Comparative Optimism and Perceptions of Specific Online Risks

Lucy R. Betts[1] · Loren Abell[1] · Sarah L. Buglass[1]

Abstract

Adults hold optimistic beliefs for online behaviours, displaying a general tendency to believe that they are less likely to experience general risks than others. Study 1 explored whether young adults displayed comparative optimism judgements for four types of specific risks that were relevant to a UK sample. Study 2 addressed methodological weaknesses associated with assessing comparative optimism. Study 1 explored 227 (194 female, 31 male, 1 non-binary, and 1 gender not disclosed) young adults' ($M_{Age} = 20.75$, $SD_{Age} = 4.22$) comparative optimistic beliefs for unwanted contact, hoaxes, behavioural, and sexual online risks that were contextualised to the UK. In study 2, young adults (134 female, 30 male, 1 non-binary, and 1 gender fluid, $M_{Age} = 20.72$, $SD_{Age} = 3.39$) provided judgements for four online risks for the general public and the comparator groups used in study 1. Participants were then provided with the prevalence rate for each risk according to data for the UK and then asked to repeat the judgments for each comparator group. Study 1 identified optimistic beliefs across the four risks, with family and the self judged to be less at risk. Study 2 revealed that again family was perceived to be at the lowest risk followed by the self. Knowledge of the actual risk led to a reduction in perceived risk for unwanted contact and hoaxes but little change for behavioural or sexual risks. Together, the findings have implications for understanding perceptions of online risk and how campaigns to promote digital safety are designed.

Keywords Comparative optimism · Online risks · Risk judgements · Relative risk

Introduction

The amount of time adults in the UK are spending online has increased over the last 4 years, with recent figures suggesting that adults typically spend 3.37 h online per day (Ofcom, 2021). Further, it is not only time spent online that is increasing but also the range of activities that individuals are undertaking when online is increasing (Ofcom, 2021). Additionally in the UK many public services are becoming "digital by default" (Cabinet Office, 2012). Against this backdrop of increasing technology use, researchers have identified seven types of internet users (Fornari, 2020). The users' profiles vary according to the amount of time spent online and the activities users engage in. At one extreme are those users who engage in no particular online activity and spend very little time online, whereas at the other extreme are those users who report to always being online and who undertake complex and specific activities online.

The term "digital natives" has been used to describe the generation who have grown up with digital technology (Prensky, 2001) and who are considered to be "'native speakers' of the digital language, and thus able to easily adapt to IT" (Wang et al., 2019, p1). Although this viewpoint has received support, there is growing evidence that there is considerable variation in young adults' technology skills (Bennett & Maton, 2010) and not all young adults view technology in the same way (Kincl & Štrach, 2021). Consequently, there is the need to support digital natives in the development of digital literacy skills (Ng, 2012). Ng argues that digital literacy includes using technology to access resources and undertake research and content learning; developing competencies in technology use; and behaving appropriately to protect oneself from online harms. Indeed, young adults report experiencing the greatest levels of incivility compared to teens and older adults (Microsoft, 2019) and fear of online risks such as identity theft adversely impacts online behaviours (e.g. purchasing; Jordan et al., 2018; Walsh et al., 2019). Therefore, understanding how young adults make judgements about their online safety is crucial to support them to develop digital literacy skills

✉ Lucy R. Betts
  lucy.betts@ntu.ac.uk

1   NTU Psychology, Nottingham Trent University, 50
    Shakespeare Street, Nottingham NG1 4FQ, UK

required to become digital citizens. Consequently, we explored young adults' perceptions of online risk in the current studies.

Online Harms and Online Risks

Crime data suggests that adults aged over 75 in England and Wales are less likely to be victims of computer misuse than those aged 35 to 74 years and adults aged between 25 and 34 or 35 and 44 are more likely to receive a phishing message than other age groups (Office for National Statistics 2022). However, there is a widely held belief that certain user groups, such as the very young or the very elderly, are most at risk of online harms such as victimisation (Conway & Hadlington, 2021). There is also variation in how individuals perceive different types of online risk including financial, performance, physical, psychological, and social risks, suggesting that it is important to consider a specific type of risk rather than general risk when exploring risk judgments (Stuck & Walker, 2019). Therefore, in the current studies we focused on four types of risk: unwanted contact, hoax, behavioural, and sexual. By considering these four types of risk identified in the Microsoft Digital Civility Index (Microsoft, 2019), this extended previous research that has tended to explore particular online risks in isolation (e.g. Betts et al., 2019; Buglass et al., 2021; Hewitt & White, 2022) and enabled us to identify risks that were specific to the participant pool in the UK. It was important to ensure that the risks were specific to our participants as previous research with children has identified variation in types and frequency of online risks according to country (Lobe, 2011). Moreover, by using data from the Microsoft Digital Civility Index, it was also possible to identify a baseline for each type of risk based on a representative sample. The Microsoft Digital Civility Index (Microsoft, 2019) was undertaken with over 11,000 internet users during May 2018 from across 22 countries, with a sample size of 250 adults (aged 18–74) and 250 teenagers (aged 13–17) per country; among other things, participants were asked to identify the most common online risks.

Managing Online Risks Using Psychological Strategies

To manage the perceptions of potential online risks, users may adopt several protective psychological strategies. These strategies include thinking that other users are more at risk (Conway & Hadlington, 2021), believing that their own knowledge, skill, and successful internet use in the past will mitigate against potential risks (Marceda Bach et al., 2020) or downplaying potential risks to the self (Blank & Lutz, 2018). For example, young adult users may downplay the severity of potential online risks because they may fail to perceive the online world as real and, as such, fail to fully appreciate the seriousness of risks online when compared to the offline world (Conway & Hadlington, 2021). Relatedly, it has been suggested that individuals experience a sense of control when they are using digital technology in their own home environment (Kostyuk & Wayne, 2021). Kostyuk and Wayne advocate that this sense of security facilitates a stronger perception of control over what can be accessed when at home versus in public.

An alternative account for how young adults manage online risks is provided by Young et al. (2023) who suggested that social media users manage online risks through developing folk theories. These folk theories emphasise that online risks are something that happen to other people who are either vulnerable because of their age (being younger or older) or are less educated than the self. Underpinning these beliefs is a desire to reduce the potential cognitive dissonance around the discourse of regular social media use as risky. The use of folk theories around likely risk also complements the literature on comparative optimism.

Comparative Optimism

Comparative optimism is the tendency to evaluate our own experiences against the experiences of others such that we believe that positive outcomes are more likely, and negative outcomes are less likely, for the self than others (Chambers & Winschitl, 2004; Jefferson et al., 2017; Weinstein, 1980; Windschitl & Stuart 2015). Following the conventions outlined by Metzger et al. (2015), we use the term comparative optimism rather than the third person effect. Specifically, comparative optimism is used because the current studies focused on the perceived likelihood of experiencing online risks (Metzger et al., 2015). Conversely, Metzger et al. argue that the third person effect relates to beliefs concerning the effectiveness of media messages for the self and others.

Applied to the online world, Hewitt and White (2022) define cyber optimistic bias as the tendency to be "*over confident in being protected, hence, be less of a victim*" (p50). Sharot (2011) estimates that 80% of individuals display an optimistic bias with the effect seen across gender, race, nationality, and age. Holding such optimistic beliefs has benefits for well-being, functioning, resilience, and prosocial behaviour (Bortolotti, 2018). Additionally, when faced with adversity, having higher levels of optimism is associated with better subjective well-being, more positive coping styles, engaging in health protection behaviours, more positive interpersonal relationships, persistence in education, and higher levels of income (Carver et al., 2010).

Adults hold comparative optimistic beliefs for a range of offline behaviour (e.g. likelihood of being involved in a road traffic collision, Castanier et al., 2012; Mills et al., 2021; likelihood of experiencing alcohol related health risks, Wild et al., 2001; likelihood of catching Covid-19 and adhering to protective behaviours, Salgado & Bernsten, 2021) and online

behaviour (e.g. likelihood of experiencing cyberbullying, Betts et al., 2019; experiencing positive outcomes on Facebook, Kim & Hancock, 2015; experiencing online harms on social networking sites, Buglass et al., 2021; experiencing a privacy risk, Metzger & Suh, 2019). While optimistic beliefs may be beneficial in some contexts, there is evidence that this is not always the case. For example, optimistic beliefs may hinder smoking cessation when individuals have unrealistic beliefs about their likelihood of experiencing lung cancer or other associated diseases (Senft Everson et al., 2022).

Notwithstanding these complexities of the impact of comparative optimism, one function of comparative optimism is that it enables individuals to make judgements about the future and facilitates an awareness of the action required to avoid potential risks and achieve possible rewards and/or positive outcomes (Sharot 2011). Holding optimistic beliefs about risks associated with health is likely to impact health behaviour (Ferrer & Klein, 2015). Extending this line of reasoning, when considering online risks, holding more optimistic beliefs may have implications for how information about online risks is framed (Praxmarer-Carus & Wielunch, 2021) to ensure the effectiveness of such safety messages. Specifically, if individuals hold optimistic beliefs about the likelihood of encountering online risks compared to others, there may be a perception that they are not the intended recipients of such messages and, may as such, downplay their significance. Further, such messages may be perceived to protect those who are most vulnerable rather than the self (Baek et al., 2014). Therefore, understanding more about comparative optimism for online risks is important to underpin safety messages.

Comparative Optimism and the Role of Comparator Groups

There is evidence that optimistic judgements made by adults vary according to who the comparison is made against—termed the comparator group. For example, Betts et al. (2019) reported consistent findings across samples of late adolescents, emerging adults, and young adults in relation to the tendency to hold optimistic beliefs for the likelihood of experiencing cyberbullying. This tendency varied according to who the comparator group was, with groups that were more socially close to the individual judged to be less at risk than those who were more socially distant. Further, Betts et al. also found evidence in support of the with age comes wisdom hypothesis (Scharrer & Leone, 2008) as comparator groups that were younger than the participants were consistently rated as being at greatest risk of experiencing cyberbullying. Drawing on the third person effect literature, there is further evidence that we perceive those younger than us and those who are less socially close to us as being at greater risk of believing fake news (Corbu et al., 2020). Similarly,

Riedl et al. (2021) reported a third person effect for social media content with participants reporting that they were less likely to experience the perceived negative effects and more likely to experience the perceived benefits than other users. Paradise and Sullivan (2012) provided an explanation for this pattern of findings and suggested that because friends share a common group with participants, and as such were socially closer to participants, then they were perceived to be less at risk because the optimistic beliefs extended to them. However, these studies did not consider family as a comparator group. Including family as a comparator group represents not only another socially close group but also a group that acts as an important information source (Gil et al., 2007). Including family as a comparator group will allow further exploration of the proposition that when judging groups who are socially close to the individual, a similar self-protection mechanism is used as to when individuals make judgements about their own risk (Perloff & Fetzer, 1986). Therefore, in the current studies, we (1) varied social distance by using family, friends, and strangers as comparator groups and (2) explored the impact of age by using people younger, people the same age, and people older than the participants as comparator groups.

Through two studies, the current research aimed to explore whether (1) young adults displayed comparative optimism judgements for four types of specific risks that were relevant to a UK sample (study 1) and (2) if an optimistic bias was identified in study 1 could this be replicated while overcoming methodological criticism associated with previous research (study 2).

Study 1

Introduction

Study 1 examined (a) the nature of comparative optimism for four types of online risk (unwanted contact, hoax, behavioural, and sexual) and (b) whether comparative optimism beliefs varied according to the comparator group. Study 1 extended existing literature in the area of comparative optimism and online risk by exploring four types of specific risks that were relevant to the population from which the sample was recruited as advocated by Stuck and Walker (2019). By using the Microsoft Digital Civility Index (Microsoft, 2019) to select online behaviours, we were able to have an indicator of the likelihood with which our UK sample would experience these online risks. Therefore, we were able to use the existing information as guide to the "standard" rate of online risk as a way of contextualising optimistic beliefs (see Windschitl & Stuart, 2015). The following hypotheses were tested:

H1: Individuals will hold comparative optimism beliefs for experiencing online risks.

H2: There will be variation of comparative optimism beliefs according to the type of risk.

H3: The strength of the comparative optimism beliefs will vary according to the nature of the comparator group with groups that are socially close to the individual judged to be at less risk than those who are socially distant. It is also expected that those younger than the participants will be judged to be at greatest risk.

Method

Participants

Responses were initially gathered from 268 adults. However, data was excluded from participants who only completed the consent statements and the demographic data ($n = 22$) and who either indicated that they were not a resident of the UK or who were aged over 25 ($n = 14$) or who selected the preference not to say response for residency ($n = 19$). The final sample comprised 213 (184 female, 28 male, and 1 non-binary) participants aged 18 to 25 (mean = 19.83, SD = 1.31). The participants reported spending between 1 and 18 h per day online (mean = 5.41, SD = 2.71). GPower 3.1.9.2 (Erdfelder et al., 1996) was used to conduct a priori power analysis; assuming a large effect size and power of .80, a sample size of 146 was required. A large effect was assumed because previous research exploring comparative optimism judgements for the likelihood of experiencing cyberbullying reported a large effect for difference in judgements according to comparator groups (Betts et al., 2019).

Measure

Comparative Optimism for Online Risks Data for the UK from the Microsoft Digital Civility Index (Microsoft, 2019) was used to identify the top three risks for each behavioural category. The four behavioural categories were (a) unwanted contact (e.g. "being repeatedly contacted through digital means after making it clear the contact was unwelcome"), (b) hoax (e.g. "experiencing fake news"), (c) behavioural (e.g. "experiencing someone posting false or misleading information about the individual"), and (d) sexual (e.g. "receiving an unwanted request for a sexual favour"). Drawing on previous research (e.g. Betts et al., 2019; Byrne et al., 2014), comparative optimism was assessed for each of the 12 behaviours by asking participants to "please say how likely that it is you will experience the following risk". This process was then repeated for the six comparator groups: friends, family, people younger than the participant, people the same age as the participant, people older than the participant, and strangers. Responses were given on a sliding scale ranging from 0 to 100% with higher scores indicating a greater likelihood of experiencing the particular

risk. Aggregate responses were created for each behavioural category per comparator group with the combined items displaying acceptable internal consistency across the various comparator groups ($\alpha \geq 0.64$ and ≤ 0.95). Following the approach adopted by the Microsoft Digital Civility Index, we did not specify any platforms to allow us to make comparisons between our data and the Microsoft data.

Procedure

Participants were recruited through a departmental research credit scheme and via advertisements on social media and call for participant websites. Once participants had read the information sheet about the study, they were asked to give their informed consent, and then complete the survey. Prior to data collection commencing, favourable ethical review was received by the College of Business, Law, and Social Sciences Research Ethics committee (2019/178). Participants had the option of either receiving research credits (for those recruited through the department) or to be entered into a prize draw to compensate them for their time.

Results

Table 1 contains the descriptive statistics for each risk type according to comparator group and highlights variation in the participants' judgements. According to the Microsoft Digital Civility Index (Microsoft, 2019), the reported prevalence for the top unwanted contact risk was 48%, for hoaxes 42%, for behavioural risks 54%, and for sexual risks 59%. Comparing these figures with the means in Table 1, the means for all comparator groups were lower than the figures reported in the Microsoft Digital Civility Index for behavioural and sexual risks, whereas the means in Table 1 were consistently higher than the rate reported for hoaxes. For unwanted contact the means for the self, friends, family, and people older were lower and those for remaining groups were higher than that reported in the Microsoft Digital Civility Index.

To test H1, H2, and H3 and to examine comparative optimism across the four types of online risk and comparator group, a 4 × 7 (risk type [unwanted contact, hoax, behavioural, sexual] × comparator group [self, friend, family, younger, same age, older, strangers]) repeated measures ANOVA was performed.

As reported in Table 2, there was a significant main effect of comparator group which provided support for H3. Pairwise comparisons revealed that family was rated as having the lowest risk compared to all other comparator groups, $p < 0.001$. Participants rated themselves as being less at risk than all other comparator groups except family, $p < 0.001$. The comparator group rated to be at most risk of online

Table 1 Study 1: means and (standard deviations) for each risk type according to comparator group

	Risk			
	Unwanted contact	Hoax	Behavioural	Sexual
You	39.08 (20.98)	51.44 (20.27)	26.10 (20.91)	37.79 (27.64)
Your friends	44.14 (20.55)	51.45 (22.23)	30.73 (22.59)	45.92 (26.18)
Your family	33.43 (23.31)	53.01 (24.02)	17.14 (18.78)	16.02 (20.42)
People younger than you	54.14 (23.32)	59.28 (22.11)	53.25 (22.11)	50.07 (26.79)
People the same age as you	50.28 (20.80)	54.83 (20.23)	38.36 (21.44)	55.66 (23.20)
People older than you	43.08 (19.57)	58.54 (25.32)	23.11 (20.24)	55.66 (23.21)
Strangers	51.28 (20.90)	60.28 (21.64)	41.75 (22.47)	47.81 (22.22)

harms was those younger than the participants, $p \leq 0.035$. Individuals the same age as participants were rated as being more at risk than the self, friends, family, and strangers, $p = 0.001$; less at risk than those older than the participants, $p < 0.006$; and the same level of risk as strangers, $p = 1.00$. The comparator group of individuals older than

Table 2 ANOVA summary table for study 1 and study 2

| Source	SS	df	MS	F	p	η^2
Study 1: risk × comparator group						
Risk	32,649.70	2.41	132,639.77	139.89	0.001	0.436
Error (risk)	422,428.55	445.53	948.15			
Group	295,420.41	4.49	65,744.13	102.96	0.001	0.363
Error (group)	519,333.10	813.32	638.53			
Risk × group	155,660.49	10.61	14,672.32	70.20	0.001	0.279
Error (risk × group)	401,338.29	1920.25	209.00			
Study 2: risk × comparator group						
Risk	67,785.99	2.80	24,189.85	10.15	0.001	0.079
Error (risk)	788,182.48	330.67	2383.63			
Group	64,162.71	4.59	13,992.88	31.99	0.001	0.213
Error (group)	236,666.63	541.08	437.40			
Risk × group	76,007.10	12.19	6236.87	22.84	0.001	0.162
Error (risk × group)	392,759.68	1438.03	273.12			
Study 2: risk × comparator group × knowledge of risk						
Knowledge	13,019.15	1.00	13,019.15	22.65	0.001	0.177
Error (knowledge)	60,348.65	105.00	574.75			
Risk	51,414.20	2.79	18,399.54	5.66	0.001	0.051
Error (risk)	952,710.57	293.40	3247.10			
Group	61,722.58	3.79	16,288.00	23.04	0.001	0.180
Error (group)	281,264.20	397.89	706.89			
Knowledge × risk	17,541.98	2.54	5847.33	14.16	0.001	0.119
Error (knowledge × risk)	130,041.44	267.15	6894.58			
Knowledge × group	900.980	4.95	181.97	2.29	0.045	0.021
Error (knowledge × group)	41,272.09	519.87	79.39			
Risk × group	108,693.20	8.98	126,038.51	25.81	0.001	0.197
Error (risk × group)	442,108.16	943.37	468.65			
Knowledge × risk × group	2463.88	11.47	214.77	2.32	0.005	0.022
Error (knowledge × risk group)	111,736.33	1204.58	92.76			

the participants were judged to be more at risk than self and family, $p < 0.001$; less at risk than people younger than participants, people the same age as participants, and strangers, $p < 0.001$; and no difference for friends, $p = 1.00$. Strangers were rated as being less at risk than people younger than the participants, $p = 0.035$; more at risk than the self, friends, family, and older than participants, $p < 0.001$; with no difference for individuals the same age, $p = 1.00$.

There was also a significant main effect of type of risk providing support for H1 and H2. Pairwise comparisons revealed that the perceived risk of experiencing unwanted contact was significantly low than the perceived risk of experiencing a hoax, $p < 0.001$, and significantly higher than the likelihood of experiencing a behavioural risk, $p < 0.001$. There was no significant difference between the perceived risk of experiencing unwanted contact and sexual risks, $p = 1.00$. The perceived risk of experiencing a hoax was significantly higher than all other types of risks, $p < 0.001$. The perceived risk of experiencing a behavioural risk was rated as significantly lower than all other types of risk, $p < 0.001$. The perceived risk of experiencing sexual risks was significantly higher than experiencing a hoax, $p < 0.001$, and lower than experiencing a behavioural risk, $p < 0.001$.

There was a significant two-way interaction between comparator group and risk. To explore the interaction, the profile ratings with 95% confidence intervals were examined (see Fig. 1). As shown in Fig. 1, there was variation in the perceived risk according to both type of risk and comparator group. The perceived risk of experiencing a hoax was judged to be at a consistently high level irrespective of comparator group. For unwanted contact, behavioural risks, and sexual risks, there were notable peaks for friends and those younger than the participant. As evident from the overlapping confidence intervals (Baguley, 2012), those younger than the participant were judged to be at similar risk of unwanted contact, behavioural risks, and sexual risks. Friends were judged to be at less risk of behavioural risks but similar levels of risk for unwanted contact, hoax, and sexual risk as denoted by the overlap in confidence intervals. The comparator groups of family and those older than the participant had a similar profile. The overlap in confidence intervals also suggests that family and those older than the participants were judged to be at similar risk of behavioural and sexual risks but with more risk of unwanted contact and hoaxes as denoted by the separation between error bars. The profile of results was also similar for friends and people the same age: the overlap between the confidence intervals for these groups suggests that they were judged to be at a similar level of risk for unwanted contact, sexual risks, and hoaxes and far less risk of behavioural risks as denoted by the separation in the error bars. For strangers, they were rated as being at similar level of risk for behavioural, sexual, and unwanted contact as denoted by the overlap of confidence intervals, and more at risk of hoaxes as denoted by the separation between confidence intervals. The confidence intervals for the self suggest that they were at least risk of behavioural risks, similar levels of sexual risks and unwanted contact, and most at risk of hoaxes.

Fig. 1 Study 1. Profile plot with 95% confidence intervals
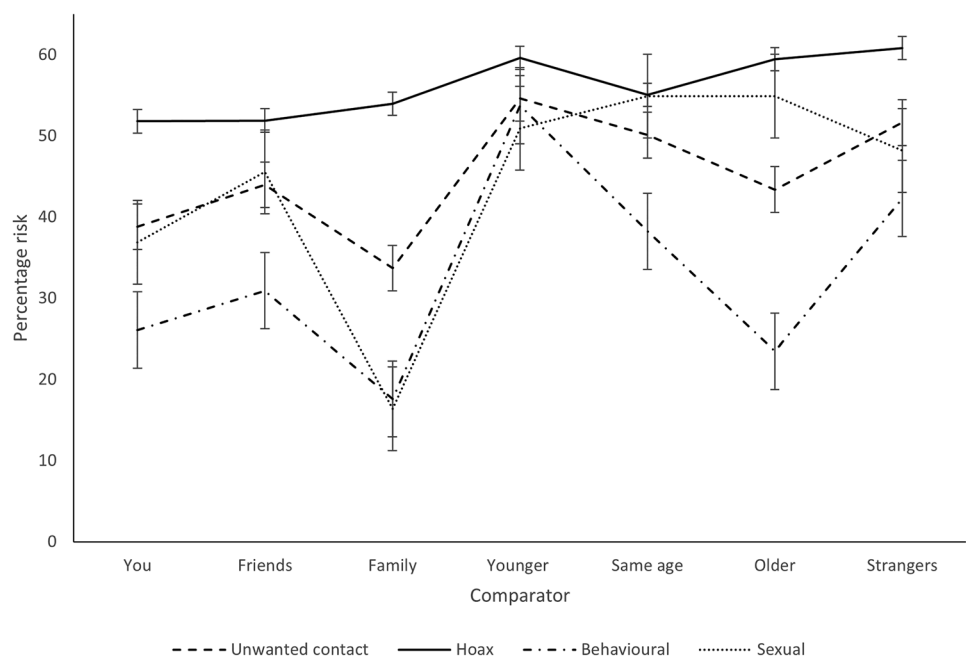
Discussion

Study 1 highlighted that young adults hold comparative optimistic beliefs across the four online risk domains examined and provided support for H1 and H2. For behavioural and sexual risks, participants tended to report the likelihood of experiencing these risks were lower than reported in the Microsoft Digital Civility Index (Microsoft, 2019). The mean ratings for hoaxes were higher for all comparator groups than those reported by Microsoft; however, the self was still just to be at lowest level of risk. Finally, a mixed pattern emerged for unwanted contact with the means for the self, friends, family, and people older than the participant being lower and those for younger people, people the same age, and strangers being higher than those reported by Microsoft. Together, these findings support the previous literature that reports individuals display comparative optimism for other forms of online risks such as cyberbullying (Betts et al., 2019) and positive outcomes of using Facebook (Kim & Hancock, 2015) while also ensuring that the risks were relevant to the population from which the sample was drawn from (see Stuck & Walker, 2019).

H3 was supported as individuals younger than the participant judged to be most at risk, irrespective of the type of risk. However, unlike previous research where the self was judged to be at greatest risk (Betts et al., 2019) and where the comparator group of family was not included, the current findings suggest that family members were perceived to be at less risk than the self. The average age of our participants may provide a potential explanation for this result. During the transition to adulthood, individuals integrate information from their family to help to shape their adult identity (Harvey & Byrd, 1998). Therefore, this reliance on family during this important transition may explain why the family was rated as being less at risk than the self in the current study. Young adults have also been found to use family as an information source and be influenced by their family members for consumer behaviour (Gil et al., 2007). In other words, because family is such an important information source, our participants may have made judgements that did not undermine this source.

Despite identifying the tendency to display comparative optimism for specific risks that were relevant to the sample, one of the limitations of study 1 is that the optimistic beliefs were explored without giving participants information about the true likelihood of experiencing the online risks. Therefore, as Purol and Chopik (2021) argue it is not possible to understand the extent of an individual's optimistic belief. Consequently, study 2 was designed to address this issue while also serving as a reliability check (Plucker & Makel, 2021) for the findings of study 1.

Study 2

Introduction

There is evidence that adults' optimistic beliefs can influence ongoing processing of relative risk in light of information about the likelihood of risks or positive outcomes (Kuzmanovic et al., 2018). Kuzmanovic et al. reported that participants were more likely to modify their views for positive information than negative risk and suggested that although there was a failure to improve the accuracy for positive outcomes, the small changes after negative information indicated that participants avoided having a worse risk estimate. There is also evidence that the magnitude of change varies according to the target. For example, Kappes et al. (2018) reported that adults were more likely to change their beliefs for friends than the self, although the tendency to learn remained better for good rather than bad news. Although Allen et al. (2020) described the misconception that if individuals were to be given enough information about risk, they would undertake the most appropriate action, it remains unclear how perceptions of online risk change when individuals have knowledge of the likelihood of experiencing an online risk. Jefferson et al. (2017) argue that an individual's risk assessment tends to be overly positive even when information about the likely risk or when the actual outcome is known. Jefferson et al. argue that this tendency is reflective of a desire rather than actual beliefs and may be underpinned by knowledge of the self but not the actions of others.

The approach used in study 1 to access comparative optimism has been criticised (e.g. Garrett & Sharrott, 2017; Jefferson et al., 2017). Specifically, Jefferson et al. argue that through using such methodology, it can be hard to determine if an individual holds unrealistically optimistic beliefs for a particular event. Consequently, Jefferson et al. argue that through modifying the procedure, it is possible to explore if people update their beliefs in an optimistically biased manner. Jefferson et al. advocate that researchers should adopt the procedure of Kuzmanovic et al. (2018) where participants were asked to provide the baseline measure for an event through providing reports for the general public, then asked to report their own experiences, and were then given information about the likelihood of experiencing the event. Therefore, we adopted this methodology to explore comparative optimism and online risk judgements in study 2. By adding the general population in the UK as a comparator group, this made participants think about those in the UK, whereas strangers could include a broader defined group.

Study 2 explored (a) comparative optimism judgements for online risks in comparison to the general population, (b) whether participants revised their optimistic beliefs

following information on the actual risk, and (c) whether perceptions of risk varied according to comparator group. Study 2 extended the previous research and literature by exploring the role of knowledge of actual risk for changes in optimistic judgements while also serving as a reliability check (Plucker & Makel, 2021) for study 1. The following hypotheses were tested:

H1: Individuals will hold comparative optimism beliefs for experiencing online risks in comparison to the general population.

H2: There will be variation of comparative optimism beliefs according to the type of risk.

H3: The strength of the comparative optimism beliefs will vary according to the nature of the comparator group with groups that are socially close to the individual judged to be at less risk than those who are socially distant. It is also expected that those younger than the participants will be judged to be at greatest risk.

H4: Participants will revise their optimistic beliefs following information on the actual risk.

Method

Participants

Data was initially gathered from a further sample of 299 adults. As with study 1, participants were excluded if they completed only the consent statements and demographic data ($n = 53$), if they either indicated that they were not a resident of the UK or if they selected the preference not to say response for residency ($n = 80$), or were over 25 ($n = 8$). The final sample comprised 158 (123 female, 25 male, 1 non-binary, and 1 gender fluid) participants aged 18 to 25 (mean $= 20.11$, SD $= 1.36$). The participants reported spending between 1 and 17 h per day online (mean $= 6.25$, SD $= 2.81$).

GPower 3.1.9.2 (Erdfelder et al., 1996) was used to conduct a priori power analysis; assuming a large effect size and power of 0.80, a sample size of 206 was required. Due to the required exclusion of participants, this meant that the final sample size was below the required level.

Measure

Comparative Optimism for Online Risks As in study 1, data for the UK from the Microsoft Digital Civility Index (Microsoft, 2019) was used to identify relevant online risks. In study 2, we presented the top risk for each of the four categories of behaviour: (a) unwanted contact (i.e. "being contacted by someone they don't know to collect personal information"), (b) hoax (i.e. "experiencing phishing/spoofing"), (c) behavioural (i.e. "being called offensive nicknames"), and (d) sexual (i.e. "receiving unwanted sexual

messages or images"). Following Kuzmanovic et al. (2018), participants were first asked to "estimate the general risk of someone in the UK" experiencing the risk. Next, as in study 1, participants were asked to indicate the likelihood that they and the same six comparator groups would experience the risk. Participants were then presented with the relevant statistic from the Microsoft Digital Civility Index relating to the likelihood of experiencing that risk in the UK. Finally, having seen the reported risk, participants were again asked to indicate the extent to which they thought that they and the six comparator groups would experience that risk. As with study 1, participants gave their responses on a sliding scale ranging from 0 to 100% with higher scores indicating a greater likelihood of experiencing the particular risk.

Procedure

The procedure outlined in study 1 was followed for study 2. Separate samples of participants were recruited through a departmental research credit scheme and via advertisements on social media and call for participant websites.

Results

Table 3 contains the descriptive statistics for the various comparator groups split according to whether participants had received information about the actual risk. According to Microsoft Digital Civility Index (Microsoft, 2019), the reported prevalence for the top unwanted contact risk was 48%, for hoaxes 42%, for behavioural risks 54%, and for sexual risks 59%. Comparing these figures with the means in Table 3, it is clear that before knowing the prevalence rates for unwanted contact and hoaxes, participants reported a level higher than the actual figure. Further, this trend remained even after participants had received the prevalence rates for unwanted contact and hoaxes. With the exception of the general population and those younger than the participants, participants reported a level of behavioural risk lower than the reported figure both before and after they had received information on the risk. For sexual risks, participants reported a lower level of risk than that identified in the Microsoft Digital Civility Index, irrespective of whether they had been presented with this information.

Comparative Optimism Beliefs Compared to the General Population To test H1, H2, and H3, and to first examine how comparative optimism judgements relate to the perception of risk for the general population, a 4×8 (risk type [unwanted contact, hoax, behavioural, sexual] $\times$ comparator group [general population, self, friend, family, younger, same age, older, strangers] repeated measures ANOVA was performed.

Table 3 Study 2: means and (standard deviations) for each risk type according to comparator group

	Before knowledge of risk				After knowledge of risk			
	Unwanted contact	Hoax	Behavioural	Sexual	Unwanted contact	Hoax	Behavioural	Sexual
General population	66.46 (21.33)	60.40 (19.94)	65.08 (22.62)	58.06 (19.90)	54.31 (21.24)	47.16 (20.48)	48.18 (23.88)	52.23 (26.81)
You	59.82 (23.60)	52.87 (22.76)	47.80 (25.79)	51.19 (27.45)	55.25 (20.23)	47.93 (19.38)	49.79 (21.52)	57.97 (21.29)
Your friends	61.15 (22.25)	53.08 (21.64)	51.41 (24.46)	56.80 (22.61)	53.27 (21.21)	50.38 (21.01)	44.47 (23.97)	36.13 (23.64)
Your family	61.07 (23.97)	55.66 (22.27)	42.34 (25.73)	31.19 (22.88)	57.72 (22.47)	49.71 (21.03)	56.21 (21.56)	57.34 (20.74)
People younger than you	64.18 (24.60)	56.59 (22.27)	57.45 (26.00)	56.29 (23.49)	53.67 (19.78)	49.32 (20.16)	53.70 (18.67)	60.00 (18.22)
People the same age as you	62.14 (23.53)	53.57 (21.65)	55.09 (21.84)	62.40 (20.90)	56.76 (24.07)	57.17 (20.76)	47.25 (20.21)	46.29 (19.740)
People older than you	66.34 (25.74)	61.98 (23.07)	47.50 (22.19)	44.03 (22.75)	52.26 (17.53)	50.93 (17.42)	56.55 (16.72)	57.08 (16.43)
Strangers	60.36 (22.43)	54.76 (19.56)	55.01 (20.11)	55.49 (18.99)				

As shown in Table 2, there was a significant main effect of comparator group providing support for H1 and H3. The general public was rated as significantly more likely to experience online risks than all other comparator groups, $p \leq 0.001$, except those young, $p = 0.058$. Family was rated as the comparator group that was significantly less likely to experience online risks than all other comparator groups, $p < 0.001$. The self was rated as less likely to experience online risks than friends, $p = 0.001$; people younger than the participant, $p = 0.014$; people the same age as the participant, $p < 0.001$; and strangers, $p = 0.008$. Friends were rated as less likely to experience risk than people the same age as the participant, $p = 0.002$. People older than the participants were also rated to be less at risk of online harms than those the same age as the participant, $p = 0.031$.

There was a significant main effect of risk type providing support for H2. Pairwise comparisons revealed that participants judged unwanted contact to be significantly greater than all other risks, $p \leq 0.009$. There were no other significant differences.

There was also significant interaction between comparator group and risk type. To explore the two-way interaction, the profile plots were examined (Fig. 2). The profiles of results for unwanted contact and hoax were broadly similar with peaks for the general public and people older than the participants. Although, there was some similarity in the profiles for behavioural risks and sexual risks with peaks for both types of risks for general public and friends (although this was higher for sexual risks). For behavioural risks and sexual risks, they reported likelihood was lower for family and the self.

Comparative Optimism Beliefs Relative to Knowledge About the Actual Risk To test H4, as a further test of H2 and H3, and to examine how comparative optimism judgements changed once participants had received information about the actual risk, a $4 \times 7 \times 2$ (risk type [unwanted contact, hoax, behavioural, sexual] × comparator group [self, friend, family, younger, same age, older, strangers] × knowledge of risk [before, after]) repeated measures ANOVA was performed.

There were several significant findings (see Table 2). In support of H2, there was a significant main effect of knowledge of risk, with participants reporting lower levels of risk once they had seen the information from the Microsoft Digital Civility Index, $p < 0.001$. In support of H3, there was also a significant main effect of risk type, with pairwise comparisons revealing that the likelihood of unwanted contact being rated as significantly higher than all other types of risk, $p \leq 0.009$. There was a significant main effect of comparator group. Pairwise comparisons revealed that family was rated as being at significantly lower risk than all other comparator groups, $p < 0.001$. The self was judged to be at significantly lower risk than friends, $p < 0.001$; people younger than the participants,
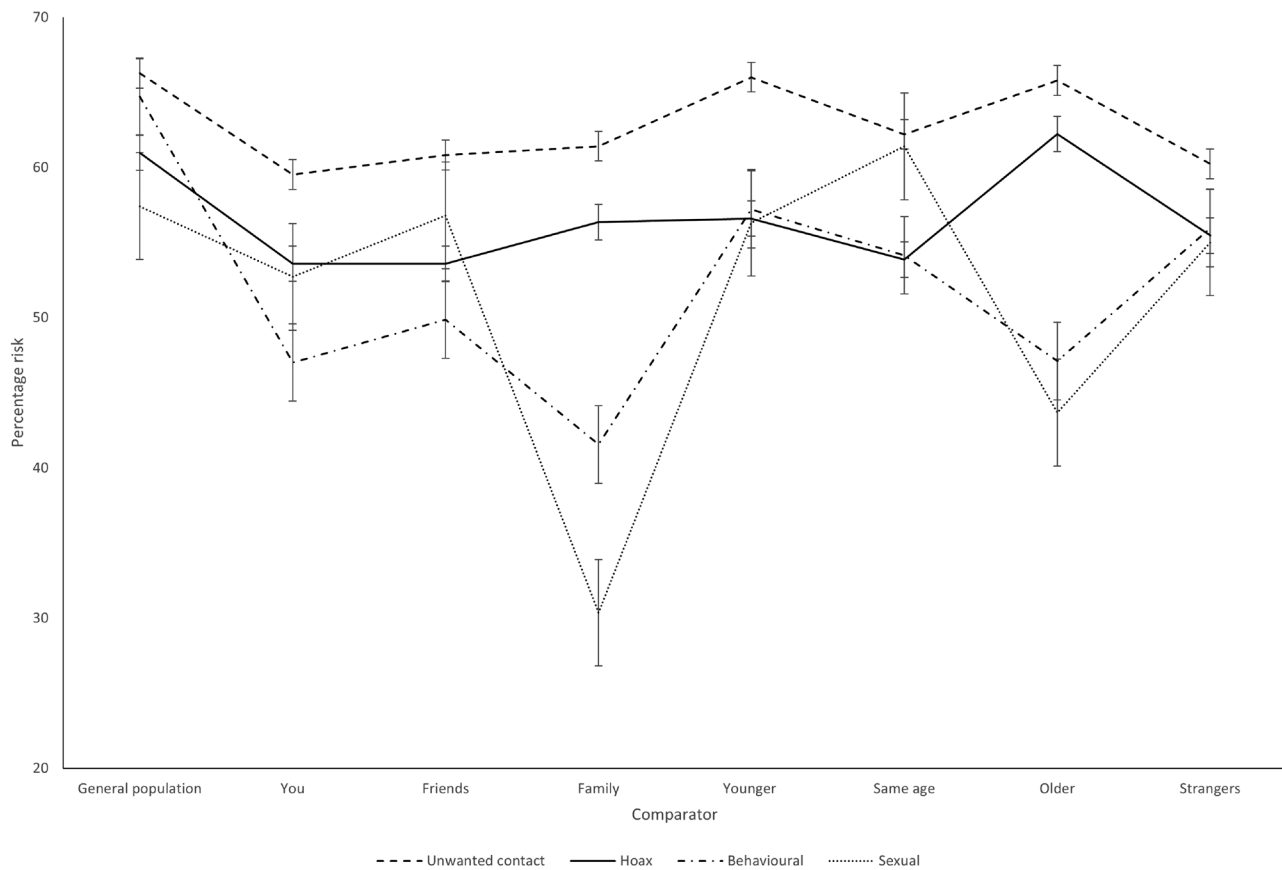
Fig. 2 Study 2. Profile plot with 95% confidence intervals for comparator group and risk

$p = 0.002$; people the same age, $p < 0.001$; and strangers, $p = 0.001$. Friends were judged to be at less risk than people the same age, $p = 0.016$.

There was a significant three-way interaction between comparator group, risk type, and knowledge of risk providing partial support for H4. Following Baguley (2012), the profile ratings with 95% confidence intervals for comparator group and knowledge of risk across all risks were explored (Fig. 3). The profile of results was similar for unwanted contact and hoax both before and after participants had knowledge of the reported likelihood of experiencing these behaviours. However, once participants were aware of the likelihood of experiencing these behaviours, there was a reduction in their ratings which was significant for those younger than the participants and those older for unwanted contact, as denoted by the lack of overlapping error bars. The profile of results for behavioural and sexual risks was very similar before and after participants had knowledge of the reported risk rates. Perceptions of the likelihood of experiencing behavioural or sexual risks were lowest for family members. For behavioural risks, those perceived to be at greatest risk were those younger than the participants and strangers, whereas for sexual risks it was those

who were the same age as participants that were perceived to be at the highest risk.

Discussion

The findings of study 2 extended and confirmed the findings of study 1 while overcoming the criticisms of previous research (Garrett & Sharrott, 2017; Jefferson et al., 2017). The addition of the general public as a comparator group resulted in this group being identified as the most at risk group supporting H1. Again, in study 2, there was variation in perception of risk according to type providing support for H2. Participants reported that unwanted contact was judged to be the most likely risk which did not reflect the results of the Microsoft Digital Civility Index (Microsoft, 2019). Replicating the findings from study 1, in study 2 family was perceived to be at the lowest risk, although the self continued to be rated as been less likely to experience the risks than other comparator groups providing support for H3. Again those younger than the participants were judged to be at greater risk.

Fig. 3 Study 2. Profile plot with 95% confidence intervals
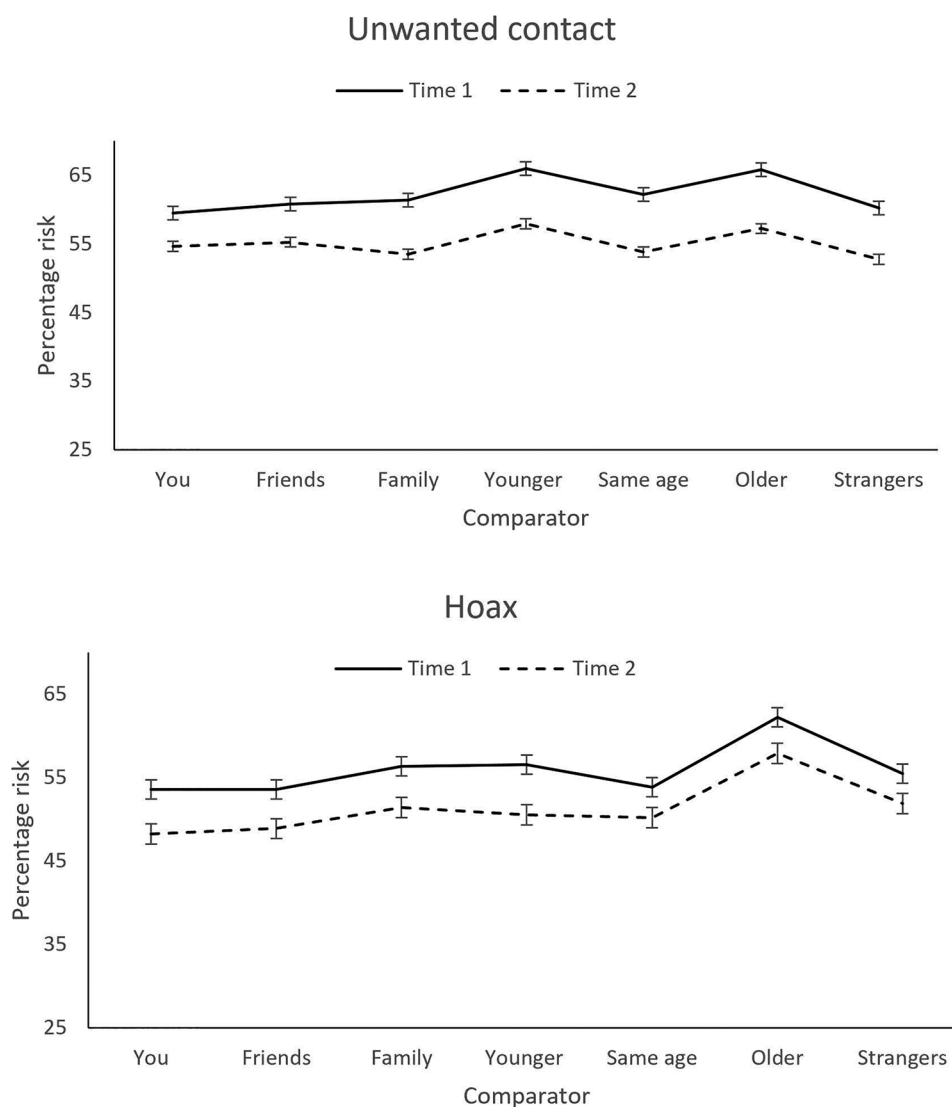

When participants were made aware of the risk, a complex set of findings emerged. Once participants were aware of the actual risk of experiencing unwanted contact and hoaxes, there was a reduction in the ratings for both of these types of risks, but their risk estimations remained higher than those reported in the Microsoft Digital Civility Index (Microsoft, 2019). However, the profile patterns remained similar across comparator groups. Receiving knowledge of the likelihood of experiencing behavioural or sexual risks had little impact on the ratings the participants gave and that the ratings were largely below the rates reported in the Microsoft Digital Civility Index. Together, these findings provide further examples of a trend identified in previous research by Sharot et al. (2011). Sharot et al. reported that people tend to update beliefs about information that was better than expected compared to information that was worse than expected. Further, the lower than expected rate for unwanted contact and hoaxes could be constructed as "good"

news in relation to the optimistic learning bias such that there was evidence of participants revising their estimations as Kappes et al. (2018) propose. The pattern for behavioural and sexual risks may reflect that the participants' initial estimates were close to the actual risk and, as such, they failed to make changes to this estimation.

General Discussion

Across both studies there was evidence of comparative optimism for four online risks and that these risk judgements varied according to who the comparator group was. The similarity and replication of the pattern of findings according to comparator group yielded by the two samples serve as a reliability check of the results (Plucker & Makel, 2021). Family was rated as the group at lowest risk of experiencing online harms, even below the self, which was an unexpected

Fig. 3 (continued)

Behavioural

—— Time 1   ---- Time 2

Sexual

—— Time 1   ---- Time 2
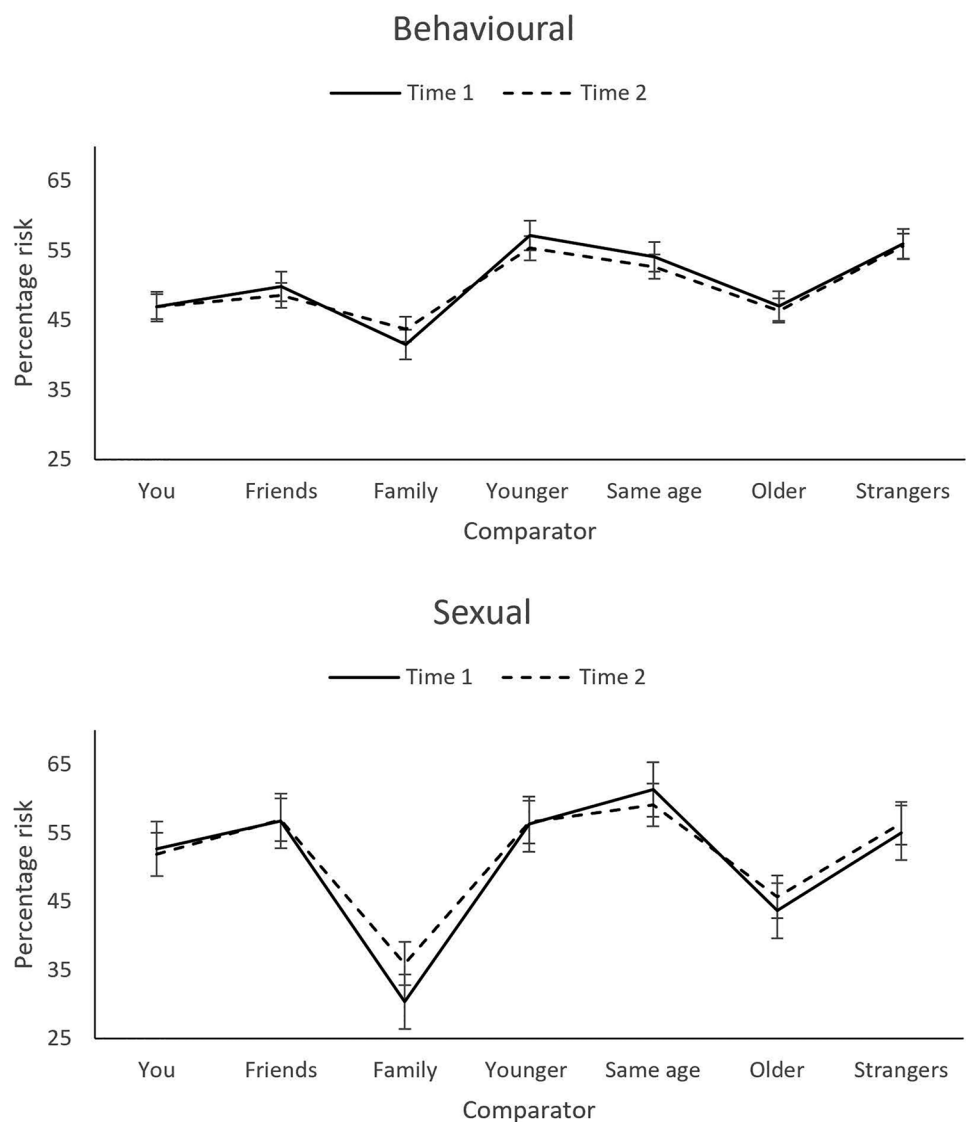
finding. Previous research has consistently reported that participants reported themselves to be at least risk of experiencing a range of online harms (e.g. Betts et al., 2019; Buglass et al., 2021; Kim & Hancock, 2015; Metzger & Suh, 2019). However, these studies did not include family as a comparator group. The trend seen in our results may reflect the importance of family as a source of influence for consumer behaviour (Gil et al, 2007) and identify formation (Harvey & Byrd, 1998) during emerging adulthood (the average age of our samples).

As expected, the research found further evidence of the with age comes wisdom hypothesis (Scharrer & Leone, 2008) which is illustrated by participants reporting that those most at risk were those younger than the self. Although this may reflect actual levels of risk, knowledge of risk, or the belief that younger people are the most vulnerable group because of their age (Scharrer & Leone,

2008), it could also reflect perceived differences in time spent online and perceived technology use. Data for adults in the UK suggests that during September 2021, the average time spent online per day by young adults (18- to 24-year-olds) was 5 h 6 min, whereas those aged 45–54 spent 3 h 51 min online, and those over 55 spent 2 h 58 min (Ofcom 2022a). Further, data suggests that older adults in the UK are less likely to have access to the internet at home and more likely to face digital exclusion compared to emerging adults (Ofcom 2022b). Consequently, our participants may have thought that those younger than them were more at risk of online harms because of the greater amount of time spent online and their greater internet access. However, it is important to acknowledge that the sample comprised young adults and we did not state the specific age of the comparator groups, which may have resulted in participants using selecting different ages as reference groups. Therefore,

future research should seek to explore the role of time spent online for the comparator groups, whether older age groups hold similar views to those reported in the current studies, and how the general age descriptors for the comparator groups are interpreted.

Despite not asking our participants why they made the judgments that they did, when presented with information on the actual risk in study 2, participants reduced their perceptions of risk where they had initially provided far greater ratings. Specifically, the ratings for unwanted contact and hoaxes in study 2 were revised down far more than the ratings of sexual or behaviour risks. This effect can potentially be explained by Allen et al.'s (2020) observation that it is a misperception that when you give people enough information about a risk, then they modify their behaviour accordingly. Further, the pattern of changes to ratings in light of knowledge of risk complements the folk theories that young adults develop to manage online risks (Young et al., 2023). Young et al. argue that these theories are underpinned by cognitive dissonance and facilitate engagement with technology even when the potential risks are highlighted. Aligned to these explanations, the ratings of sexual risks may reflect the demographics of our participants and understanding of the #MeToo movement and accounts of sexual harassment (Meyrick, 2022).

Together, the findings have implications for how information about online risk is managed and communicated to young adults. Finkelhor et al.'s (2021) review of the youth internet safety education programme highlighted a lack of correspondence between the research on internet harms and the information that was provided in training sessions. Finkelhor et al. argued that digital safety messages for particular harms should be integrated into complementary offline harms programmes (e.g. bullying, dating abuse, or sexual abuse). Praxmarer-Carus and Wielunch (2021) also provided guidance on framing risk messages and reported for messages to be effective for individuals who hold optimistic beliefs; using proximal temporal framing improved the effectiveness of the message. However, from our research it also seems that it is important to consider who the safety messages are aimed at. Across both studies we found that, with the exception of family, our participants thought that others were more likely to encounter online risks than they were, which means that individuals may believe that they are not the target of online safety campaigns and, as such, may not engage with them. Moreover, the tendency to update information asymmetrically (Garrett & Sharot, 2017) and belief that others younger than the self are at greatest may further exacerbate this.

The present studies are not without their limitations. First, although we explored the impact of having the general public as a comparator group, it remains unclear how this group may have differed from strangers in terms of social distance.

It is also unclear why the participants gave the risk judgements that they did and what factors caused them to maintain their perceptions of risk for sexual and behavioural risks. One possible explanation is due to variation in group sizes according to the comparator groups. For example, the more socially close groups such as friends and family are likely to be smaller than the most socially distant groups such as those related to age groups, strangers, and the general population. Previous research suggests that as group size increases, judgements about the likelihood of experiencing negative life events also increases (Price et al., 2006). Future research could explore the impact of group sizes and whether participants or those close to them had experienced the harm to see if previous experience has an impact on risk judgements. Relatedly, a further limitation, as Schürmann et al. (2019) note risk taking does not represent a single action in isolation but rather is repeated, while risk perception tends to be studied as a single isolated event. Moreover, to enable us to align with, and draw on, the findings of the Microsoft Digital Civility Index (Microsoft, 2019), we did not ask about online risks according to platform. Given that previous research suggests that online risks may vary according to platform type (e.g. Buglass et al., 2021; Kim & Hancock, 2015), this is something that should be explored in future research.

Due to the need to remove respondents who resided outside of the UK, this meant that the sample size for study 2 is likely underpowered, meaning that some true effects may not be detected (Maxwell, 2004). Finally, our sample was relatively homogenous in nature and was skewed towards female participants. This may have particularly influenced the study findings as females tend to report experiencing greater online sexual risks (Baumgartner et al., 2010), experiencing higher levels of cybervictimisation (Lo Moro et al., 2023), and have greater privacy concerns (Tifferet, 2019). However, some researchers have reported that adult males are more likely to experience accidental exposure to violent, sexual, or slanderous content (Park, 2009). Further, researchers such as Chadwick (2019) argue that more heterogenous samples, including those individuals with intellectual disabilities, need to be recruited for future research. Therefore, future research should seek to further explore the risk judgements of a more heterogenous group of participants and potentially use qualitative methods to seek to understand the participants' ratings.

In conclusion, the current research has demonstrated comparative optimism for specific types of risks that were contextualised for our participants and a two-study approach provided a reliability check for the findings (Plucker & Makel, 2021). There was also some evidence that participants revised their optimistic judgments when presented with the actual level of risk which complemented the folk theories (Young et al., 2023) that young adults hold for using technology.

Declarations

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

Conflict of Interest The authors declare no competing interests.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

Allen, T., Wells, E., & Klima, K. (2020). Culture and cognition: Understanding public perception of risk and (in)action. *IBM Journal of Research and Development, 64*(1/2), 1–17. https://doi.org/10.1147/JRD.2019.2952330

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

Baguley, T. (2012). *Serious Stats: A guide to advanced statistics for behavioral sciences.* Basingstoke, Hampshire: Palgrave.

Baumgartner, S. E., Valkenburg, P. M., & Peter, J. (2010). Unwanted online sexual solicitation and risky sexual online behavior across the lifespan. *Journal of Applied Developmental Psychology, 31*(6), 439–447. https://doi.org/10.1016/j.appdev.2010.07.005

Bennett, S., & Maton, K. (2010). Beyond the 'digital natives' debate: Towards a more nuanced understanding of students' technology experiences. *Journal of Computer Assisted Learning, 26*, 321–331.

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 Sciences, 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

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

Buglass, S. L., Binder, J. F., Betts, L. R., & Underwood, J. D. M. (2021). Asymmetrical third-person effects on the perceptions of online risk and harm among adolescents and adults. *Behaviour & Information Technology, 40*(11), 1090–1100. https://doi.org/10.1080/0144929X.2020.1742380

Byrne, S., Katz, S. J., Lee, T., Linz, D., & McIlrath, M. (2014). Peers, predators, and porn: Predicting parental underestimation of children's risky online experiences. *Journal of Computer-Mediated Communication, 19*, 215–231. https://doi.org/10.1111/jcc4.12040

Cabinet Office. (2012). *Government digital strategy.* Government Digital Strategy. Retrieved May 17, 2022, from (https://publishing.service.gov.uk)

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

Castanier, C., Paran, F., & Delhomme, P. (2012). Risk of crashing with a tram: Perceptions of pedestrians, cyclists, and motorists. *Transportation Research Part F: Traffic Psychology and Behaviour, 15*, 387–394. https://doi.org/10.1016/j.trf.2012.03.0

Chadwick, D. D. (2019). Online risk for people with intellectual disabilities. *Tizard Learning Disability Review*, *24*(4), 180–187. https://doi.org/10.1108/TLDR-03-2019-0008

Chambers, J. R., & Winschitl, P. D. (2004). Biases in social comparative judgements: The role of nonmotivated factors in above-average and comparative-optimism effects. *Psychological Bulletin, 130*(5), 813–828. https://doi.org/10.1037/0033-2909.130.5.813

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

Corbu, N., Oprea, D.-A., Negrea-Busuioc, E., & Radu, L. (2020). 'They can't fool me, but they can fool the others!' Third person effect and fake news detection. *European Journal of Communication, 35*(2), 165–180. https://doi.org/10.1177/0267323120903686

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis program. *Behavior Research Methods, Instruments & Computers, 28*(1), 1–11. https://doi.org/10.3758/BF03203630

Ferrer, R. A., & Klein, W. M. P. (2015). Risk perceptions and health behavior. *Current Opinion in Psychology, 5*, 85–89. https://doi.org/10.1016/j.copsyc.2015.03.012

Finkelhor, D., Walsh, K., Jones, L., Mitchell, K., & Collier, A. (2021). Youth internet safety education: Aligning programs with the evidence base. *Trauma, Violence, & Abuse, 22*(5), 1233–1247. https://doi.org/10.1177/1524838020916257

Fornari, R. (2020). Internet in everyday life: Profiling individual behaviour in the field of online experience. *DigitCult, 5*, 17–28. https://doi.org/10.4399/97888255361643

Garrett, N., Sharrott, T., et al. (2017). Optimistic update bias holds firm: Three tests of robustness following Shah, et al. *Consciousness and Cognition, 50*, 12–22. https://doi.org/10.1016/j.concog.2016.10.013

Gil, R. B., Andrés, E. F., & Salinas, E. M. (2007). Family as a source of consumer-based brand equity. *Journal of Product & Brand Management, 163*, 188–199. https://doi.org/10.1108/10610420710751564

Harvey, M., & Byrd, M. (1998). The relationship between perceptions of self-esteem, patterns of familial attachment, and family environment during early and late phases of adolescence. *International Journal of Adolescence and Youth, 7*, 93–111. https://doi.org/10.1080/02673843.1998.9747815

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

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

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

Kappes, A., Faber, N. S., Kahane, G., Savlescu, J., & Crockett, M. J. (2018). Concern for others leads to vicarious optimism. *Psychological Science, 29*(3), 379–389. https://doi.org/10.1177/0956797617737129

Kim, S. J., & Hancock, J. T. (2015). Optimistic bias and Facebook use: Self-other discrepancies about potential risks and benefits of Facebook use. *Cyberpsychology, Behavior, and Social Networking, 18*(4), 214–220. https://doi.org/10.1089/cyber.2014.0656

Kincl, T., & Štrach, P. (2021). Born digital: Is there going to be a new culture of digital natives? *Journal of Global Scholars of Marketing Science, 31*, 30–48. https://doi.org/10.1080/21639159.2020.1808811

Kostyuk, N., & Wayne, C. (2021). The microfundations of state cybersecurity: Cyber risk perceptions and the mass public. *Journal of Global Security Studies, 6*(2), ogz077. https://doi.org/10.1093/jogss/ogz077

Kuzmanovic, B., Rigoux, L., & Tittgemeyer, M. (2018). Influence of vmPFC on dmPFC predicts valence-guided belief formation. *Journal of Neuroscience, 38*(37), 7996–8010. https://doi.org/10.1523/JNEUROSCI.0266-18.2018

Lobe, B., Livingstone, S., Ólafsson, K., & Vodeb, H. (2011). *Cross-national comparison of risks and safety on the internet: Initial analysis from the EU Kids Online survey of European children.* EU Kids Online, LSE.

Lo Moro, G., Scaioli, G., Martella, M., Pagani, A., Colli, G., Bert, F., & Siliquini, R. (2023). Exploring cyberaggression and mental health consequences among adults: An Italian nationwide cross-sectional study. *International Journal of Environmental Research and Public Health, 20*(4), 3224. https://doi.org/10.3390/ijerph20043224

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

Maxwell, S. E. (2004). The persistance of underpowered studies in psychological research: Causes, consequences, and remedies. *Psychological Methods, 9*(2), 147–163. https://doi.org/10.1037/1082-989X.9.2.147

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. (2019). Comparative optimism about privacy risks on Facebook. *Journal of Communication, 67*, 203–232. https://doi.org/10.1111/jcom.12290

Meyrick, J. (2022). *# MeToo for women and men: Understanding power through sexual harassment.* Taylor & Francis.

Microsoft. (2019). Civility, safety & interaction online: United Kingdom. Retrieved April 5, 2022, from https://www.microsoft.com/en-us/online-safety/digital-civility

Mills, L., Freeman, J., Truelove, V., Davey, J., & Delhomme, P. (2021). Comparative judgements of crash risk and driving ability for speeding behaviours. *Journal of Safety Research, 79*, 68–75. https://doi.org/10.1016/j.jsr.2021.08.006

Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education, 59*, 1065–1078. https://doi.org/10.1080/21639159.2020.1808811

Ofcom. (2021). Online nation 2021 report. Available at Online Nation 2021 report. Retrieved May 17, 2022, from (https://www.ofcom.org.uk)

Ofcom. (2022a). Online nation 2022a report. Available at Online Nation 2022 Report. Retrieved March 16, 2023, from (https://www.ofcom.org.uk)

Ofcom. (2022b). Digital exclusion: A review of Ofcom's research on digital exclusion among adults in the UK. Retrieved March 16, 2023, from https://www.ofcom.org.uk/__data/assets/pdf_file/0022/234364/digital-exclusion-review-2022.pdf

Office for National Statistics. (2022). Nature of fraud and computer misuse in England and Wales: Year ending March 2022. Available at Nature of fraud and computer misuse in England and Wales - Office for National Statistics. Retrieved April 25, 2023, from (https://ons.gov.uk.com)

Park, S. (2009). Concentration of internet usage and its relation to exposure to negative content: Does the gender gap differ among adults and adolescents? *Women's Studies International Forum, 32*(2), 98–107. https://doi.org/10.1016/j.wsif.2009.03.009

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

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

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*, 255–326. https://doi.org/10.1007/s12297-021-00512-1

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon, 9*, 1–6. https://doi.org/10.1108/10748120110424816

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

Riedl, M. J., Whipple, K. N., & Wallace, R. (2021). Antecedents of support for social media content moderation and platform regulation: The role of persumed effects on self and others. *Information, Communication & Society,*. https://doi.org/10.1080/1369118X.2021.1874040

Salgado, S., & Bernsten, D. (2021). "It won't happen to us": Unrealistic optimism affects COVID-19 risk assessments and attitudes regarding protective behaviour. *Journal of Applied Research in Memory and Cognition, 10*(3), 368–380. https://doi.org/10.1016/j.jarmac.2021.07.006

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.1468-2958.2008.00319.x

Sharot, T., Korn, C. W., & Dolan, R. J. (2011). How unrealistic optimism is maintained in the face of reality. *Nature Neuroscience, 14*(11), 1475–1479. https://doi.org/10.1038/nn.2949

Schürmann, O., Frey, R., & Pleskac, T. J. (2019). Mapping risk perceptions in dynamic risk-taking environments. *Journal of Behavioral Decision Making, 32*(1), 94–105. https://osf.io/bq3ym/?view_only=4a48ba060380434d8079658aef607c0d

Senft Everson, N., Klein, W. M. P., Lee, S. S., Selove, R., Sanderson, M., Blot, W. J., Tyndale, R. F., King, S., Gilliam, K., Kundu, S., Steinwandel, M., Sternlieb, S. J., Warren Andersen, S., Friedman, D. L., Connors, E., Fadden, M. K., Freiberg, M. S., Wells, Q. S., Canedo, J., Tindle, H. A. (2022). Dispositional optimism and optimistic bias: Associations with cessation motivation, confidence, and attitudes. *Health Psychology, 41*(9), 621–629. https://doi.org/10.1037/hea0001184

Stuck, R. E., & Walker, B. N. (2019). Risk perceptions of common technologies. *Proceeding of the Human Factors and Ergonomics Society 2019 Annual Meeting, 63*, 1316. https://doi.org/10.1177/1071181319631128

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

Wang, H.-Y., & L., & Cheng, C. (2019). Digital nativity and information technology addiction: Age cohort versus individual differences approaches. *Computers in Human Behavior, 90*, 1–9. https://doi.org/10.1016/j.chb.2018.08.031

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.

Wild, T. C., Hinson, R., Cunningham, J., & Bacchiochi, J. (2001). Perceived vulnerability to alcohol-related harm in young adults: Independent effects of risky alcohol use and drinking motives. *Experimental and Clinical Psychopharmacology, 9*(1), 117–125. https://doi.org/10.1037/1064-1297.9.1.117

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

Young, R., Kanaovich, V., & Johnson, B. G. (2023). Young adults folk theories of how social media harms its users. *Mass Communication and Society, 26*, 23–46. https://doi.org/10.1080/15205436.2021.1970186

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.