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Traditional bullying as a potential warning sign of cyberbullying

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Abstract
Although traditional bullying and cyberbullying share features in common, they differ in important ways. For example, cyberbullying is often characterized by perceived anonymity and can occur any time of the day or night. Conversely, perpetrators of traditional bullying are known to the victim, and most traditional bullying occurs at school. Yet, some researchers have suggested that involvement in the two types of bullying may be related. However, little research has modeled the system of relationships among the perpetration and victimization of traditional bullying and cyberbullying. The present study uses path analysis to arrive at a suitable model of these relationships, and describes the gender differences in these relationships. Students ($N = 4{,}531$) in grades 6 through 12 completed a survey examining their involvement in traditional bullying and cyberbullying. Analysis proceeded by making fit comparisons among hypothesized path models. More frequent traditional bullying perpetration and victimization were associated with higher frequency of their electronic counterparts. However, the relationship between traditional perpetration and victimization was stronger for females than males as was the effect of traditional victimization on cyber-victimization. Implications for school practitioners are presented.

Keywords
bullying, cyberbullying, intervention, school, victimization

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Bullying is aggressive behaviour intended to harm another individual. The behaviour is often repeated and involves a power imbalance between the victim and perpetrator (Hampel, Manhal, & Hayer, 2009; Kowalski, Limber,

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& Agatston, 2012; Olweus, 1993; Olweus & Limber, 2010a; Patchin & Hinduja, 2012; Skrzypiec, Slee, Murray-Harvey, & Pereira, 2011). Importantly, the source of the power imbalance could be any number of things including physical strength, status, and knowledge. Although prevalence estimates of traditional bullying vary across studies, in a recent investigation of over 500,000 children in grades 3 through 12 in the United States, 16.8% reported being victims of bullying two to three times a month or more; 9.6% reported having bullied others two to three times a month or more (Olweus & Limber, 2010b). This suggests that a sizable number of children are being bullied with considerable frequency not only in the United States but throughout the world.

Recent years have witnessed a new type of bullying known as cyberbullying. Cyberbullying refers to 'an aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and over time against a victim who cannot easily defend him or herself' (Smith et al., 2008, p. 376). As with traditional bullying, prevalence estimates of cyberbullying vary across studies depending on the age and gender of the participants sampled, the time parameter assessed, and the venue by which the cyberbullying occurs (Monks, Robinson, & Worlidge, 2012; Raskauskas & Stoltz, 2007; Sakellariou, Carroll, & Houghton, 2012; Williams & Guerra, 2007). In a survey with over 3,700 middle school children, Kowalski and Limber (2007) found that 18% reported having been cyberbullied at least once within the previous two months; 11% reported cyberbullying others at least once in the previous two months. In his review of prevalence rates of cyberbullying, Tokunaga (2010) concluded that victimization rates range from 10% to 40% depending on the study parameters. (For a review of cyberbullying, refer to Kowalski et al., 2012; Patchin & Hinduja, 2012; von Marées & Petermann, 2012).

Research has suggested that, although cyberbullying and traditional bullying share certain features in common, they differ in important ways (Katzer, Fetchenhauer, & Belschak, 2009). One clear distinguishing feature is the perceived anonymity that often accompanies cyberbullying (Kowalski & Limber, 2007). This umbrella of anonymity increases the potential pool of individuals who might engage in bullying online (Erdur-Baker, 2010; Ybarra, Diener-West, & Leaf, 2007). Additionally, most traditional bullying occurs at school during the school day (Nansel et al., 2001). Cyberbullying, on the other hand, can occur any time of the day or night.

In spite of their differences, involvement in the two types of bullying appears to be related (Hinduja & Patchin, 2008; Skrzypiec et al., 2011; Ybarra & Mitchell, 2004), with some researchers suggesting that cyberbullying is simply an extension of traditional bullying (Li, 2005, 2006). For example, Hinduja and Patchin (2010) found that 65% of victims of cyberbullying were also victims of traditional bullying; 77% of perpetrators of cyberbullying reported perpetrating traditional bullying. Erdur-Baker (2010), in a study with 276 Turkish participants in grades 9 through 11, found that traditional bullying and cyberbullying were related to one another for males, but not for females. These studies, however, have given little attention to modeling the system of relationships among the perpetration and

victimization of traditional and cyberbullying. The present study uses path analysis to arrive at a suitable model of these relationships, and describes the gender differences in these relationships.

Hypothesized models: Traditional bullying and cyberbullying

Figure 1 is a diagrammatic representation of the five competing models discussed herein. This figure shows all of the relationships hypothesized along with the corresponding models hypothesizing each path.

Theoretical arguments may be made that more frequent involvement in traditional bullying will lead to more frequent involvement in cyberbullying. As stated by Ybarra and Mitchell (2004), 'for some youth who are bullied, the Internet may simply be an extension of the schoolyard, with victimization continuing after the bell and on into the night' (p. 1313). Given that perpetrators and victims of cyberbullying often know each other and likely interact at school, it is plausible that much of the social interaction between these social actors occurs on school grounds, with social interaction through technology serving as a means to continue social interaction with their peers from school. If this is the case, social interactions at school, including bullying, may simply be continued after school hours through the use of technology. Indeed, Cassidy, Jackson, and Brown (2009) found that 64% of respondents from grades 6 through 9 indicated their personal experience with cyberbullying began at school, often offline, then continued online once they got home (see also Brown, Jackson, & Cassidy, 2006). Following this view, traditional victimization is a cause of cyber-victimization and traditional perpetration is a cause of cyber-perpetration in all five of the hypothesized models in this study.

Of course, there are also theoretical arguments for cyberbullying leading to traditional bullying. 'Once individuals have anonymously perpetrated cyberbullying and experienced the feeling of power associated with doing so, as well as the reinforcement from peers, perpetrating traditional bullying at school becomes easier (and vice versa)' (Kowalski et al., 2012). While this certainly may be the

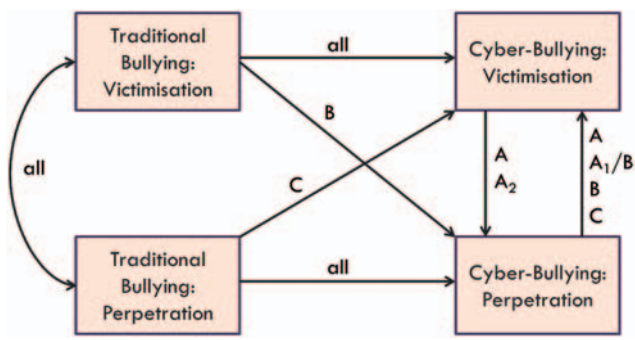

Figure 1. Hypothesized paths and associated models.

case for some perpetrators, the fact that much of cyberbullying is not perpetrated by strangers suggests that in most of the cases in which cyberbullying and traditional bullying overlap, traditional bullying by other known students may lead to cyberbullying by these same peers more often than anonymous cyberbullying leading to bullying in the schoolyard.

Hypothesized models: Cyber-victimization and cyber-perpetration

Models encompassing several possible forms of the relationship between cyber-victimization and cyber-perpetration were also tested. As with the relationship between traditional bullying and cyberbullying, it is conceivable that more frequent cyber-perpetration might contribute to more frequent cyber-victimization, as bullies become targets for cyberbullying themselves. It is also conceivable that some cyber-victims might respond to frequent cyberbullying by cyberbullying their tormentors in return (Yilmaz, 2011). While both of these scenarios are possible, models A, A_1, and A_2 will help assess which form of this relationship is most likely. Model A proposes that cyber-victimization and perpetration have a reciprocal relationship in the form of a feedback loop; both cyber-victimization and perpetration lead to one another. Model A_1 proposes that more frequent perpetration of cyberbullying will lead to more frequent cyber-victimization. Finally, Model A_2 proposes that more frequent cyber-victimization will lead a person to be more likely to perpetrate cyberbullying.

Hypothesized models: Cross-mode/state effects

Just as cyber-victims might turn to cyber-perpetration for retribution and as perpetrators of cyberbullying might expose themselves to becoming victims, it is conceivable that the victims of traditional bullying might turn to cyberbullying. Model B includes a path from traditional victimization to cyber-perpetration to account for this relationship. On the other hand, perpetrators of traditional bullying might find themselves becoming the victims of cyberbullying as their victims and other students turn on them. Model C includes a path from traditional perpetration to cyber-victimization to account for this scenario. Including both of these cross-mode (traditional/cyber) and cross-state (victim/perpetrator) effects would saturate the model, meaning that there would be no remaining degrees of freedom and model fit would be exact. Therefore, a model including both cross-mode/state effects was not considered in the set of hypothesized models.

Method

Participants

Participants were 4,720 youth in grades 6 through 12 from eight schools in different regions of the United States who volunteered to participate. Missing values for

variables under study resulted in dropping 189 cases, leaving a sample of 4,531. The final sample included 2,273 female students and 2,237 male students; 21 individuals did not indicate their sex. Participants' ages ranged from 11 to 19 ($M = 15.2$; $SD = 1.8$). Passive consent was obtained from parents. Parents received notification from the school that their children were being invited to participate in a survey. Parents could contact the school if they had questions or did not want their child to participate in the survey. The study was approved by the University Institutional Review Board. No identifying information was obtained from participants so that confidentiality could be maintained.

Materials

A survey was created to determine the experiences of youth with traditional bullying and cyberbullying. After completing demographic items, participants completed a series of questions about their experiences with bullying. These questions were taken from the Olweus Bullying Questionnaire (Olweus, 1996/2004). Bullying was defined for participants and included verbal, physical, and exclusionary acts of aggression that are intended to hurt another person, that occur repeatedly, and that make it difficult for the person being bullied to defend himself or herself. After reading this definition, participants completed two questions examining their experience with traditional bullying: 'How often have you been bullied at school in the past couple of months?' and 'How often have you taken part in bullying another student(s) at school in the past couple of months?' A five-point response format was used ('I haven't been bullied at school in the past couple of months', 'It has only happened once or twice', 'About once a week', '2 or 3 times a week', and 'Several times a week').

Participants were then provided with a definition of cyberbullying: Bullying through email, instant messaging, in a chat room, on a web page, or through a text message sent to a cell phone. Following this, they completed two questions examining their experiences with cyberbullying: 'How often have you been cyberbullied in the past couple of months', and 'How often have you cyberbullied someone else in the past couple of months?' A five-point response format identical to that used with traditional bullying was used.

Procedure

Students who agreed to participate completed the pencil-and-paper surveys in their classrooms. All students who were asked agreed to participate.

Statistical analysis

Path analysis was used to test and compare the fit of alternative models of traditional bullying and cyberbullying. Path analysis allows for simultaneous estimation of all paths, whereas regression would have involved estimating separate models of

cyber-perpetration and cyber-victimization. In the case of the non-recursive model A, the presence of a feedback loop could have resulted in biased estimates if regression had been employed.

Because the items used to measure these behaviours were potentially ordinal in scale and were non-normal in distribution (skewness > 2, kurtosis > 6), the assumptions of Maximum Likelihood estimation did not appear to hold. Accordingly, the robust asymptotically distribution-free estimation method of Diagonally Weighted Least Squares was used in lieu of Maximum Likelihood. The sample covariance matrix was used for the input and the asymptotic covariance matrix was used for the diagonal weights. LISREL 8.8 was used in the analysis. See Table 1 for the correlation matrix and descriptive statistics of these key variables.

Twenty percent ($N = 910$) of participants were held out from the initial analyses as a validation dataset for the overall path analysis. The same final model is suggested by both datasets, and the estimates were similar between the datasets, RMSE = 0.064. Accordingly, results from the full sample are presented below.

Results

Prevalence of traditional bullying and cyberbullying and descriptive statistics

In this sample, using a criterion of the behaviour having occurred at least once in the previous two months, 37.8% ($N = 1711$) of participants reported being victims of traditional bullying, 31.8% ($N = 1441$) reported having perpetrated traditional bullying, 17.3% ($N = 784$) reported being victims of cyberbullying, and 10.9% ($N = 495$) reported having perpetrated cyberbullying.

Based upon their responses to the questions examining whether they had ever been the victim of or perpetrated traditional bullying or cyberbullying, participants were classified into groups: Victims only, bullies only, bully/victims, and not involved. These categories were created separately for cyberbullying and traditional bullying. Table 2 presents the overlap between involvement in traditional bullying

Table 1. Correlation matrix and descriptive statistics

	Traditional victimization	Traditional perpetration	Cyber victimization	Cyber perpetration
Traditional victimization	1			
Traditional perpetration	0.235	1		
Cyber-victimization	0.301	0.219	1	
Cyber-perpetration	0.137	0.358	0.423	1
Mean	1.63	1.45	1.27	1.15
SD	1.03	0.82	0.71	0.53

and involvement in cyberbullying. Of particular note, individuals who were cyber bully/victims were likely to be involved in traditional bullying as both victims (65.7%) and perpetrators (68.2%). Individuals who perpetrated cyberbullying were also likely to be involved in the perpetration of traditional bullying (60.1%) but less likely to be victims of traditional bullying (38.9%). Interesting, students who were traditional bully/victims were not as likely to be involved in cyberbullying as victims (36.4%) or perpetrators (24.3%).

Gender differences: Frequency of bullying behaviours

Multivariate analysis of variance of the effect of gender on the frequency of traditional victimization, traditional perpetration, cyber-victimization, and cyber-perpetration revealed significant differences between males and females, Wilk's $\Lambda = 0.978$, F (4, 4508) $= 25.44$, $p < 0.001$. Univariate tests indicated that the gender difference was significant for traditional perpetration, F (1, 4508) $= 28.95$, $p < 0.001$, $sr^2 = 0.006$ and for cyber-victimization, F (1, 4508) $= 47.85$, $p < 0.001$, $sr^2 = 0.011$, but not for traditional victimization, $p = 0.520$, or for cyber-perpetration, $p = 0.085$. Males ($M = 1.52$, SE $= 0.017$) perpetrated traditional bullying more frequently than females ($M = 1.39$, SE $= 0.017$), while females ($M = 1.34$, SE $= 0.015$) were victims of cyberbullying more frequently than males ($M = 1.20$, SE $= 0.015$).

Comparison of nested models: Cyber-victimization and perpetration

Chi-square difference testing indicated that the fit of the more parsimonious model A_1 had no significant difference in fit when compared to model A, $\Delta\chi^2$ (1) $= 0.30$, $p = 0.584$, indicating that including the path from cyber-victimization to cyber-perpetration as part of a feedback loop does not improve the fit of the model.

Table 2. Overlap between traditional and cyberbullying

Cyberbullying status	Traditional victims	Traditional bullies	All participants
Victim	305 (62.0%)	202 (41.1%)	492 (10.9%)
Bully	79 (38.9%)	123 (60.6%)	203 (4.5%)
Bully/Victim	192 (65.8%)	199 (68.2%)	292 (6.4%)
Neither	1135 (32.0%)	918 (25.9%)	3544 (78.2%)
Traditional bullying status	**Cyber victims**	**Cyber bullies**	**All participants**
Victim	204 (22.5%)	76 (8.4%)	907 (20.0%)
Bully	108 (17.0%)	126 (19.8%)	637 (14.1%)
Bully/Victim	293 (36.4%)	195 (24.3%)	804 (17.7%)
Neither	179 (8.2%)	98 (4.5%)	2183 (48.2%)

Model A_2 had significantly worse fit than model A, $\Delta\chi^2$ (1) = 107.48, $p < 0.001$, indicating that deleting the path from cyber-perpetration to cyber-victimization from the feedback loop in model A significantly deteriorates the fit of the model. These two comparisons provide evidence that the relationship between cyber-victimization and cyber-perpetration is more likely to flow in one direction, from perpetration to victimization.

Comparison of nested models: Effects across bullying mode and state

Model A_1 had significantly worse fit when compared to model B, $\Delta\chi^2$ (1) = 15.76, $p < 0.001$, indicating that including the diagonal path from traditional victimization to cyber-perpetration did improve the model fit, in conflict with the fact that this individual path is not significant ($t = 0.6$) and that model A_1 has a smaller AIC (Aikake Information Criterion) than model B. A_1 also has significantly worse fit when compared to model C, $\Delta\chi^2$ (1) = 3.87, $p = 0.049$, indicating that removing the path from traditional perpetration to cyber-victimization also significantly deteriorates the fit of the model. These tests indicate that these diagonal paths across bullying modes and states do contribute significantly to the fit of the model, even though these effects are very weak. The fit of model B is closer than that of model C based on comparative fit indices and AIC, and the path from traditional victimization to cyber-perpetration is slightly stronger than that from traditional perpetration to cyber-victimization.

Comparative fit statistics and final model

See Table 3 for comparative fit statistics of each model. Examination of these fit statistics indicates that model B has the closest fit to the data among these models tested. See Figure 2 for a path diagram of model B with standardized estimates. Table 4 provides more information on the estimates in model B. These show that the paths from traditional bullying to cyberbullying within victimization and perpetration are moderate in strength, with the perpetration path considerably

Table 3. Fit statistics of hypothesized models

Model	χ^2	df	*p*	AIC	RMSEA	SRMR	CFI	TLI
A	18.97	1	<.001	26.5	<.001	.015	1	1
A_1	19.27	2	<.001	24.57	<.001	.016	1	1
A_2	126.45	2	<.001	28.21	.016	.05	1	1
B	3.51	1	.061	26.12	<.001	.007	1	1
C	15.4	1	<.001	26.42	<.001	.016	1	1

AIC: Aikake's information criterion; CFI: confirmatory fit index; RMSEA: root mean square error of approximation; SRMR: standardized root mean residual; TLI: Tucker-Lewis index.

stronger than the victimization path. The vertical cross-state path from cyber-perpetration to cyber-victimization is stronger still, but the diagonal cross-state path from traditional victimization to cyber-perpetration is very weak. It may also be noted that the diagonal path from traditional perpetration to cyber-victimization in model C was even weaker ($\beta = 0.01$).

Causal priority of traditional bullying

There is some evidence that traditional bullying being causally prior to cyberbullying is more plausible than the reverse given the data at hand. If all of the paths in model B leading from traditional bullying to cyberbullying are reversed, the model fails the exact fit test, $\chi^2\ (1) = 33.94$, $p < 0.001$, AIC = 26.99. The only model tested with worse fit was model A_2.

Gender differences: Bullying path models

To test if differences in the paths of the final model existed between males and females, multiple group analysis was conducted using model B. The fit between a

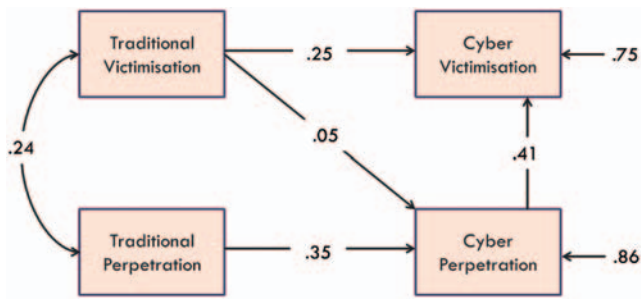

Figure 2. Model B standardized estimates.

Table 4. Parameter estimates from Model B

	Standardized	Unstandardized	SE
Trad. Vict. ↔ Trad. Perp.	0.24	0.20	0.03
Trad. Vict. → Cyber-Vict,	0.25	0.17	0.04
Trad. Perp. → Cyber-Perp.	0.35	0.23	0.05
Trad. Vict. → Cyber-Perp.	0.05	0.03	0.04
Cyber-Perp. → Cyber-Vict.	0.41	0.55	0.18
Cyber-Vict. Disturbance	0.75	0.37	0.09
Cyber-Perp. Disturbance	0.86	0.24	0.05

model in which all paths were constrained to be equal between males and females was compared to that of a model in which all paths were freely estimated separately for both groups. The model with equal estimates between males and females showed significantly worse fit than the model with separate estimates, $\Delta\chi^2$ (6) = 91.56, $p < .001$.

Furthermore, comparison of the five hypothesized models revealed that different models fit males and females best, with model B being the best fitting model for females, χ^2 (1) = 2.53, $p = 0.112$, AIC = 28.53, RMSEA = 0.026, SRMR = 0.0047, CFI = 1, TLI = 1, and model C being the best fitting model for males, χ^2 (1) = 0.02, $p = 0.899$, AIC = 26.02, RMSEA < 0.001, SRMR = 0.001, CFI = 1, TLI = 1. See Table 5 for path estimates by gender, Figure 3 for a diagram of the final model for females with standardized paths, and Figure 4 for a diagram of the final model for males with standardized paths.

Table 5. Estimates for separate gender models

	Females (model B)			Males (model C)		
	Std.	Unstd.	SE	Std.	Unstd.	SE
Trad. Vict. ↔ Trad. Perp.	0.26	0.19	0.03	0.21	0.20	0.04
Trad. Vict. → Cyber-Vict.	0.27	0.20	0.05	0.22	0.13	0.08
Trad. Perp. → Cyber-Perp.	0.35	0.24	0.07	0.35	0.24	0.21
Trad. Vict. → Cyber-Perp.	0.11	0.05	0.05	–	–	–
Trad. Perp. → Cyber-Vict.	–	–	–	0.04	0.03	0.13
Cyber-Perp. → Cyber-Vict.	0.37	0.56	0.20	0.39	0.47	0.51
Cyber-Vict. disturbance	0.75	0.41	0.09	0.77	0.32	0.20
Cyber-Perp. disturbance	0.84	0.21	0.06	0.88	0.26	0.13

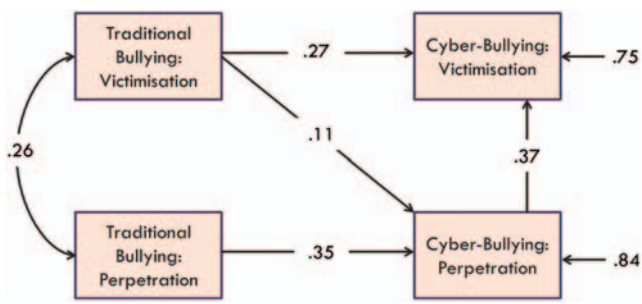

Figure 3. Female final model.

Examination of the model estimates demonstrates the differences between males and females with respect to the relationships between traditional and cyberbullying. The relationship between traditional perpetration and victimization is stronger for females, as is the effect of traditional victimization on cyber-victimization. The effect of cyber-perpetration on cyber-victimization, however, is slightly stronger for males than females. Finally, the cross-mode/state path of traditional victimization to cyber-perpetration in the female model is stronger than the cross-mode/state path of traditional perpetration to cyber-victimization for males.

Discussion

These results have important implications for research on cyberbullying and for practitioners in schools. This study presented further evidence of the relationship between traditional bullying and cyberbullying and made comparisons of several models of victimization and perpetration of both traditional bullying and cyber-bullying. Gender differences in these relationships were found and the best fitting models for males and females were presented.

Refer to Figure 1 for a path diagram representation of the five models tested. The final model (model B) for the overall sample shows a moderate correlation between traditional victimization and traditional perpetration, moderate effects of traditional victimization on cyber-victimization and of traditional perpetration on cyber-perpetration, and a stronger effect of cyber-perpetration on cyber-victimization. The direct cross-mode (traditional/cyber) cross-state (victim/perpetrator) effects were weak. In this model, the total effect of traditional perpetration on cyber-victimization is still substantial, as suggested by examination of the bivariate correlations, but is expressed indirectly through the effect of cyber-perpetration on cyber-victimization.

If this final model corresponds to the true model underlying the relationships between traditional bullying and cyber-victimization and perpetration, we would expect youth who are very frequently bullied through traditional means to also become targets for cyberbullying (see also Monks et al., 2012). We would not

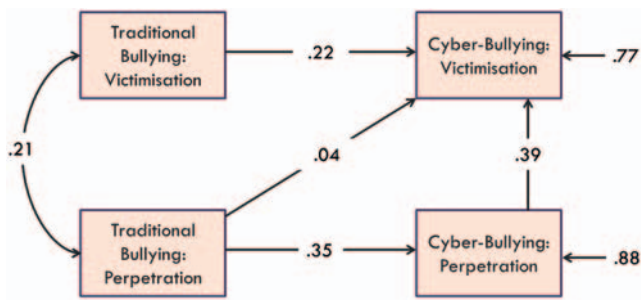

Figure 4. Male final model.

necessarily expect these victims to turn against their attackers as cyber-perpetrators themselves unless they also retaliated through traditional means. We would expect very frequent perpetrators of traditional bullying to also begin bullying electronically and to become victims of cyberbullying themselves as their frequency of electronic perpetration increases. Furthermore, we would expect that females who experience the same frequency of traditional victimization to be targeted by cyberbullying with slightly greater frequency on average than males, while we would expect that males who perpetrate cyberbullying at the same frequency to be targeted by cyberbullying slightly more on average than females. The final models for female and male youth reflect these through a stronger path from traditional victimization to cyber-perpetration for females and a stronger path from cyber-perpetration to cyber-victimization for males. The correlation between traditional victimization and traditional perpetration is also stronger for females. The differential pattern of relationships for males and females reinforces the findings of Erdur-Baker (2010) and suggests that a one-size-fits-all model may not be best for prevention and intervention efforts. Possibly different prevention and intervention strategies need to be developed for males and females.

That said, practitioners and intervention specialists should be aware of the relationship between traditional bullying and cyberbullying (Paul, Smith, & Blumberg, 2012) and that the risk of youth being involved in cyberbullying is greater if they are frequently involved in bullying at school. As always, parents should be informed when their children are involved in bullying, but they should also be alerted to the possibility of their children being involved in cyberbullying. This, of course, requires that educators be fully able to recognize cyberbullying that is occurring (for a more detailed discussion of this issue see Cassidy, Brown, & Jackson, 2012). This should encourage parents to be more aware of their children's affect and behaviour at home and especially while using electronic communication devices. The study results also suggest that bullying intervention should address both traditional and cyberbullying in an integrated way.

Limitations

Though the path analysis results may help rule out some less plausible models of the relationship between traditional and cyberbullying, the cross-sectional data cannot conclusively support the causal directions in the final model as an experimental study could. Ideally, multiple items would have been used to measure the constructs under study so that measurement error could have been included in a structural equation model. The use of multiple items in future research may elucidate gender patterns of behaviour more completely, showing perhaps that males and females use different venues when they cyberbully. The models would have also been improved by the inclusion of other explanatory variables in respect to cyberbullying. The relationships among the variables under investigation may be explained by common causes

that were not included in the model. Future work elaborating on these results should incorporate these potential causes of cyberbullying.

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