



Selected Papers of #AoIR2023:
The 24th Annual Conference of the
Association of Internet Researchers
Philadelphia, PA, USA / 18-21 Oct 2023

ANTECEDENTS OF PRIVACY PROTECTION BEHAVIORS AT THE VERTICAL AND HORIZONTAL LEVELS

Jošt Bartol
University of Ljubljana

Vasja Vehovar
University of Ljubljana

Andraž Petrovčič
University of Ljubljana

Introduction

Online privacy is an important matter for internet users, and concerns about its loss may cause them to refrain from online activities (Baruh et al., 2017). One way internet users can reduce potential threats to their privacy is by adjusting their privacy settings or using privacy enhancing software (Park, 2013; Trepte, 2021; Youn, 2009). Such privacy protection behaviors (PPBs) depend on socio-demographic characteristics and digital engagement because individuals' social roles and life stage determine their privacy needs (Epstein & Quinn, 2020; Laufer & Wolfe, 1977; Petronio, 2002). PPBs also depend on individuals' appraisal of and ability to cope with a potential and/or actual threat (Li, 2012; Rogers, 1983). Research has shown that privacy concerns (threat appraisal) and online privacy literacy (OPL; coping ability) are two important factors that increase the frequency and diversity of PPBs, and that OPL might moderate the influence of privacy concerns on PPBs because a certain level of literacy is required to understand privacy threats and employ appropriate protective measures (Li, 2012; Orloff et al., 2021; Schubert et al., 2022).

Although previous research has examined antecedents of PPBs, it has rarely made clear distinctions and comparisons between the contexts in which different privacy threats arise in (Orloff et al., 2021; Epstein & Quinn, 2020; Masur et al., 2021; Yun et al., 2019). This is a somewhat surprising omission, as context plays a major role in individuals' privacy perceptions and behaviors (Nissenbaum, 2010). Bazarova and Masur (2020) suggested that researchers should take these differences into account,

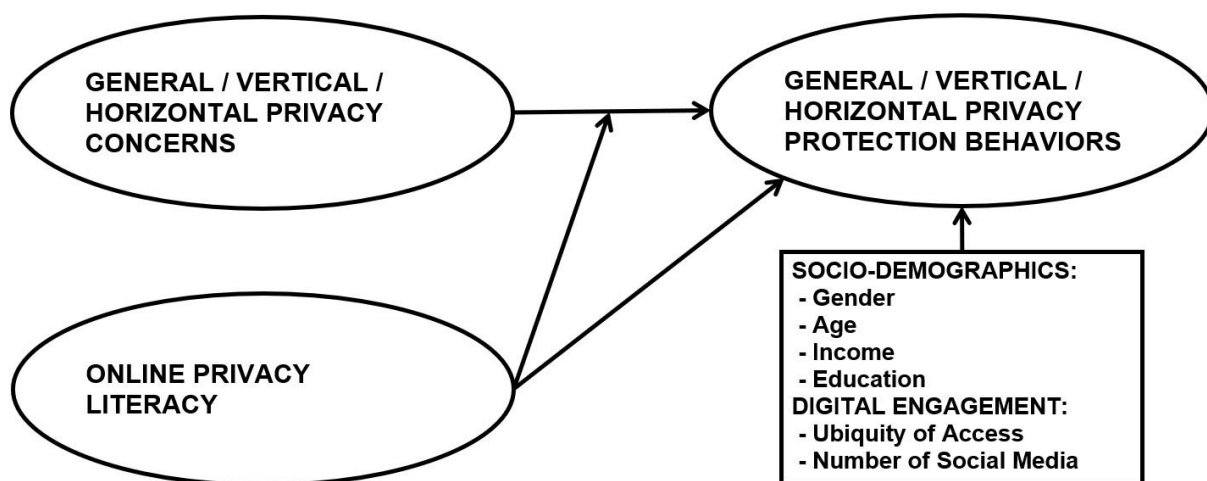
Suggested Citation (APA): Bartol, J., Vehovar, V., & Petrovčič, A. (2023, October). *Antecedents of privacy protection behaviors at the vertical and horizontal levels*. Paper presented at AoIR2023: The 24th Annual Conference of the Association of Internet Researchers. Philadelphia, PA, USA: AoIR. Retrieved from <http://spir.aoir.org>.

proposing a distinction between two major contextual units relevant to privacy: The horizontal level, which includes individuals' relationships with other internet users (acquaintances and strangers), and the vertical level, which includes individuals' relationships with institutions (companies and governments).

Given this gap in the literature, it is important to compare the same set of antecedents at the general (i.e., where contextual specifics are omitted), vertical, and horizontal levels and investigate potential differences in their effects on PPBs among levels. Thus, this study examined how socio-demographic characteristics, digital engagement, privacy concerns, and OPL influence PPBs at the general, vertical, and horizontal levels, and assessed whether OPL moderates the influence of privacy concerns on PPBs (Figure 1). Accordingly, two research questions (RQs) were posed: (1) How do socio-demographic characteristics, digital engagement, privacy concerns, and OPL influence PPBs at the general, vertical, and horizontal levels?; and (2) How does OPL affect the potential influence of privacy concerns on PPBs at the general, vertical, and horizontal levels?

Figure 1

Model of privacy protection behaviors



Method

To answer the RQs, we tested three linear regression models on a nation-wide sample of 1,015 internet users aged 18+ from Slovenia. Respondents were recruited from the largest Slovenian access panel. The data were collected by means of a web survey in October 2022. OPL was measured using the Online Privacy Literacy Scale (Masur et al., 2017), vertical and horizontal privacy concerns using scales from Masur (2019), and vertical and horizontal PPBs using scales from Epstein and Quinn (2020). Questions on socio-demographic characteristics and digital engagement were adapted from Blank and OxIS (2019). The items were translated by one author and an assistant, reviewed by experts, and assessed for clarity by five internet users. The validity of the measures was confirmed through confirmatory factor analyses (Kline, 2015). Items were then averaged to obtain scale scores. To obtain scores for general privacy concerns and

PPBs, the vertical and horizontal scales for each were averaged. Three regression models were tested for each type of PPBs (general, vertical, and horizontal): (1) socio-demographic characteristics (i.e., gender, age, income, education) and digital engagement (i.e., ubiquity of access—measured as the number of devices used to access the internet—and the number of different social media used); (2) socio-demographic characteristics, digital engagement, privacy concerns, and OPL; and (3) socio-demographic characteristics and digital engagement, privacy concerns, OPL, and the interaction term between privacy concerns and OPL.

Results

Regarding RQ1, the results showed that age had a negative and number of social media used a positive effect on PPBs at all levels, while income had a negative and ubiquity of access a positive effect on general and horizontal PPBs. Gender had no effect on general PPBs, although females were more likely than males to engage in horizontal PPBs, but less likely to engage in vertical PPBs. Education had no effect. Privacy concerns and OPL both had a statistically significant positive influence on PPBs at all levels (general, vertical, and horizontal). Comparisons of regression coefficients among levels revealed statistically significant differences between the effects of gender, age, and privacy concerns on PPBs at the vertical compared to the horizontal levels. With reference to RQ2, the results suggested that OPL does not moderate the effects of privacy concerns on PPBs at any level.

Discussion and Conclusion

This study examined the differences in antecedents of PPBs at the general, vertical, and horizontal levels (RQ1). It revealed that examining PPBs only at the general level obscures important differences in the effects of the same variables on PPBs at the vertical and horizontal levels. In terms of socio-demographic characteristics, the analysis showed that males have higher levels of vertical PPBs but lower levels of horizontal PPBs, and that age has a stronger influence on horizontal than on vertical PPBs. These findings are consistent with the literature which suggests that males and females have different perceptions of what should be kept private (Petronio, 2002), while younger people have different privacy needs than older people (Laufer & Wolfe, 1977). Furthermore, privacy concerns had a stronger influence on PPBs at the horizontal than at the vertical level. This suggests that horizontal privacy concerns are more easily translated into protection from other internet users, presumably because related privacy protections are more readily available and easier to employ compared to privacy protections against institutions (Heyman et al., 2014). Interestingly, no significant differences were found in the effect of OPL on PPBs across levels. This implies that if people are more privacy-literate they protect their privacy more generally (Masur, 2020). We also examined the potential moderating effects of OPL on the effect of privacy concerns on PPBs at different levels (RQ2). However, contrary to some previous research (Ortloff et al., 2021; Schubert et al., 2022), no significant moderating effects were found. Nevertheless, the absence of moderation instills optimism, as it suggests that greater concerns lead directly to protective actions, irrespective of users' OPL.

This study extends previous research by comparing the antecedents of PPBs between the general, vertical, and horizontal levels. Findings suggest that although users often engage with both other users and institutions in the same online environment (e.g., social media platforms), vertical and horizontal levels should still be examined separately, as the nuances of each level are otherwise obfuscated. Future research could explore differences between the vertical and horizontal level further, possibly incorporating additional factors such as personality traits or cultural characteristics, investigating specific e-services, or extending the comparisons to other privacy behaviors. Such endeavors are important because the online environment is a complex socio-technical system, and a holistic understanding of internet users' privacy-related behaviors requires systematic and comparative analyses of different online contexts.

References

- Baruh, L., Secinti, E., & Cemalcilar, Z. (2017). Online privacy concerns and privacy management: A meta-analytical review. *Journal of Communication*, 67(1), 26–53. <https://doi.org/10.1111/jcom.12276>
- Bazarova, N. N., & Masur, P. K. (2020). Towards an integration of individualistic, networked, and institutional approaches to online disclosure and privacy in a networked ecology. *Current Opinion in Psychology*, 36, 118–123). <https://doi.org/10.1016/j.copsy.2020.05.004>
- Blank, G., & OxIS (2019). Questionnaire. All parts (January 30, 2019). Available at SSRN: <https://ssrn.com/abstract=3522118>
- Epstein, D., & Quinn, K. (2020). Markers of online privacy marginalization: Empirical examination of socioeconomic disparities in social media privacy attitudes, literacy, and behavior. *Social Media and Society*, 6(2). <https://doi.org/10.1177/2056305120916853>
- Heyman, R., De Wolf, R., & Pierson, J. (2014). Evaluating social media privacy settings for personal and advertising purposes. *info*, 16(4), 18–32. <https://doi.org/10.1108/info-01-2014-0004>
- Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford Press.
- Laufer, R., & Wolfe, M. (1977). Privacy as a concept and a social issue: A multidimensional developmental theory. *Journal of Social Issues* 33(3), 22–41. <https://doi.org/10.1111/j.1540-4560.1977.tb01880.x>
- Li, Y. (2012). Theories in online information privacy research: A critical review and an integrated framework. *Decision Support Systems*, 54(1), 471–481. <https://doi.org/10.1016/j.dss.2012.06.010>
- Masur, P. K. (2019). *Situational privacy and self-disclosure: Communication processes in online environments*. Springer International Publishing. <https://doi.org/https://doi.org/10.1007/978-3-319-78884-5>

- Masur, P. K. (2020). How online privacy literacy supports self-data protection and self-determination in the age of information. *Media and Communication*, 8(2), 258–269. <https://doi.org/10.17645/mac.v8i2.2855>
- Masur, P. K., Epstein, D., Quinn, K., Wilhelm, C., Baruh, L., & Lutz, C. (2021). A comparative privacy research framework. *SocArXiv*. <https://osf.io/preprints/socarxiv/fjqhs/>
- Masur, P. K., Teutsch, D., & Trepte, S. (2017). Entwicklung und Validierung der Online-Privatheitskompetenzskala (OPLIS). *Diagnostica*, 63(4), 256–268. <https://doi.org/10.1026/0012-1924/a000179>
- Nissenbaum, H. (2010). *Privacy in context: Technology, policy, and the integrity of social life*. Stanford University press.
- Ortloff, A.-M., Zimmerman, S., Elsweiler, D., & Henze, N. (2021). The effect of nudges and boosts on browsing privacy in a naturalistic environment. In: *Proceedings of the 2021 Conference on Human Information Interaction and Retrieval* (pp. 63–73). Association for Computing Machinery. <https://doi.org/10.1145/3406522.3446014>
- Park, Y. J. (2013). Digital literacy and privacy behavior online. *Communication Research*, 40(2), 215–236. <https://doi.org/10.1177/0093650211418338>
- Petronio, S. (2002). *Boundaries of privacy: Dialectics of disclosure*. Suny Press.
- Rogers, R. W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In J. Cacioppo & R. Petty (Eds.), *Social Psychophysiology* (pp. 153–177). Guilford Press.
- Schubert, R., Marinica, I., Mosetti, L., & Bajka, S. (2022). *Mitigating the privacy paradox through higher privacy literacy? Insights from a lab experiment based on Facebook data*. Collegium Helveticum. <https://collegium.ethz.ch/wp-content/uploads/2022/05/Schubert-Marinica-Mosetti-Bajka-Mitigating-the-Privacy-Paradox2.pdf>
- Trepte, S. (2021). The social media privacy model: Privacy and communication in the light of social media affordances. *Communication Theory*, 31(4), 549–570. <https://doi.org/10.1093/ct/qtz035>
- Youn, S. (2009). Determinants of online privacy concern and its influence on privacy protection behaviors among young adolescents. *Journal of Consumer Affairs*, 43(3), 389–418. <https://doi.org/10.1111/j.1745-6606.2009.01146.x>
- Yun, H., Lee, G., & Kim, D. J. (2019). A chronological review of empirical research on personal information privacy concerns: An analysis of contexts and research

constructs. *Information & Management*, 56(4), 570–601.
<https://doi.org/10.1016/j.im.2018.10.001>