

Privatsphäre-Bewusstsein – Messung, Validierung und interkulturelle Vergleichbarkeit

Measuring Privacy Concerns

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Starting Point



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- ▶ private companies, public agencies base innovative goods and services on data shared or provided by customers or citizens (trust required)
- ▶ agreements on data linkage/data sharing (Antoni & Schnell 2017)
- ▶ acceptance of new information-communication-technologies (ICT) or new electronic forms of money (Przepiorka & Horne 2020, Mehlkop, Neumann & von Hermann 2023)

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- ▶ privacy competence major issue in communications research (Park 2013, Masur et al. 2017)

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- ▶ privacy competence major issue in communications research (Park 2013, Masur et al. 2017)
- ▶ privacy concerns of rather recent interest (Nissenbaum 2009, 2019; Acquisti et al. 2015), mostly with respect to privacy paradox

Theory I

- ▶ privacy originally with a negative connotation (J.S. Mill 1965[1848])
- ▶ privacy as a fundamental (legal) right, privacy related to the degree of interference

- ▶ Alan Westin (1968): “Privacy is the claim of individuals, groups, or institutions to determine for themselves when, how, and and to what extent information about them is communicated to others”

- ▶ privacy as contextual integrity (Nissenbaum 2009), contextual features may vary and change (current discussion)
- ▶ legal perspective to assess privacy violations in different domains (e.g. people involved, form of information)

Theory II

- ▶ Nissenbaum's contextual integrity approach goes beyond dichotomy private vs. public
- ▶ underscores the importance of established norms and degrees of appropriateness across different contexts
- ▶ social norms perspective crucial, injunctive norms vs. descriptive norms (Cialdini et al. 1990; Bicchieri 2006)
- ▶ popularity of a service changes normative expectations and trustworthiness of the service, makes privacy violation acceptable (Przepiorka & Horne 2020)
- ▶ such results along with Westin's definition are dangerous ("I've got nothing to hide.")
- ▶ preservation of privacy remains a collective action problem

What is the research problem?

- ▶ measures of privacy concern remain unsatisfying
 - ▶ focus on internet privacy concern (e.g. Hart & Dinev 2006)
 - ▶ comprise single item measures of concern or long item lists of conceptually different constructs (e.g. 20 item privacy competence scale; Masur et al. 2017)

- ▶ or simply use Westin's privacy items
 - ▶ which adhere to the (in our view) positive perspective on privacy
 - ▶ do not represent a standardized instrument or provide a coherent measurement approach

Westin's privacy scales

- ▶ since 1970 Westin has conducted more than 30 surveys on privacy concerns (very relevant for policy)
- ▶ different privacy indices to summarize and to account for changes over time
- ▶ Westin's main result: three groups of varying privacy concern
 1. high and fundamentalist
 2. medium and pragmatist
 3. low and unconcerned
- ▶ Kumaraguru & Cranor (2005) have documented/picked apart the weaknesses of the Westin's indices
 - ▶ different questions for the same index, varying number of questions
 - ▶ no transparency, no quality control

Our approach

- ▶ based on three component model of attitude research (e.g. Rosenberg & Hovland 1960)
 - ▶ affective (emotional component)
 - ▶ cognitive (knowledge aspect, reflection)
 - ▶ conative (behavioral component)

- ▶ to address that privacy concerns reflect a collective action problem, ideas of measuring environmental concern were picked up (Diekmann & Preisendörfer 2003)

- ▶ rely on 5- (pretest) and 7-point rating scales with labeled end-points (1 “fully disagree” to 7 “fully agree”)

Unsere (deutschsprachigen) Items

▶ **Affektive Komponente**

- ▶ Es beunruhigt mich, wenn ich daran denke, persönliche Daten im Internet anzugeben.
- ▶ Es verunsichert mich, dass man nicht weiß, was mit seinen persönlichen Daten im Internet geschieht.
- ▶ Wenn ich Berichte über Datenskandale lese, bin ich oft empört.

▶ **Kognitive Komponente**

- ▶ Meiner Meinung nach beschäftigen sich viel zu wenige Menschen damit, was mit ihren persönlichen Daten passiert.
- ▶ Es gibt nach wie vor zu wenig Aufklärungsangebote über den sicheren Umgang mit persönlichen Daten.

▶ **Konative Komponente**

- ▶ Aus meiner Sicht unternimmt die Politik immer noch zu wenig, um Bürger in ihrem Recht auf Privatsphäre zu unterstützen.
- ▶ Wenn es um die Preisgabe von persönlichen Daten an geht, bin ich sehr viel vorsichtiger als andere.
- ▶ Konsumenten haben jegliche Kontrolle darüber verloren, wie Ihre persönlichen Daten von Unternehmen gesammelt und verwendet werden.

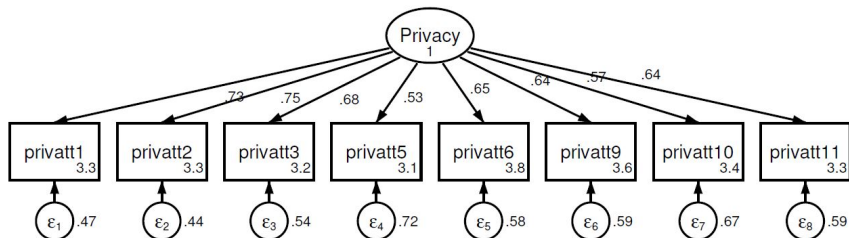
Our data

1. Pretest data from a mixed-mode survey in the Winter 2018/19 and summer 2019
 - ▶ 411 interviews conducted at four German Universities (Dresden, Erfurt, Kiel and Leipzig)
2. Data from a web-survey of 1,582 members of TU Dresden (781 scientists/ administrative staff and 813 students) in May 2020
 - ▶ CFA and a first validation on COVIDapp usage
3. 3-country privacy websurvey in India, U.S. and Germany in summer 2022
 - ▶ 3,532 interviews and 10,592 behavioral measures (factorial survey)
 - ▶ Test for measurement invariance and validation on digital payment app usage

Measurement model

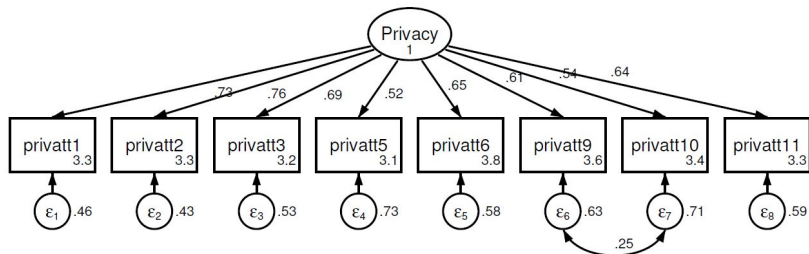
- ▶ Pretest data identified best fit for an eight item measurement model (initially nine items)
- ▶ CFA of the model on data from web-survey in May 2020 (1,582 members of TU Dresden)
- ▶ models allowing for correlated uniqueness (corr. error terms) generated reasonable fit
 - ▶ $\chi^2(16) = 50.89$ ($p < 0.00$), $RMSEA = 0.034$, $CFI = 0.989$, $TLI = 0.981$
 - ▶ Raykov's $\rho = 0.701$ (penalizes corr. error terms within attitude components)

Measurement model II



- ▶ full model on data from our 3-Country Privacy Survey (pooled data) with mediocre fit
- ▶ $\chi^2(20) = 470.16$ ($p < 0.00$), $RMSEA = 0.08$ $CFI = 0.952$, $TLI = 0.933$, Raykov's $\rho = 0.854$

Measurement model III



- ▶ full model with one CU term data with good fit
- ▶ $\chi^2(19) = 171.48$ ($p < 0.00$), $RMSEA = 0.048$ $CFI = 0.971$, $TLI = 0.957$, Raykov's $\rho = 0.842$

Comparability warranted?

- ▶ measurement invariance test if construct from different groups is measured the same way (Meredith 1993, Putnick & Bornstein 2016, Leitgöb et al. 2023)
- ▶ to allow meaningful comparisons of means between groups (not our primary goal) as well as with other covariates

Model	#gr.	χ^2	df	CFI	TLI	RMSEA	Δ -2LL	p(Δ -2LL)
Baseline	1	171.484	19	0.971	0.957	0.048		
Configural	3	225.886	57	0.968	0.953	0.050		
Metric	3	264.566	71	0.964	0.957	0.048	39.694	0.0023
Scalar	3	665.779	85	0.891	0.892	0.076	557.687	0.000

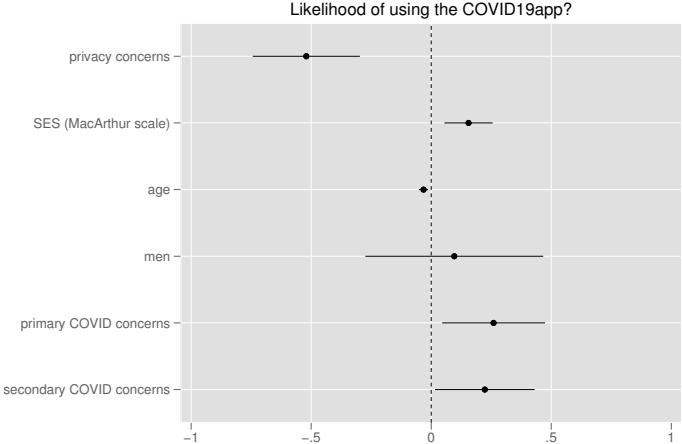
calculations done in Mplus 8.4 (Muthen & Muthen 1998-2019)

Validation

- ▶ Our focus: can we confirm theoretical implied relationships with the measure
- ▶ Compare privacy related behavior within jurisdictions an compare concerned with less concerned
 - A on usage of COVID tracing app (–)
 - B on vignette answers on app usage to receive a windfall-gain as a digital currency (-) or cash (+)
- ▶ important (Przpiorka & Horne 2020, p.6): no network effects of using the app (in contrast to dating apps) only warranted in

Results A - COVID app usage

- ▶ Estimation results from logistic regression model on app usage (n=1,307)

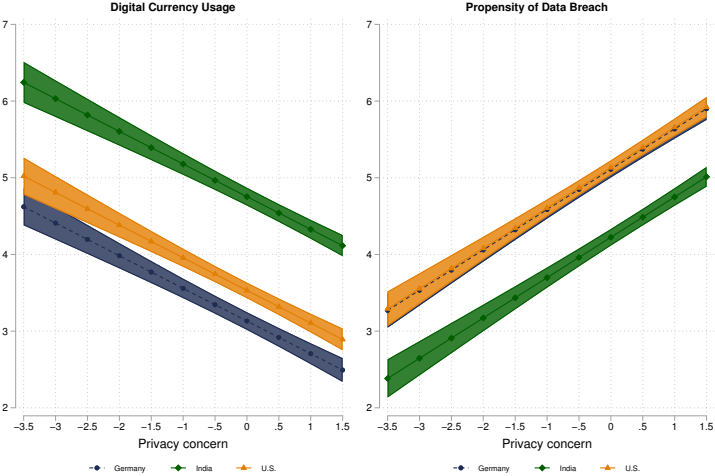


Validation B - digital payment app (Mehlkop et al. 2023)

- ▶ fully-confounded design where respondents rated three vignettes
- ▶ Vignette: respondents receive a monthly windfall gain (similar to an UBI) that can only be claimed via this app
 - ▶ provider of the app (central bank vs ministry of finance vs. private company)
 - ▶ popularity (many use it already vs. hardly anyone uses it vs. no info)
 - ▶ scope of data linkage (postal feedback on purchases to home address vs. feedback on purchases vs. no feedback)
- ▶ Would you use this app for payment of withdraw cash? (–) (7-point scale)
- ▶ How likely do you think it is that your data will be passed on to third parties without your authorization? (+) (7-point scale)

Results B

- ▶ Estimation results from six separate multilevel-models with varying intercepts



Summary

Conceptual point

- ▶ concept of privacy as a fundamental right, reflects a collective action problem
- ▶ we want to avoid Westin's privacy scales (positive concept, inconsistent measurement)

Our proposal

- ▶ 8-item measurement approach along the three component model (affective, conative, cognitive)
- ▶ good to very good model fit and composite reliability, metric MI is warranted

Measurement quality

- ▶ expectations about the relationship with other concepts were confirmed
- ▶ our scale showed predictive validity in cross-sectional data as well as in a experimental factorial survey

Outlook

- ▶ shorter? Eight items quite a lot (time is scarce)
- ▶ check measurement model with respect to different modes (PAPI/CATI) and longitudinal measurement invariance within respondents
- ▶ collect more data on relationship with other privacy concepts and behavioral measures
- ▶ spread the word – zenodo project page coming soon!

Thank you!!

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Related literature:

Mehlkop, G., Neumann, R., & von Hermanni, H. (2023). Privacy and the acceptance of centralized digital currencies in the US, India and Germany. *Scientific Reports*, 13(1), 8772.

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