually linked. For the analysis, nine items from the privacy scale were used to measure the three different dimensions of privacy. Due to the theoretical reason that privacy as a value consists of three dimensions, namely observational, informational, and social privacy, a factor analysis with three factors was performed first. Furthermore, according to the elbow criterion, a factor analysis with three factors was also deemed the best fit. The analysis showed that the factors explain 42% of the total variance. However, item 50, which measures social privacy, loaded very low on all three factors, which is why a factor analysis with three factors without item 50 was tested (Awe et al., 2022). This model showed a better fit to the data as it explained 46% of the total variance, has lower values for the chi-square test, the RMSA, the BIC, higher values for the Tucker Lewis Index of factor reliability, and higher eigenvalues of the three factors (Awe et al., 2022). Factor loadings, as well as correlations between factors, can be seen in Table 5. The factor analysis, including item 50, can be found in Appendix C.

Factor 1 Informational Privacy

Factor one is comprised of three items that measure informational privacy as a value and can, therefore, be conceptualized as the dimension of informational privacy. The items demonstrated factor loadings between 0.75 and 0.80 and explain 23% of the total variance. Conclusively, the variable informational privacy as a value is calculated by averaging the three items (M = 4.23, SD = 1.15, α = .82).

Factor 2 Observational Privacy

Factor two consists of three items, which measured observational privacy. The factor is therefore named observational privacy. The factor loadings of the four items vary from 0.49 to 0.67 and explain 14% of the total variance. Concluding, by averaging the three items the variable of observational privacy as a value is calculated (M = 4.21, SD = 0.97, α = .62).

Factor 3 Social Privacy

The third factor is explained by two items that measure social privacy. It is, therefore, named social privacy. The items showed a factor loading of 0.48 and 0.65 and explain 9% of the total variance. In conclusion, social privacy as a value is calculated by averaging the three items (M = 4.40, SD = 0.84, α = .33).

Table 5

Factor Loadings for Exploratory Factor Analysis of Privacy as a Value

		Factor		
Item No.	Items	1	2	3
	Informational:			
2	It is important to him/her to be aware of which data are collected about him/her while using the internet.	**.77**		
30	It is important to him/her to control which personal information is collected about him/her.	**.75**		
54	It is important to him/her to actively protect his/her online data.	**.80**		
	Observational:			
16	It is important to him/her that others do not hear what he/she discusses with his/her best friend.		**.67**	-.10
42	It is important to him/her to communicate with others without being overheard.		**.57**	
71	It is important to him/her to control who is able to see and hear when he/she interacts with close others.	.11	**.49**	.18
	Social:			
20	It is important to him/her to be able to control when he/she has interactions with close others.		.24	**.48**
34	It is important to him/her to control how he/she interacts with others to meet his/her own needs.			**.65**
	% of Variance			
		23	14	9
Factor 1			.17	.24
Factor 2				.34

4.1.2. Separate Factor Analyses

In addition, two separate factor analyses were conducted for the privacy scale, comparing responses from German and Romanian participants. The purpose of this comparison was to determine whether observational privacy is perceived as a separate dimension in the individual nationalities as well. The results of the German sample were similar to the factor analysis that is including all responses. In the German sample, the first and second factors showed a correlation of 0.36, the first and third factors showed a correlation of 0.21, and the second and third factors showed a correlation of 0.38. The results of the Romanian sample were slightly different from the factor analysis that included all responses. Item 20, initially measuring social privacy, was slightly loading on all three factors, which is why a factor analysis with three factors without item 20 was tested (Awe et al., 2022). This model showed a better fit to the data as it explained a higher proportionate of the total variance than the model including item 20. In addition, the first and second factors showed a correlation of 0.1, the first and third factors showed a correlation of 0.15, and the second and third factors showed a correlation of 0.07. To summarize, the Romanian and German samples separately have the same three factors as the sample as a whole, namely observational, informational, and social privacy. Merely, the factor of social privacy in the Romanian population consists solely of item 34, while in the whole sample and German subsample social privacy consists of items 20 and 34. The factor loadings, diagrams, and explanation of factors of the two separate factor analyses can be found in Appendix C.

4.2. Privacy-related Behaviors

Before conducting the mediation analysis, a factor analysis with the nine behavioral items was performed to see if similar factors can be found as in the privacy as a value factor analysis. The Kaiser-Meyer-Olkin measure (0.71) and Bartlett's test for sphericity (χ^2 (36) = 179.442, $p<.001$) showed significant results, indicating that the behavioral items are suitable to a factor analysis. However, when conducting factor analyses with factor numbers of two, three and four, the factors are completely different from the factors of the privacy as a value scale (Appendix D). Therefore, the three observational privacy-related behaviors are treated as independent and separate variables, which is also beneficial for answering the hypotheses. Additionally, the low cronbach's alpha (0.33) indicates that the behavioral items have limited internal consistency, making it appropriate to treat them as separate variables.

4.3.1. Predictive Validity

The general linear model analysis examined the relationships between the independent variable, observational privacy as a value, and the dependent variables, the three observational privacy-related behaviors.

In line with hypothesis two, the results showed that observational privacy as a value has a marginally significant, positive effect on covering up one's laptop camera to ensure one is not being observed, $\beta = .22$, $SE = .11$, $t = 1.95$, $p = .052$.

In addition, the findings showed that observational privacy as a value has a significant, positive effect on having private conversations only when no one else can listen to them, $\beta = .44$, $SE = .07$, $t = 5.89$, $p < .001$. Therefore, hypothesis three is accepted.

In contradiction to hypothesis four, results showed that observational privacy as a value has no significant effect on ensuring not being observed while undressing or changing clothes, $\beta = .15$, $SE = .10$, $t = 1.51$, $p = .134$.

Two general linear model analyses within the separate samples revealed similar results. The only difference from the whole sample was, that in the German subsample, observational privacy as a value has a significant, positive effect on ensuring not being observed while changing clothes or undressing, $\beta = .32$, $SE = .13$, $t = 2.36$, $p = .019$.

4.3.2. Convergent Validity

The score of the universal human value face is the average of the three items 11, 31, and 62. In line with hypothesis one, a correlation analysis between observational privacy as a value and the universal human value face showed a significant, positive correlation, $t(5) = 0.31$, $p < 0.01$, $R^2 = 0.07$.

Due to the theoretical reason that observational privacy, social privacy, and informational privacy all are dimensions of the construct privacy as a value, the dimensions could be conceptually connected. Thus, a correlation of these concepts was also tested. A significant, positive correlation between observational privacy as a value and informational privacy as a value was found, $t(219) = 0.16$, $p = .016$, $R^2 = 0.02$. In addition, a significant, positive correlation between observational privacy as a value and social privacy as a value has been found, $t(219) = 0.40$, $p < 0.01$, $R^2 = 0.15$.

4.3.3. Discriminant Validity

The results of the general linear model analysis showed that gender has no significant effect on observational privacy as a value, $\beta = .18$, $SE = 0.14$, $t = 1.25$, $p = .215$. Thus, hypothesis five is rejected.

The findings revealed that participant's nationality has no effect on observational privacy as a value, $\beta = -.15$, $SE = .13$, $t = -1.15$, $p = .253$.

Not in line with hypothesis six, results showed that age has no significant effect on observational privacy as a value, $\beta = -.01$, $SE = .00$, $t = -1.30$, $p = .196$.

In an additional analysis it had been found that participant's age (β = .005, *SE* = .00, *t* = 1.61, *p* = .108) and nationality (β = .06, *SE* = .10, *t* = 0.54, *p* = .593) did not significantly affect scores on the universal human value face.

Furthermore, no significant effects of age (β = -.01, *SE* = .00, *t* = -2.95, *p* = .112) and nationality (β = .02, *SE* = .11, *t* = 0.14, *p* = .889) had been found on the dimension of social privacy as a value.

An additional analysis was conducted to examine interaction effects between the independent variables age, gender, and nationality. It was demonstrated that the independent variables have no significant interaction effects and that the independent variables have no significant direct effect on observational privacy as a value, as demonstrated in table 6.

Table 6

Statistics of Interaction Effects on Observational Privacy as a Value

Interaction Effect	β	p-value
Age	-.01	.196
Nationality	-.15	.253
Gender	.18	.215
Age x Nationality	-.03	.357
Age x Gender	-.01	.717
Nationality x Gender	-.14	.842
Age x Nationality x Gender	.004	.846

5. Discussion

This research aimed to test if observational privacy is a distinct dimension of privacy as a value in a German and Romanian population and to validate the scale measuring observational privacy as a value. It was found that observational privacy is a separate dimension of privacy that is valued by the German and Romanian populations. Additionally, the scale measuring observational privacy as a value has been partially validated.

5.1. The Dimension of Observational Privacy as a Value

According to prior research on privacy from Markink (2024) and theoretical support from Conklin (1976) it was expected to find three different dimensions of privacy, namely observational privacy, social privacy, and informational privacy. The first research question, *Can we measure observational privacy described by Markink (2024) as a distinctive dimension of privacy within the framework proposed by Schwartz in a German and Romanian population?,* is answered based on previously reported results. The findings revealed that

observational privacy is a distinct dimension of privacy as a value in a Romanian and German population. It demonstrated a significant moderate correlation with social privacy, which is consistent with the findings of Markink's (2024) study.

Congruent with Markink's (2024) findings in the UK population, the three dimensions of observational, informational, and social privacy have been found in the German subsample and the Romanian subsample. Small differences to the whole sample were that in the German sample observational privacy was moderately positively correlated to informational and social privacy, rather than just to social privacy. Differently than in the German and UK populations, observational privacy as a value within the Romanian population showed no correlation to informational and social privacy (Markink, 2024). The results indicated that people in the UK, Germany, and Romania have a similar understanding of privacy and that their observational privacy is comparably important to them. In contrast to other countries, European countries such as Romania, the UK, and Germany place great value on the independence and autonomy of the individual, which also plays a major role in the understanding of privacy (Capurro, 2005). Capurro (2005) suggests that when people in European countries refer to privacy, they think of it as protecting the independence and self-determination they have in their lives. Thus, individuals living in European countries think they should protect themselves and their autonomy, as they are the most important thing they have. It has been shown that cultural differences have an effect on the understanding and perception of privacy. For example, it is assumed that people in individualistic cultures have greater concerns about privacy and are more protective of privacy than those in collectivistic cultures (Li, 2022). Individuals living in more individualistic societies, such as Germany and the UK, may be more concerned about institutional or corporate surveillance than peer or community judgment, reflecting their prioritization of personal autonomy and privacy (Capurro, 2005; Nickerson, 2023). In comparison, individuals living in more collectivistic countries, such as Romania, may be more concerned about the judgment of one's actions toward others, reflecting the fear of not being accepted by society. This suggests that the value of observational privacy remains important across cultures, yet concerns and the reasons for being concerned about its breach vary across different cultures and countries.

In conclusion, the first research question can be answered as follows. Observational privacy as a value could reliably be identified as a distinct dimension in the German and Romanian population within the framework proposed by Schwartz and colleagues (2017). The study thus shows similar results to the study by Markink (2024) in an UK population and

suggests that observational privacy is perceived as valuable by humans and can reliably be measured.

5.2. The Validity of Observational Privacy as a Value

This research tested for predictive, convergent, and discriminant validity to validate the observational privacy as a value scale. The second research question, *Can we validate the observational privacy scale developed by Markink (2024) and Jansen (2023)?,* targets this aim. The six hypotheses formulated in the beginning were tested to answer the research question.

Predictive Validity

The results reveal that predictive validity is partially met, as observational privacy as a value positively predicts the privacy-related behavior of only having private conversations when no one else can listen to them. Additionally, observational privacy as a value marginally significantly predicts the behavior of covering up one's laptop camera to ensure not being observed. Marginally significant effects are often observed in smaller samples because each individual data point carries more weight and can influence the overall result to a greater extent. Thus, there is more variability, and it is harder to detect real effects due to lower statistical power (Pritschet et al., 2016). However, not in line with expectations, observational privacy as a value does not relate to the behavior of ensuring not being observed while changing clothes or undressing. Interestingly, when only taking the German sample into account, observational privacy is positively predicting this behavior. Thus, the effect was found to be significant in the German subsample but not significant in the Romanian subsample. This observation suggests that valuing observational privacy may not specifically lead Romanian individuals to engage in that type of behavior. Romanians may exhibit this behavior without consciously considering that they are protecting their privacy from observation in such situations. Moreover, this behavior might be considered normal or habitual by Romanians, who may not necessarily think about the option of being observed. Therefore, there might not be a significant relationship between the value of the privacy of observation and the behavior of ensuring not being observed when changing clothes or undressing in the Romanian sample. Furthermore, this could also be influenced by the fact that Romanians live in more rural areas with fewer neighbors than individuals in Germany, which reduces the concern of being observed when changing clothes or undressing (Vincze, 2014).

Future studies could explore a wider range of privacy-related behaviors connected to observational privacy. This research only measured one behavior related to remote

observational privacy and two behaviors related to direct observational privacy (one visual and one auditory). To gain more robust insights, it would be beneficial to include additional privacy-related behaviors in future research, as this would better capture the variability among observational privacy-related behaviors and provide stronger statistical support for the findings (Cohen, 1988).

Concluding, it has been shown that observational privacy has a predictive power for some observational privacy-related behaviors. However, it was not thoroughly tested on which specific behaviors it has this power. Therefore, predictive validity is only met partially.

Convergent Validity

Convergent validity is met, because observational privacy is moderately correlated to the universal human value face. It was argued that face and observational privacy are conceptually related, because control over observation helps individuals manage and protect their public image by ensuring that only the desired aspects are revealed to others (Schwartz et al., 2012; Markink, 2024). It was indeed found that observational privacy and the universal human value face are positively related. Since observational, social, and informational privacy were argued to be dimensions of the same underlying construct, privacy as a value, they were assumed to be conceptually correlated. Their correlation was tested to provide additional support for convergent validity. It was found that observational privacy is moderately positively correlated to informational privacy and social privacy, indicating that the three dimensions are indeed conceptually correlated.

Concluding, observational privacy as a value has conceptual connections with the human value face and the privacy dimensions of social privacy and informational privacy. These correlations supported the idea that observational privacy is a coherent and meaningful construct within the broader framework of human values and privacy (Spangler et al., 2012). It demonstrates that the measure or concept of observational privacy captures relevant aspects of individuals' privacy concerns and behaviors, which increases its credibility and applicability in research and practical contexts (Spangler et al., 2012). Based on the findings, it is concluded that support has been found for convergent validity (Walton & Jones, 2018).

Discriminant Validity

The results have shown that discriminant validity is not met, as there are no significant differences between the participant's scores of observational privacy as a value depending on gender, age, or nationality. Hypothesis five hypothesized that women show higher scores in observational privacy as a value. The reason why this expectation is not met in this study could be that the sample is relatively small and not representative of the population, with a

significantly higher number of female participants compared to males. This imbalance could lead to insufficient power to detect gender differences (Cohen, 1988). Another possible reason why the expectation is not met could be that male participants in the study value observational privacy more than expected. This higher valuation by men may reflect changing attitudes or increased awareness of privacy issues, suggesting that traditional gender differences in privacy concerns are becoming less pronounced (Hazari & Brown, 2013). Next to that, it could be that men place more value on their observational privacy than expected due to their stronger self-orientation (Meyers-Levy & Loken, 2015). While women are generally more other-oriented and react cautiously, men may place more value on protecting their own privacy. This self-orientation might lead men to prioritize observational privacy as it directly impacts their personal space and autonomy, which they may value more than women (Meyers-Levy & Loken, 2015). Future studies should examine these potential gender dynamics more thoroughly, considering larger and more balanced samples to gain clearer insights into the nuances of observational privacy as a value.

Additionally, there were no differences in observational privacy scores based on age or nationality. Young and old participants, as well as Germans and Romanians, valued observational privacy similarly. The analysis also showed that age and nationality did not affect scores on the universal human value face or social privacy as a value, indicating that these demographics do not influence concerns about observational privacy and related concepts. There might be other factors, such as education level, relationship status, or personality traits, influencing people's scores on observational privacy as a value (Zukowski & Brown, 2007; Junglas et al., 2008). The results suggest that gender, age, and nationality did not influence an individual's score on observational privacy as a value. Therefore, discriminant validity is not met in this research.

In conclusion, based on the results, the second research question can be answered as follows. The scale of observational privacy as a value shows first approaches to validly measure the concept of observational privacy in Romanian and German communities, as predictive validity is partially met, and convergent validity is met. The gender, age, and nationality of the participants did not affect the importance people attach to observational privacy as a value, which is why discriminant validity across groups is not given in this study. However, future research could also examine discriminant validity across constructs, validating the scale of observational privacy for future studies. Discriminant validity across constructs ensures that the scale accurately distinguishes between different aspects or constructs, confirming that they are not merely different expressions of the same underlying

concept (Rönkkö & Cho, 2022). The observational privacy as a value scale was only partially valid in the Romanian and German populations, indicating the need for further studies to confirm its validity in these and other countries.

5.3. Limitations

Although the G*Power analysis showed that the sample size was sufficient, the lack of representativeness of the sample could be a limitation. Due to the convenient sampling technique, the sample of this study may not be representative of the population as a whole and the results may not be valid for other groups of people or populations (Jager et al., 2017). In addition, the distribution of the gender ratio was unbalanced, which could limit the generalizability of the results. The fact that almost 75% of the participants are female limits the generalizability of the study results, considering that in the population as a whole, the proportion of women and men is 50% each (United Nations, 2019). Another limitation of this study can be found in the self-reported measurements, which can be influenced by social desirability. Participants tend to answer the survey in a way that aligns with what they believe is socially acceptable or expected rather than providing honest and accurate responses (Chandler & Paolacci, 2017). Consequently, this may result in data that does not accurately reflect actual behaviors or attitudes, which compromises the validity and reliability of the study results.

Despite these limitations, the study has several positive aspects that contribute significantly to the understanding of observational privacy as a value. This study explores a crucial and emerging area of investigation. The dimension of observational privacy has been relatively overlooked in existing literature, highlighting the significance of this study in filling this gap. Additionally, given the pervasive influence of technology and the continuous growth of the online sphere, observational privacy is gaining increasing relevance in today's society (Beigi & Liu, 2018). Furthermore, this study was conducted in two distinct populations, allowing for statistical comparison of findings across two countries.

5.4. Recommendations

Building on the key findings and implications discussed, several recommendations can be made to further enhance the understanding and application of observational privacy as a value. These recommendations aim to address the identified limitations and provide guidance for future research. To begin with, there are several potential approaches to further research privacy as a value, specifically observational privacy, which can significantly contribute to the existing literature.

First of all, further research could, for example, identify factors that are influencing the level of importance people attach to observational privacy. For example, education level, relationship status, or personality traits could be factors that influence people's scores on observational privacy as a value (Zukowski & Brown, 2007; Junglas et al., 2008). This could be tested by future research, maybe enabling researchers to accept discriminate validity for the scale measuring observational privacy.

Additionally, it would be valuable to test the three scales developed by Jansen (2023) and Markink (2024) for measuring observational, social, and informational privacy in countries beyond the UK, Romania, and Germany. It would be particularly interesting to test the scale of observational privacy in collectivist cultures or non-European countries. In Japanese countries, for example, privacy is seen differently than in European countries. Individuals living in Japanese countries view the self as something bad that should not be respected and, therefore, not protected (Capurro, 2005). Their focus on privacy is on society and on the good of living together rather than on an individual. In contrast to Japanese countries and aligning with the understanding of privacy in European countries, Americans value their personal independence and seek to protect it (Rainie, 2016). Like Europeans, they view privacy as the protection of one's own autonomy based on each individual's unique needs (Raini, 2016). As European countries are more individualistic and countries like Japan, China, or Africa are more collectivistic, one can assume that there are differences in the perception and importance of privacy (Friedlmeier & Gavreliuc, 2013; Prince & Wallsten, 2022; Sun et al., 2004). Collectivistic countries are characterized by traditional social values, including a strong adherence to religion, a high degree of risk avoidance, an emphasis on discipline, and conservatism (Sun et al., 2004). These traditional values emphasize social cohesion, conformity, and the continuation of established norms. This is why individuals living in collectivistic countries are very concerned with how others perceive their actions in their community. Observational privacy as a value could, therefore, be characterized by fear of social condemnation and the importance of maintaining a good reputation in collectivistic cultures, leading to concerns about who is observing one's behavior and how this observation affects one's social image (Friedlmeier & Gavreliuc, 2013).

Thirdly, another research approach could involve developing additional behavioral items to reliably measure observational privacy-related behavior. This would allow for a more comprehensive assessment of the relationship between privacy concerns and related behaviors. Currently, only one behavior related to remote observational privacy and two behaviors related to direct observational privacy were measured. Including a broader range of

privacy-related behaviors would capture their variability and provide stronger statistical support, ultimately helping to confirm the predictive validity of the observational privacy as a value scale (Cohen, 1988).

In addition, while this research focuses on remote and direct observational privacy, future research could focus on one of the two. There is currently very little literature on remote observational privacy, making research in this area particularly important. Breaches of privacy through remote observation threaten human independence and self-determination, which are highly valued by people living in European countries (Capurro, 2005; Steeves, 2016). Another valuable research approach could be to test direct and remote observational privacy as separate variables to research what Conklin (1976) has theorized.

Finally, this and future research could provide valuable insights for policy-making and legal norms. This research has shown that people value their observational privacy moderately high across cultures on average. Therefore, this research could be relevant, for example, in the discussion about cameras in public spaces. While they are intended to provide security in public places, such as city centers or parks, there are also dangers that come into focus, such as concerns about the breach of people's privacy, possible risk to personal freedoms, and improper use of cameras (Sun, 2023). In addition, body cameras on police officers are being used in more and more countries. These are intended to better control the work of police officers, civilize the police, and make police officers accountable for their behavior (Lippert & Newell, 2016). However, there is an ongoing debate about the fact that these cameras extremely restrict residents' privacy, as they not only collect and store information but can also collect data in private households (Lippert & Newell, 2016). The study has shown that people moderately protect their observational privacy by covering up their laptop cameras. This demonstrates the importance people attach to protecting their privacy. As technology continues to evolve, the concept of privacy is changing. This study highlights the importance of adapting laws and regulations to changes in society to protect personal freedoms and civil liberties.

5.5. Conclusion

In conclusion, this study provides valuable insights into the concept of observational privacy. The findings support the measurement of observational privacy as a distinct dimension within the framework proposed by Schwartz et al. (2017). The scale' observational privacy as a value,' developed by Markink (2024) and Jansen (2023), shows promising initial validity in both German and Romanian populations. These results contribute significantly to

the rather limited literature on observational privacy, offering new approaches for further research and enriching theoretical discussions on privacy concerns in current debates.

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Footnotes

[1]This research tests for discriminant validity between groups. It is also possible to test for discriminant validity between constructs, which is not done in this research. For more information regarding discriminant validity between groups and between constructs, see Rönkkö, M., & Cho, E. (2022). An Updated Guideline for Assessing Discriminant Validity. Organizational Research Methods, 25(1), 6-14. https://doi.org/10.1177/1094428120968614

Appendixes

Appendix A

Female English Version of Qualtrics Questionnaire

Start of Block: Language

Q1 In which language do you want to answer the questionnaire? / În ce limbă doriți să completați chestionarul? / In welcher Sprache möchten sie diese Umfrage beantworten?

- ○ Română (1)
- ○ German (2)
- ○ English (3)

Start of Block: Informed Consent - english

Q3 Before you begin participating in this study, you are required to read about the procedures and other information you will encounter. At the end of this consent form, you will give your permission for using the collected data for research purposes.

● Purpose of the research
- The aim of this research is to measure how privacy is perceived and how it is connected to various privacy-related behaviours. This study is performed by Miruna Russa, Sophia Hochmann, and Matthias Giesen, students of the University of Twente, under the supervision of Nicole Huijts, who works at the same university.

● Risks of participating
- There are no risks associated with participation in this study. The research was reviewed and approved by the BMS Ethics Committee.

● Procedures for withdrawal from the study
- Your participation in this study is voluntary. In case you feel any discomfort while participating, you can withdraw from the study without giving any reasons and at any point during the participation. Your data will only be registered after reaching the end.

● Duration
- Completing this survey will take approximately 15 minutes.

● Personal Information
- In this study demographic data (gender, age, nationality) and experimental data (responses to the survey), will be collected, analyzed, and stored. The aim is to be able to answer the research questions and to possibly publish it in scientific literature.

● Usage of the data during and after research
- All the data will be treated with confidentiality and anonymously. The data will be locally stored on the computer of the researchers. The data collected in this study might also be of

relevance for future research projects
- data will be stored on a private device under the regulations of the general data protection regulation (GDPR)
- Data will be stored for 10 years.

● Contact details of the researcher (or his/her representative)

m.russa@student.utwente.nl (for romanian participants)
m.j.giesen@student.utwente.nl
s.hochmann@student.utwente.nl
n.m.a.huijts@utwente.nl

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee/domain Humanities & Social Sciences of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-hss@utwente.nl

	Please tick the appropiate boxes	
	Yes (1)	No (2)
I have read and understood the study information and procedures. (1)	○	○
I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason. (2)	○	○
I understand that information I provide will be used only for research purposes, and it will be treated with confidentiality and anonymity. (3)	○	○
I give permission for the information and answers that I provide to be stored so it can be used for future research and learning. (5)	○	○

End of Block: Informed Consent - english

Start of Block: Demographics - english

Q4 What is your gender?

- ○ Male (1)
- ○ Female (2)
- ○ Non-binary / third gender (3)
- ○ Prefer not to say (4)

Q5 What is your Nationality?

- ○ German (1)
- ○ Dutch (2)
- ○ Romanian (3)

Q6 What is your age in years?

_____

End of Block: Demographics - english

Start of Block: PVQ-RR female English

Q7 DF1 Here we briefly describe different people. Please read each description and think about how much that person is, or is not like you. Put a checkmark in one of the boxes to the right of each question to indicate how much the person described is like you. How much like you is this person?

	Not like me at all (1)	Not like me (2)	A little like me (3)	Moderately like me (4)	Like me (5)	Very much like me (6)	Does not apply (7)
It is important to her to form her views independently. (1)	○	○	○	○	○	○	○
It is important to her to be aware of which data are collected about her while using the internet. (2)	○	○	○	○	○	○	○
It is important to her that her country is secure and stable. (3)	○	○	○	○	○	○	○
It is important to her to have a good time (4)	○	○	○	○	○	○	○
It is important to her to avoid upsetting other people. (5)	○	○	○	○	○	○	○
It is important to her that the week and vulnerable in society be protected. (6)	○	○	○	○	○	○	○
It is important to her that people do what she says they should. (7)	○	○	○	○	○	○	○

It is important to her never to think she deserves more than other people. (8)	○	○	○	○	○	○	○
It is important to her to care for nature. (9)	○	○	○	○	○	○	○
It is important that you pay attention to this study. To indicate that you have read this please tick "Not like me". (10)	○	○	○	○	○	○	○
It is important to her that no one should ever shame her. (11)	○	○	○	○	○	○	○
It is important to her to regulate the manner in which she interacts with others. (12)	○	○	○	○	○	○	○
It is important to her always to look for different things to do. (13)	○	○	○	○	○	○	○
It is important to her to take care of people she is close to. (14)	○	○	○	○	○	○	○
It is important to her to have the power that money can bring. (15)	○	○	○	○	○	○	○

It is important to her that others do not hear what she discusses with her best friend. (16)	○	○	○	○	○	○	○
It is very important to her to avoid disease and protect her health. (17)	○	○	○	○	○	○	○
It is important to her to be tolerant toward all kinds of people and groups. (18)	○	○	○	○	○	○	○
It is important to her never to violate rules or regulations. (19)	○	○	○	○	○	○	○
It is important to her to be able to control when she has interactions with others. (20)	○	○	○	○	○	○	○
It is important to her to make her own decisions about her life. (21)	○	○	○	○	○	○	○
It is important to her to have ambitions in life. (22)	○	○	○	○	○	○	○

It is important to her to maintain traditional values and ways of thinking. (23)	○	○	○	○	○	○	○
It is important to her that people she knows have full confidence in her. (24)	○	○	○	○	○	○	○
It is important to her to decide when to be by herself without any social interaction. (25)	○	○	○	○	○	○	○
It is important to her to be wealthy (26)	○	○	○	○	○	○	○
It is important to her to take part in activities to defend nature. (27)	○	○	○	○	○	○	○
It is important to her never to annoy anyone. (28)	○	○	○	○	○	○	○
It is important to her to develop her own opinions. (29)	○	○	○	○	○	○	○
It is important to her to control which personal information is collected about her. (30)	○	○	○	○	○	○	○

It is important to her to protect her public image. (31)	○	○	○	○	○	○	○
It is very important to her to help the people dear to her. (32)	○	○	○	○	○	○	○
It is important to her to be personally safe and secure. (33)	○	○	○	○	○	○	○
It is important to her to control how she interacts with others to meet her own needs. (34)	○	○	○	○	○	○	○
It is important to her to be a dependable and trustworthy friend. (35)	○	○	○	○	○	○	○
It is important to her to take risks that make life exciting. (36)	○	○	○	○	○	○	○
It is important to her to have the power to make other do what she wants. (37)	○	○	○	○	○	○	○
It is important to her to plan her activities independently. (38)	○	○	○	○	○	○	○

It is important to her to follow rules even when no-one is watching. (39)	○	○	○	○	○	○	○
It is important to her to be very successful. (40)	○	○	○	○	○	○	○
It is important to her to follow her family's customs or the customs of a religion. (41)	○	○	○	○	○	○	○
It is important to her to communicate with others without being overheard. (42)	○	○	○	○	○	○	○
It is important to her to listen to and understand people who are different from her. (43)	○	○	○	○	○	○	○
It is important to her to have a strong state that can defend its citizens. (44)	○	○	○	○	○	○	○
It is important to her to enjoy life's pleasures. (45)	○	○	○	○	○	○	○

It is important to her that every person in the world has equal opportunities in life. (46)	○	○	○	○	○	○	○
It is important to her to be humble. (47)	○	○	○	○	○	○	○
It is important her to figure things out herself. (48)	○	○	○	○	○	○	○
It is important to her to honor the traditional practices of her culture. (49)	○	○	○	○	○	○	○
It is important to her to have a space that is exclusively hers. (50)	○	○	○	○	○	○	○
It is important to her to be the one who tells others what to do. (51)	○	○	○	○	○	○	○
It is important to her to obey all the laws. (52)	○	○	○	○	○	○	○
It is important to her to have all sorts of new experiences. (53)	○	○	○	○	○	○	○

It is important to her to actively protect her online data. (54)	○	○	○	○	○	○	○
It is important to her to own expensive things that show her wealth. (55)	○	○	○	○	○	○	○
It is important that you pay attention to this study. To indicate that you have read this please tick "Like me". (56)	○	○	○	○	○	○	○
It is important to her to protect the natural environment from destruction or pollution. (57)	○	○	○	○	○	○	○
It is important to her to take advantage of every opportunity to have fun. (58)	○	○	○	○	○	○	○
It is important to her to control who can be physically close to her. (59)	○	○	○	○	○	○	○

It is important to her to concern herself with every need of her dear ones. (60)	○	○	○	○	○	○	○
It is important to her that people recognize what she achieves. (61)	○	○	○	○	○	○	○
It is important to her never to be humiliated. (62)	○	○	○	○	○	○	○
It is important to her that her country protects itself against all threats. (63)	○	○	○	○	○	○	○
It is important to her never to make other people angry. (64)	○	○	○	○	○	○	○
It is important to her that everyone be treated justly, even people she doesn't know. (65)	○	○	○	○	○	○	○
It is important to her to avoid anything dangerous. (66)	○	○	○	○	○	○	○
It is important to her to be satisfied with what she has and not ask for more. (67)	○	○	○	○	○	○	○

It is important to her that all her firends and family can rely on her completely. (68)	○	○	○	○	○	○	○
It is important to her to be free to choose what she does by herself. (69)	○	○	○	○	○	○	○
It is important to her to accept people even when she disagrees with them. (70)	○	○	○	○	○	○	○
It is important to her to control who is able to see and hear her when she interacts with close others. (71)	○	○	○	○	○	○	○

Page Break

Q19 Here we briefly describe different behaviors. Please read each description and indicate how often or not often you engage in these behaviours. Put a checkmark in one of the boxes to the right of each question.
How often do you engage in these behaviors?

	Never (1)	Rarely (2)	Regularly (3)	Often (4)	Always/Very often (5)	Does not apply (6)
I generally check and manage the location settings of my personal devices (e.g. Instagram, Maps, TikTok) (1)	○	○	○	○	○	○
I prefer to solve personal matters alone rather than asking people for help. (2)	○	○	○	○	○	○
I generally ensure that I am not observed through the camera of my laptop, for example by covering up the camera. (3)	○	○	○	○	○	○
I actively select a more restricted setting when encountering Cookies-Pop-ups (everything besides "Accept all cookies") (4)	○	○	○	○	○	○

I generally choose carefully with whom I spend time. (5)	○	○	○	○	○	○
I generally hold private conversations only when no one else can listen to them. (6)	○	○	○	○	○	○
I generally tend to keep sensitive personal documents (e.g. Important Receipts, Bank Statements, Medical records) in a designated location. (7)	○	○	○	○	○	○
I generally try to limit interactions with strangers at social events. (8)	○	○	○	○	○	○
I generally ensure that I am not observed while undressing or changing clothes, for example by closing the curtains. (9)	○	○	○	○	○	○

End of Block: PVQ-RR female english

Appendix B

R Script

```
#Load Packages
install.packages("tidyverse")
library(tidyverse)
install.packages("readr")
library(readr)
install.packages("psych")
library(psych)
install.packages("ggplot2")
library(ggplot2)
install.packages("caret")
library(caret)
install.packages("lattice")
library(lattice)
install.packages("lavaan")
library(lavaan)
install.packages("mediation")
library(mediation)
install.packages("MASS")
install.packages("Matrix")
install.packages("mvtnorm")
install.packages("sandwich")
library(MASS)
library(Matrix)
library(mvtnorm)
library(sandwich)
install.packages("janitor")
install.packages("Hmisc")
install.packages("corrplot")
install.packages("ggpubr")
library(tidyverse)
library(janitor)
library(modelr)
```

```
library(broom)
library(Hmisc)
library(corrplot)
library(ggplot2)
library(ggpubr)
library(modelr)
#Load Data
raw_data <- Copy_of_Privacy_as_a_value_Miruna_Matthias_Sophia_April_20_2024_03_57

#Deletion of user data
raw_data$StartDate <- NULL
raw_data$EndDate <- NULL
raw_data$Status <- NULL
raw_data$IPAddress <- NULL
raw_data$Progress <- NULL
raw_data$`Duration (in seconds)` <- NULL
raw_data$Finished <- NULL
raw_data$RecordedDate <- NULL
raw_data$ResponseId <- NULL
raw_data$RecipientLastName <- NULL
raw_data$RecipientFirstName <- NULL
raw_data$RecipientEmail <- NULL
raw_data$ExternalReference <- NULL
raw_data$LocationLatitude <- NULL
raw_data$LocationLongitude <- NULL
raw_data$DistributionChannel <- NULL
raw_data$UserLanguage <- NULL

#remove 1st row
my_data <- raw_data[-c(1), ]

#exclusion of participants that did not pass the attention checks
rows_to_delete <- c(15, 16, 22, 30, 37, 91, 113, 171, 205, 214)
my_dataset <- my_data[-rows_to_delete, ]
```

```
my_dataset <- apply(my_dataset, 2, as.numeric)
germandata <- apply(germandata, 2, as.numeric)
romaniandata <- apply(romaniandata, 2, as.numeric)
germanframe <- data.frame(germandata)
romanianframe <- data.frame(romaniandata)
my_dataframe <- data.frame(my_dataset)

#descriptive statistics
summary(as.numeric(my_dataset$Q3_1))
summary(as.numeric(my_dataset$Q3_2))
summary(as.numeric(my_dataset$Q3_3))

#average age
mean(as.numeric(my_dataset$Q3_3))
sd(as.numeric(my_dataset$Q3_3))

#gender distribution
tabyl(as.numeric(my_dataset$Q3_1))
str(my_dataset)

(my_datresult <- aggregate(my_dataset$Q3_3, by = list(my_dataset$Q3_1,
my_dataset$Q3_2), FUN = mean)
germandata <- subset(my_dataframe, "Q3_2" == 1)
mean(as.numeric(germandata$Q3_3))
romaniandata <- subset(my_dataset, Q3_2 == 2)
mean(as.numeric(romaniandata$Q3_3))

#scoring human value face
PVQface <- (my_dataset[, "Q36_11"] + my_dataset[, "Q36_31"] + my_dataset[, "Q36_62"]) /
3
View(PVQface)
mean(PVQface)

#cronbachs alpha
```

```
privacyitems <- (my_dataset[, c("Q36_2", "Q36_12", "Q36_16", "Q36_20", "Q36_25",
"Q36_30", "Q36_34", "Q36_42", "Q36_50", "Q36_54", "Q36_59", "Q36_71")])
alpha_privacy <- alpha(privacyitems)
print(alpha_privacy)

itemsobservation <- (my_dataset[, c("Q36_16", "Q36_42", "Q36_71")])
alpha_itemso <- alpha(itemsobservation)
print(alpha_itemso)
averageobservation <- rowMeans(itemsobservation)
summary(averageobservation)
standard_obs <- sd(averageobservation, na.rm = TRUE)
print(standard_obs)

itemsobsger <- (germandata[, c("Q36_16", "Q36_42", "Q36_71")])
alpha_itemsog <- alpha(itemsobsger)
print(alpha_itemsog)
averageobsg <- rowMeans(itemsobsger)
summary(averageobsg)
standard_obsg <- sd(averageobsg, na.rm = TRUE)
print(standard_obsg)

itemsobsrom <- (romaniandata[, c("Q36_16", "Q36_42", "Q36_71")])
alpha_itemsor <- alpha(itemsobsrom)
print(alpha_itemsor)
averageobsr <- rowMeans(itemsobsrom)
summary(averageobsr)
standard_obsr <- sd(averageobsr, na.rm = TRUE)
print(standard_obsr)

itemsinformation <- (my_dataset[, c("Q36_2", "Q36_30", "Q36_54")])
alpha_itemsi <- alpha(itemsinformation)
print(alpha_itemsi)
averageinfo <- rowMeans(itemsinformation)
summary(averageinfo)
```

```
standard_info <- sd(averageinfo, na.rm = TRUE)
print(standard_info)

itemsinfog <- (germandata[, c("Q36_2", "Q36_30", "Q36_54")])
alpha_itemsig <- alpha(itemsinfog)
print(alpha_itemsig)
averageig <- rowMeans(itemsinfog)
summary(averageig)
standard_ig <- sd(averageig, na.rm = TRUE)
print(standard_ig)

itemsirom <- (romaniandata[, c("Q36_2", "Q36_30", "Q36_54")])
alpha_itemsir <- alpha(itemsirom)
print(alpha_itemsir)
averageir <- rowMeans(itemsirom)
summary(averageir)
standard_ir <- sd(averageir, na.rm = TRUE)
print(standard_ir)

itemssocial <- (my_dataset[, c("Q36_34", "Q36_20", "Q36_50")])
alpha_itemss <- alpha(itemssocial)
print(alpha_itemss)
averagesoc <- rowMeans(itemssocial)
summary(averagesoc)
standard_soc <- sd(averagesoc, na.rm = TRUE)
print(standard_soc)

itemssger <- (germandata[, c("Q36_34", "Q36_20")])
alpha_itemssg <- alpha(itemssger)
print(alpha_itemssg)
averagesg <- rowMeans(itemssger)
summary(averagesg)
standard_sg <- sd(averagesg, na.rm = TRUE)
print(standard_sg)
```

```
itemssrom <- (romaniandata[, c("Q36_34")])
itemssrom <- data.frame(itemssrom)
alpha_itemssr <- alpha(itemssrom)
print(alpha_itemssr)
averagesr <- rowMeans(itemssrom)
summary(averagesr)
standard_obsr <- sd(averagesr, na.rm = TRUE)
print(standard_obsr)

behavioralobservation <- (my_dataset[, c("Q40_3", "Q40_6", "Q40_9")])
alpha_behaviors <- alpha(behavioralobservation)
print(alpha_behaviors)

#Research QUestion 1
# Replace all values 7 with NA in privacy as a value dimensions
my_dataset[, c("Q36_71", "Q36_54", "Q36_50", "Q36_42", "Q36_34", "Q36_30", "Q36_20",
"Q36_16", "Q36_2")][my_dataset[, c("Q36_71", "Q36_54", "Q36_50", "Q36_42", "Q36_34",
"Q36_30", "Q36_20", "Q36_16", "Q36_2")] == 7] <- NA
germandata[, c("Q36_71", "Q36_54", "Q36_50", "Q36_42", "Q36_34", "Q36_30", "Q36_20",
"Q36_16", "Q36_2")][germandata[, c("Q36_71", "Q36_54", "Q36_50", "Q36_42", "Q36_34",
"Q36_30", "Q36_20", "Q36_16", "Q36_2")] == 7] <- NA
romaniandata[, c("Q36_71", "Q36_54", "Q36_50", "Q36_42", "Q36_34", "Q36_30",
"Q36_20", "Q36_16", "Q36_2")][romaniandata[, c("Q36_71", "Q36_54", "Q36_50",
"Q36_42", "Q36_34", "Q36_30", "Q36_20", "Q36_16", "Q36_2")] == 7] <- NA
#Kaiser-Meyer Olkin criteria
kmo_result <- (my_dataset[, c("Q36_2", "Q36_16", "Q36_20", "Q36_30", "Q36_34",
"Q36_42", "Q36_50", "Q36_54", "Q36_71")])
kmo <- KMO(kmo_result)
print(kmo)
#Bartlett's sphericity test
bartlett_test <- cortest.bartlett(kmo_result)
print(bartlett_test)
#Explanatory Factor Analysis with 3 factors
```

```
install.packages("GPArotation")
library(GPArotation)
library(psych)
.libPaths("C:/Users/Hochmann/Desktop/Bachelor Thesis - 2024")
install.packages("GPArotation")

factoranalysis <- fa(my_dataset[, c("Q36_2", "Q36_16", "Q36_20", "Q36_30", "Q36_34",
"Q36_42", "Q36_50", "Q36_54", "Q36_71")], nfactors = 3, rotate = "oblimin")
print(summary(factoranalysis))
fa.diagram(factoranalysis)
print(summary(factoranalysis))
print(factoranalysis$loadings)
print(factoranalysis$values)

#Faktoranalyse with 2 factors
factoranalysis2<- fa(my_dataset[, c("Q36_2", "Q36_16", "Q36_20", "Q36_30", "Q36_34",
"Q36_42", "Q36_50", "Q36_54", "Q36_71")], nfactors = 2, rotate = "oblimin")
print(summary(factoranalysis2))
fa.diagram(factoranalysis2)
print(summary(factoranalysis))
print(factoranalysis2$loadings)
print(factoranalysis2$values)

#Faktornanalyse ohne Q50
f3analysis <- fa(my_dataset[, c("Q36_2", "Q36_16", "Q36_20", "Q36_30", "Q36_34",
"Q36_42", "Q36_54", "Q36_71")], nfactors = 3, rotate = "oblimin")
print(summary(f3analysis))
fa.diagram(f3analysis)
print(f3analysis$loadings)
print(f3analysis$values)

#Faktorenanalysis ohne Q50 und Q20
f4analysis <- fa(my_dataset[, c("Q36_2", "Q36_16", "Q36_30", "Q36_34", "Q36_42",
"Q36_54", "Q36_71")], nfactors = 3, rotate = "oblimin")
```

```
print(summary(f4analysis))
fa.diagram(f4analysis)
print(f4analysis$loadings)
print(f4analysis$values)

#Explanatory Factor Analysis German population
fanalysisgerman <- fa(germandata[, c("Q36_2", "Q36_16", "Q36_20", "Q36_30", "Q36_34",
"Q36_42", "Q36_54", "Q36_71")], nfactors = 3, rotate = "oblimin")
summary(fanalysisgerman)
fa.diagram(fanalysisgerman)
print(fanalysisgerman$loadings)
print(fanalysisgerman$values)

#Explanatory Factor Analysis Romanian population
fanalysisromanian <- fa(romaniandata[, c("Q36_2", "Q36_16", "Q36_20", "Q36_30",
"Q36_34", "Q36_42", "Q36_54", "Q36_71")], nfactors = 3, rotate = "oblimin")
summary(fanalysisromanian)
fa.diagram(fanalysisromanian)
print(fanalysisromanian$loadings)
print(fanalysisromanian$values)

#Ellbow Criteria
f3_results <- f3analysis$values
#Plot der Eigenwerte in Abhängigkeit von der Anzahl der Faktoren
plot(1:length(f3_results), f3_results, type = "b", xlab = "Number of Factors", ylab =
"Eigenvalues")



#Four Assumptions of Linearity Gender
#Normality of Residuals
hist(residuals(modelg.0), main = "Histogram of Residuals", probability = TRUE)
curve(dnorm(x, mean = mean(residuals(modelg.0)), sd = sd(residuals(modelg.0))),
      +       col = "darkblue", lwd = 2, add = TRUE)
hist(residuals(modelg.M), main = "Histogram of Residuals", probability = TRUE)
```

```
curve(dnorm(x, mean = mean(residuals(modelg.M)), sd = sd(residuals(modelg.M))),
      +       col = "darkblue", lwd = 2, add = TRUE)
hist(residuals(modelg.Y), main = "Histogram of Residuals", probability = TRUE)
curve(dnorm(x, mean = mean(residuals(modelg.Y)), sd = sd(residuals(modelg.Y))),
      +       col = "darkblue", lwd = 2, add = TRUE)
#Linearity
plot(modela.0)
plot(modela.M)
plot(modela.Y)

#Independence of Errors
dw_test1 <- dwtest(modela.0)
print(dw_test1)
dw_test2 <- dwtest(modela.M)
print(dw_test2)
dw_test3 <- dwtest(modela.Y)
print(dw_test3)

#Homoscedasticity
bp_test1 <- bptest(modela.0)
print(bp_test1)
bp_test2 <- bptest(modela.M)
print(bp_test2)
bp_test3 <- bptest(modela.Y)
> print(bp_test3)

#Four Assumptiona of linearity Nationality
#Normality of Residuals
hist(residuals(modeln.0), main = "Histogram of Residuals", probability = TRUE)
curve(dnorm(x, mean = mean(residuals(modeln.0)), sd = sd(residuals(modeln.0))),
      +       col = "darkblue", lwd = 2, add = TRUE)
hist(residuals(modeln.M), main = "Histogram of Residuals", probability = TRUE)
curve(dnorm(x, mean = mean(residuals(modeln.M)), sd = sd(residuals(modeln.M))),
      +       col = "darkblue", lwd = 2, add = TRUE)
```

```
hist(residuals(modeln.Y), main = "Histogram of Residuals", probability = TRUE)
curve(dnorm(x, mean = mean(residuals(modeln.Y)), sd = sd(residuals(modeln.Y))),
      +       col = "darkblue", lwd = 2, add = TRUE)

#Four Assumptiona of linearity Age
#Normality of Residuals
hist(residuals(modela.0),main = "Histogram of Residuals", probability = TRUE)
curve(dnorm(x, mean = mean(residuals(modela.0)),sd = sd(residuals(modela.0))),
     +       col = "darkblue", lwd = 2, add = TRUE)
hist(residuals(modela.M), main = "Histogram of Residuals", probability = TRUE)
curve(dnorm(x, mean = mean(residuals(modela.M)), sd = sd(residuals(modela.M))),
      +       col = "darkblue", lwd = 2, add = TRUE)
hist(residuals(modela.Y), main = "Histogram of Residuals", probability = TRUE)
curve(dnorm(x, mean = mean(residuals(modela.Y)), sd = sd(residuals(modela.Y))),
      +       col = "darkblue", lwd = 2, add = TRUE)

#Research Question 2
#Factor Analysis Behavioral Items
kmob <- my_dataset[, c("Q40_1", "Q40_2", "Q40_3", "Q40_4", "Q40_5", "Q40_6",
"Q40_7", "Q40_8", "Q40_9")]
kmoresult <- KMO(kmob)
print(kmoresult)
bartlettbehavior <- cortest.bartlett(kmob)
print(bartlettbehavior)
factorbehavioral <- fa(my_dataset[, c("Q40_1", "Q40_2", "Q40_3", "Q40_4", "Q40_5",
"Q40_6", "Q40_7", "Q40_8", "Q40_9")], nfactors = 3, rotate = "oblimin")
summary(factorbehavioral)
fa.diagram(factorbehavioral)
print(factorbehavioral$loadings)
print(factorbehavioral$values)

#Predictive Validity
Mediator <- rowMeans(my_dataset[, c("Q36_16", "Q36_42", "Q36_71")])
DV1 <- my_dataset[, "Q40_3"]
```

```
DV2 <- my_dataset[, "Q40_6"]
DV3 <- my_dataset[, "Q40_9"]
behavior1 <- lm(DV1 ~ Mediator, data = my_dataframe)
summary(behavior1)
behavior2 <- lm(DV2 ~ Mediator, data = my_dataframe)
summary(behavior2)
behavior3 <- lm(DV3 ~ Mediator, data = my_dataframe)
summary(behavior3)

#additional behavioral analysis
be1 <- lm(DV1 ~ IVgender + IVage + IVnation, data = my_dataframe)
summary(be1)
be2 <- lm(DV2 ~ IVgender + IVage + IVnation, data = my_dataframe)
summary(be2)
be3 <- lm(DV3 ~ IVgender + IVage + IVnation, data = my_dataframe)
summary(be3)

#predictive validity German Sample
MediatorG <- rowMeans(germandata[, c("Q36_16", "Q36_42", "Q36_71")])
DV1G <- germandata[, "Q40_3"]
DV2G <- germandata[, "Q40_6"]
DV3G <- germandata[, "Q40_9"]
behavior1G <- lm(DV1G ~ MediatorG, data = my_dataframe)
summary(behavior1G)
behavior2G <- lm(DV2G ~ MediatorG, data = my_dataframe)
summary(behavior2G)
behavior3G <- lm(DV3G ~ MediatorG, data = my_dataframe)
summary(behavior3G)

#predictive validtiy romanian sample
MediatorR <- rowMeans(romaniandata[, c("Q36_16", "Q36_42", "Q36_71")])
DV1R <- romaniandata[, "Q40_3"]
DV2R <- romaniandata[, "Q40_6"]
DV3R <- romaniandata[, "Q40_9"]
```

```
behavior1R <- lm(DV1R ~ MediatorR, data = my_dataframe)
summary(behavior1R)
behavior2R <- lm(DV2R ~ MediatorR, data = my_dataframe)
summary(behavior2R)
behavior3R <- lm(DV3R ~ MediatorR, data = my_dataframe)
summary(behavior3R)

#convergent validity
#observational privacy and human value face and social privacy and informational privacy
correlationface <- lm(PVQface ~ Mediator, data = my_dataframe)
summary(correlationface)

itemssoc <- rowMeans(itemssocial)
correlationinteraction <- cor.test(itemssoc, Mediator)
print(correlationinteraction)

itemsinfo <- rowMeans(itemsinformation)
corinformation <- cor.test(itemsinfo, Mediator)
print(corinformation)

convalid <- data.frame(PVQface, Mediator)
plot(convalid$PVQface, convalid$Mediator,
    xlab = "Privacy as a Value", ylab = "Universal Human Value Face",
    main = "Scatterplot")
abline(lm(DV ~ Mediator), col = "red")

#discriminant validity
IVgender <- my_dataset[, "Q3_1"]
IVage <- my_dataset [, "Q3_3"]
IVnation <- my_dataset[, "Q3_2"]

#all together
discmodel <- lm(Mediator ~ IVage + IVnation + IVgender, data = my_dataframe)
summary(discmodel)
```

```
#germansample
discgermmodel <- lm(MediatorG ~ IVage + IVgender, data = germanframe)
summary(discgermmodel)

#romaniansample
IVgender <- romaniandata[, "Q3_1"]
IVage <- romaniandata[, "Q3_3"]
discrommmodel <- lm(MediatorR ~ IVage + IVgender, data = romanianframe)
summary(discrommmodel)

#FaceDIscriminant validity
facediscmodel <- lm(PVQface ~ IVage + IVgender + IVnation, data = my_dataframe)
summary(facediscmodel)

#informational discriminant
infodiscmodel <- lm(itemsinfo ~ IVage + IVgender + IVnation, data = my_dataframe)
summary(infodiscmodel)

#social discriminant
socialdiscmodel <- lm(itemssoc ~ IVage + IVgender + IVnation, data = my_dataframe)
summary(socialdiscmodel)

#behavioral discriminant validity
discbe <- lm(behavioralobservation ~ IVage + IVnation + IVgender, data = my_dataframe)
summary(discbe)

#interaction effect
intermodel <- lm(Mediator ~ IVage * IVnation * IVgender, data = my_dataframe)
summary(intermodel)
```

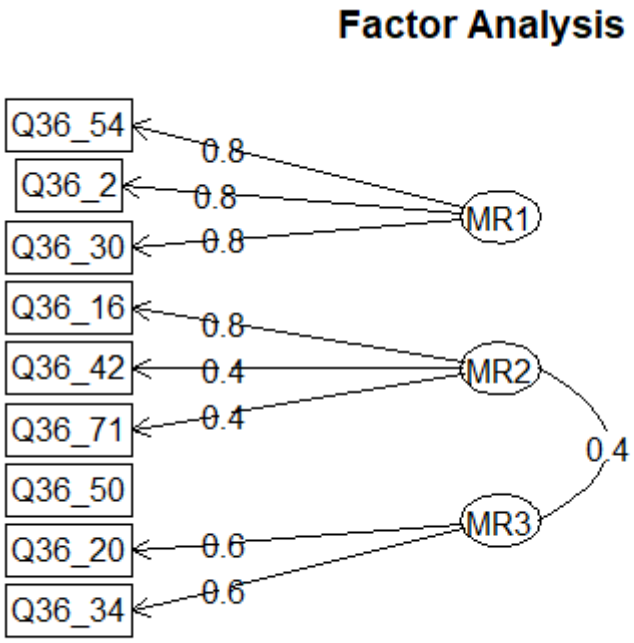
Appendix C

Alternative Factor Analyses

Factor Loadings including Item 50

		Factor		
Item No.	Items	1	2	3
	Informational:			
2	It is important to him/her to be aware of which data are collected about him/her while using the internet.	**.76**		
30	It is important to him/her to control which personal information is collected about him.	**.75**		
54	It is important to him/her to actively protect his/her online data.	**.82**		
	Observational:			
16	It is important to him/her that others do not hear what he/she discusses with his/her best friend.		**.77**	
42	It is important to him/her to communicate with others without being overheard.		**.40**	.23
71	It is important to him/her to control who is able to see and hear when he/she interacts with close others.	.11	**.39**	.31
	Social:			
20	It is important to him/her to be able to control when he/she has interactions with close others.			**.65**
34	It is important to him/her to control how he/she interacts with others to meet his/her own needs.		-.13	**.57**
50	It is important to him/her to have a space that is exclusively his/hers.	.18	.28	.14
	% of Variance	21	11	10

Diagram of Factor Analysis including Item 50

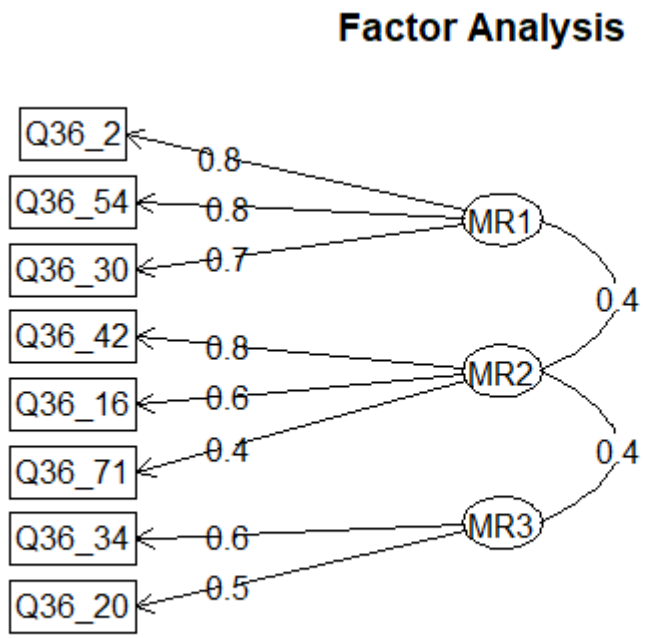


Factor Loadings for Exploratory Factor Analysis of German Sample

		Factor		
Item No.	Items	1	2	3
	Informational:			
2	It is important to him/her to be aware of which data are collected about him/her while using the internet.	**.84**		
30	It is important to him/her to control which personal information is collected about him.	**.74**		
54	It is important to him/her to actively protect his/her online data.	**.80**		
	Observational:			
16	It is important to him/her that others do not hear what he/she discusses with his/her best friend.	-.18	**.56**	
42	It is important to him/her to communicate with others without being overheard.		**.81**	
71	It is important to him/her to control who is able to see and hear when he/she interacts with close others.	.13	**.42**	.21
	Social:			
20			.24	**.48**

	It is important to him/her to be able to control when he/she has interactions with close others.			
34	It is important to him/her to control how he/she interacts with others to meet his/her own needs.			**.64**
	% of Variance	24	15	9
Factor 1			.36	.21
Factor 2				.38

Diagram of Factor Analysis of German Sample



Factors German Sample

Factor 1 Informational Privacy

Factor one of the German sample consists of three items that measured informational privacy as a value and can therefore be conceptualized as the dimension of informational privacy. The items demonstrated factor loadings between 0.74 and 0.84 and explain 24% of the total variance. Conclusively, the variable informational privacy as a value is calculated by averaging the three items (M = 3.90, SD = 1.14, α = .79).

Factor 2 Observational Privacy

Factor two of the German sample is comprised of three items, which measured observational privacy. The factor is therefore named observational privacy. The factor loadings of the three items vary from 0.42 to 0.81 and explain 15% of the total variance.

Concluding, by averaging the three items the variable of observational privacy as a value is calculated (M = 4.31, SD = 0.97, α = .66).

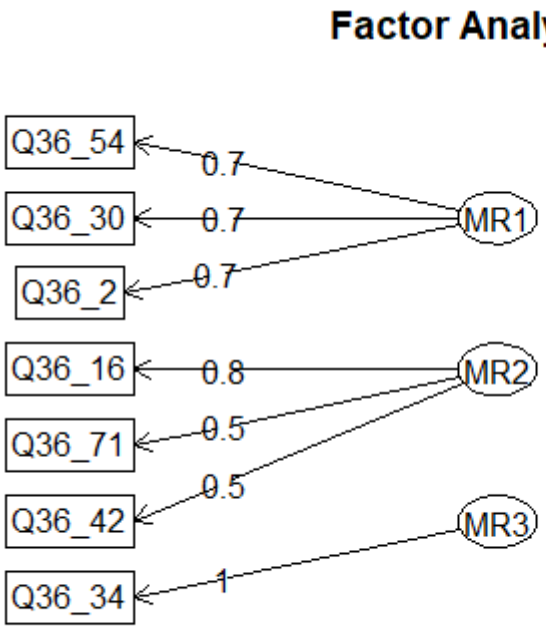
Factor 3 Social Privacy

The third factor of the German sample is explained by two items that measured social privacy. It is therefore named social privacy. The items showed a factor loading of 0.48 and 0.64 and explain 9% of the total variance. In conclusion, social privacy as a value is calculated by averaging the three items (M = 4.21, SD = 0.99, α = .42).

Factor Loadings for Exploratory Factor Analysis of Romanian Sample

		Factor		
Item No.	Items	1	2	3
	Informational:			
2	It is important to him/her to be aware of which data are collected about him/her while using the internet.	**.66**		
30	It is important to him/her to control which personal information is collected about him.	**.68**		
54	It is important to him/her to actively protect his/her online data.	**.70**		
	Observational:			
16	It is important to him/her that others do not hear what he/she discusses with his/her best friend.		**.79**	
42	It is important to him/her to communicate with others without being overheard.		**.46**	.17
71	It is important to him/her to control who is able to see and hear when he/she interacts with close others.		**.53**	.16
	Social:			
34	It is important to him/her to control how he/she interacts with others to meet his/her own needs.			**1**
	% of Variance	20	16	15
Factor 1			.1	.15
Factor 2				.07

Diagram of Factor Analysis of Romanian Sample



Factors Romanian Sample

Factor 1 Informational Privacy

Factor one of the Romanian sample is comprised of three items that measured informational privacy as a value and can therefore be conceptualized as the dimension of informational privacy. The items demonstrated factor loadings between 0.66 and 0.70 and explain 20% of the total variance. Conclusively, the variable informational privacy as a value is calculated by averaging the three items (M = 4.70, SD = 1, α = .71).

Factor 2 Observational Privacy

Factor two of the Romanian sample consists of three items, which measured observational privacy. The factor is therefore named observational privacy. The factor loadings of the three items vary from 0.46 to 0.79 and explain 16% of the total variance. Concluding, by averaging the three items the variable of observational privacy as a value is calculated (M = 4.13, SD = 1, α = .61).

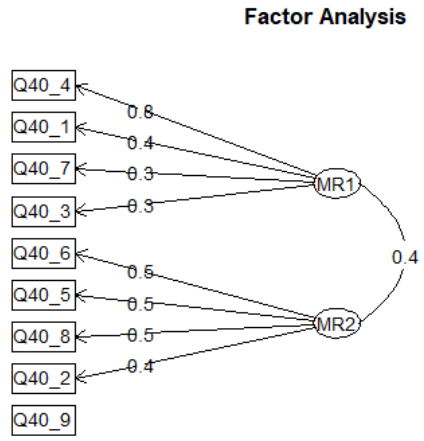
Factor 3 Social Privacy

The third factor is explained by one item that measured social privacy. It is therefore named social privacy. The item showed a factor loading of 1 and explains 15% of the total variance. In conclusion, social privacy as a value is the score of each participant on that item (M = 4.25, SD = 1.20).

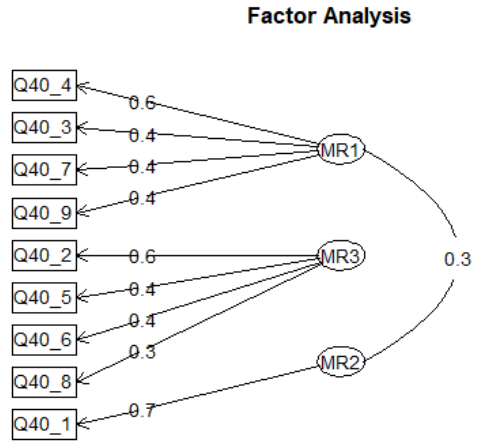
Appendix D

Factor Analysis Diagrams of Privacy-related Behavioral Items

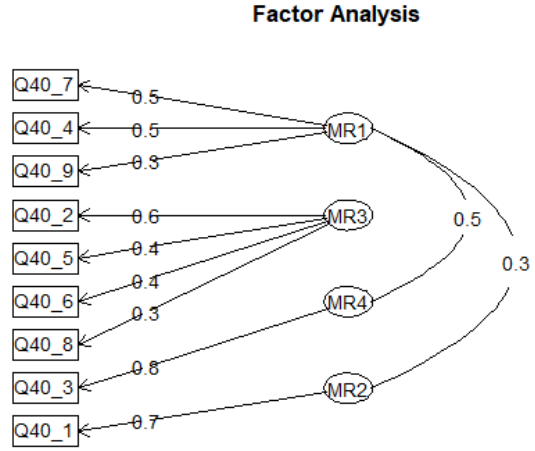
2 Factors



3 Factors



4 Factors



Appendix E

Normality of Residuals