Asymmetrical third-person effects on the perceptions of online risk and harm among adolescents and adults

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Abstract

Although research has identified a range of opportunities, risks, and harms related to online social networking, the public debate on online risks follows a set pattern by which members of older age groups (parents, regulators) hold a picture of members of younger age groups (teenagers, digital natives) at a uniformly high level of risk. Perceptions of online risk, however, are prone to third-person effects in which individuals perceive risks to be more apparent in others than themselves. This study investigated third-person effects across age groups to further our understanding of the set positions found in current public debate. Multivariate analysis was used to compare adolescent and adult users' personal and third-person perceptions of common psycho-social risks associated with social networking engagement in a sample of 506 UK-based Facebook users (53% male; 13 to 77 years). Results indicated that rates of exposure to online vulnerabilities were similar for both age groups. However, differences in adult and adolescent perceptions of risk highlighted apparent mismatches between reported exposure to risk and an individual's perceptions, with adults demonstrating lower personal perceptions and higher third-person perceptions of risk than their adolescent counterparts. The research considers the implications of risk perception on an individual's online vulnerability.

Keywords: Facebook; risk perception; online vulnerability; third-person effect; adolescent users; online networking.

Introduction

Over the past two decades, digital literacy rates in Westernized countries have been on the increase in people young and old (Ofcom, 2015a,b). Increased levels of digital literacy, i.e., possessing the technical and operational skills to use a range of ICT (Information Communications Technology), have been shown to increase the online opportunities (e.g., engaging with online social network sites (SNS)) open to an individual (Livingstone & Helsper, 2010). However, with increased opportunity comes the potential for online user vulnerability through exposure to risks to an individual's psychological, reputational, or physical wellbeing (Davidson & Martezello, 2013) whilst engaging in digital activities (Boyd & Ellison, 2008; Buglass, Binder, Betts, & Underwood, 2016). On SNS, this vulnerability can stem from a variety of social and data risks, including threats to data privacy (e.g., Fogel & Nehmad, 2009), online harassment (e.g., Hasebrink, Livingstone, Haddon & Ólafsson, 2009), and exposure to inappropriate content (e.g., Livingstone & Helsper, 2013).

To date research into online risks and harms has tended to focus its attention on adolescents SNS users with associations having been drawn between their young age and risky online behaviors (Livingstone et al., 2011; Livingstone & Smith, 2014; Staksrud et al., 2013; Wolak et al., 2007). The perception of adolescents being at potential risk on SNS is not constrained to academia, with the media, parents and young people themselves expressing concern (Ofcom, 2018). Experiences of online risk, however, are not limited to adolescents with an increasing body of evidence reporting on the susceptibility of users across the lifespan (e.g., Bevan, Ang, & Fearns, 2014; Chen & Lee, 2013; Kross et al., 2013).

Despite research indicating the pervasiveness of online risks related to online social networking across the lifespan, the public debate on online risks seems to follow a set pattern by which members of older age groups (parents, regulators) hold a picture of vulnerable members of younger age groups (teenagers, digital natives) at a uniformly high level of risk.

Perceptions of online risk, however, are prone to third-person effects (TPE) in which individuals perceive risks to be more apparent in others than themselves (Davison, 1983). While the TPE has been evidenced in a range of SNS users (Debatin et al., 2009; Paradise & Sullivan, 2012; Kim & Hancock, 2015; Tsay-Vogel, 2016; Metzger & Suh, 2017), direct comparisons of the perceptions of users across age groups have not been readily addressed. The present study therefore investigated third person effects on risk perceptions of UK-based Facebook users for distinct adult and adolescent age groups to further our understanding of the set positions found in current public debate.

Literature Review

SNS afford their users many social and psychological opportunities (Ellison, Steinfield & Lampe, 2007; Valkenburg & Peter, 2011). The greater the perceived benefits an individual expects from an online platform, the more time they are likely to spend online (Livingstone & Helsper, 2010). However, with increased online usage comes a higher level of probability that individuals will be exposed to online vulnerabilities and risks (Hasebrink, Görzig, Haddon, Kalmus, & Livingstone, 2011).

Attempts to avert online user vulnerability and harm are widespread, with users of SNS routinely exposed to a myriad of online safety information and interventions through the popular press, educational initiatives, and SNS platforms themselves (Facebook, 2016; NSPCC, 2016; Safer Internet, 2016; Thinkuknow, 2016). The majority of this content addresses younger users, perhaps because an educational approach is deemed both appropriate and necessary for these age groups. Articles in the popular press (e.g., Telegraph, 2016), television programs (e.g., Cyberbully, 2017), and online video resources (e.g., CBBC LifeBabble, 2016) further feed into skewed age perceptions of online risk by consistently attributing online vulnerability to younger SNS users, a notion seemingly supported by the

plethora of academic research focused on adolescents (Dredge, Gleeson, & de la Piedad Garcia, 2014; Kwan & Skoric, 2013; Staksrud, Ólafsson, & Livingstone, 2013).

Despite the availability and prominence of information relating to online risks and harms, research strongly suggests that well-established, risk-prone practices such as oversharing data and connecting to strangers are, and remain, wide-spread across age groups (e.g., Tufekci, 2008; Vanderhoven, Schellens, & Valcke, 2013; Xie, Fowler-Dawson & Tvauri, 2019). Indeed, a seminal survey study of 506 SNS users by Acquisti and Gross (2006) found that gaining awareness of online privacy issues did little to change the self-disclosing behaviors of SNS users, with users believing that their own ability to control their information on the network, in other words their 'digital skills', would be an effective means of safeguarding themselves against a potential data threat.

This apparent mismatch between risk awareness and an individual's online behavior is often referred to as the "privacy paradox" (Barnes, 2006; Westin, 2003). The "privacy paradox" is an information privacy theory that has been used to classify online users (Draper, 2017) as fundamentalists (individuals who feel strongly about their personal privacy and will rarely relinquish control of their data), unconcerned (individuals who readily provide their data to other individuals or organizations), and pragmatists (individuals who demonstrate some concern for their privacy but are willing to relinquish control when faced with the prospect of attaining benefits). Research into SNS privacy attitudes (Acquisti & Gross, 2006; Christofides et al., 2009; Krasnova, Gunther, Spiekermann, & Koroleva, 2009; Young & Quan-Haase, 2013) suggests that a majority of SNS users fall into the category of privacy pragmatists, with individuals using cost-reward judgments to decide whether engaging in and/or being exposed to potentially risky online behaviors presents a necessary cost if they are to reap the perceived rewards of use (Dinev & Hart, 2006; Draper, 2017).

However, cost-reward judgements might be prone to optimistic bias, a theory that states that individuals display a tendency to perceive negative events as less likely and positive events as more likely to happen to them (Higgins et al., 1997). Research by Cho, Lee, and Cheung (2010) showed online users to perceive others to be more vulnerable to privacy and safety concerns than themselves. Such a comparison, termed 'comparative optimism' in the realms of risk perception research, has been attributed to a variety of factors including over-confidence (Weinstein, 1980), denial that the risk is present (Arnett, 2007), and a desire to protect one's own self-image (Helweg-Larsen, Sadeghian, & Webb, 2002). In the realms of online research, comparative optimism has been linked to overly optimistic perceptions of cyberbullying (Betts, Metwally, & Gardner, 2019) and Facebook use (Kim & Hancock, 2015).

An individual's level of comparative optimism is likely to be subject to the third person effect (Davison, 1983). The TPE is derived from a theoretical framework which suggests that individuals perceive mass communication media to affect others more than themselves (Davison, 1983). In the context of SNS, the TPE refers to a discrepancy in self-other perceptions in terms of the consequences of online behavior, with individuals being more likely to attribute the negative effects of online life to others (Debatin, Lovejoy, Horn, & Hughes, 2009). For example, Paradise and Sullivan (2012), in a study of 357 undergraduates, found that when asked to estimate the negative effects of Facebook, participants were more likely to rate 'others' (e.g., younger people and/or friends on their network) as being more likely to experience negative online experiences than themselves. When faced with the threat of a myriad of potential negative online experiences, comparative optimism and the TPE might therefore help to explain why some individuals view the cost of data privacy to be a justifiable means of reaping the perceived opportunities and psycho-social rewards of engaging with SNS.

The TPE is said to be more pronounced when individuals feel demographically distanced from the 'others' in question (Gunther, 1991). In many contexts, age constitutes such

demographic distance. For example, adults often regard themselves as being more risk adverse than their younger counterparts due in part to the increased level of life experience and education that they have accrued (Tiedge, Silverblatt, Havice, & Rosenfield, 1991). The distance in age has been shown to inflate an adult's perception of a young person's vulnerability in a variety of contexts such as road safety (Carver, Timperio, & Crawford, 2008), television viewing (Hoffner & Buchanan, 2002), and 'stranger danger' (Fessler, Holbrook, Pollack, & Hahn-Holbrook, 2014; Foster, Villanueva, Wood, Christian, & Giles-Corti, 2014).

Recent research indicates that in an increasingly complex digital landscape young people may benefit from a parent, or other significant adult, providing support to help mitigate potential risks of online engagement (Livingstone et al., 2017); highlighting the role of an adult as a source of guidance and experience. However, such approaches while seemingly sensible in an online context, serve to emphasize perceived demographic distances in digital users. Therefore, it can be expected that adults and young people perceive their levels of risk differently due to the apparent influence of their demographic distance in age and life experience. Differing perceptions are to some extent rooted in reality. Supportive online risk research has highlighted adolescent engagement with risky online behaviors such as oversharing of information, accumulating large unmanageable networks, and connecting and interacting with unknown or spurious contacts (Livingstone & Smith, 2014; Staksrud et al., 2013; Wolak, Mitchell, & Finkelhor., 2007). Differing perceptions, at the same time, are likely to be exacerbated by the often sensationalized 'media panic' that surrounds young people's digital lives (Draper, 2012). The apparent association between such differing risk perceptions and the TPE has previously been alluded to in SNS research concerning homogenous age-group samples (Debatin et al., 2009; Paradise & Sullivan, 2012; Kim & Hancock, 2015; Tsay-Vogel, 2016; Metzger & Suh, 2017), however, at present direct comparisons of the perceptions of users across age groups are lacking.

Hypotheses

On the basis of the research presented and the apparent public portrayal of online user vulnerability as a domain of the young, it can be assumed that, in comparison to older users, younger people are (a) either more likely to experience and to report instances of online risks and harm (i.e., negative/aversive outcomes of online communication), or (b) more likely to perceive themselves to be at risk, or (c) both. The present study therefore investigated risk perceptions, personal and third person, of UK-based Facebook users for distinct adult and adolescent age groups.

Firstly, in terms of experience of risk and harm, some 13 – 15% of online users' report being the target of negative online experiences (Lenhart et al., 2011, Ofcom, 2018) with increased rates of reporting of risks and harms observed amongst adolescents (Sengupta & Chaudhuri, 2011). A possible explanation for this is that engagement in risky behaviors (online and offline) is said to peak between the ages of 12 and 17 years, during the period of adolescence (Baumgartner, Valkenburg, & Peter, 2011). On this basis, it is therefore hypothesized that:

> H1: Adolescents will report higher levels of prior experience of online risks and harm than adults.

Secondly, adolescent perceptions of online risk are likely to be influenced by the public, media and educational perceptions of the inherent risks and harms associated with young people engaging with online platforms (Ofcom, 2018). As such, young people may not only report higher rates of exposure to vulnerability, but also perceive themselves to be significantly more at risk than adult SNS users. It is therefore hypothesized that:

> H2: Adolescents' perceptions of personal risk will be higher than adults' perceptions of personal risk.

Finally, in line with comparative optimism and TPE research into perceptions of online risk (e.g., Betts et al., 2019; Kim & Hancock, 2015; Tsay-Vogel, 2016) it is expected that SNS

users will rate another user as perceptually more ‘at risk’ when engaging online and that demonstrable effects will be exacerbated by demographic distances in age (Gunther, 1991). It is therefore hypothesized that:

> H3: Adult users will report higher perceptions of third-person risk for an adolescent social media user, than adolescent users themselves.

Next to these focal hypotheses, there are likely to be other variables playing a role in risk perceptions. Specifically, previous studies have demonstrated that gender makes a difference regarding an individual’s propensity to accurately perceive risk and harm in both offline and online domains (e.g., Finucane & Satterfield, 2000; Gutteling & Wiegman, 1993; Youn & Hall, 2008). Furthermore, online risk perception studies have been criticized for not controlling for prior experience of online risks and harm (Garbarino & Strahilevitz, 2004). It is plausible to assume that prior experience will provide a strong anchor for current risk estimates. In the present study, gender and prior experience of online risks and harm were therefore controlled for. No explicit hypotheses relating to these variables are tested.

Method

Data from online surveys were used to explore the relationship between SNS users’ age and perceptions of online risk. The data set used here is derived from an online self-report survey of social networking behaviors previously described in [AUTHORS HIDDEN FOR REVIEW]. This research was carried out in accordance with ethical standards set by the British Psychological Society. Ethical approval for the project “[BLINDED]” was granted by the [BLINDED] College of Business, Law, and Social Sciences Institutional Review Board (Approval Reference No. 2014/13).

Sample

Responses from 506 UK-based Facebook users (Mean Age = 20 years 7 months; *SD* = 9 years 10 months; 53% male) were obtained.[1] Adolescent (N = 282; 13 to 17 years; 73% male) and adult (N = 224; 18 to 77 years; 77% female) participants were recruited from three populations: school-based students from five socio-economically diverse UK schools; students from a large UK university, and adult UK Facebook users recruited via online advertisements on UK-centric online forums and Facebook groups. All adult participants were required to confirm their country of residence prior to completion of the survey. Participants were eligible for entry into a prize draw to win online vouchers. Missing data prompted the removal of 17 participants from the analysis, producing a final sample size of 489 (267 adolescent and 222 adults). Appropriate ethical procedures were observed for all samples. For school-based adolescents, school and parental consent were obtained prior to the study.

Measures and procedure

Participants completed an online survey optimized for use on desktop computers and mobile devices. Measures used for the present study were:

Online Vulnerability. Six items (Cronbach's $\alpha = .91$), designed to measure participants' prior experience of online risks and harm, drew on questions and theory previously presented in Binder, Howes, and Smart (2012) and Debatin et al. (2009). Participants reported the frequency, ranging from 1 (*Very rarely*) to 5 (*Very often*), of their exposure to six common indicators of psycho-social online vulnerability to risks and harm: "critical or hurtful direct comments", "social embarrassment", "damaging gossip / rumors", "personal data misuse", "inappropriate content (i.e., of a sexual or violent nature)", and

"unwanted advances, stalking, or harassment". Scores were averaged ranging from 1 to 5, with higher scores indicating higher levels of reported experience.

Personal Perception of Risk (PPR). Ten items (Cronbach's $\alpha = .94$) measured an individual's personal perception of online risk drawing on items and theory presented in Paradise and Sullivan (2012). Participants were asked to indicate the extent to which the information they shared on Facebook might increase a range of potential vulnerabilities (e.g., "conflicts with family", "attracting unwanted attention"). Responses to each item ranged from 1 (*No concern*) to 5 (*Strong concern*). The scale items produced an average score ranging from 1 to 5, with higher scores indicating increased perceptions of online risk.

Third-person Perception of Risk (TPR). The ten items of the PPR scale were further used alongside a vignette of a 'typical' teenage Facebook user (Cronbach's $\alpha = .93$):

> "Alex is 14 and has been a regular user of Facebook for the past 6 months. Alex usually uses a smartphone to access Facebook, but also has access to the family laptop after school and at weekends."

The name Alex was chosen as a gender-neutral name to reduce the chance of bias in the results. To measure third-person perception of online risk, participants were asked to imagine that Alex was a teenager that they knew in real life and to indicate the extent to which they felt that information Alex shared on Facebook might increase a range of potential vulnerabilities for him/her (e.g., "conflicts with family", "attracting unwanted attention"). Responses to each item ranged from 1 (*No concern*) to 5 (*Strong concern*). The scale items were averaged, with higher scores indicating increased perceptions of third-person online risk.

Data analysis

Data analysis was conducted using IBM SPSS v.25.0 (IBM Corp, 2017). A principal components analysis with varimax rotation was used to assess concurrently the construct validity of the risk related measures (i.e., prior experience of online risks and harm, PPR, and TPR). Items loaded onto three factors as expected with item loadings of greater than 0.5 onto their corresponding factors indicating convergent validity (Hair et al., 1998). Furthermore, there were no high cross-loadings of items in one construct with items in the other constructs, thus indicating discriminant validity. ANCOVA and MANCOVA were used to statistically control for the effects of gender and prior experience of online risks and harm.

Results

A one-way ANOVA was used to test for mean score differences, in PPR, $F(1,220) = 2.05$, $p = .15$, and TPR, $F(1,220) = .89$, $p = .37$, between the university and adult samples to ensure the use of a single 'adult' age-group was appropriate. No statistically significant ($p > .05$) differentiation could be achieved among adult participants, and all subsequent analyses were based on the two groups: adolescents and adults.

Descriptive statistics for the full sample and by age group are provided in Table 1. Bivariate correlations for the full sample were calculated. A moderate association between PPR and TPR scores, $r = .426$, $p < .001$, showed higher levels of PPR to be associated with higher levels of TPR. Testing of the proposed covariates, gender (coded as 0 males, 1 females) and prior experience of online risks and harms, showed small significant associations between prior experience of online risks and harms and both PPR, $r = .108$, $p < .01$, and TPR, $r = .094$, $p < .05$, scores. A small, but significant positive correlation was also evident in the relationship between gender and TPR, $r = .170$, $p < .001$, and gender and prior experience of online risks and harm, $r = .189$, $p < .01$, indicating that in both instances' females reported higher levels. PPR and gender were not significantly correlated ($p>.05$). The

correlations, together with the previous literature supporting the role of the covariates in risk perceptions (e.g., Finucane & Satterfield, 2000; Gutteling & Wiegman, 1993; Youn & Hall, 2008; Garbarino & Strahilevitz, 2004), provided good grounds for their inclusion in the main analysis.

Contrary to H1, a gender controlled ANCOVA comparing the age-group means for prior experience of online harm indicated no significant difference , $F(1, 486) = .68$, $p = .41$, between adults, M = 2.67, SD = 1.06, and adolescents, M = 2.40, SD = 1.10. Both age-groups displayed moderate levels of reported prior experience of online risks and harms. A one-way ANOVA conducted prior to the ANCOVA had indicated a significant difference between adolescent and adult ratings ($p < .01$). As argued previously, gender has an influence over the reporting and perception of risk, and it is advisable to control for gender. The difference in outcomes between ANOVA and ANCOVA is also likely to reflect the uneven gender distribution in the sample. ANCOVA are considered here to more informative for H1.

Testing group differences in perceptions of online risk

A one-way MANOVA was first used to test H2 and H3, the role of age-group (adolescent vs. adult) on the two dependent variables (PPR and TPR). PPR scores were transformed using 1/Cube Root to resolve issues of normality and equality of variance. The resultant model rendered a non-significant homogeneity of variance test (Box's M $p = .12$). Pillai's Trace statistics were reported for robustness in light of the unequal group sample sizes (Finch, 2005). In support of H2, a statistically significant difference in age-group was evident, F (2, 486) = 34.76, $p < .001$; Pillai's Trace = .125; $\eta^2 = .125$, in PPR scores, F (1, 487) = 15.95, $p < .001$; $\eta^2 = .03$. Furthermore, support for H3 was also evidenced by a statistically significant age-group difference in TPR scores when rating against the vignette of the adolescent social media user, F (1, 487) = 22.67, $p = .007$; $\eta^2 = .04$.

Covariates were then included in the model. Differences across the independent groups (Age-group: adolescent vs. adult) in the PPR (H2) and TPR (H3) outcome variables, were explored with gender and prior experience of online risks and harm entered as co-variates. The overall model showed a statistically significant difference between the age-groups on the combined dependent variables, F (2, 484) = 29.39, $p < .001$; Pillai's Trace = .108; $\eta^2 = .108$, when covariates were controlled for. Statistically significant differences in both PPR, F (1, 485) = 23.30, $p < .001$; $\eta^2 = .05$, and TPR, F (1, 485) = 10.49, $p = .001$; $\eta^2 = .02$, scores supported the initial findings of the MANOVA. Supporting H2, adolescents demonstrated a higher perception of personal risk when using SNS than adults (Figure 1). In contrast, the perceived third person risk of the vignette-derived adolescent social media user was rated higher by adults than by adolescents, lending support to H3 and the notion that demographic distance in age might be a factor in participants' perceptions of third person risk. Gender was not a significant factor in the model ($p = .15$). In line with initially reported correlations, however, a significant portion of the variance in PPR scores, F (1, 485) = 12.51, $p < .001$; $\eta^2 = .03$, was explained by the inclusion of the prior experience of online risks and harm measure. TPR scores were not significantly impacted by prior experience of online risks and harm ($p > .05$). Furthermore, tests for possible interactions between the variables were non-significant ($p > .05$).

Finally, to engage in further in-depth testing of H3, third person effects in the perceptions of risk were tested using methods based on those presented in Price, Huang, and Tewkesbury (1997). Their approach simultaneously takes account of both PPR and TPR and focuses directly on self-other discrepancies. A TPE differential score was created by subtracting PPR scores from TPR scores. The TPE differential score reflected the differences in the perceived likelihood of an adolescent other experiencing online risks when compared to the perceptions of the self-experiencing online risks. Positive scores were indicative of

higher levels of optimism that the self would not experience online risks. Negative scores were indicative of the self being perceived more likely to experience online risks than an adolescent other. Scores close to zero were indicative of a perceptually neutral stance on the susceptibility of self and an adolescent other to negative online experiences (Joshi & Carter, 2013).

For the overall sample, the mean TPE differential score was .51 (SD = 1.30), suggesting that on average the full sample perceived themselves to be less likely to encounter online risks than an adolescent other. Bivariate associations indicated that the TPE differential score was significantly associated with age-group, r = .442, p < .001, and gender, r = .209, p < .001. Reported prior online vulnerability was not significantly associated with the TPE differential (p > .05). A one-way ANCOVA was conducted with the TPE differential as the dependent variable, F (3, 485) = 40.81, p < .001. Assumptions of normality and equality of variance were satisfied. In support of H3 the model showed a significant difference in age-group, F (1, 485) = 93.52, p < .001, in that the adults demonstrated larger third person effects. Adults (M = 1.13, SD = 1.17) were more optimistic about their own perceived online safety when compared to an adolescent other, than the adolescents who held a more neutral position (M = -.02, SD = 1.16). Gender and prior experience of online risks and harm were not significant in the model (p > .05). No significant interactions between the variables were evident (p > .05).

Discussion

The present study adds to our understanding of SNS user risk perceptions by drawing on the theory of the third person effect (Davison, 1983). According to the TPE, when faced with an appraisal of third person risk, people are more likely to harbor an optimistic bias towards the self. While the TPE has been applied previously to information privacy and SNS research

(Debatin et al., 2009; Paradise & Sullivan, 2012; Kim & Hancock, 2015; Tsay-Vogel, 2016; Metzger & Suh, 2017), the dependence of the effect on demographic distance has not been well acknowledged to date. The present study therefore used a multivariate analysis of a cross-sectional self-reported dataset to investigate age-group differences in Facebook users' perceptions of specific psycho-social forms of online risk and harm.

The domain of online risk is often discussed with a bias towards adolescent users (Dredge, Gleeson, & de la Piedad Garcia, 2014; Kwan & Skoric, 2013; Staksrud, Ólafsson, & Livingstone, 2013). We therefore expected to find significantly higher levels of prior experience of online risks and harm in the adolescent sample. The lack of support for H1, with both adults and adolescents displaying similarly moderate levels, however, indicates that the link between age and risk may not be as straightforward. The observed similarities between age groups may be down to several factors, most notably the calibration of retrospective self-assessments and the compensatory influence of skills related to digital literacy.

Regarding retrospective self-assessment, it is possible that study participants did not rely on actual memories of past experiences and based their responses on a more holistic understanding of moderate risk levels. Similarly, participants may have based their subsequent evaluation of relevant memories on an age-dependent concept of risk. While self-reports always need to viewed critically, it is important to note that further findings in the present work are in line with prior theorizing. Regarding digital literacy, this seems to be the most prominent and age-dependent factor that could have prevented younger users in this study from actually experiencing noticeably higher levels of harm and risk. Younger users may well have higher levels of digital literacy, as far as complex social constellations online are concerned. Digital literacy, broadly understood, requires users to master not only the skills required to operate the tools and platforms with which they wish to interact, but also

navigate a complex social and psychological landscape in which a myriad of opportunities (both good and bad) abound (Martin & Grudziecki, 2006). While there is a growing expectation that individuals living in the 21st century should be digitally literate, this is by no means a given, and a wide spectrum of online literacy levels need to be assumed instead (Helsper & Van Deursen, 2015).

In contrast to H1, the age difference in PPR scores (H2) indicated that self-perceptions of online risk and vulnerability were likely to be decided by age. Adult SNS users reported lower levels of PPR, complementing existing literature that suggests that older individuals consider themselves to be safer online due to their life experience (Tiedge et al., 1991). In terms of the higher levels of risk perception reported by adolescents, it would indicate that adolescent users might be quite effective at estimating their own likelihood of encountering potential risks on SNS. A possible explanation for this, aside from their own experience of such encounters, could be that younger users may be more sensitive to the personal risks of SNS use due to the frequency of information that they receive regarding their online safety and the potential hazards on interacting with others online (for example, NSPCC, 2016; Safer Internet, 2016; Thinkuknow, 2016). However, despite being well-informed, studies have maintained that adolescents' actual online behavior frequently does not reflect this level of information, nor does it conform to e-safety recommendations provided (Vanderhoven et al., 2013), with risky online behaviors regarded as normative in some adolescent circles (Moreno et al., 2009). This means it might be difficult for current online interventions, which are mostly informational and educational in character, to bring about changes in 'informed' adolescents' online risk behavior or to provide advice to older, adult users who deem themselves to be of low risk. On this basis, further research considering the motivations behind continued online risk-taking behaviors, considering a broader selection of online social network sites and online vulnerabilities, in both adults and adolescent user populations is recommended.

The TPE results (H3) presented in this study provide support for previous research showing that SNS users are prone to attributing negative outcomes of SNS engagement to others rather than themselves (Debatin et al., 2009; Paradise & Sullivan, 2012). The present work outlines how these perceptions are potentially affected by the age of the SNS user, suggesting that demographic distance plays an important role in determining an individual's perceptions of online risk and vulnerability. In line with theories of optimistic bias (Dinev & Hart, 2006; Krasnova et al., 2009), adults perceived themselves to be significantly more optimistic that they were less vulnerable than the adolescent Facebook user depicted in the study vignette.

The fact that self-other discrepancies, when looking at the TPE differentials, were close to zero for adolescent users, can shed further light on the role of demographic distance. While the TPE is supposed to hold universally (Kim & Hancock, 2015), our findings support Gunther's (1991) theory and indicate that small demographic distances can lessen the effect. For the adolescents, the fictional adolescent vignette of a 'typical' teenage user (a fourteen-year-old Facebook user named Alex), presented them with an opportunity to rate the vulnerability of someone who was more likely to be their peer and therefore more likely to exhibit similar online characteristics.

Open questions remain surrounding further variability in gender and age asymmetries. The present study made use of a short scenario based on a single, gender-neutral adolescent user. This means it has not been possible to test whether the TPE is consistent when rating differently aged and gendered others. To fully explore the role of age and other demographic distances in the TPE, a wider array of vignettes allowing people to rate multiple others is recommended. Furthermore, this would allow for the inclusion of an adolescent-to-adult perspective, complementing the adult-to-adolescent perspective investigated here. In addition, further consideration of a wider range of control variables, such as the role of

psycho-social motivations and online behaviors is recommended. Experience of online risk and harm has previously been associated with several factors including self-esteem (Koutamanis, Vossen & Valkenburg, 2015), fear of missing out (Buglass, Binder, Betts, & Underwood, 2017), self-disclosure habits (White, Cutello, Gummerum & Hanoch, 2018), network size (Buglass et al., 2016), and network diversity (Binder et al., 2012). It is likely therefore that such factors will influence an individual's self-other risk perceptions. To gain a more in-depth understanding of user perceptions and to allow for more comprehensive models, such factors should be considered in future research.

Conclusions

In conclusion, the present research builds on previous SNS-related TPE literature that considered single age-group samples (Chapin, 2014; Debatin et al., 2009; Paradise & Sullivan, 2012; Tsay-Vogel, 2016) and extends such studies by highlighting the role of age as an important driver behind user perceptions of online risk. Online risks and vulnerability do not apply to adolescent users alone. Indeed, adolescents may have a more pragmatic perception of online risks and vulnerabilities than their optimistically biased adult counterparts, a divide that needs to be bridged in order to ensure safe and enjoyable user practices are experienced by all. A core recommendation based on our findings, therefore, is to adopt a more inclusive approach to the design and implementation of online safety interventions so as to foster a greater sense of awareness amongst all online user groups, and not just the young. As the digital audience continues to increase in age, it would be foolhardy to assume that life experience alone is enough to prevent susceptibility to the ever-evolving digital risks associated with online life.

Providing individuals of all age groups with digital literacy pertaining to relevant safe use practices and a greater understanding of both the positive and negative outcomes

associated with SNS use is needed to ensure that all users can make informed and pragmatic cost-reward behavioral judgements online. Such an approach is likely to come with novel challenges. In particular, attempts to safeguard adult online behavior and content via inventions could easily be seen as exaggerated control and/or regulation (Rowbottom, 2012). As a final point, then, perceptions of risk on social media have implications beyond the individual user and feed into wider issues such as online participation (Moreno-Ibarra & Torres-Ruiz, 2019; Visvizi & Lytras, 2019), freedom of expression and censorship (Benedek & Kettemann, 2014), digital inclusivity (Thompson, Jaeger, Taylor, Subramaniam, & Bertot, 2015) and others.

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Footnotes

1 In line with effect sizes in previous studies (e.g., Paradise & Sullivan, 2012), a sample size target of > 350 was calculated for medium-sized effects (f = .2) in a repeated-measures ANOVA with power = .90 at α = .01 using G*Power3 (Faul, Erdfelder, Lang, & Buchner, 2007).

Table 1. Descriptive statistics for the full cross-sectional sample (N = 489)

	Cronbach's α	Full Sample	Adults (N = 222)	Adolescents (N = 267)
		Mean (SD)	Mean (SD)	Mean (SD)
Prior experience	.91	2.52 (1.09)	2.67 (1.06)	2.40 (1.10)
PPR	.94	2.44 (1.27)	2.08 (1.03)	2.74 (1.37)
TPR	.93	2.95 (1.15)	3.21 (1.07)	2.73 (1.16)

Prior experience = prior experience of risk and harm, PPR = Personal perception of risk; TPR = Third-person perception of risk

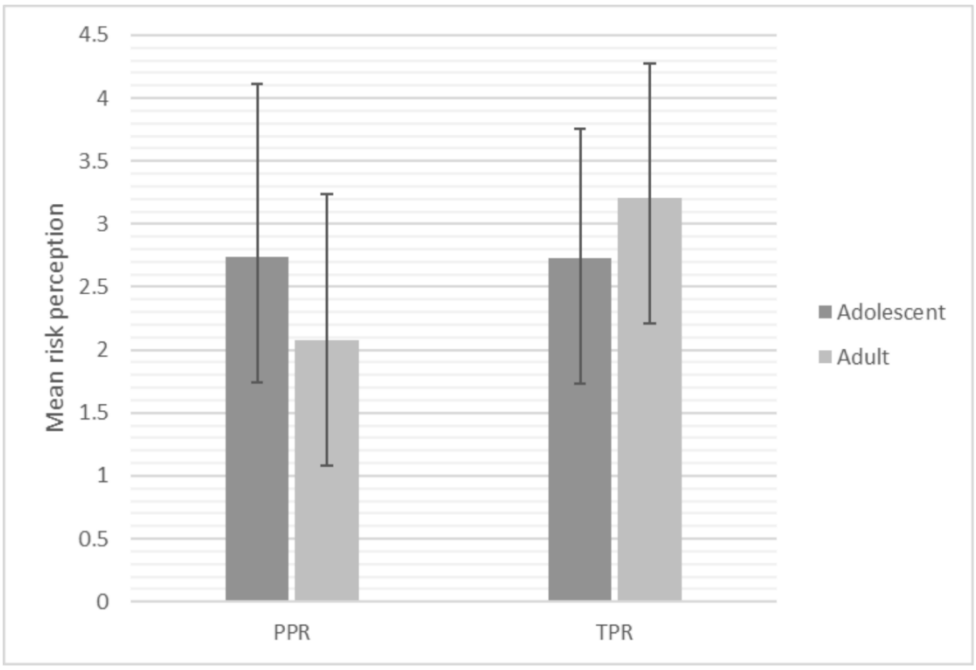

Figure 1. Mean differences in PPR and TPR between adolescents and adults (N = 489).