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A longitudinal study of cyberbullying: Examining risk and protective factors

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The objective of the current study was to examine possible risk (school-bullying and victimization, exposure to media violence, callous-unemotional traits, impulsivity and narcissism) and protective (family, peer and school social support) factors that might be associated with cyberbullying and cyber-victimization by employing a longitudinal, two-wave design. The sample consisted of 1,416 (50.1% girls) adolescents living in Cyprus. The findings suggested cross-sectional and longitudinal associations between school-bullying and cyberbullying and between school-victimization and cyber-victimization. Furthermore, callous-unemotional traits were longitudinally related to cyberbullying. Media violence exposure was a risk factor leading to both cyberbullying and cyber-victimization, while family social support was a protective factor for both types of adjustment problems. Finally, family social support protected adolescents living in single-parent households from being cyber-victimized when their friendships were not supportive.

Keywords: Cyberbullying; Cyber-victimization; Psychopathic traits; Social support; Media violence exposure.

Bullying is an international, widespread phenomenon occurring in different social contexts, such as the schoolyard, the workplace, and more recently technology. The majority of research investigating bullying behaviour has been focusing on school-bullying, which is defined as repeated physical, verbal or psychological attack or intimidation that is intended to cause fear, distress or harm to the victim (Olweus, 1993). Nowadays with the rapid

increase in electronic or online communication and the increase use of computers and mobile phones by young people, bullying is no longer limited to the schoolyard (Juvonen & Gross, 2008). Even though prior studies have provided evidence for an overlap between school-bullying and cyberbullying (Beran & Li, 2005; Li, 2007), cyberbullying differs from school-bullying in that it allows for limitless boundaries, an infinite audience, and the anonymity of the perpetrator (Patchin & Hinduja, 2006).

Cyberbullying is defined as an aggressive, intentional act carried out by an individual or a group of individuals with the use of electronic forms of contact (Smith et al., 2008). This action is repeated across time and the victim cannot easily defend him- or herself (Strom & Strom, 2005). Cyberbullies may harass, tease, disrespect, or exclude from social activities fellow peers with the use of instant messaging, chat rooms, e-mail, and text messages through cell phones and computers (Swartz, 2009). In order to understand the development of cyberbullying and cyber-victimization, the current study utilized an ecological approach by taking into account adolescents' personality characteristics and the social contexts in which adolescents are embedded (Bronfenbrenner, 1979).

On the individual level, we consider three personality traits, callous-unemotional (CU) traits, narcissism, and impulsivity. Research suggests that the presence of these personality traits designates an important subgroup of antisocial youth or youth with conduct problems (Frick & Dickens, 2006). Among youth with conduct problems, those high on CU traits (e.g., lack of remorse or guilt; lack of concern for others' feelings; and shallow or deficient emotions) show a more severe, aggressive, and stable pattern of antisocial behaviour (Frick & White, 2008). According to Fanti, Frick, and Georgiou (2009), CU traits are also associated with school-bullying but not victimization. CU traits constitute the affective dimension of psychopathy; psychopathy comprises two other dimensions, narcissism and impulsivity, each of which has been linked with aggressive behaviour in youth (Frick & Hare, 2001). Compared with non-involved youth, school victims and bullies are at greater risk of displaying impulsive behaviour (O'Brennan, Bradshaw, & Sawyer, 2009; Olweus, 1995). Narcissism was found to be positively related to bullying behaviour (Ang, Ong, Lim, & Lim, 2010), and narcissistic youth tend to perceive themselves as victims of others' interpersonal transgressions more so than other youth (McCullough, Emmons, Kilpatrick, & Mooney, 2003). In the current study, we attempted to apply the rich body of literature on conduct problems, aggression and school-bullying to cyberbullying and cyber-victimization in an effort to improve our understanding of the development of this new form of bullying. It was expected that CU traits would have the power to influence the development of cyberbullying and that narcissism and impulsivity would influence both cyberbullying and cyber-victimization.

In terms of environmental influences, we posited that media violence exposure (MVE) would be a risk marker for both cyberbullying and cyber-victimization. MVE may lead to desensitization to real-life aggression and to the suffering of victims, which increases the likelihood of aggressive behaviour (Fanti, Vanman, Henrich, & Avraamides, 2009). Additionally, cyberbullying is a form of bullying behaviour that takes place with the use of different media, such as the internet, suggesting that MVE might be especially detrimental for this type of behaviour. Also, prior research has provided evidence for the association between exposure to television and school-bullying and cyberbullying (Calvete, Orue, Estévez, Villardón & Padilla 2010; Kuntsche et al., 2006; Zimmerman, Glew, Christakis, & Katon, 2005), although it is unclear how MVE is associated with different forms of victimization; an objective of the current study.

In understanding development, one must consider not only risk processes but also how the environment protects adolescents from developing maladaptive behaviours (Sroufe & Rutter, 1984). The current study took into account three protective variables in the child's proximal environment, family, school and friend social support. Empirical evidence suggested that positive school climate and friend social support are negatively related to verbal, physical and cyberbullying (Williams & Guerra, 2007). A supportive school climate and a supportive social network of peers may also protect children from being victimized (Eliot, Cornell, Gregory, & Fa, 2010; Pellegrini & Bartini, 2000). Parental support has been associated with less involvement in all forms of bullying including cyberbullying (Wang, Iannotti, & Nansel, 2009). In the present study, it was expected that youth who experience support from school personnel, family members, and peers would be less likely to engage in cyberbullying and less likely to experience cyber-victimization. This hypothesis is based on the ecological approach, which proposes that multiple social contexts, in which youth are embedded simultaneously, work together to influence adjustment (Brookmeyer, Fanti, & Henrich, 2006). The intersecting social ecologies of family, friend and school are also expected to interact with one another to influence cyberbullying and cyber-victimization.

Last, gender and family structure differences will be taken into account. Prior work has suggested that females are more likely to report being cyberbullied than their male peers and that boys use cyberbullying to a greater extent than girls (Calvete et al., 2010; Li, 2007). However, Finn (2004) did not report any significant gender differences among cyberbullies and cyber-victims. Moreover, youth from single-parent families are at greater risk for exhibiting aggressive behaviour and for being victimized by peers in comparison to youth from intact families (Grifin, Botvin, Scheier, Diaz, & Miller, 2000; Turner, Finkelhor, & Ormrod, 2007).

In summary, the aim of the present study was to examine possible risk and protective factors that might be associated with cyberbullying and cyber-victimization, a field of inquiry that has received little empirical attention. In accordance with the ecological model, MVE and psychopathic personality traits were hypothesized to place a child at risk for the development of cyberbullying and cyber-victimization. However, experiencing support from family, peer, and school members was expected to protect children from engaging in these behaviours. The role of gender and family structure was also taken into consideration.

METHOD

Participants

The sample consisted of 1,416 adolescents living in Cyprus (50.1% girls; aged 11–14 years at the first assessment, $M_{age} = 12.89$, $SD = 0.78$). Following approval of the study by the Cyprus Ministry of Education, 13 middle schools were randomly selected (12 public, 1 private) from three of the four school districts (Lefkosia, Larnaca, Lemeso) in Cyprus. After approval of the study by the school boards, students were given an informed consent form for their parents to sign. In the classroom, students were informed about the study and were also informed about their rights as participants. Only students with parental consent were permitted to participate in the study. Group assessments were conducted with questionnaires being administered by trained research assistants. Prior to the first assessment, parental consent was obtained from 1,513 students, and these students completed questionnaires administered during Year 1. At the second assessment one year later, 93.59% ($n = 1,416$) of the original sample of students participated. Attrition was due to an inability to contact students who had moved away or transferred to a different school. The sample was diverse in terms of parental educational levels (20.1% did not complete high school, 46% had a high-school education, and 33.9% had a university degree) and parental marital status (7.2% of the families consisted of one-parent households).

Measures

Psychopathic traits. CU traits were measured with the Inventory of Callous-Unemotional Traits (ICU; Frick, 2004), which is a 24-item self-report scale. Narcissism (seven items) and impulsivity (five items) were measured with the Antisocial Process Screening Device–Youth report (APSD; Frick & Hare, 2001). All the items were placed on a 4-point scale (from $0 = $ *Not at all true* to $3 = $ *Definitely true*). The items measuring CU traits ($\alpha = .80$; e.g., "I do not show my emotions to others"), narcissism

($\alpha = .70$; e.g., "I act charming or nice to get things I want"), and impulsivity ($\alpha = .73$; e.g., "I do not plan ahead or I leave things until the last moment") formed internally consistent scales. Previous research has provided evidence for the validity of the self-reported versions of the ICU and APSD in community and high risk samples in Cyprus, Germany and the USA (Fanti et al., 2009; Kimonis, Frick, Skeem, Marsee, Cruise, Munoz, Aucoin, & Morris, 2008; Munoz & Frick, 2007).

MVE.   Participants were asked five questions regarding the average time per week (ranging from 0 to more than 20 hours per week) they spent watching violent television programmes, violent scenes on the internet, violent movies (at home or in movie theatres), and playing violent video games ($\alpha = .89$). This questionnaire was based on prior work by Funk, Bechtoldt-Baldacci, Pasold, and Baumgartner (2004).

Supportive social relations.   These were assessed with the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). This instrument was used to measure supportive relationships within three contexts: family ($\alpha = .82$; e.g., "I get the emotional support I need from my family"), friend ($\alpha = .80$; e.g., "I can count on my friend when things go wrong"), and school ($\alpha = .87$; e.g., "The staff at my school provides me the support and encouragement that I need"). The participants respondent on a 4-point scale (from $0 = $ *Not at all true* to $3 = $ *Definitely true*). Prior work has provided evidence that the MSPSS is a valid and reliable measure of perceived social support during adolescence (Canty-Mitchell & Zimet, 2000).

Bullying, victimization, cyberbullying, and cyber-victimization.   The Student Survey of Bullying Behaviour-Revised (SSBB-R; Varjas, Meyers, & Hunt, 2006) was administered at Years 1 and 2 to measure school-bullying, school-victimization, cyberbullying and cyber-victimization. Participants indicated whether they had engaged in different types of bullying or how often they experienced different types of victimization on an ordinal scale of: *never, once or twice a year, monthly, weekly,* or *daily*. The SSBB-R includes 12 items assessing school-bullying ($\alpha = .89$; e.g., "How often do you pick on younger, smaller, less powerful, or less popular kids by hitting or kicking them?"), 12 items assessing school victimization ($\alpha = .90$; e.g., "How often do older, bigger, more popular or more powerful kids pick on you by hitting or kicking you?"), four items assessing cyberbullying ($\alpha = .86$), and four items assessing cyber-victimization ($\alpha = .91$). To asses cyberbullying and cyber-victimization participants were asked how often they *sent* or *received* a threatening or harassing: (1) e-mail; (2) instant message; (3) message in a chat room or social networking sites; and (4) Short Text Message (SMS).

Previous research using the SSBB-R successfully measured school-bullying, school-victimization, cyberbullying, and cyber-victimization in community samples of adolescents in Cyprus and the USA (Fanti et al., 2009; Hunt, Meyers, Jarrett, & Neel, 2005; Varjas et al., 2006).

RESULTS

Descriptive statistics

Table 1 reports the descriptive statistics of the study's variables measured at Times 1 and 2 and the correlations among the variables under investigation. School-bullying and victimization and cyberbullying and victimization were correlated cross-sectionally and longitudinally. Furthermore, cyberbullying and cyber-victimization were positively associated with the three dimensions of psychopathy and MVE, while they were negatively correlated with family and friend social support, providing initial evidence of potential risk and protective variables. According to independent samples t-tests, boys scored higher than girls on school-bullying, $t(1415) = 8.04$, $p < .001$, and victimization, $t(1415) = 4.90$, $p < .001$, CU traits, $t(1415) = 8.06$, $p < .001$, narcissism, $t(1415) = 6.65$, $p < .001$, impulsivity, $t(1415) = 16.03$, $p < .001$, MVE, $t(1415) = 16.70$, $p < .001$, Time 1 cyberbullying, $t(1415) = 7.39$, $p < .001$, and cyber-victimization, $t(1415) = 4.55$, $p < .001$, Time 2 cyberbullying, $t(1415) = 6.28$, $p < .001$, and cyber-victimization, $t(1415) = 3.33$, $p = .001$, and lower on friend social support, $t(1415) = 9.03$, $p < .001$. According to paired-sample t-tests, there was a significant mean-level increase in cyber-victimization from Year 1 to Year 2, $t(1415) = 2.40$, $p < .05$. No change in cyberbullying was identified, $t(1415) = 0.83$, $p = .41$.

Hierarchical linear regressions

Table 2 shows the hierarchical linear regression analyses with cyberbullying and cyber-victimization as the outcomes. In step 1, we controlled for demographics—gender (coded with 0 for boys and 1 for girls), and parental marital status (coded with 0 for one-parent families and 1 for intact families). In step 2 we controlled for Year 1 cyberbullying, cyber-victimization, school-bullying and school victimization. Step 3 included all the risk variables (MVE, CU traits, narcissism, and impulsivity) and step 4 the protective variables (family, friend, and school social support). Subsequent steps included the two-way and three-way interactions between social-support variables. Interactions between the demographic variables (gender and parental marital status) and all the variables under investigation as well as the two- and three-way interactions between social support variables were also examined. To probe the interaction effects we used the

TABLE 1
Descriptive statistics and correlations among the main study variables

	CU	NAR	IMP	SB	SV	FamS	FrS	SchS	MVE	CB	CV	CB	CV
						Time 1						Time 2	
NAR	.30**												
IMP	.33**	.60**											
SB	.36**	.51**	.46**										
SV	.15**	.31**	.33**	.49**									
FamS	−.38**	−.19**	−.25**	−.22**	−.23**								
FrS	−.32**	−.03	−.07**	−.10**	−.22**	.35**							
SchS	−.28**	−.10**	−.24**	−.16**	−.15**	.38**	.38**						
MVE	.21**	.26**	.31**	.28**	.14**	−.11**	−.06**	−.09**					
CB Time 1	.29**	.21**	.16**	.48**	.29**	−.21**	−.11**	−.01	.38**				
CV Time 1	.21**	.17**	.17**	.32**	.39**	−.18**	−.08**	−.01	.30**	.67**			
CB Time 2	.14**	.15**	.12**	.17**	.08**	−.12**	−.06*	−.04	.41**	.40**	.28**		
CV Time 2	.12**	.18**	.15**	.17**	.18**	−.18**	−.07*	−.05	.35**	.24**	.35**	.72**	
Descriptives	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Boys	22.18 (8.81)	6.16 (3.78)	5.65 (3.23)	6.72 (8.16)	10.03 (9.93)	8.93 (2.81)	7.12 (2.82)	5.26 (3.33)	1.72 (1.57)	0.84 (2.51)	0.83 (2.29)	1.01 (2.73)	0.98 (2.41)
Girls	18.53 (8.29)	4.91 (3.33)	4.54 (2.77)	3.75 (5.68)	7.65 (8.31)	9.16 (2.96)	8.46 (2.80)	5.55 (3.40)	0.58 (0.89)	0.21 (1.03)	0.49 (1.46)	0.19 (1.04)	0.48 (1.49)

Notes: $N = 1,416$. **$p < .01$; *$p < .05$. CU = callous-unemotional traits; NAR = narcissism; IMP = impulsivity; SB = school bullying; SV = school victimization; FamS = family social support; FrS = friend social support; SchS = school social support; MVE = media violence exposure; CB = cyberbullying; CV = cyber-victimization.

TABLE 2
Regression analyses with Year 2 cyberbullying and cyber-victimization as the outcomes

	Time 2 cyberbullying				Time 2 cyber-victimization			
	B	SE B	β	ΔR^2	B	SE B	β	ΔR^2
Step 1				.04**				.02**
Gender	−0.83	0.11	−0.20**		−0.51	0.11	−0.13**	
Family structure	−0.05	0.23	−0.01		−0.57	0.22	−0.07*	
Step 2				.12**				.11**
School victimization	−0.01	0.01	−0.04		0.02	0.01	0.10*	
School bullying	0.04	0.01	0.16**		0.02	0.01	0.01	
Cyber-victimization	0.05	0.04	0.06		0.21	0.03	0.24**	
Cyberbullying	0.39	0.04	0.37**		0.01	0.04	0.01	
Step 3				.04**				.02**
Media violence exposure	0.21	0.05	0.16**		0.11	0.04	0.10**	
CU traits	0.02	0.01	0.11**		0.01	0.01	0.04	
Narcissism	−0.01	0.03	−0.01		0.05	0.03	0.06	
Impulsivity	−0.01	0.03	−0.02		−0.02	0.02	−0.03	
Step 4				.01**				.01*
Family social support	−0.05	0.02	−0.10**		−0.04	0.02	−0.10**	
Friend social support	0.01	0.02	0.02		−0.01	0.02	−0.01	
School social support	0.01	0.02	0.01		0.01	0.01	0.02	
Step 5 (two-way interactions)								.01**
Marital status × Family social support					0.16	0.04	0.44**	
Family × Friend social support					0.01	0.01	0.09*	
Step 6 (three-way interactions)								.01**
Marital status × Family × Friend social support					−0.01	0.01	−0.34**	

Notes: N = 1,416. **p < .01; *p < .05. Regression coefficients represent value at initial entry. All the independent variables were measured at Time 1.

procedures described by Aiken and West (1991). All variables were centred to facilitate ease of interpretation of the significant interaction terms. Table 2 only reports the significant interactions.

Cyberbullying.   Table 2 shows the hierarchical linear regression analysis with cyberbullying as the dependent variable. In the first step of independent variables, gender was significantly associated with cyberbullying, suggesting that boys were at higher risk for exhibiting cyberbullying. School-bullying and cyberbullying at Year 1 predicted cyberbullying one year later. MVE and CU traits were each positively related to changes in cyberbullying above

and beyond the variables entered in steps 1 and 2. Furthermore, family social support was related to decreases in cyberbullying a year later after taking into account all the risk factors. No significant interactions were found.

Cyber-victimization.   According to Table 2, boys and adolescents living in single-parent households were more likely to be cyber-victimized. Step 2 suggested that Time 1 cyber-victimization and school victimization were positively related to Year 2 cyber-victimization. MVE was the only risk factor that predicted changes in cyber-victimization, and family social support was the only environmental protective factor negatively related to cyber-victimization.

There were two significant two-way interactions, parental marital status × family social support and family × friend social support, predicting Year 2 cyber-victimization. Furthermore, there was a significant three-way interaction between parental marital status, family, and friend social support. As a result, the two-way interactions were conditional on the significant three-way interaction, and thus only the higher order three-way interaction needs to be interpreted (Aiken & West, 1991). The results of the three-way interaction suggested that the family by friend social support interaction was only significant for single-parent households ($\beta_{family} \times \beta_{friend} = 0.29$, $p < .05$), but not for intact households ($\beta_{family} \times \beta_{friend} = 0.03$, $p = .38$). The significant interaction is depicted in Figure 1. The high and low points in the graphs represent values of one standard deviation above and below the mean. According to the graph, family social support was associated with decreases in cyber-victimization at low levels of friend
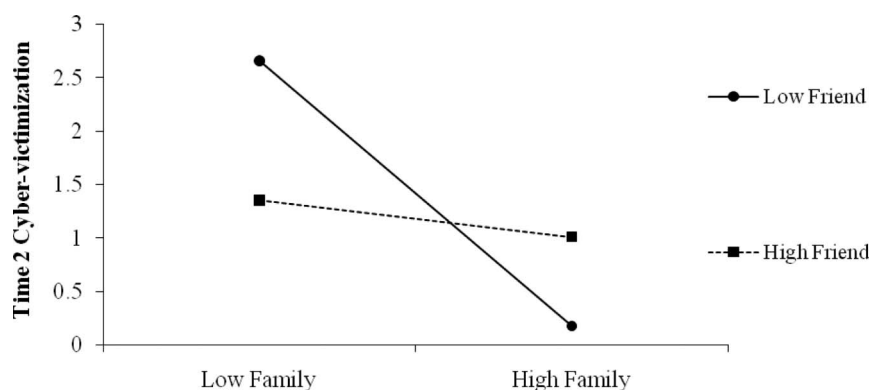

Figure 1. The interaction between Time 1 family and friend social support predicting Time 2 cyber-victimization (single-parent households).

social support ($\beta = -0.40$, $p < .01$), but not for high levels of friend social support ($\beta = -0.17$, $p = .29$). Thus, the stronger relation between family social support and cyber-victimization was obtained for adolescents living in single-parent households who reported the lowest levels of friend social support. This finding further suggests that at higher levels of family support, low friend support was not as detrimental for the development of cyber-victimization. In addition, low family support coupled with low friend support predicted the highest levels of cyber-victimization.

DISCUSSION

The current study contributes several novel findings to the literature investigating the development of cyberbullying and cyber-victimization during adolescence. Building on the ecological model of development the findings suggested that both individual and contextual predictors are important for the development of cyberbullying and cyber-victimization. Furthermore, cross-sectional and longitudinal associations between school-bullying and cyberbullying and between school-victimization and cyber-victimization were identified. Regarding gender differences, the results supported prior research in that boys reported higher incident rates of cyberbullying (e.g., Li, 2007), although is inconsistent with prior studies suggesting that girls are more vulnerable to be cyber-victimized (Calvete et al., 2010). Actually, compared to girls, boys in our sample were at higher risk for all forms of bullying and victimization, to be characterized by psychopathic traits, to be exposed to media violence and to perceive lower friend social support.

On the individual level, the findings provided evidence for the importance of CU traits as a risk factor for the involvement of adolescents in cyberbullying. Prior research has suggested that CU traits constitute an important predictor of school-bullying behaviour and that they characterize bullies but not victims of bullying behaviour (Fanti et al., 2009). The current findings extend this line of work in that CU traits have the power to differentiate bullies from victims within different contexts, school and technology. Compared to youth scoring low on CU traits, youth high on CU traits tend to recognize poorly and pay less attention to others' distress cues, and they lack concern for others' feelings (Kimonis, Frick, Fazekas, & Loney, 2006; Pardini, Lochman, & Frick, 2003). Thus, the fear and distress experienced by victims of cyberbullying may be less inhibitory for adolescents scoring high on CU traits. They are also more likely to expect that aggression will result in positive outcomes (e.g., peer dominance; Pardini et al., 2003), which is possibly one factor leading to the continuation of this type of behaviour.

An additional risk factor leading to the development of both cyberbullying and cyber-victimization was MVE. It is possible that MVE may lead to different interpretations of the witnessed aggressive action (Berkowitz, 1984). Cyberbullies might perceive the aggressive behaviour they view as appropriate, profitable, or even morally justified, which is likely to increase their own aggressive behaviour. Repeated exposure to media violence has also been shown to desensitize viewers to media violence, and as a result viewers may feel less sympathetic toward the victims of violence (Fanti et al., 2009). However, cyber-victims exposed to media violence might perceive the world as mean and scary, which will possibly lead to an increased fear and higher vulnerability of being victimized be peers. Reducing MVE (TV, videotape, and video games) has been shown to result in the reduction of aggressive behaviour and reductions in the perceptions that the world is mean and scary (Robinson, Wilde, Navracruz, Haydel, & Varady, 2001).

Finally, within the framework of the ecological perspective, the findings of this study, consistent with prior research (e.g., Wang et al., 2009), highlight the potential role of parents in protecting youth from engaging in both cyberbullying and cyber-victimization. Adolescents reporting greater family support reported fewer incidents of cyberbullying and cyber-victimization a year later. While examining the interaction between the different sources of social support, it was found that among children living in single-parent households, perceived family social support was associated with decreases in cyber-victimization at low levels of friend social support. Thus, feeling supported by family may protect adolescents from cyber-victimization when their friendships are not supportive. Furthermore, adolescents living in single-parent homes who were exposed to low family and low friend social support were at greater risk for being cyber-victimized in the future. As a result, the interrelated social networks of friends and family members are important for protecting youth from being cyber-victimized, agreeing with prior work suggesting that a child is more likely to be victimized when he or she is interpersonally at risk (Hodges & Perry, 1999). This association is especially important among children from single-parent families who, compared to children from intact families, were more likely to be cyber-victimized by their peers.

Strengths, limitations, and conclusions

The large sample of early adolescents, which allowed for testing and interpreting interactions, and the short-term longitudinal design were strengths of this investigation. However, additional time points of measurement would have allowed for the investigation of trajectories of change over time. Moreover, data were based solely on adolescent self-report for all variables, and the correlations among them could have been

inflated due to shared method variance. Nevertheless, the validity of self-report measures on behavioural problems and personality increases during the adolescence age period and self-report instruments administered to adolescents have the advantage of measuring individual attitudes and emotions that may not be apparent to other people (Essau, Sasagawa, & Frick, 2006; Kamphaus & Frick, 1996).

In conclusion, our findings provide evidence that in order to understand the development of cyberbullying and cyber-victimization it is important to consider both individual traits and contextual variables. The current study replicates prior work showing that MVE, family social support, and school forms of bullying and victimization are associated with cyberbullying and cyber-victimization. The findings further suggest that psychopathic traits, and more specifically CU traits, predict the development of cyberbullying, supporting the need for further research in this area. By controlling for initial levels of cyberbullying and cyber-victimization, we also provide evidence that CU traits, MVE, and family social support influence the development of this new form of bullying and victimization. Identifying risk and protective factors related to both cyberbullying and cyber-victimization is important for the design of new preventive interventions.

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