Adolescents' experience of offline and online risks: separate and joint propensities

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Abstract

Adolescence is a period of increased risk experience and ever more often these occur online. The current study aims to investigate whether adolescents' online and offline risk experiences are driven by the same general propensity to risks. Data from a representative study of N = 19,406 (50% girls) internet-using 11-16 year olds (M = 13.54, SD = 1.68) youth in Europe were subjected to the current analyses. Three confirmatory factor analyses were applied to measures of offline and online risk experiences (five each). A bi-factor model of a general risk factor and two specific factors of online and offline risks was shown to provide the best theoretical and empirical fit. All risk experiences loaded significantly on the general risk factor while additionally all offline risks loaded significantly on the offline risk factor. However, none of the online risks loaded significantly on the online risk factor. Online risks could not be explained by factors that go beyond a general propensity to experience risks suggesting that new technologies do not bring with them a new type of risk propensity driven by that environment. Interventions should target risk and protective factors that can account for adolescents' experiences across risk types (online and offline).

Keywords: online risks, offline risks, risk behaviour, internet use, adolescence

1 Introduction

There is ample evidence that adolescence is a period of increased risk behaviour (Burke et al., 1997; van Nieuwenhuijzen et al., 2009). Moreover, research suggests that those engaging in one type of risk behaviour often additionally do so in others, i.e. engage in multiple risks (Guilamo-Ramos, Litardo, & Jaccard, 2005; Jessor, 2013). Already Rutter (1987) argued that it is not an individual risk factor but the number of risk factors children experience that lead to psychopathology. In a similar vein, Schoon (2006) put forward that experiencing isolated risk factors in childhood may help to build resilience; however, it is the combined effect of risk factors that will show adverse effects on developmental outcomes. Coherent with this theorizing empirical validity of methodological approaches using cumulative risk indices has been demonstrated (Deater-Deckard, Dodge, Bates, & Pettit, 1998; Stoddard et al., 2013; Williams, Anderson, McGee, & Silva, 1990). This argumentation is in line with the notion that independent of the specific type of risk behaviour this might be driven by a general underlying risk factor or propensity for displaying risky behaviours (Donovan & Jessor, 1985; Jessor, 1991, 2013).

The current generation of adolescents are making ever more use of the internet. Consequently, adolescents risk behaviour also occurs online. Children's online risk experiences have received growing attention in recent years by researchers (e.g., Cyberbullying Research Center; The Pew Internet & American Life Project; Youth Internet Safety Survey etc.), policy makers and stakeholders (e.g., Childnet; EC Safer Internet Programme; Internet Watch Foundation). This is not surprising as consequences of online risk experiences can reach as far as severe mental health difficulties and in some instances suicide (Kowalski & Limber, 2013). However, it is not known whether the concept of a general underlying risk factor or propensity for displaying risky behaviours also applies to online risk

experiences and whether such a factor would display a joint or separate risk propensity to that of offline risk experiences.

The focus on propensity to risk recognises the influence of personality and behavioural factors which apply across domains, including across the offline/online boundary. In relation to adolescence, one explanation put forward is that teenagers combine sensation-seeking with a relative lack in impulse control (Peach & Gaultney, 2013; Steinberg et al., 2008; van Nieuwenhuijzen et al., 2009). Recent empirical evidence suggests that, similar to offline risk experiences, online risk experiences do often co-occur and are associated with similar characteristics (Hasebrink, Görzig, Haddon, Kalmus, & Livingstone, 2011). The hypothesis that those who encounter offline risks are more likely to encounter online risks, whether because of their personality or behaviour, is supported by survey evidence (Palfrey, Sacco, Boyd, DeBonis, 2008; Wolak, Finkelhor, & Mitchell, 2008), clinical reports (Delmonico & Griffin, 2008; Mitchell & Wells, 2007), policy analysis (Byron, 2008) and criminal cases (Child Exploitation and Online Protection Centre, 2010). Further examples include the findings that involvement in traditional bullying predicts cyberbullying (Görzig, 2011; Kowalski, Morgan, & Limber, 2012), that those who engage in more risky offline (and risky online) activities are more likely to be involved in sexting (Livingstone & Görzig, 2014) or that online and offline sex offenders show similar characteristics and tactics (Wolak & Finkelhor, 2013). Furthermore, adolescents' risk experiences do not appear to have risen with the onset of new technologies, that is, over the period when internet and mobile use have risen sharply, long term measures of harm to children reveal little or no increase over recent years (Madge & Barker, 2007; Maughan, Collishaw, Meltzer, & Goodman, 2008), and some reductions in bullying and victimization (Finkelhor, 2013, Livingstone & Smith, 2014).

Despite this research evidence there have been many alarmist accounts of elevated risks for adolescents due to the onset of new media often aggravated by the coverage in the

media. Considerable research efforts are underway to progress beyond the moral panic (Critcher, 2008) associated with young people's use of new media such as the internet so as to identify appropriate policy responses. This is urgent insofar children and young people are adopting digital communication technologies rapidly, often far ahead of the adults charged with their safety and wellbeing. Yet, it is not clear whether the experience of (multiple) risks online can be traced back to the same common underlying risk factor shared with the experience of (multiple) risks offline and how much (if any) of adolescents' risk experience can be explained by the specific environment (offline vs. online). If a common factor were identified it could account for both online and offline risks and so aid the development of prevention strategies for online risks (Hale & Viner, 2012; Hale, Fitzgerald-Yau, & Viner, 2014; Jackson, Henderson, Frank, & Haw, 2012).

1.1 Research questions

Given the lack in the knowledgebase concerning a common factor underlying various kinds of adolescents' risk experiences whether online or offline and its timely importance the current paper aims to investigate possible joint and separate propensities to experience risks online and offline. Firstly, it is examined whether adolescents' online and offline risk experiences are driven by a propensity to experience risks within each type of environment separately and secondly, whether any risk experience (offline *and* online) is driven by the same general propensity to experience risks and what (if any) the role of the specific environment (offline *or* online) plays. In particular, it is investigated whether 1a) adolescents' offline risk experiences are related to one underlying offline risk factor and 1b) adolescents' online risk experiences are related to one underlying online risk factor, 2) adolescents' risk experiences (online and offline) are related to one underlying risk factor without any notable contribution of the specific environment (i.e., online or offline) or 3) adolescents' risk experiences are related to two separate underlying components: one related to the propensity

to experience risks in general and one related to the specific environment of the risk experience (i.e., online or offline).

2 Methods

2.1 Study design and sample

Data were obtained from the cross-national survey data of the EU Kids Online II project (Livingstone, Haddon, Görzig, & Ólafsson, 2011). A random stratified sample of approximately 1,000 internet-using youths aged 9–16 and one of their parents were interviewed at home during 2010 in each of twenty-five European countries[1], yielding a total sample size of 25,142 youths. Interviews were conducted face-to-face for questions about internet access and use, with private completion for sensitive questions, including those on the experience of online and offline risks. Questions about all risk experiences included in the questionnaire were posed only to 11-16 year olds, with a core sample size of 19 406[2] (50% girls/boys) The London School of Economics' Research Ethics Committee approved the methodology and appropriate protocols were put in place to ensure that the rights and wellbeing of children and families were protected during the research process (for full details, see Livingstone et al., 2011 and Görzig, 2012).

2.2 Measures

The EU Kids Online survey was designed in consultation with international experts and stakeholders. As a result ten specific risk experiences (five online and five offline) were included.

Offline risk experiences. Adolescents were asked whether they had engaged in any of five offline risk behaviours in the previous 12 months (adapted from the Health Behaviour in School-aged Children (HBSC) survey; Currie et al., 2008): "Had so much alcohol that I got really drunk" (8.2%) , "Missed school lessons without my parents knowing" (12.6%),

"Had sexual intercourse" (5.5%), "Been in trouble with my teachers for bad behaviour" (15.4%), "Been in trouble with the police" (2.9%).

Online risk experiences. Children were asked whether they had experienced any of five online risks in the previous 12 months (for the exact and detailed phrasing, see Livingstone, Haddon, & Görzig, 2012; Livingstone et al., 2011): Seen sexual images online (16.6%), sent sexual messages online (2.9%), bullied others online (3.2%), made a new contact online (33.5%), seen negative user generated content (i.e., hate messages that attack certain groups or individuals, content promoting bulimia/anorexia, self-harm or drug use; 21.4%).

2.3 Data analysis

The ten risk experiences were used for the present analyses. A reflective model using structural equation modelling seemed appropriate given that the direction of theoretically assumed causality was from each risk factor to the respective risk experiences (Jarvis, Cheryl, MacKenzie, & Podsakoff, 2003). Confirmatory factor analysis (CFA) was applied to test three potential factor structures as warranted by the research questions: 1) a non-hierarchical correlated *two-factor* model including online and offline risk experiences as two separate factors 2) a *one-factor* model including all risk experiences 3) a *bi-factor* model of a general risk factor and two specific factors of online and offline risk experiences.

The two-factor model assesses whether adolescent offline risk experiences are related to one underlying offline risk factor and whether adolescent online risk experiences are related to one underlying online risk factor. In addition, information is provided about the relation between those two factors by allowing them to correlate. The one-factor model informs us whether the specific risk experiences form a coherent group and can be attributed to the same underlying latent risk factor. It does not however account for specific contribution due to the fact that a risk is experienced online or offline. Finally, the bi-factor model

accounts for the covariation among all items assessing risk experiences through the general factor while the specific factors will reflect the amount of covariation independent from the general factor and due to the particular environmental factors (i.e., online and offline) only. In other words the general factor will tell us about the communality across all risk experiences independent of whether they are offline or online while the specific factors reflect the coherence among the specific risk environment (online and offline) that is not due to the propensity to experience risks in general. The factor loadings of an individual risk experience on the general factor will inform us of the strength of its relation to the experience of risks in general while the factor loading on the specific risk factor (online or offline) informs us how strong the experience is related to the fact that it is online or offline and not due to a general propensity to experience risks.

In order to account for the fact that the data are binary all CFA models were fitted using Weighted Least Square (WLS) estimation in Mplus version 6.12 (Muthén & Muthén, 2011) with polychoric correlations rather than normal-theory estimation and product-moment correlation providing asymptotically unbiased, consistent and efficient parameter estimates, as well as correct chi-square tests of fit with binary observed variables (Flora & Curran, 2004). Individuals with partially missing data were included, as estimation of missing data patterns is possible with Weighted Least Square estimation (Abbott et al., 2006). Model fit was assessed with the Comparative Fit Index (CFI), the Tucker Lewis Index (TLI) and the Root Mean Square Error of Approximation (RMSEA) following recommendations on their interpretation (Yu, 2002).

3 Results

In the present analyses 13 661 (70%) of the respondents had complete data on all items while ten respondents had to be excluded because of non-response and 96% had

responded to at least seven of the ten risk experience items. Chi-square statistics and goodness of fit criteria for each model are shown in Table 1.

Table 1. Fit of CFA models for adolescents' risk experiences

Model	df	χ^2	CFI	TLI	RMSEA
two-factor	34	338	**0.98**	**0.97**	**0.022**
one-factor	35	815	0.94	0.92	**0.035**
bi-factor	25	249	**0.98**	**0.97**	**0.022**

Notes.
df: degrees of freedom; χ2: chi-square fit statistic;
CFI: comparative fit index, values >0.95 indicate good fit;
TLI: Tucker Lewis index, values >0.95 indicate good fit;
RMSEA: root mean square error of approximation, values <0.08 indicate good fit.
Model statistics showing a good fit are indicated in bold.

The two-factor model and the general-specific model showed similarly good fit to the data while the one-factor model was less favourable albeit fit indices were close to what is considered a good fit.

The standardized estimates (probit regression coefficients) of the risk experience items for the two models showing the best fit to the data (i.e., the two-factor and bi-factor model) are shown in Figure 1.

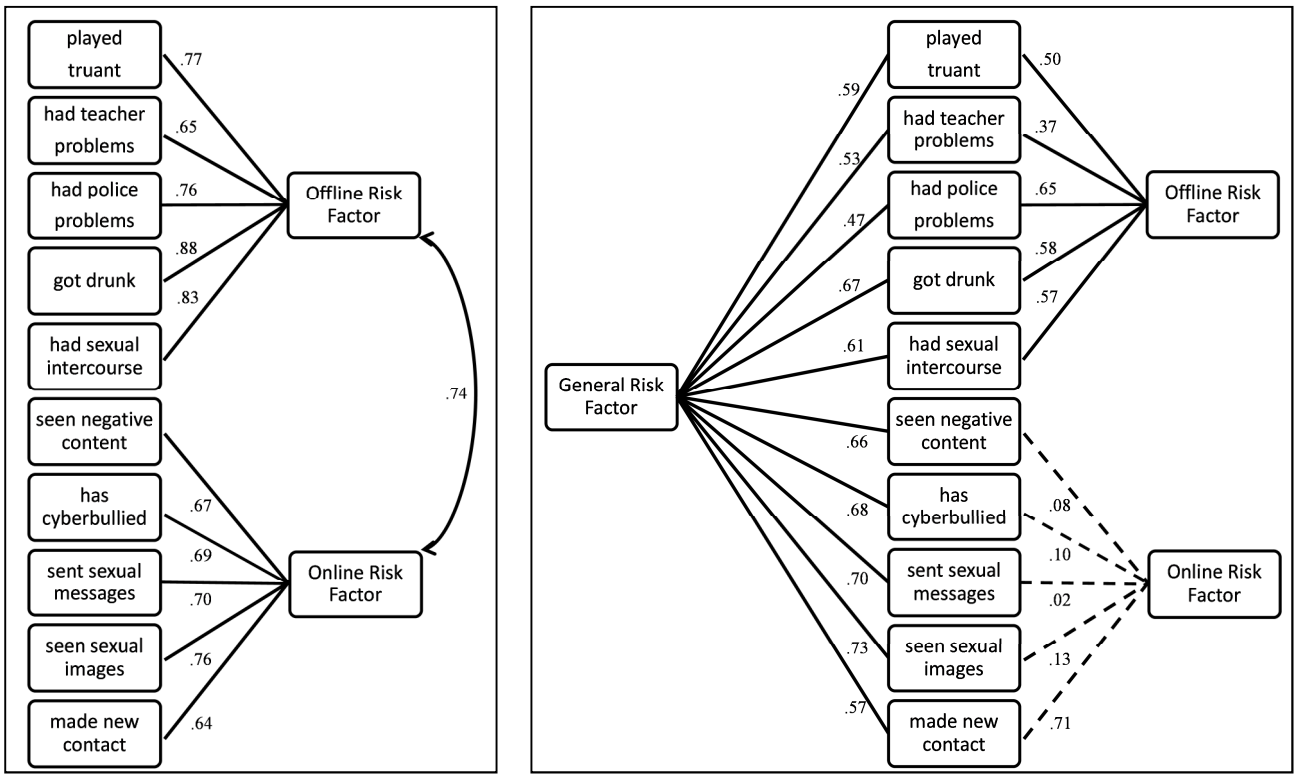

Figure 1. Factor structure for offline and online risks for the two-factor (left) and the bi-factor model (right). *Note:* Dashed lines indicate statistically insignificant and solid lines statistically significant coefficients ($p < .001$). Numbers represent probit coefficients due to the binary nature of observed variables and are not to be confused with factor loadings retrieved via linear models commonly used for continuous variables. To aid interpretation the inclined reader is referred to Muthén and Muthén (1998-2012).

For the two-factor model all coefficients were statistically significant (all $p < .001$). The offline risk factor accounted for 77% of the shared variance among the offline risk experiences while the online risk factor accounted for 58% of shared variance among the online risk experiences (p's $< .001$). Further, the correlation between the offline and the online risk factor in the two-factor model was fairly high ($r = .74$; $p < .001$).

For the bi-factor model all coefficients for the general risk factor and the specific factor for offline risk experiences were statistically significant (all $p < .001$); however, none of the coefficients of the specific factor for online risk experiences were statistically significant. Accordingly, the coefficients for online risks hardly differ between the online risk factor of the two-factor model and the general risk factor of the bi-factor model. In contrast, the coefficients for offline risks differ between the two-factor and the bi-factor model, all

offline risks showing substantial (but lower) coefficients on two factors simultaneously for the bi-factor model. In addition, all offline risk experiences except for one ("Been in trouble with the police") showed slightly higher coefficients on the general risk compared to the offline risk factor. Further, the general risk factor accounted for 44% of the shared variance among all risk experiences and the offline risk factor accounted for 32% of the shared variance among the offline risk experiences (p's < .001) while the online risk factor accounted for a statistically insignificant amount of 2% of shared variance among the online risk experiences (p = .69).

4 Discussion

The current study compared three confirmatory factor analysis models. A one-factor model supporting the assumption that all off- and online risk experiences can be explained by one underlying common propensity without contribution of the specific environment (online or offline) was discarded in favour of two equally fitting models (two- and bi-factor) offering consecutive explanations. The two-factor model supported the assumption that adolescents' offline risk experiences are driven by a latent factor associated with a propensity to experience offline risks and adolescents' online risk experiences are driven by a latent factor associated with a propensity to experience online risks. Further, this model showed that the propensities to experience offline risks and online risks are highly associated with one another.

The bi-factor model supported the assumption that risk experiences are associated with two underlying components, one being the propensity to experience risks in general and one associated with the propensity to experience risks in a specific environment (i.e., online or offline). All risk experiences showed a significant association with the factor reflecting the general propensity to experience risks. In addition, the influence of the specific environment, reflected by two separate online and offline risk factors, was confirmed for all of the offline

risk experiences but none of the online risk experiences. Given the high association between the online and offline risk factor in the two-factor model, the bi-factor model constitutes an elaboration of the two-factor model, confirming the existence of a common risk propensity that can serve to explain the high association between the factors in the two-factor model. Hence, the remainder of the discussion will focus on the bi-factor model only.

The identification of a general risk factor supports previous assumptions of a single underlying personality or behavioural factor to account for the range of risks that adolescents encounter (Donovan & Jessor, 1985; Jessor, 1991, 2013). Moreover, the finding that offline and online risk experiences are both associated with such a common underlying propensity to a similar extend consolidates findings which have shown that offline and online risks often do co-occur and that the same individuals involved in a particular offline risk (e.g. bullying) are also involved in a corresponding online risk (e.g., cyberbullying) (Livingstone & Smith, 2014).

Further, the finding that each of the offline risk experiences but none of the online risk experiences have shown to be associated with a second factor independent of the general risk factor but specific to the (offline) environment may suggest two things. First, the experience of offline risks can be explained by factors that go beyond a general propensity to experience risks and are tied to the fact that these experiences take place offline. These might be factors associated with that environment, i.e. the immediate surrounding an adolescent lives in may provide more or less access to certain risk experiences including factors such as social circumstances, policy regulations as well as law enforcement strategies (e.g., regulations on the availability of alcohol, police scrutiny, existence of delinquent peers etc.). A further factor that might be unique to the experience of offline risks is the association of risk (defined as the occurrence of an event which is associated with a probability of harm) with the actual experience of harm (defined as actual physical or mental damage as reported by the person

concerned) (Livingstone & Görzig, 2014). While online risks could lead to harmful experiences (e.g., dangerous encounters and exposures) this link is more immediate for offline risks that might inevitably lead to harm (e.g., unprotected sex, drinking etc.).

Second, the experience of online risks cannot be explained by factors that go above and beyond the general propensity to experience risks or those associated with offline risks., Contrary to recent alarmist assumptions that new technologies bring with them new risks specific to and driven by the environment, these findings suggests that a contrasting set of hypotheses as outlined by Finkelhor might be supported:

> "(a) that the digital environment is no more perilous and perhaps less perilous than other offline environments youth inhabit; (b) that the problems that do occur are not unique, but rather extensions of social interaction or media consumption problems that cut across environments and are best conceptualized holistically rather than as special to the digital technology; and (c) that the appropriate responses should not be specialized Internet safety training but more generic education about life skills, social interaction, emotional intelligence, and media literacy. " (Finkelhor, 2014:655)

Inherent in these hypotheses is the approach to appropriate policy and practice responses, i.e. interventions should target risk and protective factors that can account for adolescents' experiences across risk types (online and offline). In order to aid policy responses future research is needed to identify factors that are associated with a general propensity to experience risks in adolescence. This might include socio-demographic as well as structural variables. In addition, further exploration is needed to identify the link between a general propensity to experience risks and a vulnerability to harm. As discussed above the experience of harm from risk might vary across the offline/online environment – an assumption that remains to be tested empirically. Moreover, after highlighting the importance to differentiate between risk and harm the possible notion of a common underlying harm or vulnerability factor might need some consideration. The identification of such a factor and its link with the propensity to experience risks could play a crucial role in designing intervention

strategies to target resilience building in adolescence (Coleman & Hagell, 2007; Luthar, Cicchetti, & Becker, 2000).

The current research presents a step towards consolidating research on adolescent risk that reaches across the offline/online boundary. However, the findings are not without its limitations. The current analysis did focus on a specific selection of risk experiences. The results could be solidified if future research would replicate these findings using different types of risks (as there are plenty) as well as a conceptual match between offline and online risks (e.g. bullying and cyberbullying, seeing sexual images offline and online).

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[1] Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Turkey and the UK.

[2] Country and individual level weights in line with reports of the EU Kids Online survey data (Görzig, 2012; Livingstone et al., 2011) have been applied. The unweighted sample size was N = 18 709. Percentages are reported from weighted data analyses.