**Comparative optimism for judgements about online identity theft**

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**Abstract**

**Objectives:** Individuals believe that negative events are less likely to happen to them than others – termed optimistic bias. The research aimed to explore developmental differences in comparative optimism for online identity theft (Study 1) and the impact of previous experiences of identity theft and representativeness of comparator groups for such judgements (Study 2).

**Methods:** Study 1 included 101 late adolescents, 226 emerging adults, and 147 adults. Study 2 included 313 university students. In both studies participants provided judgements about the likelihood of experiencing online identity theft and in Study 2 experiences of identity theft, fear of identity theft, and representativeness.

**Results:** Both studies provided evidence of optimistic bias; participants reported that they were less at risk of experiencing online identity theft than others. There was no effect of age (Study 1), and judgements were not accounted for by the targets’ representativeness of the comparator groups (Study 2). Fear of identity theft mediated the relationship between previous experiences of identity theft and perceptions of risk for the self (Study 2).

**Discussion:** The findings contribute to our understanding of how online risks are perceived and have implications for online safety messages.

*Keywords:* Comparative optimism; online identity theft; online risks; risk judgments

Identity theft refers to the theft of personal information such as an individual’s name, date of birth, or credit card details (Hoar, 2001) which is then potentially used to purchase goods or services (Anderson et al., 2008). While the opportunity for identity theft arises when individuals share or make their personal information available, targets of identity theft may not become aware that their personal information has been stolen until they try to take out a loan (Hoar, 2001). Although identity theft is not a new phenomenon, information and communication technology has afforded new opportunities for identity theft (Anderson et al., 2008). For example, information and communication technology may increase the risk of identity theft occurring (Holt & Turner, 2012) and increase the potential scale of identity theft (Roberts et al., 2013) incurring costs to consumers and businesses (Lai et al., 2012).

Experiencing identity theft can impact an individual’s physical and mental health meaning that identity theft is regarded as a public health issue (Burnes et al., 2020). Moreover, research reports an association between experiencing identity theft and elevated levels of depression and subsequent poor health (Golladay & Holtfreter, 2017). A range of behavioural risk and protective factors associated with the likelihood of experiencing online identity theft have been identified. For example, behaviours such as engaging in more online shopping activities increase the risk of online identity theft (Burnes et al., 2020). Conversely, not using credit cards online and avoiding risky content is likely to reduce the risk of experiencing online identity theft (Guedes et al., 2022). Holt and Turner (2012) argue that awareness raising campaigns could provide one mechanism to reduce identity theft. However, the effectiveness of such awareness raising campaigns depends on the extent to which the target audience engage with the campaign materials and believe that the campaign message is directly relevant to them (Nævestad, 2010). Relatedly, when individuals hold an optimistic bias, it can influence the success of such safety messages (Perrissol et al., 2011; Weinstein & Klein, 1995) and can prevent individuals from taking appropriate measures to avoid online risks (Alnifie & Kim, 2023).

**Comparative optimism**

Despite the impacts associated with experiencing online identity theft and the likelihood of experiencing other online harms, individuals may adopt a range of protective psychological strategies to mitigate against this risk (Betts et al., 2024). Such strategies include thinking that other users are more at risk (Conway & Hadlington, 2021), believing that the self is more skilled to manage the situation than others (Marceda Bach et al., 2020), and downplaying potential risks (Blank & Lutz, 2018). Together, these strategies are akin to comparative optimism.

Comparative optimism refers to the tendency to believe that positive events are more likely to happen to the self and that negative events are less likely to happen to the self when compared to others (Chambers & Winschitl, 2004; Jefferson et al., 2017; Weinstein, 1980; Winschitl & Stuart, 2015). Rather than view comparative optimism through a motivational lens, Chambers and Winschitl (2004) proposed a three-stage theoretical framework that accounts for comparative optimism beliefs through proposing that the bias arises from judgment processes and information processing limitations. In the first stage, information recruitment, individuals draw on memories or information from the environment that relates to judgements about the individual and the reference group for the specific topic. The second stage, absolute evaluation, involves individuals using the information retrieved at stage one to evaluate the diagnosticity and implications for the target and the reference group. The final stage, comparative-judgement formation, involves the individual forming a comparative judgement about the topic.

Researchers have reported evidence of individuals holding optimistic beliefs across a range of behaviours and judgements, including the likelihood of experiencing: (a) Covid-19 in the short-term (Asimakopoulou et al., 2020), (b) financial risks associated with Covid-19 (Van der Meer et al., 2023), and (c) food safety-risks (Evans et al., 2020). There is also evidence that holding such optimistic beliefs have positive impacts for an individual’s well-being, functioning, resilience, and prosocial behaviour (Bortolotti, 2018). Moreover, holding optimistic beliefs is also associated with improved subjective well-being, positive coping styles and interpersonal relationships, engagement with health protection behaviours, persistence in education, and higher income when faced with adversity (Carver et al., 2010).

We use the term comparative optimism rather than the third person effect based on the recommendations of Metzger et al. (2015). Metzger et al. recommend adopting the term comparative optimism to reflect that individuals may hold either positive or negative beliefs about the likelihood of experiencing an event as comparative optimism is a more appropriate term to “*explain one’s ability to avoid experiencing direct risks and negative events”* (p. 511). Therefore, applied to the current studies, comparative optimism would reflect individuals’ beliefs about the extent to which they would or would not experience online identity theft compared to others. Conversely following Metzger et al.’s (2015) approach, the third person effect would in this case refer to beliefs about the effectiveness of media messages about online identity theft for the self and others. Consequently, as the current research focused on the perceived likelihood of experiencing online identity theft we used the term comparative optimism.

**Comparative optimism and online identity theft**

Relating to online behaviours and comparative optimism, Hewitt and White (2022) define cyber optimistic bias as the tendency to be “*over confident in being protected, hence, be less of a victim*” (p. 50). A recent meta-analysis identified that holding an optimistic bias for online security negatively impacted cyber security behaviours (Alnifie & Kim, 2023). Specifically, holding greater optimistic beliefs for online security was associated with a greater likelihood to share passwords, not taking preventive measures, ignoring security breaches, having a biased view of cyber threats, and being overconfident in cybersecurity abilities. Alnifie and Kim argue that underpinning these behaviours is a belief that individuals “*are immune to cyberattacks even when others have been demonstrated to be vulnerable because these people underestimate the risk”* (p. 97). Relatedly, individuals also hold comparative optimistic beliefs for the likelihood of experiencing phishing (Lei et al., 2023), online privacy risks (Cho et al., 2010), and risks associated with Facebook use (Lev-On, 2017). Further, Schaupp and Carter (2010) argue that holding comparative optimistic beliefs about abilities to complete e-filing of income tax returns is indicative of individuals being more willing to use e-file systems despite the potential risks. However, while researchers have explored comparative optimism and privacy concerns more generally (e.g., Baek et al., 2014; Cho et al., 2023; Metzger & Suh, 2017), the extent to which individuals hold comparative optimistic beliefs for experiencing online identity theft remains largely unclear. Therefore, the current studies address this issue.

**Comparator optimism and comparator groups**

Previous research has highlighted the importance of who the comparator groups are for making optimistic judgements, with variations reported according to the social closeness (Perloff & Fetzer, 1996) and age of the comparator groups (Scharrer, 2002). Groups that are more socially close to the individual making the judgement, such as friends, may be judged to be less at risk than other more socially distant groups for two reasons. First, the behaviour of socially close groups such as friends may reflect back on the individual providing the rating (Pahl et al., 2009). Second, with socially close groups individuals likely draw on a common group membership to inform their judgements (Paradise & Sullivan, 2012). Comparator groups that are younger than the self may be judged to be at greater risk of experiencing harm because of a belief that with age comes wisdom (Scharrer & Leone, 2008). Indeed, in our previous research we found that strangers and those younger than the self were judged to be most at risk of experiencing cyberbullying (Betts et al., 2019). However, when looking at social comparisons, there is some suggestion that the scales used in previous research lack systematic measurement (Chen & Atkin, 2021). Therefore, in the current studies, we varied comparator groups according to social distance and age.

**Comparative optimism and gender differences**

There is evidence of a complex pattern of gender differences in experiences of comparative optimism that vary according to topic. For example, some studies have reported that males tend to hold more optimistic beliefs (e.g., for the long-term risk of catching Covid-19, Asimakopoulou et al., 2020; for the likelihood of experiencing a happy marriage, Helweg-Laresen et al., 2011) whereas other studies have reported that females hold more optimistic beliefs (e.g., for positive and negative events, Dricu et al., 2022). When focusing on online harms, there is evidence that males hold more optimistic beliefs about the likelihood of experiencing cyberbullying compared to females (Betts et al., 2019). Although these beliefs could reflect the actual likelihood of experiencing the online harm (Betts et al., 2019), when considering the likelihood of experiencing identity theft, males are less likely to experience identity theft (Guedes et al., 2022) and are less resilient against identity theft (Holt & Turner, 2012) than females. However, given the non-contact nature of online identity theft, Roberts et al. (2013) argue that gender may be less relevant than for other crimes. Therefore, in the current studies, gender differences in optimistic beliefs about the likelihood of experiencing online identity theft were examined.

**The current studies**

Given the raise in technology use and concerns over possible identity theft (Anderson et al., 2008; Burnes et al., 2020), the current studies explored: (a) developmental differences in optimistic judgements about the likelihood of experiencing online identity theft (Study 1) and the impact of previous experiences of online identity theft and representativeness of comparator groups for optimistic judgements about the likelihood of experiencing online identity theft (Study 2). The data reported in the current studies was collected as part of extensive online questionnaires administered to participants (Study 1) and during 2021-2023 (Study 2). At both times, a range of measures relating to online risks including cyberbullying (Betts et al., 2019) and online identity theft were administered to participants to answer discrete and different research questions. T to answer the current research questions

**Study 1: Developmental differences in optimistic judgements about the likelihood of experiencing online identity theft**

Developmental differences across adulthood have been reported regarding perceptions of online risk related to personal information and privacy violations (Steijn et al., 2016). Specifically, older individuals were found to hold different privacy conceptions than adolescents and these, in turn, predicted privacy concerns. One possible explanation for such developmental differences is how conceptualisations of privacy change with age. For example, adolescents typically associate privacy with relationships whereas adults tend to associate privacy with data collection by the government, profiling, and identity theft (Stejin & Vedder, 2015). Stejin and Vedder argue that this variation in privacy concerns likely reflects developmental life stages and social needs rather than a generational difference.

Focusing on comparative optimism, the extent to which age differences have been reported in judgements varies across topics. For example, one study reported that optimism judgements on the life orientation test increase between the age of 50 and 70 and then decrease after the age of 70 (Chopik et al., 2015). However, more recent research suggests that young adults tend to hold more optimistic beliefs about their risk of experiencing accidents in the household compared to older adults (Morgan et al., 2019). Relating to online risks, there is also a common misperception that certain age groups, including the very young or the very elderly are at greatest risk of experiencing online harms (Conway & Hadlington, 2021). Given this variation in optimistic judgements according to age and the developmental differences reported for privacy violations with adolescents, young adults, and adults holding different beliefs (Steijn et al., 2016), Study 1 explored age differences in optimistic beliefs for experiencing online identity theft in three samples to reflect three different age groups: late adolescents, emerging adults, and adults.

The aim of Study 1 was to explore: (a) the developmental differences in perceptions of the likelihood of experiencing online identity theft and (b) whether there was variation in comparative optimism beliefs for experiencing online identity theft according to gender and the nature of the comparator group. The following hypotheses were tested:

H1: individuals will hold comparative optimism beliefs for the relative risk of experiencing online identity theft.

H2: there will be differences in comparative optimism beliefs for experiencing online identity theft according to age.

H3: there will be variation in the likelihood of experiencing online identity theft according to comparator group. It is expected that those groups that are socially distant and younger than the participants will be judged to be more at risk.

H4: there will be gender differences in comparative optimism beliefs for experiencing online identity theft.

**Method**

***Participants***

**Late adolescents.** In total, 101 (53 male, 37 female, 11 gender not reported) late adolescents aged between 16 and 18 (mean age = 16.88, SD age = .45) were recruited from three colleges across the UK through initially contacting principals and inviting them to consider whether their students could participate in the research.

**Emerging adults.** Initially, 237 university students completed the survey as part of a larger project. Data was excluded from participants who were over 24 (n = 10) and who only completed the consent statements (n = 1). The final sample was 226 (17 male, 209 female) emerging adults aged between 18 and 24 (mean age = 19.32, SD age = 1.29). The emerging adult sample was recruited through advertising the study on an online departmental research recruitment system at one University.

**Adults.** Data was gathered from 264 adults as part of the larger project on online risks. For this analysis, only the data for those aged 25 and over were included yielding a sample of 147 (45 male, 97 female, 5 gender not reported) adults aged between 25 and 74 (mean age = 33.24, SD = 9.77). The sample for the adult group was recruited through advertisements placed on nine online forums, with the permission of the forum moderator.

The missing data across the samples for variables of interest was ≤ 1.4% and no departure from the missing completely at random assumption was detected, *Little’s MCAR χ2* (19) = 15.18, *p* = .711.

***Measure***

**Online identity theft.** To assess participants’ perceptions of the likelihood of experiencing online identity theft, they were asked “For each person or group below, please indicate how likely you think it is that their personal information will be stolen over the internet”. Participants responded using a 7-point rating scale ranging from 1 (*very unlikely*) to 7 (*very likely*), with higher scores indicating a greater perceived risk of experiencing online identity theft. Participants were asked to provide reports separately for: “you”, “your friends”, “other students [forum users] younger than you”, “other students [forum users] the same age as you”, “people older than you”, and “strangers”.

***Procedure***

Ethical approval for a larger study on online risk was granted from the College of Business, Law, and Social Sciences Research Ethics Committee (2014/28). All participants received information about the study via a sample specific information sheet and were informed that the results be anonymous, that individual responses would be kept confidential, and that the data may be used for publications. However, there was variation in how informed consent was managed and the nature of data collection according to sample.

For late adolescents informed consent for the research was initially given by the principals at the three colleges that the late adolescents attended. Letters were then sent to parents/guardians of eligible students, with parents/guardians asked to notify the college if they did not want their child(ren) to participate. For those late adolescents who were not removed from the sample by their parent/guardian, they received information about the study and were also asked to give their informed consent either in writing or through selecting compulsory check boxes according to whether they completed a paper-based or electronic survey, respectively.

After emerging adult participants had signed up to complete the study via the online recruitment system, they were presented with an information sheet and were asked to give their informed consent through selecting compulsory check boxes before completing an electronic version of the survey that was hosted on a separate system. The emerging adult participants received study credits to compensate them for their time which were allocated through the sign-up system.

The adult sample were given an information sheet and asked to give their informed consent through selecting compulsory check boxes before completing an electronic version of the survey.

**Results**

The descriptive statistics show that there was variation in reports of perceptions of the likelihood of experiencing online identity theft according to comparator group, gender, and sample (see Table 1). Therefore, to examine perceptions of the likelihood of experiencing online identity theft across gender, sample, and comparator group a 2 x 3 x 6 (gender x sample x comparator group) mixed ANOVA was performed to test H1, H2, H3, and H4. Gender and sample were independent measures and comparator group was repeated measures (with violations of Sphericity dealt with using the Greenhouse-Geisser correction).

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Insert Table 1 about here

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As reported in Table 2, there were several significant main effects and interactions. There were significant main effects of comparator group and gender which provided support for H3 and H4 respectively. Pairwise comparisons with a Bonferroni correction revealed that the self was rated as significantly less likely to experience online identity theft than all other comparator groups (*p* < .001). Those younger than participants were rated to be at the greatest risk of experiencing online identity theft than all other comparator groups (*p* ≤ .040). Females (*M* = 4.13) provided higher ratings of the likelihood of experiencing online identity theft compared to males (*M* = 3.70).

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Insert Table 2 about here

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A significant two-way interaction emerged between comparator group and sample. The two-way interaction was explored using the profile ratings with 95% confidence intervals (see Figure 1). Figure 1 suggests that while across all three samples, there were similar notable peaks for those younger than the participant and strangers providing support for H1, no one sample rated all groups consistently higher than the others. The overlapping confidence intervals (Baguley, 2012) suggest that the differences between samples for each comparator group were not significant.

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Insert Figure 1 about here

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There was also a significant two-way interaction between comparator group and participant gender which was explored using the profile ratings with 95% confidence intervals (see Figure 2). As shown in Figure 2, the lack of overlapping confidence intervals (Baguley, 2012) for the self, friends, and people the same age suggests that there were significant gender differences in the perceptions of the likelihood of experiencing online identity theft for these comparator groups, with females providing higher ratings for the self, friends, and same age than males.

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Insert Figure 2 about here

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**Discussion**

There were significant differences in the reported likelihood of experiencing online identity theft, providing evidence that our participants held comparative optimistic beliefs (H1). In support of H3, the self was consistently judged to be at the lowest risk of experiencing online identity theft and those consistently judged to be at greatest risk of experiencing online identify theft were those younger than the participants. This result provides support for the previous research which has reported that those younger than the self are judged to be at most risk (Betts et al., 2019; Scharrer & Leone, 2008).

The overall similarity in profiles across the three samples, did not support H2 and, suggests that there is little evidence of developmental differences in judgements about the likelihood of experiencing online identity theft. Stejin and Vedder (2015) argued that developmental differences in privacy conceptions reflected life stage and social relationships. As our sample of late adolescents were older than the adolescent sample that Stejin and Vedder worked with, our findings may reflect that the participants in our study had already transitioned into the developmental period where privacy conceptualisations change. Further, previous research has suggested that students tend to show a stronger optimistic bias than non-students (Paul et al., 2000) and that findings may be underscored by the students’ knowledge of online activities (Lev-On, 2017). However, although in the current study we did not ask individuals about their status as a student, we did not find differences in comparative optimism judgements for experiencing online identity theft between the adult sample and the late adolescent and emerging adult samples that were recruited through educational establishments. Further, we defined emerging adulthood according to educational level and, as such, there were a small number of participants aged 18 in the late adolescent sample. Consequently, there could have been some overlap as Arnett (2000) describes emerging adulthood to be between the ages of 18 and 25 to reflect of the periods of change and social exploration during this time.

In support of H4, the findings indicate that females were more likely to report a greater likelihood of experiencing online identity theft. This finding may reflect that females are more likely to experience identity theft than males (Guedes et al., 2022). However, in Study 1, we did not ask participants to report their previous experience of identity theft. Understanding participants’ previous experience of the topic, when exploring comparative optimism is important because the results may be reflective of minority under sampling (Shepperd et al., 2013). Shepperd et al. argue that due to the potentially low frequency of an event occurring, it is possible that only a small proportion of the sample have experienced the event which may, in turn, affect their judgements. Therefore, Study 2 was designed to address this issue.

Although there was evidence of a tendency for individuals to hold comparative optimistic beliefs about the likelihood of experiencing online identity theft, a further limitation of Study 1 is that it is not clear how representative of the group the individual participants thought of was when they completed the measures. It has also been suggested that previous research lacks systematic measurement in terms of the comparison groups (Chen & Atkin, 2021). Therefore, Study 2 was also designed to address these issues while serving as a reliability check (Plucker & Makel, 2021) for the overall findings for Study 1.

**Study 2 The impact of previous experiences of identity theft and representativeness of comparator groups**

Previous research has shown that comparative optimism judgements may be influenced by, not only who the comparator groups are and how socially close they are to the participant (Perloff & Fetzer, 1986) but also, the size of the comparator group (Price et al., 2006). Specifically, as group size increases so too does the effect of comparative optimism judgements for the self (Price et al., 2006). Relatedly, it is often not clear in previous research the extent to which the individual the participant thinks about when completing measures of comparative optimism is representative of the group participants are being asked about. For example, when participants are asked to report the likelihood of an individual from a particular group experiencing an event, it is not always clear the extent to which participants believe that the individual is representative of the group. Therefore, in Study 2, we addressed these limitations by: (a) extending the number of comparator groups and (b) including a measure to assess the extent to which an individual is a representative member of the comparator group.

Given the lack of developmental differences for judgements about the likelihood of experiencing online identity theft evident in Study 1, Study 2 focused exclusively on emerging adults defined through their status as university students. Focusing on emerging adults was appropriate as this age group has a higher reported prevalence of identity theft (Holt & Turner, 2012) which addresses a limitation of Study 1 pertaining to whether identity theft has happened to participants (Harris & Hahn, 2011). Specifically, previous research has suggested that prior experiences of online privacy risks reduce an individual’s optimistic bias for future online privacy risks (Cho et al., 2010). Moreover, Sheppherd et al. (2013) also caution against minority under sampling when exploring optimistic judgements - an artefact that may occur if only a very small proportion of the sample have experienced the event in question and a disproportionally large amount of the sample have not experienced the event. Therefore, in Study 2, participants were asked to report their experiences of identity theft.

As well as potentially influencing optimistic judgements about the likelihood of experiencing online identity theft, previous experiences of identity theft may also be associated with behavioural changes and fear. For example, Anderson et al. (2008) proposed that an individual’s level of concern about protecting their personal data, and avoiding identity theft, may prompt individuals to avoid online transactions. Fear of identity theft also significantly impacts online purchasing behaviour (Jordan et al., 2018) and the propensity to engage in online transactions (Jibril et al., 2020; Walsh et al., 2019) with those who fear identity theft being less likely to engage in online purchasing and online transactions. Together, this unwillingness to engage with online purchasing because of a fear of identity theft can negatively impact e-commerce (Walsh et al., 2019). Therefore, in Study 2, we explored: (a) the relationship between previous experiences of online identity theft and optimistic beliefs about the likelihood of experiencing online identity theft and (b) whether fear of identity theft mediated this relationship.

While serving as a reliability check (Plucker & Makel, 2021) for Study 1, Study 2 extended the current research by: (a) increasing the number of comparator groups, (b) assessing the representativeness of the individual participants selected for each group when making judgements, and (c) exploring the relationship between previous experiences of identity theft and optimistic beliefs about the likelihood of experiencing identity theft, and fear of identity theft as a potential mediator. The following hypotheses were tested:

H1: emerging adults will hold comparative optimism beliefs for the relative risk of experiencing online identity theft.

H2: there will be variation in the likelihood of experiencing online identity theft according to comparator group. It is expected that those groups that are socially distant and younger than the participants will be judged to be more at risk.

H3: there will be gender differences in comparative optimism beliefs for experiencing online identity theft.

H4: fear of identity theft will mediate the relationship between previous experiences of identity theft and judgements about the likelihood of the self experiencing online identity theft.

H5: fear of identity theft will mediate the relationship between previous experiences of identity theft and comparative optimism beliefs for experiencing online identity theft.

**Method**

***Participants***

Initially, 329 university students completed the online survey. Data was excluded from participants who did not complete all the consent statements or who only provided demographic information (n = 16). This resulted in a sample of 313 (55 male, 254 female, 3 non-binary, and 1 unlabelled) university students aged 18 to 53 (mean age = 21.81, SD = 5.12) who were recruited from two universities in the UK. The missing data for variables of interest was ≤ 11.1% and no departure from the missing completely at random assumption was detected, *Little’s MCAR χ2* (19) = 15.61, *p* = .683.

***Measures***

**Online identity theft.** The likelihood of experiencing online identity theft was assessed using a variation of the measure used in Study 1. In this study, we extended the number of comparator groups to include: “your enemies”, “people you don’t like”, and “family”. Participants were again asked to rate the various comparator groups: “For each person or group below, please indicate how likely you think it is that their personal information will be stolen over the internet” using a 7-point rating scale ranging from 1 (*very unlikely*) to 7 (*very likely*). For all comparator groups, participants were asked “How representative of the group is this individual?” and provided ratings using a 4-point rating scale ranging from 1 (*not at all*) to 4 (*a lot*). High scores indicated a greater perceived risk of online identity theft and greater representativeness of the group.

A single indicator of comparative optimism beliefs was calculated following Joshi and Carter’s (2013) approach, with the ratings for the self subtracted from the average of the ratings for the eight other comparator groups. A negative score indicated that participants thought that the chance of the self experiencing online identity theft was more likely than the chance of others experiencing online identity theft.

**Experiences of identity theft.** Four items from Lai et al.’s (2012) identity theft scale were used to assess participants’ experiences of identity theft (e.g., “Somebody used my identity to apply for credit cards or open bank accounts”). Participants responded to the items using a 7-point scale ranging from 1 (*never*) to 7 (v*ery often*). Items were summed such that high scores indicated greater experiences of identity theft. Given the number of items, the scale demonstrated acceptable internal consistency, α = .65.

**Fear of identity theft.** The 12-item fear of identity theft scale (Hille et al., 2015) was used to assess participants’ fear of identity theft. Together the items assess fear of financial losses (e.g., “*I am afraid that somebody could steal my money while I am transferring it online”*) and fear of reputational damage (e.g., *“I am frightened of somebody using my personal data on the Internet to run me down*”). Participants indicated their agreement with the items using a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Items were summed such that high scores indicated great fear of identity theft. The scale demonstrated excellent internal consistency, α = .95.

**Procedure**

As with the data collection for the emerging adults in Study 1, the study was advertised through the departmental research recruitment systems at the respective universities. Again, after potential participants had signed up to complete the study via the online recruitment system, they were provided with an information sheet about the study and were asked to give their consent through selecting compulsory check boxes before completing an electronic version of the survey that was hosted on a separate system. The participants received study credits to compensate them for their time which were automatically allocated after participation. Ethical approval was granted from the College of Business, Law, and Social Sciences Research Ethics Committee (2022/292). Participants were again informed that the results would be anonymous, that individual responses would be kept confidential, and that data may be used for publications.

**Results**

***Comparative optimism and identity theft***

Consistent with the findings of Study 1, the descriptive statistics again showed that there was variation in the reports of experiencing online identity theft according to comparator group and gender (see Table 3). To examine perceptions of likelihood of experiencing online identity theft across gender and comparator group a 2 x 9 (gender x comparator group) mixed ANOVA was performed to test H1, H2, and H3. Gender was independent measures and comparator group was repeated measures (with violations of sphericity dealt with using the Greenhouse-Geisser correction).

Again, there was evidence of a significant main effect of comparator group (see Table 2) providing support for H1 and H2. However, unlike the findings of Study 1, the pairwise comparisons with Bonferroni correction revealed fewer significant differences between comparator groups. Specifically, participants thought that those younger than them were significantly more likely to experience online identity theft than all other comparator groups (*p* < .001) except those older than the participants. Participants also thought that their enemies were less likely to experience online identity theft compared to those older than the participants and strangers. People older than the participants were also rated as being at greater risk of experiencing online identity theft compared to those the participants disliked (*p* = .026).

Unlike Study 1, there were no significant gender differences in comparative optimism beliefs for experiencing online identity theft meaning H3 was not supported.

***Experiences of identity theft, comparative optimism, and fear of identity theft***

To test H4 and H5, the PROCESS Macro programme for SPSS was used as PROCESS enables the testing of “*observed variable path analysis-based moderation and mediation analysis as well as their integration as conditional process analysis*” (Hayes, 2017, p. 551). Consequently, model 4 was used to explore whether fear of identity theft mediated the relationship between previous experiences of identity theft and perceptions of risk for: (a) the self and (b) comparative optimism differential. The mediation (indirect) effects were tested using bias-corrected bootstrapping with 10,000 samples and the 95% confidence intervals are reported.

**The self.** The total, direct, and indirect effects for fear as a mediator in the relationship between previous experiences of identity theft, and judgements about the likelihood of the self experiencing online identity theft are outlined in Table 4. There was evidence of an indirect effect of fear of identity theft partially mediating the relationship providing support for H4. Previous experiences of identity theft positively predicted fear of identity theft and fear of identity theft positively predicted judgements of the risk of the self experiencing online identity theft such that having greater experiences of identity theft previously predicted higher levels of fear of identity theft which, in turn, predicted higher levels of the self as likely to experience online identity theft.

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Insert Table 4 about here

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**Comparative optimism differential.** The total, direct, and indirect effects for fear as a mediator in the relationship between previous experiences of identity theft, and comparative optimism differential for identity theft are outlined in Table 5. There was no evidence of an indirect effect of fear of identity theft mediating the relationship between pervious experiences of identity theft and comparative optimism differential. H5 was not supported.

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***Is comparative optimism accounted for by representativeness of the comparator?***

One explanation for the variation in comparative optimism judgements is that they are partly or fully accounted for by the representativeness of the individual that the participant thinks of for each comparator group. To address this, the data were re-analysed including representativeness as covariate. As conventional repeated measures models can not include covariates that vary within participants, this was achieved by using a multilevel regression model with the lme4 package (Bates et al., 2015) in R version 4.2.1. This used perceptions of the likelihood of experiencing online identity theft as the outcome, comparator group as a factor, and the centred representativeness rating as a covariate and included participant as a random factor. All tests used the Kenward-Roger correction implemented in the lmerTest package (Kuznetsova et al., 2017). Representativeness did not predict the likelihood of experiencing online identity theft, *F*(1, 2015.8) = 3.32, *p* = .068, and the comparator group effect remained statistically significant after adjustment for the covariate, *F*(1, 1765.5) = 16.62, *p* < .001. Figure 3 shows the comparative optimism by group after adjustment for representativeness.

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**Discussion**

As with Study 1, there were some significant differences in the reported likelihood of experiencing online identity theft again suggesting that our participants held comparative optimistic beliefs (H1). Again, those younger than the participants were judged to be at greatest risk of experiencing online identity theft supporting H2 and providing further evidence for the perception that those younger than the self are at more risk of experiencing negative events than the self (Betts et al., 2019; Scharrer & Leone, 2008). Moreover, through the re-analysis of the data reported in Study 2, it was clear that the effect of the comparator group for judgments about the likelihood of experiencing online identity theft remained after controlling for representativeness. This finding addresses the limitation of previous research where participants have been asked to make such judgments for an individual from a particular comparator group. However, it is important to acknowledge that these results are sample dependent and that a larger or different sample may have yielded different results.

There was no support for H3 as there was no evidence of gender differences in the reports of the likelihood of experiencing online identity theft. Although this finding is contrary to the findings of Study 1, it is important to acknowledge the predominately female sample in Study 2 which is likely to have impacted on the analysis. Moreover, Roberts et al. (2013) argue that gender differences in online identity theft may be less relevant because of the non-contact nature of online identity theft.

Fear of identity theft partially mediated the relationship between previous experiences of identity theft and judgements of the likelihood of the self experiencing online identity theft providing some support for H4. Having a greater previous experience of identity theft predicted greater fear of identity theft which, in turn, predicted reports of the likelihood of experiencing online identity theft in the future. However, no such relationship was evident between experiences of identity theft, fear of identity theft, and comparative optimism differential. Therefore, it seems that while participants’ previous experiences of identity theft predicted their own future likelihood of experiencing online identity theft, it did not impact their optimistic judgements about the likelihood of experiencing online identity theft compared to others. Study 2 only explored previous experiences of identity theft and the impact that these may have on perceptions of online identity theft, although this represents correspondence of behaviour, previous research has indicated that other behaviours such as experiences of harassment and online bullying are associated with perceptions of internet risk (Chen & Atkin, 2021).

**General discussion**

There was evidence that adults hold comparative optimism judgements for the likelihood of experiencing online identity theft across both studies. The two study approach enabled the second study to serve as a reliability check of the results (Plucker & Makel, 2021). However, there was not a complete replication of the results across studies. Specifically, the Study 1 findings pertaining to the differences in judgments about the likelihood of experiencing online identity theft according to comparator group were not replicated in Study 2 in their entirety. Moreover, the gender differences identified in Study 1 were not replicated in Study 2.

Common across Study 1 and Study 2 was the finding that those younger than the participant were judged to be at the greatest risk of experiencing online identity theft. Scharrerr and Leone (2008) proposed a with age comes wisdom hypothesis such that people believe that they have more knowledge about a particular topic than those younger than them. While there is evidence in both Study 1 and Study 2 of our participants reporting that those younger than them were most at risk of experiencing online identity theft this perception may not accurately reflect actual risk. Recent figures suggest that those most likely to experience identity fraud in the UK are over the age of 31, with 23% of victims aged over 61 (Cifas, 2023). Cifas also reported variation according to the type of identity fraud and age. For example, young people aged under 21 were most likely to experience impersonation for online retail, those aged under 30 were most likely to experience impersonation for telecoms products, and adults aged 51 to 60 were most likely to experience impersonation for insurance products. Therefore, it may be that our participants were not aware of the actual risk for each age group. Relatedly, in Study 1 we explored whether there were developmental differences in optimistic judgements about the likelihood of experiencing online identity theft and the findings suggest a similar pattern of results irrespective of the age of the sample. Consequently, future research should seek to explore comparative optimistic judgements when individuals are in receipt of accurate information about the likelihood of experiencing the event to fully explore optimistic beliefs (Purol & Chopik, 2021).

Despite asking about the participants’ own experiences of identity theft in Study 2, when interpreting the findings of the current studies, it is important to acknowledge that the results may not be reflective of the participants’ experiences on the internet (Baek et al., 2014). Moreover, we did not explore the “exposure effect” reported by Roberts et al. (2013) who argued that those individuals who spend more time online are potentially more likely to experience online identity theft but are also more likely to accurately understand the risks. The exposure effect may go some way to explain why those who were younger than the participants were judged to be more at risk of experiencing online identity theft. There is evidence that young adults in the UK report spending more time online than those in older age groups (Ofcom, 2022a) and that older adults are more likely to experience digital exclusion compared to younger adults (Ofcom, 2022b). However, there is an ongoing debate about the importance of considering digital media engagement rather than the amount of time spent online per se (Kucirkova et al., 2023). Relatedly, the participants’ judgements may have been influenced by their knowledge of cases of online identity theft within their close social circle as such vicarious experiences have been found to influence behaviour in the context of punishment avoidance (Piquero & Pogarsky, 2002). Further, van Veen and Sattler (2020) argue that when individuals lack personal experience, risk perceptions may be influenced by vicarious information based on others’ experiences. Therefore, future research should explore these topics in greater detail.

A further limitation of the current studies is that the samples were relatively homogenous in nature and were predominately female which may have influenced the findings according to gender due to the unequal sample sizes. Although previous research has reported that females tend to hold greater privacy concerns (Tifferet, 2019) and gender differences in optimistic beliefs for the likelihood of experiencing cyberbullying (Betts et al., 2019), the lack of a systematic pattern of gender differences for the likelihood of experiencing online identity theft across Study 1 and Study 2 warrants further attention. Therefore, as Chadwick (2019) advocates, future research should recruit more heterogenous samples, especially if trying to use the findings to inform online safety messages.

It is also important to acknowledge that the studies took place over several years and during this time differences have been reported in the levels of cybercrime in the UK (Sikra et al., 2023) and in online security and safety feature use in the UK (Petrosyan, 2024). Also, the sample for Study 2 was recruited during the Covid-19 pandemic meaning that participants had experiences of the associated lockdowns. There is some evidence that during the months where the strictest lockdowns were enforced in the UK cybercrime rates were higher with an increase in cyber-dependent crime and online fraud against individuals and organisations during this time (Buil-Gil et al., 2021). Further, Johnson and Nikolovska (2024) reported multiple peaks and troughs of online shopping fraud that mirrored the increase in online activities due to government-imposed restrictions. However, a similar pattern was not identified for online fraud which Johnson and Nikolovska (2024) argued may have occurred because of the UK National Centre for Cyber Security’s Covid-19 response. Kemp et al. (2021) argue that routine activity approach (Cohen & Felson, 1979) can account for this variation in cybercrime as individual’s online behaviours changed with the covid restrictions. Therefore, the findings may have been influenced by these changes in crime rates and Covid-19 restrictions.

Previously it has been suggested that awareness raising campaigns could be an effective way of reducing identity theft (Holt & Turner, 2012). However, the current studies identified that individuals tend to hold optimistic judgements about the likelihood of experiencing online identity theft which could impact how such awareness raising campaigns are received. Specifically, holding such optimistic biases impacts the effectiveness of safety messages (Perrissol et al., 2011; Weinstein & Klein, 1995) and can prevent individuals from engaging in measures to reduce online risks (Alnifie & Kim, 2023). Therefore, when awareness raising campaigns are developed it is important that they are appropriately framed (Praxmarer-Carus & Wielunch, 2021) and encourage all to engage with the message through highlighting their relevance for the individual (Nævestad, 2010).

In conclusion, the current studies show that individuals hold comparative optimistic beliefs for the likelihood of experiencing online identity theft. There was some evidence of the reliability of the findings (Plucker & Makel, 2021) across the studies as participants reported that they were less at risk of experiencing identity theft compared to others (except family members in Study 2). Study 1 found no effect of participant age across late adolescents, emerging adults, and adults in their judgement. Study 2 also directly addressed issues around how representative the selected target was of the comparator group and found that judgements were not influenced by the representativeness of the target. Fear of identity theft also mediated the relationship between previous experiences of identity and perceptions of the risk of the self experiencing online identity theft.

**Ethical statement**

• Funding: Portions of the data collection were support through SPUR funding from Nottingham Trent University

• Conflict of Interest: The authors have no conflicting interests to declare

• Informed consent: Informed consent was obtained from all individual participants included in the study. Participants also gave consent for their data to be used in publications.

**References**

Alnifie, K. M., & Kim, C. (2023). Appraising the manifestation of optimism bias and its impact on human perception of cyber security: A meta analysis. *Journal of Information Security, 14,* 93-110. <https://doi.org/10.4236/jis.2023.142007>

Anderson, K. B., Durbin, E., & Salinger, M. A. (2008). Identity theft. *Journal of Economic Perspectives, 22*(2), 171-192. <https://doi.org/10.1257/jep.22.2.171>

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*(5), 469-480. <https://doi.org/10.1037/0003-066X.55.5.469>.

Asimakopoulou, K., Hoorens, V., Speed, E., Coulson, N. S., Antoniszczak, D., Collyer, F., ... & Scambler, S. (2020). Comparative optimism about infection and recovery from COVID‐19; Implications for adherence with lockdown advice. *Health Expectations*, *23*(6), 1502-1511. <https://doi.org/10.1111/hex.13134>

Baek, Y. M., Kim, E-M., & Bae, Y. (2014). My privacy is okay, but theirs is endangered: Why comparative optimism matters in online privacy concerns. *Computers in Human Behavior, 31,* 48-56. <https://doi.org/10.1016/j.chb.2013.10.010>

Bates, D., Maechler, M., Bolker B., & Walker, S., (2015). *lme4: Linear Mixed-Effects Models using “Eigen” and S4*  [Computer software]. <https://CRAN.R-project.org/package=lme4>

Betts, L. R., Abell, L., & Buglass, S. L. (2024). Comparative Optimism and Perceptions of Specific Online Risks. *Journal of Technology in Behavioral Science*, *9*(2), 236-251. <https://doi.org/10.1007/s41347-023-00324-3>

Betts, L. R., Metwally, S. H., & Gardner, S. E. (2019). We are safe but you are not: Exploring comparative optimism and cyber bullying. *Journal of Technology in Behavioral Science, 4,* 227-233. <https://doi.org/10.1007/s41347-018-0070-6>

Blank G., & Lutz, C. (2018). Benefits and harms from internet use: A differentiated analysis of Great Britain. *New Media & Society, 20*(2), 618-640. [https://doi.org/10.1177/1461444816667135](https://doi.org/10.1177%2F1461444816667135)

Bortolotti, L. (2018). Optimism, agency, and success. *Ethic Theory Moral Practice, 21,* 521-535. <https://doi.org/10.1007/s10677-018-9894-6>

Buil-Gil, D., Miró-Llinares, F., Moneva, A., Kemp, S., & Díaz-Castaño, N. (2021). Cybercrime and shifts in opportunities during COVID-19: a preliminary analysis in the UK. *European Societies*, *23*(sup1), S47-S59. <https://doi.org/10.1080/14616696.2020.1804973>

Burnes, D., DeLiema, M., & Langton, L. (2020). Risk and protective factors of identity theft victimization in the United States. *Preventive Medicine Reports, 17,* 101058. <https://doi.org/10.1016/j.pmedr.2020.101058>

Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review, 30*(7), 879-889. <https://doi.org/10.1016/j.cpr.2010.01.006>

Chambers, J. R., & Windschitl, P. D. (2004). Biases in social comparative judgments: the role of nonmotivated factors in above-average and comparative-optimism effects. *Psychological Bulletin*, *130*(5), 813.  [https://doi.org/10.1037/0033-2909.130.5.813](https://psycnet.apa.org/doi/10.1037/0033-2909.130.5.813)

Chen, H., & Atkin, D. (2021). Understanding third-person perception about internet privacy risks. *New Media & Society, 23*(3), 419-437. <https://doi.org/10.1177/1461444820902103>

Cho, H., Lee, J-S., & Chung, S. (2010). Optimistic bias about online privacy risks: Testing the moderating effects of perceived controllability and prior experience. *Computers in Human Behaviour, 26,* 987-995. <https://doi.org/10.1016/j.chb.2010.02.012>

Cho, H., Metzger, M., Trepte, S., & Nekmat, E. (2023). A cross-country study of comparative optimism about privacy risks on social media. *International Journal of Communication*, *17*, 21. <https://doi.org/1932–8036/20230005>

Chopik, W. J., Kim, E. S., & Smith, J. (2015). Changes in optimism are associated with changes in health over time among older adults. *Social Psychological and Personality Science, 6,* 814–822. <https://doi.org/10.1177/1948550615590199>.

Cifas (2023). *Fraudscape 2023: 6 month update.* Available at <https://uploads-ssl.webflow.com/5f24212f91518a2cd44d736f/64b1524fc42bf27c0f545f1d_Fraudscape%202023%206%20Month%20update%20pdf.pdf> retrieved 4/10/23.

Cohen L. E., Felson M. (1979). Social change and crime rate trends: A routine activity approach. *American Sociological Review*, 44(4), 588-608. <https://doi.org/10.2307/2094589>

Conway, G., & Hadlington, L. (2021). How do undergraduate students construct their view of cybercrime? Exploring definitions of cybercrime, perceptions of online risk and victimization. *Policing, 15*(1), 119-129. <https://doi.org/10.1093/police/pay098>

Dricu, M., Moser, D. A., & Aue, T. (2022). Optimism bias and its relation to scenario valence, gender, sociality, and insecure attachment. *Scientific Reports, 12,* 18534. <https://doi.org/10.1038/s41598-022-22031-4>

Evans, K. S., Teisl, M. F., Lando, A. M., & Liu, S. T. (2020). Risk perceptions and food-handling practices in the home. *Food Policy, 95,* 101939. <https://doi.org/10.1016/j.foodpol.2020.101939>

Golladay, K., & Holtfreter, K. (2017). The consequences of identity theft victimization: An examination of emotional and physical health outcomes. *Victims & Offenders, 12(*5), 741-760. <https://doi.org/10.1080/15564886.2016.1177766>

Guedes, I., Martins, M., & Cardoso, C. S. (2022). Exploring the determinants of victimization and fear of online identity theft: An empirical study. *Security Journal*, 1-26. <https://doi.org/10.1057/s41284-022-00350-5>

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford publications.

Helweg-Larsen, M., Harding, H. G., & Klein, W. M. P. (2011). Will I divorce or have a happy marriage?: Gender differences in comparative optimism and estimation of personal chances among U.S. college students. *Basic and Applied Social Psychology, 33*(2), 157-166. <https://doi.org/10.1080/01973533.2011.568874>

Hewitt, B., & White, G. L. (2022). Optimistic bias and exposure affect security incidents on home computer. *Journal of Computer Information Systems, 62*(1), 50-60. <https://doi.org/10.1080/08874417.2019.1697860>

Hille, P., Walsh, G., & Cleveland, M. (2015). Consumer fear of online identity theft: Scale development and validation. *Journal of Interactive Marketing*, *30*(1), 1-19. <http://dx.doi.org/10.1016/j.intmar.2014.10.001>

Hoar, S. B. (2001). Identity theft: The crime of the new millennium. *Oregon Law Review, 80*(4), 1423-1448.

Holt, T. J., & Turner, M. G. (2012). Examining risks and protective factors of on-line identity theft. *Deviant Behavior, 33*(4), 308-323. <https://doi.org/10.1080/01639625.2011.584050>

Jefferson, A., Bortolotti, L., & Kuzmanovic, B. (2017). What is unrealistic optimism?. *Consciousness and Cognition*, *50*, 3-11. <https://doi.org/10.1016/j.concog.2016.10.005>

Jibril, A. B., Kwarteng, M. A., Nwaiwu, F., Appiah-Nimo, C., Pilik, M., & Chovancova, M. (2020). Online identity theft on consumer purchase intention: A mediating role of online security and privacy concern. In *Responsible Design, Implementation and Use of Information and Communication Technology: 19th IFIP WG 6.11 Conference on e-Business, e-Services, and e-Society, I3E 2020, Skukuza, South Africa, April 6–8, 2020, Proceedings, Part II 19* (pp. 147-158). Springer International Publishing.

Johnson, S. D., & Nikolovska, M. (2024). The effect of COVID-19 restrictions on routine activities and online crime. *Journal of Quantitative Criminology*, *40*(1), 131-150. <https://doi.org/10.1007/s10940-022-09564-7>

Jordan, G., Leskovar, R., & Marič, M. (2018). Impact of fear of identity theft and perceived risk on online purchase intention. *Organizacija*, *51*(2), 146-155. <https://doi.org/10.2478/orga-2018-0007>

Joshi, M. S., & Carter, W. (2013). Unrealistic optimism: East and west? *Frontiers in Psychology, 4*(6), 1-15. <https://doi.org/10.3389/fpsyg.2013.00006>

Kemp, S., Buil-Gil, D., Moneva, A., Miró-Llinares, F., & Díaz-Castaño, N. (2021). Empty streets, busy internet: A time-series analysis of cybercrime and fraud trends during COVID-19. *Journal of Contemporary Criminal Justice*, *37*(4), 480-501. [https://doi.org/10.1177/1043986221102798](https://doi.org/10.1177/10439862211027986)

Kucirkova, N. I., Livingstone, S., & Radesky, J. S. (2023). Faulty screen time measures hamper national policies: here is a way to address it. *Frontiers in Psychology*, *14*: 1243396. <https://doi.org/10.3389%2Ffpsyg.2023.1243396>

Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). *lmerTest*: Tests in Linear Mixed Effects Models. *Journal of Statistical Software*, *82*(13). <https://doi.org/10.18637/jss.v082.i13>

Lai, F., Li, D., & Hsieh, C. T. (2012). Fighting identity theft: The coping perspective. *Decision Support Systems*, *52*(2), 353-363. <https://doi.org/10.1016/j.dss.2011.09.002>

Lei, W., Hu, S., & Hsu, C. (2023). Unveiling the process of phishing precautions taking: The moderating role of optimism bias. *Computers & Security, 129,* 103249. <https://doi.org/10.1016/j.cose.2023.103249>

Lev-On, A. (2017). The third-person effect on Facebook: The significance of perceived proficiency. *Telematics and Informatics*, *34*(4), 252-260. <https://doi.org/10.1016/j.tele.2016.07.002>

Marceda Bach, T., da Silva, W. V., Mendonça Souza, A., Kudlawicz-Franco, C., & Pereira da Veiga, C. (2020). Online customer behavior: perceptions regarding the types incurred through online purchases. *Palgrave Communications, 6*(13), 1-12. <https://doi.org/10.1057/s41599-020-0389-4>

Metzger, M., Flanagin, A., & Nekmat, E. (2015). Comparative optimism in online credibility evaluation among parents and children. *Journal of Broadcasting & Electronic Media, 59,* 509-529. <https://doi.org/10.1080/08838151.2015.1054995>

Metzger, M. J., & Suh, J. J. (2017). Comparative optimism about privacy risks on Facebook. *Journal of Communication*, *67*(2), 203-232. <https://doi.org/10.1111/jcom.12290>

Morgan, J., Reidy, J., & Probst, T. (2019). Age group differences in household accident risk perceptions and intentions to reduce hazards. *International Journal of Environmental Research and Public Health*, *16*(12), 2237. <https://doi.org/10.3390/ijerph16122237>

Nævestad, T. O. (2010). Evaluating a safety culture campaign: Some lessons from a Norwegian case. *Safety Science*, *48*(5), 651-659. <https://doi.org/10.1016/j.ssci.2010.01.015>

Ofcom (2022a). Online nation 2022 report. Available at [Online Nation 2022 Report (ofcom.org.uk)](https://www.ofcom.org.uk/__data/assets/pdf_file/0023/238361/online-nation-2022-report.pdf) accessed 16/03/2023.

Ofcom (2022b). Digital exclusion: A review of Ofcom’s research on digital exclusion among adults in the UK. Available at [Digital exclusion: a review of Ofcom's research on digital exclusion among adults in the UK](https://www.ofcom.org.uk/__data/assets/pdf_file/0022/234364/digital-exclusion-review-2022.pdf) accessed 16/03/2023.

Paradise, A., & Sullivan, M. (2012). (In)visible threats? The third-person effect in perceptions of the influence of Facebook. *Cyberpsychology, Behavior, and Social Networking, 15*(1), 55- 60. <https://doi.org/10.1089/cyber.2011.0054>

Paul, B., Salwen, M. B., & Dupagne, M. (2000). The third-person effect: a meta-analysis of the perceptual hypothesis. *Mass Communication & Society, 3,* 57–85. <https://doi.org/10.1207/S15327825MCS0301_04>

Perloff, L. S., & Fetzer, B. F. (1986). Self-other judgement and perceived vulnerability to victimization. *Journal of Personality and Social Psychology, 50,* 502-510. [https://doi.org/10.1037/0022-3514.50.3.502](https://psycnet.apa.org/doi/10.1037/0022-3514.50.3.502)

Perrissol, S., Smeding, A., Laumond, F., & Le Floch, V. (2011). Effect of a road safety training program on drivers’ comparative optimism. *Accident Analysis & Prevention, 43*(1), 478-482. <https://doi.org/10.1016/j.aap.2010.08.023>

Petrosyan, A. (2024). Usage of selected online security and safety features at home in the United Kingdom (UK) from 2016 to 2023. Available at: <https://www.statista.com/statistics/322219/usage-of-online-security-and-safety-features-uk/> accessed 14/08/2024.

Piquero, A. R., & Pogarsky, G. (2002). Beyond Stafford and Warr's reconceptualization of deterrence: Personal and vicarious experiences, impulsivity, and offending behavior. *Journal of Research in Crime and Delinquency*, *39*(2), 153-186. <https://doi.org/10.1177/002242780203900202>

Plucker, J. A., & Makel, M. C. (2021). Replication is important for educational psychology: Recent developments and key issues. *Educational Psychologist, 56,* 90-100. <https://doi.org/10.1080/00461520.2021.1895796>

Praxmarer-Carus, S., & Wielunch, M. I. (2021). Now or never? Temporal framing in risk messages and the moderating effect of comparative optimism. *ZVersWiss*, *110*, 255–26. <https://doi.org/10.1007/s12297-021-00512-1>.

Price, P. C., Smith, A. R., & Lench, H. C. (2006). The effect of target group size on risk judgements and comparative optimism: The more, the risker. *Journal of Personality and Social Psychology, 90*(3), 382-398. <https://doi.org/10.1037/0022-3514.90.3.382>

Purol, M., F., & Chopik, W. J. (2021). Optimism: Enduring resource or miscalibrated perception? *Social and Personality Psychology Compass, 15*(5), e12593. <https://doi.org/10.1111/spc3.12593>

Reyna, V. F., & Farley, F. (2006). Risk and rationality in adolescent decision-making: implications for theory, practice, and public policy*. Psychological Science in the Public Interest, 7,* 1–44. <https://doi.org/10.1111/j.1529-1006.2006.00026.x>.

Roberts, L. D., Indermaur, D., & Spiranovic, C. (2013). Fear of cyber-identity theft and related fraudulent activity. *Psychiatry, Psychology and Law, 20*(3), 315-328. <https://doi.org/10.1080/13218719.2012.672275>

Scharrer, E. (2002). Third-person perception and television violence: the role of out-group stereotyping in perceptions of susceptibility to effects. *Communication Research, 29*, 681–704. <https://doi.org/10.1177/009365002237832>.

Scharrer, E., & Leone, R. (2008). First-person shooters and the third-person effect. *Human Communication Research, 34*, 210–233. <https://doi.org/10.1111/j.1468-958.2008.00319.x>.

Schaupp, L. C., & Carter, L. (2010). The impact of trust, risk and optimism bias on E-file adoption. *Information System Frontiers, 12,* 299-309. <https://doi.org/10.1007/s10796-008-9138-8>

Sheppherd, J. A., Klein, W. M. P., Waters, E. A., & Weinstein, N. D. (2013). Taking stock of unrealistic optimism. *Perspectives on Psychological Science, 8*(4), 395-411. <https://doi.org/10.1037/0022-3514.90.3.382>

Sikra, J., Renaud, K. V., & Thomas, D. R. (2023). UK cybercrime, victims and reporting: A systematic review. *Commonwealth Cybercrime Journal*, *1*(1), 28-59.

Steijn, W. M. P., Schouten, A. P., & Vedder, A. H. (2016). Why concern regarding privacy differs: The influence of age and (non-) participation on Facebook. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 10*(1), article 3. <https://doi.org/10.5817/CP2016-1-3>

Steijn, W. M. P., & Vedder, A. (2015). Privacy under construction: A developmental perspective on privacy perception. *Science, Technology, & Human Values, 40*(4), 615-637. <https://doi.org/10.1177/0162243915571167>

Tifferet, S. (2019). Gender differences in privacy tendencies on social network sites: A meta-analysis. *Computers in Human Behavior, 93*, 1-12 <https://doi.org/10.1016/j.appdev.2010.07.005>

van der Meer, T. G., Brosius, A., & Hameleers, M. (2023). The role of media use and misinformation perceptions in optimistic bias and third-person perceptions in times of high media dependency: Evidence from four countries in the first stage of the COVID-19 pandemic. *Mass Communication and Society*, 26(3), 438-462. <https://doi.org/10.1080/15205436.2022.2039202>

van Veen, F., & Sattler, S. (2020). Modeling updating of perceived detection risk: The role of personal experience, peers, deterrence policies, and impulsivity. *Deviant Behavior*, *41*(4), 413-433. <https://doi.org/10.1080/01639625.2018.1559409>

Walsh, G., Shiu, E., Hassan, L., Hille, P., & Takahashi, I. (2019). Fear of online consumer identity theft: Cross-country application and short scale development. *Information Systems Frontiers*, *21*, 1251-1264. <https://doi.org/10.1007/s10796-019-09958-2>

Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology, 39,* 806-820. <https://doi.org/10.1037/0022-3514.39.5.806>

Weinstein, N. D., & Klein, W. M. (1995). Resistance of personal risk perceptions to debiasing interventions. *Health Psychology, 14,* 132–140. <https://doi.org/10.1037/0278-6133.14.2.132>

Windschitl, P. D., & Stuart, J. O. R. (2015). Optimism biases: Types and causes. In G. Keren & G. Wu (Eds.), *The Wiley Blackwell handbook of judgment and decision making*, (pp. 431-455). Chichester, West Sussex: John Wiley & Sons <https://doi.org/10.1002/9781118468333>

**Table 1**

*Study 1: Descriptive statistics*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Late adolescents | | | | | | | |  | Emerging adults | | | | | | | |  | Adults | | | | | | | |  |
|  | Male | |  | Female | |  | Total | |  | Male | |  | Female | |  | Total | |  | Male | |  | Female | |  | Total |  |  |
|  | *M* | *SD* |  | *M* | *SD* |  | *M* | *SD* |  | *M* | *SD* |  | *M* | *SD* |  | *M* | *SD* |  | *M* | *SD* |  | *M* | *SD* |  | *M* | *SD* |  |
| You | 2.83 | 1.76 |  | 3.53 | 1.60 |  | 3.24 | 1.69 |  | 2.50 | 1.32 |  | 3.54 | 1.64 |  | 3.47 | 1.64 |  | 2.90 | 1.78 |  | 3.26 | 1.60 |  | 3.15 | 1.66 |  |
| Your friends | 3.27 | 2.01 |  | 3.71 | 1.46 |  | 3.53 | 1.71 |  | 2.75 | 1.12 |  | 3.83 | 1.59 |  | 3.75 | 1.58 |  | 3.26 | 1.84 |  | 3.49 | 1.56 |  | 3.42 | 1.65 |  |
| Other students [forum users] younger than you | 4.10 | 1.77 |  | 4.72 | 1.39 |  | 4.47 | 1.58 |  | 4.31 | 1.66 |  | 4.85 | 1.44 |  | 4.81 | 1.46 |  | 4.95 | 1.79 |  | 4.77 | 1.64 |  | 4.82 | 1.64 |  |
| Other students [forum users] the same age | 3.17 | 1.57 |  | 4.11 | 1.36 |  | 3.73 | 1.51 |  | 3.56 | 1.46 |  | 4.18 | 1.47 |  | 4.14 | 1.47 |  | 4.07 | 1.67 |  | 4.12 | 1.33 |  | 4.10 | 1.44 |  |
| People older than you | 3.81 | 1.79 |  | 3.92 | 1.66 |  | 3.88 | 1.71 |  | 4.00 | 1.51 |  | 4.38 | 1.74 |  | 4.35 | 1.72 |  | 4.29 | 2.00 |  | 4.46 | 1.60 |  | 4.41 | 1.73 |  |
| Strangers | 4.13 | 1.40 |  | 4.51 | 1.23 |  | 4.36 | 1.31 |  | 4.38 | 1.20 |  | 4.62 | 1.34 |  | 4.60 | 1.33 |  | 4.31 | 1.73 |  | 4.31 | 1.26 |  | 4.31 | 1.42 |  |

**Table 2**

*ANOVA summary table for differences in relative risk perceptions of experiecning online identity*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source |  | | SS | | df | | MS | | *F* | *p* | η2 | |
| Study 1 | | | | | | | | | | | | |
| Gender |  | | 12.37 | | 1 | | 12.37 | | 7.88 | .005 | .016 | |
| Sample |  | | 2.38 | | 2 | | 1.19 | | .76 | .470 | .003 | |
| Comparator group |  | | 460.30 | | 3.65 | | 126.11 | | 88.51 | <.001 | .156 | |
| Gender x sample |  | | 4.02 | | 2 | | 2.01 | | 1.28 | .279 | .005 | |
| Gender x comparator group |  | | 14.07 | | 3.65 | | 3.85 | | 2.71 | .034 | .006 | |
| Sample x comparator group |  | | 30.75 | | 7.30 | | 4.21 | | 2.96 | .004 | .012 | |
| Gender x sample x comparator group |  | | 13.78 | | 7.30 | | 1.89 | | 1.33 | .267 | .006 | |
| Error (risk) |  | | 2491.22 | | 1748.39 | | 1.43 | |  |  |  | |
| Error |  | | 752.04 | | 479 | | 1.57 | |  |  |  | |
| Study 2 | | | | | | | | | | | | |
| Gender | |  | | .63 | | 1 | | .63 | .45 | .503 | .002 |
| Comparator group | |  | | 76.08 | | 6.01 | | 12.66 | 8.90 | <.001 | .034 |
| Gender x comparator group | |  | | 15.73 | | 6.00 | | 2.62 | 1.84 | .088 | .007 |
| Error (risk) | |  | | 2180.23 | | 1579.24 | | 1.42 |  |  |  |
| Error | |  | | 354.74 | | 255 | | 1.39 |  |  |  |

*Note.* SS = Sum of squares, MS = mean squares

**Table 3**

*Study 2: Descriptive statistics*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male | |  | Female | |  | Total | |  |
|  | *M* | *SD* |  | *M* | *SD* |  | *M* | *SD* |  |
| You | 4.84 | 1.53 |  | 4.52 | 1.66 |  | 4.58 | 1.64 |  |
| Your friends | 4.55 | 1.83 |  | 4.53 | 1.45 |  | 4.54 | 1.53 |  |
| Your enemies | 4.39 | 1.87 |  | 4.47 | 1.41 |  | 4.46 | 1.51 |  |
| People you don’t like | 4.51 | 1.60 |  | 4.49 | 1.44 |  | 4.49 | 1.46 |  |
| Family | 4.86 | 1.83 |  | 4.30 | 1.67 |  | 4.41 | 1.71 |  |
| People at your university | 4.49 | 1.43 |  | 4.64 | 1.43 |  | 4.61 | 1.45 |  |
| People younger than you | 5.24 | 1.52 |  | 5.13 | 1.52 |  | 5.16 | 1.52 |  |
| People older than you | 4.98 | 1.80 |  | 4.93 | 1.59 |  | 4.94 | 1.63 |  |
| Strangers | 4.92 | 1.43 |  | 4.63 | 1.24 |  | 4.68 | 1.28 |  |

**Table 4**

*Study 2: Total, direct, and indirect effects (mediation analysis for the self)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | 95% CI | |  |
| Effect | B |  | Lower | Upper |  |
| **Total effect** |  |  |  |  |  |
| Previous experience → the self | .070\*\* |  | .022 | .125 |  |
| **Multi-step mediation model** |  |  |  |  |  |
| Direct effects |  |  |  |  |  |
| Previous experience → the self | .043 |  | -.007 | .093 |  |
| Previous experience → fear | .717\*\*\* |  | .341 | 1.09 |  |
| Fear → the self | .042\*\*\* |  | .027 | .058 |  |
| Indirect effect |  |  |  |  |  |
| Previous experience → fear → the self | .030 |  | .014 | .052 |  |

*Note.* *p*\*\*\* < .001, *p*\*\* < .01

**Table 5**

*Study 2: Total, direct, and indirect effects (mediation analysis for comparative optimism differential)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | 95% CI | |  |
| Effect | B |  | Lower | Upper |  |
| **Total effect** |  |  |  |  |  |
| Previous experience → CO differential | -.036 |  | -.076 | .005 |  |
| **Multi-step mediation model** |  |  |  |  |  |
| Direct effects |  |  |  |  |  |
| Previous experience → CO differential | -.028 |  | -.070 | .013 |  |
| Previous experience → fear | .717\*\*\* |  | .341 | 1.09 |  |
| Fear → CO differential | -.010 |  | -.023 | .003 |  |
| **Indirect effect** |  |  |  |  |  |
| Previous experience → fear → CO differential | -.007 |  | -.020 | .004 |  |

*Note.* CO = comparative optimism, *p*\*\*\* < .001.

**Figure 1**

Diagram

Description automatically generated

**Figure 2**

A picture containing text, antenna

Description automatically generated

**Figure 3**

A picture containing text, screenshot, number, plot

Description automatically generated

**Figure Captions**

Figure 1 *Study 1. Profile plot of the sample x comparator group interaction with 95% confidence intervals*

Figure 2 *Study 1. Profile plot gender x comparator group interaction with 95% confidence intervals*

Figure 3 *Study 2. The likelihood of experiencing identity theft by group after adjustment for representativeness*