J Youth Adolescence (2013) 42:698–710
DOI 10.1007/s10964-013-9920-x

EMPIRICAL RESEARCH

Individual and Contextual Predictors of Cyberbullying: The Influence of Children's Provictim Attitudes and Teachers' Ability to Intervene

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Received: 31 October 2012 / Accepted: 23 January 2013 / Published online: 1 February 2013

Abstract Electronic social communication has provided a new context for children to bully and harass their peers and it is clear that cyberbullying is a growing public health concern in the US and abroad. The present study examined individual and contextual predictors of cyberbullying in a sample of 16,634 students in grades 3–5 and 7–8. Data were obtained from a large cluster-randomized trial of the KiVa antibullying program that occurred in Finland between 2007 and 2009. Students completed measures at pre-intervention assessing provictim attitudes (defined as children's beliefs that bullying is unacceptable, victims are acceptable, and defending victims is valued), perceptions of teachers' ability to intervene in bullying, and cyberbullying behavior. Students with higher scores on provictim attitudes reported lower frequencies of cyberbullying. This relationship was true for individual provictim attitudes as well as the collective attitudes of students within classrooms. Teachers' ability to intervene assessed at the classroom level was a unique, positive predictor of cyberbullying. Classrooms in which students collectively considered their teacher as capable of intervening to stop bullying had higher mean levels of cyberbullying frequency. Our findings suggest that cyberbullying and other indirect or covert forms of bullying may be more prevalent in classrooms where students collectively perceive their teacher's ability to intervene in bullying as high. We found no evidence that individual or contextual effects were conditional on age or gender. Implications for research and practice are discussed.

Keywords Cyberbullying · Provictim attitudes · Teacher intervention · Youth · Adolescence

The Finish Ministry of Education provided funding for the KiVa Antibullying Trial; data from the KiVa trial were used in the present study.

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Introduction

Traditional forms of bullying have received considerable attention from researchers for several decades (Card and Hodges 2008; Hawker and Boulton 2000; Olweus 1993). Evidence consistently demonstrates significant social and individual consequences for victims of bullying (Card and Hodges 2008; Hawker and Boulton 2000), commonly believed to stem in part from the inherent power imbalance between a bully and his/her victim (Olweus 1993). In recent years, however, the rapid development of and increasing access to information and communication

technology (ICT; e.g., text messaging, cell phones, social meeting spaces) has created new contexts for youth to bully and harass their peers (Law et al. 2011). Bullying that occurs through electronic means has become the focus of a growing body of research. The purpose of the present investigation was to examine individual and contextual predictors of cyberbullying in a sample of elementary and middle-school students. We examined, at both the individual and classroom level, whether children's provictim attitudes (defined as children's beliefs that bullying is unacceptable, victims are acceptable, and defending victims is a valued behavior) and perceptions of their teachers' ability to successfully intervene in bullying were associated with concurrent frequencies of cyberbullying.

Cyberbullying

A variety of terms are used to describe bullying that occurs through electronic sources (e.g., social media sites, text messaging, chat rooms), including, but not limited to, cyberbullying, cyberharrassment, online bullying, and cyberaggression. Moreover, there is little agreement among researchers on the definition of this phenomenon. Borrowing from prior research, we define cyberbullying as the repeated harassment of a victim through the use of computers, cell phones, and other electronic devices (Hinduja and Patchin 2009). It is estimated that 20–40 % of youth will be affected by cyberbullying in some way during adolescence (Tokunaga 2010) and in one study 47 percent of youth between 9 and 18 years of age reported witnessing cyberbullying during the previous 30 days (Patchin and Hinduja 2006). It is clear that children are now using electronic forms of social communication as contexts to bully and harass their peers.

Some evidence suggests that the prevalence of cyberbullying may vary by age and gender, but inconsistencies in the literature do exist. Some studies find older children are more likely to engage in cyberbullying than younger children (Smith et al. 2008; Ybarra and Mitchell 2004), others suggest that the prevalence of cyberbullying peaks in middle school (7th and 8th grades) and then declines in high school (Williams and Guerra 2007), and still others report no relationship between age and cybervictimization (Juvonen and Gross 2008; Patchin and Hinduja 2006). Findings from studies examining the relationship between gender and cyberbullying are equally equivocal. A few studies find that girls are more likely to be the victims of cyberbullying than boys (Kowalski and Limber 2007; Ybarra and Mitchell 2007), while boys are more likely to perpetrate cyberbullying than girls (Li 2006; Slonje and Smith 2007; Sourander et al. 2010). However, one recent study of Canadian youth found that although girls were significantly more likely to be victims of cyberbullying, there was no difference between boys and girls in regards to the perpetration of cyberbullying (Wade and Beran 2011). Overall, the majority of studies report no gender differences in either cyberbullying or cybervictimization (Hinduja and Patchin 2008; Li 2006; Patchin and Hinduja 2006; Williams and Guerra 2007).

Similarities between cyberbullying and traditional bullying do exist. In fact, one study of Turkish youth found that 32 % of participants were victims of both traditional and cyber forms of bullying and 26 % reported being both traditional and cyberbullies (Erdur-Baker 2010). Additionally, like traditional bullies, cyberbullies inflict harm on their victims through acts of aggression and could hold more power (Patchin and Hinduja 2006). There are, however, key differences. Unlike traditional bullying, one incident of cyberbullying can be viewed repeatedly by an individual or group of individuals (e.g., social media sites) (Dooley et al. 2009). The perception of anonymity by cyberbullies is also a distinguishing feature, particularly in comparison to children who bully through physical or verbal aggression. Perceived anonymity may allow for bullies to distance themselves physically and psychologically from the aggressive act and its social or psychological consequences (Kiriakidis and Kavoura 2010). Here, youth who are unwilling to engage in traditional bullying for fear of detection and the real or perceived consequences of coming in direct contact with their victim may gravitate toward cyberbullying (Hemphill et al. 2012; Tokunaga 2010). This is supported by findings from a recent qualitative study involving focus groups of 5th through 8th grade students from urban schools in Toronto. The youth participating in this study reported feeling that the anonymous nature of the internet promoted cyberbullying among youth who had never bullied others through traditional bullying methods (Mishna et al. 2009). Moreover, cyberbullying is not bounded by time (e.g., school hours) or location (e.g., school yard) and can quickly reach a large audience, features that make it very difficult for victims to avoid or escape harassment.

Accumulating evidence suggests that victims of cyberbullying experience a number of negative psychosocial outcomes similar to victims of traditional bullying. Cybervictimization is associated with lower self-esteem, higher levels of depression, social anxiety, and academic problems (i.e., poorer academic performance, tardiness and school absenteeism, truancy; Tokunaga 2010). However, the unique characteristics of cyberbullying have led some researchers to speculate that the consequences of cyberbullying could be greater than those of traditional bullying (Kiriakidis and Kavoura 2010; Campbell 2005). Although cyberbullying could occur in the presence of other individuals, cybervictims may be less likely than victims of traditional forms of bullying to know the identity of the perpetrator (Kowalski and Limber 2007). In fact, a recent

study of rural American youth found that half of the participants who reported being cyberbullied did not know the identity of the bully (Bauman 2010). Consequently, the uncertainty of not knowing the origin of bullying could intensify the victims feeling of fear because anyone—including friends—could be the one bullying them (Raskauskas and Stoltz 2007). Accordingly, researchers have found that cyberbullied youth often convey feelings of fear, emotional distress, and anger toward the cyberbully (Patchin and Hinduja 2006; Ybarra et al. 2006) as well as report feeling sad, hopeless, and powerless because they feel as though they cannot stop the harassment (Raskauskas and Stoltz 2007).

Individual and Contextual Predictors of Cyberbullying

Children's beliefs are important in motivating and regulating behavior (Bandura 1986). When children are asked about their attitudes or beliefs about bullying, the vast majority oppose bullying (Boulton et al. 1999; O'Connell et al. 1999; Rigby 2005). Interestingly, despite an implicit norm against bullying, it is rare for students to voice their concerns to peers or intervene in bullying episodes (Ortega and Mora-Merchán 1999). In fact, peers often join in bullying or reinforce the bully through laughter or attention (Salmivalli 2001). For example, one study of 5–12 year old children found that, during bullying incidents, 54 % of the time peers supported bullies by silently watching without intervening or providing help to the victim (O'Connell et al. 1999). Still, past research has shown that children's normative beliefs and attitudes are related to aggressive behavior and traditional forms of bullying (Henry et al. 2000; Rigby 2004; Salmivalli and Voeten 2004; van Goethem et al. 2010). Children who hold unfavorable attitudes toward bullying are less likely to bully than children who hold favorable attitudes. For example, Salmivalli and Voeten (2004) found that holding antibullying attitudes was related negatively to bullying others as well as reinforcing or assisting the bully. Salmivalli and Voeten also suggest that individual antibullying attitudes are likely to decrease as youth age. Furthermore, Rigby (2005) found that, although most students endorsed provictim attitudes, negative attitudes toward victims were associated significantly with higher rates of self-reported bullying behavior. Interestingly, the majority of students viewed their friends as either expecting them to support bullying behavior or to do nothing to support the victim. It appears that negative attitudes toward victims coupled with friends' expectations regarding appropriate behavior in bullying scenarios are important correlates of self-reported bullying behavior, findings that further substantiate the important role of bystanders in mitigating or encouraging bullying among peers. However, to our knowledge, no study has examined the degree to which children's individual provictim attitudes are associated with cyberbullying.

Recent trends in the bullying literature suggest that bullying can be characterized as a group-level phenomenon (Gini 2006; Salmivalli et al. 1996; Salmivalli et al. 1998; Sutton and Smith 1999). Consistent with this research, group-level processes may be important determinants of bullying behavior. Similar to children's individual attitudes, no study has examined the relationship between classroom attitudes toward bullying and children's cyberbullying behavior. There is, however, a growing body of evidence investigating whether classroom-level attitudes are associated with aggression and traditional forms of bullying behavior, but inconsistencies in the literature do exist. Some studies find that negative attitudes toward victims are associated with an increase in aggression and bullying (Henry et al. 2000; Salmivalli and Voeten, 2004) whereas other studies fail to find a significant association (Stevens et al. 2000). For example, Scholte et al. (2010) found that antibullying attitudes at the classroom level were related negatively to bullying behavior even after controlling for individual antibullying attitudes. These findings are consistent with the view that bullying represents a group or social phenomenon and, accordingly, norms present within a classroom may uniquely influence behavior. Thus, classroom-level indicators appear to directly and uniquely influence bullying behavior. Of note, the influence of classroom norms may differ by gender. Salmivalli and Voeten (2004) found that, in general, the classroom context had a greater influence on the behavior of girls as compared to that of boys. It remains unclear whether these findings would extend to cyberbullying. As cyberbullying is likely to occur outside of the classroom or at home, where the influence of group norms may be less salient, the degree to which classroom norms influence cyberbullying behavior becomes a particularly relevant question.

There is increased recognition that teachers play an important role in bullying problems. We argue that a student's perception of his or her teacher's ability to successfully intervene in bullying could be an important determinant of changes in cyberbullying. Teachers are uniquely positioned to affect change in the processes that maintain bullying (Olweus 1993; Rodkin and Hodges 2003), as they are the adults most proximal to and knowledgeable about school bullying problems (Newgent et al. 2009). Evidence suggests that teachers who consistently implement bullying prevention programs experience greater reductions in traditional bullying than teachers who implement programs less consistently (Hirschstein et al. 2007; Salmivalli et al. 2005). Cyberbullying, like traditional bullying, also may be more frequent in classrooms where teachers are less capable of managing bullying

issues. Consistent with social learning theory (Bandura 1986), when children bully and teachers fail to intervene or their intervention efforts are unsuccessful, the frequency with which children bully may increase as a result of peer modeling (e.g., deviancy training; Dishion et al. 1999) and reinforcement. When bullying is not managed well in the classroom, children may come to view bullying as a viable option to reach a personal or social goal. However, another possibility is that students from classrooms with teachers who successfully intervene in incidents of bullying may gravitate toward other, more covert forms of bullying behavior. Indeed, when a bully can no longer harass their victim in traditional forms for fear of consequence, they may adopt a more sophisticated bullying strategy. As such, an alternative hypothesis is that cyberbullying is more common in classrooms where a teacher's ability to intervene is high. In the current study, we examine whether perceptions of teachers' ability to intervene in bullying, at both the individual and classroom level, are associated with cyberbullying behavior. We believe that classroom-level normative beliefs regarding a teacher's ability to intervene successfully in bullying may be an important classroom-level influence on the cyberbullying behavior.

The Current Study

The purpose of the current study was to examine the contributions of provictim attitudes and teachers' ability to intervene in bullying to cyberbullying behavior. To our knowledge, this is the first study to examine whether children's attitudes or students' perceptions of teachers' classroom behavior influences cyberbullying and whether cyberbullying behavior is subject to classroom contextual influences. The investigation had 3 primary aims. First, we examined whether provictim attitudes and teachers' ability to intervene at the individual level were associated with frequency of cyberbullying behavior. Consistent with past research examining the relationship between antibullying attitudes and traditional bullying (Henry et al. 2000; Rigby 2004; Salmivalli and Voeten 2004; van Goethem et al. 2010), we hypothesized that cyberbullying would be less common for children who hold positive provictim attitudes. Regarding teachers' ability to intervene, we explored two competing hypotheses. One possibility is that cyberbullying is less common in classrooms where the teacher is perceived as able to intervene in bullying incidents. Another possibility is that cyberbullying may actually be higher in classrooms where teachers are perceived to be able to intervene. As indicated above, children may resort to more covert means, such as cyberbullying, when they feel that bullying in the classroom or at school is being carefully monitored by teachers. Next, we examined whether classroom-level attitudes and perceptions of teachers' ability to intervene were uniquely associated with cyberbullying behavior. We anticipated that the effects for provictim attitudes would be in the same direction to the effects found at the individual level and examined both possibilities for teachers' ability as described above. Finally, we examined whether the effects of provictim attitudes and a teacher's ability to intervene (at both the individual and classroom level) were conditional on gender and age (separately at the individual and classroom level). Consistent with prior evidence (e.g., Rigby and Slee 1991; Salmivalli and Voeten 2004), we expected that the relative influence of provictim attitudes at the individual level on cyberbullying behavior may decline with age. We also expected that gender may moderate the relationship between attitudes and cyberbullying at the classroom level, given prior evidence (e.g., Salmivalli et al. 1998; Salmivalli and Voeten 2004) that the classroom context, in general, may have more influence on girls' bullying behavior.

Methods

Sample Design and Procedure

Data for the present study were obtained from a large cluster-randomized trial of the KiVa antibullying program (Salmivalli et al. 2010) that occurred in Finland between 2007 and 2009. In the fall of 2006, all 3,418 schools providing basic education in Finland were contacted by a letter that described the KiVa program and goals of the study. Of these, a total of 275 schools initially were recruited into the study. Because the assessment of intervention effects were not of interest in the present study, only baseline data were used (see Kärnä et al. 2011a, b; Williford et al. 2012; for information on program outcomes). The analysis sample consisted of students in grades 3–5 and 7–8 who maintained parental consent throughout the trial. Baseline data were collected in May 2007 for grades 3–5 and in May 2008 for grades 7–8. Program implementation occurred during the following academic year and thus students who were in grade 6 in the spring of 2008 had not yet enrolled in participating schools and were excluded. The final analysis sample consisted of 16,634 students in 1,043 classrooms in 146 schools. The sample was balanced by gender—48.72 % male and 51.28 % female—and the mean age was 12.91 years (SD = 1.58). Additionally, 10.93 % of students attended schools in which Swedish was the language of instruction (approximately 9.4 % of schools in Finland provide basic education in Swedish). More details regarding recruitment and attrition can be found in Kärnä et al. (2011a) and Kärnä et al. (2012).

The data were collected via an online survey administered in school computer laboratories. Students were given

unique user identification names and passwords to access the survey instruments online. Before answering survey questions, the definition of bullying outlined in Olweus (1996) was read aloud to students by teachers ("Bullying is when someone repeatedly and on purpose says or does mean or hurtful things to another person who has a hard.

time defending himself or herself"). A shortened version of the definition remained on a portion of the computer screen throughout the survey's administration. To prevent order effects, the presentation order was randomized.

Measures

Cyberbullying

In the trial, bullying was assessed via a modified version of the Revised Olweus Bully/Victim Questionnaire (OBVQ; Olweus 1996). The 39-item instrument assesses the nature (e.g., physical, verbal, relational, cyber) and frequency of bullying (9 items). Each question on the online survey was presented on a separate page with the following prompt, "Have you bullied [been bullied by] another pupil like this at school during the past few months?". The outcome variable for the present study assessed the frequency of cyberbullying (i.e., "I bullied others by mobile phone or through the computer: I sent mean or hurtful messages, calls, or pictures). This item was rated on a 5-point Likert scale (0 = *Not at all*, 1 = *Once or twice*, 2 = *Two or three times a month*, 3 = *Every week*, 4 = *Several times a week*). In prior studies, the OBVQ has shown desirable psychometric properties including high internal consistency (Olweus 1996) and construct validity (Kyriakides et al. 2006). Also, Hartung et al. (2011) found evidence supporting the discriminant and convergent validity of the OBVQ as compared to Reynolds' (2003) *Bully/Victim Scales for Schools* using multi-trait multi-method matrices. At baseline, internal consistency of the OBVQ was .93 for the bullying items according to the ordinal alpha coefficient (Zumbo et al. 2007).

Provictim Attitudes

Provictim attitudes were measured via a 12-item scale assessing attitudes toward bullying, victimization, and defending. The scale was a subset of Rigby and Slee's (1991) 20-item measure which was shown to have adequate reliability and discriminant validity. Items were rated on a four-point Likert-scale ranging from 0 = *completely disagree* to 4 = *completely agree*. Sample items include "It's okay to call some kids nasty names," "Kids who are weak are just asking for trouble," and "I like it when someone stands up for kids who are being bullied." Six of the items were reverse-coded such that higher scores indicated a greater propensity to support and defend victims while denouncing bullying. Average scores across the 12 items were used in the analyses. At baseline, the scale demonstrated acceptable internally consistent (ordinal alpha = .92).

Teachers' Ability to Intervene

Students' perception of their teachers' ability to intervene and stop bullying was assessed via a 4-item scale created for the trial. The four questions addressed students' perceptions of (1) the frequency at which teachers addressed bullying in the classroom, (2) teachers' attitudes towards bullying, (3) teachers' efforts to decrease bullying, and (4) teachers' efficacy in reducing bullying. Items were not specific to any one type of bullying. For each student a mean scale score across the four variables was calculated. The ordinal alpha coefficient at baseline for the analysis sample was .89.

Classroom-Level Variables

At the level of the classroom, we were interested in the contextual effects of age, gender, provictim attitudes (i.e., attitudinal norms) and students' perception of their teachers' ability to address bullying in the classroom. For each of these variables, students' scores were the classroom average. The mean for the dummy-coded gender variable (female = 0, male = 1) represented the proportion of males within a given classroom. Additionally, a dummy-coded variable indicated whether instruction was provided in Finnish or Swedish. This variable was included to control for the slight oversampling of Swedish schools in the trial (Kärnä et al. 2011a, b).

Analytic Method

We used multilevel ordinal regression to analyze the data (Snijders and Bosker 2012). This approach is appropriate when data are organized hierarchically and the outcome variable is ordinal. Both conditions were met because students were sampled from classrooms and the response scale of the outcome variable consisted of ordered frequency categories. Ignoring multilevel structures can result in biased test statistics (Snijders and Bosker 2012) and using a normal-theory model for ordinal variables can negatively bias parameter estimates (Bauer and Sterba 2011). In multilevel ordinal regression models, it is assumed that an unobserved continuous variable gives rise to the observed categorical responses. This unobserved variable is realized in the model by estimating additional parameters called *thresholds*—points on the scale of the underlying continuous variable at which respondents begin to report the next highest observed category. We used the

cumulative logistic link function which expresses the log odds of endorsing an observed response category or any higher category versus all lower categories as a function of the predictors. We also assumed that effects were equivalent at all points along the response scale (i.e., proportional odds assumption). To facilitate interpretation of the model estimates, we exponentiated each regression coefficient to obtain odds ratios (OR). Following Osborne (2006), we transformed all OR below 1 to be greater than 1 and adjusted interpretations accordingly.

To evaluate our hypotheses, we estimated a *random-intercept* model (Snijders and Bosker 2012). At the individual level, cyberbullying was predicted by students' age, gender, provictim attitudes, and perceptions of their teachers' ability to intervene. All of these effects were fixed (i.e., the effects were not allowed to vary across classrooms). At the classroom level, cyberbullying was predicted by the proportion of males within classrooms and mean levels of provictim attitudes, students' age, and perceptions of teachers' ability to intervene. The model was used to test for *contextual effects*—the extent to which group level variables account for variation in an outcome after controlling for individual-level effects (Snijders and Bosker 2012). Put another way, we tested whether the regression coefficients at the classroom level were significantly different from the regression coefficients at the individual level. Because the individual-level predictors were not group-mean centered, the classroom-level effects represented the unique prediction of the contextual variables on the classroom mean of cyberbullying (Enders and Tofighi 2007).

Data were analyzed in Mplus version 7.0 (Muthén and Muthén 1998–2012) using full-information maximum likelihood or FIML estimation. Regression coefficients were tested for significance according to Wald tests—a z-test of the estimate divided by its standard error. Interaction terms were tested for significance by comparing the fit of a model that included the interaction effect to a model in which the effect was omitted (i.e., deviance test; Snijders and Bosker 2012). We use the symbol "ΔD" to denote the difference in model deviances—negative two times the log of the likelihood value—when reporting the results of these tests. All deviance tests were based on a difference of one degree of freedom. The Type I error rate was set at $\alpha = .05$ for all tests.

Missing Data

The percent missing for the dependent variable at baseline was 8.33 %. The percent missing for predictor variables was 0.00 % for gender, 0.51 % for age, 9.76 % for provictim attitudes and 9.80 % for teacher stance on bullying. Two "state-of-the-art" methods for dealing with missing data (Enders 2010) were considered: full-information maximum likelihood (FIML) estimation and multiple imputation (MI). We chose to use FIML which in the multivariate case uses all available information in the dataset to estimate model parameters. With a single-dependent variable, however, Mplus will remove cases that have missing data on any variable, similar to the listwise deletion method, unless distributional assumptions are made for the predictors. We attempted this strategy but the program was not able to correctly estimate the model standard errors. As such, we used listwise deletion. Although this is not optimal, MI has certain limitations that were too restricting for the present study. Unfortunately, the deviance test is not yet available with MI and there is not yet consensus on how best to handle the imputation of multilevel categorical data (Gebregziabher and DeSantis 2010). Ultimately, we decided that the potential loss of power and precision associated with FIML would not be significant given the large sample size in the current study and that this approach was a better fit for our analyses.

Results

Descriptive Statistics

Descriptive statistics are provided in Table 1. The distribution of the outcome variable was highly asymmetric which necessitates the ordinal regression techniques that were used. Less than 5 % of the sample engaged in any cyberbullying. The intraclass correlation coefficient (ICC)—the amount of variance due to group-level differences—was .05 and significantly different from zero according to a deviance test ($\Delta D = 12.73$, $p < .01$). Correlations between the predictor variables were generally low. The largest correlation was observed between age and teachers' ability to intervene (−.37) as well as between gender and provictim attitudes (−.33).

Individual and Contextual Effects

Parameter estimates for individual-level effects are reported in Table 2. Individual-level effects imply that scores on the dependent variable are partially explained by individuals' standing relative to their classroom means on a predictor variable. At the individual level, significant effects were found for gender and provictim attitudes while holding other variables in the model constant. With regard to gender, females reported significantly greater cyberbullying compared to males within the same classroom. The odds of female students reporting higher versus lower frequencies of cyberbullying were 46 % greater compared to male students (OR = 1.46; 95 % C.I. = 1.23–1.74). Higher levels of provictim attitudes were associated with less frequent cyberbullying. For each unit decrease in

Table 1 Descriptive statistics

Outcome variable	ICC	Never	Only once or twice	2–3 times per month	Once per week	Several times per week
Cyber-bullying (CYB)	.05	15987 (.961)	491 (.030)	54 (.003)	30 (.002)	72 (.004)

Predictor variables	M	SD	N	*p*
Age (AGE)	12.91	1.58	–	–
Pro-victim attitudes (PRV)	3.05	.68	–	–
Teachers' ability to intervene (TAI)	2.24	.80	–	–
Gender (BOY)	–	–	8,101	.49
Swedish (SWE)	–	–	1,813	.11

Variables	CYB	AGE	PRV	TAI	BOY	SWE
CYB	1.00					
AGE	.03	1.00				
PRV	−.27	−.25	1.00			
TAI	−.10	−.37	.30	1.00		
BOY	.03	<−.01	−.33	−.01	1.00	
SWE	<.01	.04	.03	−.11	<−.01	1.00

ICC Intraclass correlation coefficient, *M* Mean, *SD* Standard deviation, *N* Number of respondents endorsing variable, *p* Proportion of respondents endorsing variable

provictim attitudes, the odds of reporting higher versus lower frequency categories of cyberbullying compared to students within the same classroom increased by a factor of 2.61 (OR = 2.61, 95 % C.I. = 2.30–2.97). Students' age (OR = 1.01, 95 % C.I. = .87–1.16) and perceptions of teachers' ability to intervene (OR = 1.11, 95 % CI = .99–1.25) did not significantly predict cyberbullying frequency.

Classroom-level effects are also reported in Table 2. A contextual effect is present when the unique classroom-level effect is significantly different from zero. The classroom means of provictim attitudes significantly predicted cyberbullying (OR = 1.75, 95 % CI = 1.13–2.70) such that classrooms with collectively lower levels of provictim attitudes contained students that cyberbullied more. For each unit decrease in the mean of provictim attitudes, the odds of a given classroom having a larger mean frequency of cyberbullying increased by 75 % after controlling for the effect of individual attitudes. Put another way, the collective attitudes of the peer group affected students' engagement in cyberbullying above and beyond the effect of students' individual attitudes toward victims.

A significant contextual effect of teachers' ability to intervene was also found (OR = 1.49, 95 % CI = 1.10–2.01). Controlling for individuals' perceptions of their teachers, the odds of higher versus lower cyberbullying frequency in a given classroom increased by 49 % for each unit increase in the mean level of teachers' ability to intervene. In other words, although students' perceptions of their teachers did not affect their propensity to cyberbully others, classrooms in which students collectively considered their teacher as capable of intervening to stop bullying had higher mean levels of cyberbullying frequency.[1] All other classroom-level predictors were not significant, namely, the mean age of students (OR = 1.12, 95 % CI = .95–1.32), the proportion of males (OR = 1.55, 95 % CI = .69–3.48), and the language of instruction (OR = 1.17, 95 % CI = .89–1.55).

Moderating Effects

The important and yet inconsistent findings of gender and age differences on cyberbullying behavior led us to consider the moderating influence of gender and age on other

[1] Supplemental analyses were conducted to explore whether this finding was specific to indirect or covert forms of bullying (e.g., social exclusion, gossiping, cyber) or was a general finding for all forms of bullying. The same ordinal regression model was estimated separately for the remaining 8 bullying frequency items from the OBVQ. These items measure traditional forms of bullying in both direct (physical, verbal, threat/force, theft, racist, sexist) and indirect (gossip, social exclusion) forms. The effect of teachers' ability to intervene at the classroom level was non-significant for all but one of these items. Specifically, higher mean levels of students' perception of their teacher's ability to intervene were associated with higher classroom levels of exclusionary behavior ("I left someone without any notification or outside activities or excluded from my friends"). The odds ratio for the effect was 1.22, which was smaller than the observed effect for cyberbullying of 1.44. Although not significant, the other indirect bullying item also had a positive effect size (OR = 1.11). Together, these findings may suggest that covert or indirect forms of bullying may be positively associated with higher levels of teachers' ability to deter bullying, although in this sample the largest effect was for cyberbullying.

Table 2 Multilevel ordinal logistic regression results

Effects	Parameter	Est	SE	OR
Individual-level fixed effects	Age	.01	.07	1.01
	Male	−.38**	.09	1.46
	Provictim attitudes	−.96**	.07	2.61
	Teachers' ability to intervene	−.11	.06	1.11
Classroom-level fixed effects	Mean age	−.11	.08	1.12
	Proportion of males	−.44	.41	1.55
	Mean provictim attitudes	−.56*	.22	1.75
	Mean teachers' ability to intervene	.40**	.15	1.49
	Swedish	.16	.14	1.17
Random effects	Student-level[a]	3.29	–	–
	Residual-variance			
	Classroom-level	.22*	.09	–
	Residual variance			
Thresholds	Threshold #1	−2.20*	1.10	–
	Threshold #2	−.72	1.10	–
	Threshold #3	−.28	1.10	–
	Threshold #4	.07	1.10	–
Parameters				14
$-2LL$				6,193.14

Est = Parameter estimate, *SE* Standard error, *OR* Odds Ratio, $-2LL$ = Negative twice the model loglikelihood value

* $p < .05$. ** $p < .01$

[a] The individual-level residual variance was fixed to $\pi^2/3$ which is the variance of the logistic distribution

effects in the model. To address this question, we created interaction terms between age and provictim attitudes, age and teachers' ability to intervene, gender and provictim attitudes, and gender and teachers' ability to intervene. At the individual-level, the terms were created by group-mean centering all of the predictors and then creating the interaction terms. At the classroom level, the same number of interaction terms was created between the mean levels of the individual-level predictors which were previously included as main effects. Results of the deviance tests suggested none of the effects were significant at the individual level: age × provictim attitudes ($\Delta D = .65$, $p = .42$), age × teachers' ability to intervene ($\Delta D = < .01$, $p = .96$), gender × provictim attitudes ($\Delta D = .62$, $p = .43$), and gender × teachers' ability to intervene ($\Delta D = .14$, $p = .71$). Likewise, all classroom-level interaction terms were non-significant: mean age × mean provictim attitudes ($\Delta D = 1.37$, $p = .24$), mean age × teachers' ability to intervene ($\Delta D = 1.18$, $p = .28$), proportion of boys × mean provictim attitudes ($\Delta D = .14$, $p = .71$) and teachers' ability to intervene ($\Delta D = .87$, $p = .35$).

Discussion

It is clear that a portion of children and adolescents are now using electronic social communication technology to bully and harass their peers (Tokunaga 2010). There is also a growing body of empirical evidence documenting the emotional and psychological consequences for youth who are victims of cyberbullying (Patchin and Hinduja 2006; Raskauskas and Stoltz 2007; Ybarra et al. 2006). Thus, understanding characteristics that are associated with cyberbullying is important as the field aims to refine its understanding and prevention of such behaviors among children and adolescents. In this study, we examined whether individual- and classroom-level provictim attitudes and perceptions of teachers' ability to intervene in bullying were associated with the perpetration of cyberbullying. Our study is the first to examine whether children's attitudes and perceptions of their teachers' classroom behavior influences cyberbullying. This study is also the first to examine whether cyberbullying behavior, a form of bullying that is more likely to occur off school grounds or outside of the classroom context, is subject to classroom contextual influences. Changing students' attitudes about bullying and teachers' ability to manage incidents of bullying in the classroom are often targets of school-wide antibullying programs (Hirschstein et al. 2007; Salmivalli et al. 2010; Salmivalli et al. 2005). However, we know very little about whether these factors are associated with frequency of cyberbullying behavior, and an examination of these relationships may shed light on important targets for prevention and intervention.

We found that the rates of cyberbullying and cybervictimization were low in the current sample. Across frequency categories, approximately 4 % of students perpetrated cyberbullying. When identifying chronic cyberbullies using the cut-off criteria recommended by Solberg and Olweus (2003) for estimating prevalence rates of traditional bullying, we found that approximately 1 % of our sample met this threshold for cyberbullying, whereas around 4 % met this definition for traditional bullying in the Solberg and Olweus study. Although Solberg and Olweus (2003) suggest categorizing bullying as repeated and chronic requires meeting a minimum threshold of two to 3 times a month, this threshold may not be appropriate for cyberbullying. Previous research has found that a single incident of cyberbullying could be viewed repeatedly (Patchin and Hinduja 2006). Therefore, the frequency of cyberbullying incidents may be less important than the frequency with which individual incidents are viewed. This would be an important consideration as the field refines the measurement of cyberbullying.

We found that both individual- and classroom-level factors influenced the frequency with which students

reported cyberbullying. As hypothesized, students' individual provictim attitudes were associated negatively with cyberbullying frequency. The odds of endorsing higher frequencies of cyberbullying were 2.61 times higher for those individuals scoring lower on provictim attitudes. Using a simple transformation as described in Chinn (2000), an OR of 2.61 is equivalent to a Cohen's *d* value of .53, which is interpreted as a moderate effect (Cohen 1988). Furthermore, and consistent with our hypothesis, classroom-level attitudes associated uniquely with cyberbullying behavior. Significantly less cyberbullying occurred in classrooms with higher collective levels of provictim attitudes. Although the effect was more modest ($d = .31$), this finding suggests that classroom-level attitudes do have an influence on cyberbullying behavior over and above the effect of students' individual attitudes. These findings are in line with previous literature linking individual- and classroom-level attitudes to traditional bully behavior (Salmivalli and Voeten 2004; Scholte et al. 2010). We did not find evidence to support the notion that the relationship between provictim attitudes and cyberbullying was conditional on age or gender. Neither classroom nor individual age or gender moderated the effect of provictim attitudes on cyberbullying behavior.

Although teachers' ability to intervene did not emerge as a significant individual-level predictor of cyberbullying frequency, the contextual effect was significant ($d = .22$). Classroom-level perceptions of teachers' ability to intervene was associated positively with classroom-level variability in cyberbullying behavior. When students perceived their teachers as intervening effectively in bullying, classrooms reported higher mean frequencies of cyberbullying. Although teachers in the current study were not specifically instructed on the implementation of effective antibullying practices (i.e., data were collected prior to the implementation of the KiVa intervention), there is evidence to suggest that consistently implementing such practices leads to greater reductions in bullying (Hirschstein et al. 2007; Salmivalli et al. 2005). One possible explanation for this finding is that, when students collectively view overt or direct bullying as a non-workable option to achieve personal or social goals in the classroom, they may adopt more sophisticated, covert forms of bullying behavior. When teachers crack down on bullying in the classroom, bullying may change form or shift to new contexts that are harder to monitor or are less often monitored by teachers. To provide further support for this assertion, we conducted supplemental analyses examining the association between teachers' ability to intervene and each of the remaining 8 bullying items (6 direct bullying and 2 indirect bullying) of the OBVQ (see footnote link). We were interested in determining whether the association between students' perceptions of teachers' ability to intervene and classroom-level variation in bullying was similar regardless of the form of bullying or whether the finding was specific to indirect or covert forms of bullying behavior (e.g., social exclusion, gossiping). This set of analyses revealed that students' perceptions of teachers' ability to intervene was associated significantly and positively with one of the two forms of indirect bullying. Classroom means on social exclusion were higher when students' collectively perceived their teachers' ability to intervene as high. The finding for gossiping was not significant but in the same direction as both cyberbullying and social exclusion. In other words, the effects of a teacher's ability to intervene on several indirect forms of bullying, including exclusionary behaviors, gossiping, and cyberbullying, were in same direction. Alternatively, students' perceptions of a teacher's ability to intervene were not associated significantly with any of the items measuring direct bullying. Collectively, our analyses provide some support for the notion that indirect or covert forms of bullying may be more common in classrooms where students collectively perceive their teacher's ability to intervene in bullying as high.

Previous evidence regarding gender and age effects on cyberbullying is mixed. Some studies have reported that boys are more likely to perpetrate cyberbullying than girls (Li 2006; Slonje and Smith 2007; Sourander et al. 2010), but the majority of studies report no gender differences in either cyberbullying or cybervictimization (Hinduja and Patchin 2008; Li 2006; Patchin and Hinduja 2006; Williams and Guerra 2007). In our study, girls were more likely to endorse higher frequencies of cyberbullying than boys, but the effect was modest in size. Conceptually, cyberbullying is related more closely to relational or indirect forms of aggression in that it does not occur face-to-face (Smith et al. 2008), and there is at least some research that suggests relational aggression is more common in girls (Crick and Grotpeter 1995). Interestingly, when provictim attitudes was removed from the model, the effect for gender was non-significant and the estimate was close to zero. This held regardless of what other predictors were in the model. In other words, the gender effect was primarily influenced by the presence of provictim attitudes in the model. It appears that boys have lower provictim attitudes than girls ($r = -.27$), and when provictim attitudes are controlled for in the model, girls tend to report higher frequencies of cyberbullying than boys. Still, this finding needs replication and we recommend interpreting it with caution. Regarding age effects, there is a small literature suggesting a trend for cyberbullying to increase until middle school and then decline as children move through high school (Smith et al. 2008; Tokunaga 2010; Williams and Guerra 2007; Ybarra and Mitchell 2004). We found no evidence for an effect of age on cyberbullying at the individual or classroom level.

Study Limitations

This study has several limitations that are worth noting. First, cyberbullying was measured using a single item, and although the OBVQ has acceptable psychometric properties, it is unclear whether a single item can accurately index cyberbullying. Unfortunately, the definition of cyberbullying is still a topic of some debate among researchers and studies examining the psychometric properties of existing self-report measures are scarce (Menesini et al. 2011). The likely consequence of using a single item is the underestimation of observed relationships as a result of measurement error. Thus, stronger effects would be expected in future studies that employ a multi-item measure of cyberbullying and methods that correct for measurement error (e.g., structural equation modeling). It should be noted that single indicators have often been used to examine the prevalence (Li 2006; Patchin and Hinduja 2006) and correlates (Arıcak et al. 2008) of cyberbullying. Still, future research establishing the reliable and valid measurement of cyberbullying remains a top priority for researchers. Second, it is unclear whether students' perceptions of their teachers' ability to intervene actually captures teachers' ability to manage bullying in the classroom. The measure was created specifically for this study and has not been tested extensively in other samples. Still, students' beliefs in their teachers' ability to intervene could be an important determinant of children's classroom behavior particularly in light of evidence that children are more likely to report instances of victimization to school personnel they feel are caring, fair, and capable of intervening (Eliot et al. 2010). Third, relationships among study variables were examined cross-sectionally, limiting our ability to make statements regarding the direction of effects. It is possible that individual or classroom cyberbullying behavior influences students' provictim attitudes and perceptions of their teachers' ability to intervene or that the effects are bidirectional. Prospective designs would shed light on models of influence. Finally, sample participants were fairly homogenous in terms of ethnicity, race, and nation of origin—it is unclear whether our results would generalize to more ethnically or racially diverse geographic regions.

Conclusions and Implications for Bullying Prevention

The current study contributes to the literature on cyberbullying in several important ways. Our results suggest that, much like for traditional bullying and general peer aggression, students' individual attitudes are important determinants of cyberbullying behavior (Henry et al. 2000; Rigby 2004; Salmivalli and Voeten 2004; van Goethem et al. 2010). Students who hold positive attitudes about victims of bullying are less likely to cyberbully. More interesting was the fact that the collective attitudes of students appear to uniquely influence cyberbullying. When students in a classroom collectively held positive attitudes about victims, the classroom-level frequency of cyberbullying was lower. Although the majority of cyberbullying may occur outside of the classroom or away from school grounds (Patchin and Hinduja 2006; Shariff and Hoff 2007; Ybarra and Mitchell 2007), classroom norms appear to have a meaningful, albeit modest, influence. Our finding suggests that the influence of classroom norms on students' behavior may transcend the classroom or school context. These findings have implications for bully prevention and intervention research. They suggest that, in order to reduce cyberbullying, it is not sufficient to only target children's individual attitudes about bullying and victimization; instead, and consistent with research on traditional forms of bullying (Salmivalli and Voeten 2004; Scholte et al. 2010), classroom normative beliefs should be targeted because they appear to influence children's decisions to cyberbully. We also found that students' perceptions of their teachers' ability to intervene at the classroom level was associated positively with classroom-level variability in cyberbullying. A similar pattern of findings emerged for other items of the OBVQ measuring indirect or covert bullying, but not for those measuring direct bullying. It appears that indirect or covert forms of bullying behavior may be more common in classrooms where students collectively perceive their teachers' ability to intervene as high. It is possible that students may employ covert or indirect forms of bullying when they perceive direct forms of bullying as a non-workable option in the classroom. Our finding provides further support for the recommendation that cyberbullying interventions may need to incorporate specific bullying prevention strategies, both inside and outside the classroom, aimed at reducing cyberbullying behavior (Couvillon and Ilieva 2011; Kiriakidis and Kavoura 2010; Williams and Guerra 2007). For example, several authors have suggested that specific strategies are needed to address the far-reaching impact of cyberbullying; thus, parents and community leaders, in addition to teachers and students, must be involved in cyberbullying prevention (Beale and Hall 2007; Couvillon and Ilieva 2011). The results of the current study suggest that strategies may be particularly successful if provictim attitudes are reinforced at school as well as at home. Moreover, although teachers are key to preventing bullying behaviors within the classroom (Olweus 1993; Rodkin and Hodges 2003), parents may be an important target for cyberbullying prevention efforts. Previous research has found that parents often have little awareness of their children's online activities (David-Feron and Feldman 2007). As such, strategies targeting parents may be especially effective if they encourage the direct monitoring of children's online activities to decrease

the probability that they will make harmful choices while online (Hinduja and Patchin 2008).

Cyberbullying remains a pervasive and troubling problem among children and youth. Accordingly, further research is needed to explicate the unique mechanisms at both the individual and contextual levels that lead to reductions in cyberbullying behaviors. The present study offers some evidence of the importance of individual and collective attitudes and perceptions as they contribute to cyberbullying behavior.

Author Contributions LCE conceived of the study and helped to draft the introduction, methods, results, and discussion as well as contributed to the revision of the introduction, methods, and discussion; AW conceived of the study and drafted the introduction and discussion as well as contributed to the revision of the introduction, methods and discussion; AB performed the statistical analysis, lead the interpretation of the results and drafted the methods and results sections as well as to the revision of the introduction, methods, and discussion; KD helped to draft the introduction and the discussion section and assisted with final editing as well as with the revision of the introduction and the discussion; TL participated in the study's design, consulted on the analysis, reviewed the results for accuracy, and assisted with final editing of both the original submission and the revision; CS conceived intervention trial from which data for the present study were drawn, participated in the present study's design, reviewed the manuscript for accuracy, and assisted with final editing of both the original submission and the revision. All authors read and approved the final manuscript.

References

Arıcak, T., Siyahhan, S., Uzunhasanoğlu, A., Sarıbeyoğlu, S., Çıplak, S., Yılmaz, N., et al. (2008). Cyberbullying among Turkish Adolescents. *Cyber Psychology & Behavior*, doi:10.1089/cpb.2007.0016.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bauer, D. J., & Sterba, S. K. (2011). Fitting multilevel models with ordinal outcomes: Performance of alternative specifications and methods of estimation. *Psychological Methods*, doi:10.1037/a0025813.

Bauman, S. (2010). Cyberbullying in a rural intermediate school: An exploratory study. *Journal of Early Adolescence*, doi:10.1177/0272431609350927.

Beale, A. V., & Hall, K. R. (2007). Cyberbullying: What school administrators (and parents) can do. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 81*(1), 8–12.

Boulton, M. J., Bucci, E., & Hawker, D. D. S. (1999). Swedish and English secondary school pupils' attitudes towards, and conceptions of, bullying: Concurrent links with bully/victim involvement. *Scandinavian Journal of Psychology*, doi:10.1111/1467-9450.404127.

Campbell, M. A. (2005). Cyber bullying: An old problem in a new guise? *Australian Journal of Guidance and Counselling*, doi:10.1375/ajgc.15.1.68.

Card, N. A., & Hodges, E. V. E. (2008). Peer victimization among schoolchildren: Correlations, causes, consequences, and considerations in assessment and intervention. *School Psychology Quarterly*, doi:10.1037/a0012769.

Chinn, S. (2000). A simple method for converting an odds ratio to effect size for use in meta-analysis. *Statistics in Medicine*, doi:10.1002/1097-0258(20001130)19:22<3127::AID-SIM784>3.0.CO;2-M.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Couvillon, M. A., & Ilieva, V. (2011). Recommended best practices: A review of school-wide preventative programs and strategies on cyberbullying. *Preventing School Failure*, doi:10.1080/1045988X.2011.539461.

Crick, N. R. & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development*, doi:10.1111/1467-8624.ep9506152720.

David-Feron, C. & Feldman, M. H. (2007). Electronic media, violence, and adolescents: An emerging public health problem. *Journal of Adolescent Health*, doi:10.1016/j.jadohealth.2007.08.020.

Dishion, T. J., McCord, J., & Poulin, F. (1999). When interventions harm: Peer groups and problem behavior. *American Psychologist*, doi:10.1037/0003-066X.54.9.755.

Dooley, J. J., Pyżalski, P., & Cross, D. (2009). Cyberbullying versus face-to-face bullying: A theoretical and conceptual review. *Journal of Psychology*, doi:10.1027/0044-3409.217.4.182.

Eliot, M., Cornell, D., Gregory, A., & Fan, X. (2010). Supportive school climate and student willingness to seek help for bullying and threats of violence. *Journal of School Psychology*, doi:10.1016/j.jsp.2010.07.001.

Enders, C. K. (2010). *Applied missing data analysis (Methodology in the Social Sciences)*. New York, NY: The Guilford Press.

Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, doi:10.1037/1082-989X.12.2.121.

Erdur-Baker, O. (2010). Cyberbullying and its correlation to traditional bullying, gender and frequent and risky usage of internet-mediated communication tools. *New Media & Society*, doi:10.1177/1461444809341260.

Gebregziabher, M., & DeSantis, S. M. (2010). Latent class based multiple imputation approach for missing categorical data. *Journal of Statistical Planning and Inference*, doi:10.1016/j.jspi.2010.04.020.

Gini, G. (2006). Bullying as a social process: The role of group membership in students' perception of inter-group aggression at school. *Journal of School Psychology*, doi:10.1016/j.jsp.2005.12.002.

Hartung, C. M., Little, C. S., Allen, E. K., & Page, M. C. (2011). A psychometric comparison of two self-report measures of bullying and victimization: Differences by gender and grade. *School Mental Health*, doi:10.1007/s12310-010-9046-1.

Hawker, D., & Boulton, M. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry*, doi:10.1111/1469-7610.00629.

Hemphill, S. A., Kotevski, A., Tollit, M., Smith, R., Herrenkohl, T. I., Toumbourou, J.W., et al. (2012). Longitudinal predictors of cyber and traditional bullying perpetration in Australian secondary school students. *Journal of Adolescent Health*, doi:10.1016/j.jadohealth.2011.11.019.

Henry, D. B., Guerra, N., Huesmann, R., Tolan, P., VanAcker, R., & Eron, L. (2000). Normative influences on aggression in urban elementary school classrooms. *American Journal of Community Psychology*, doi:10.1023/A:1005142429725.

Hinduja, S., & Patchin, J. W. (2008). Cyberbullying: An exploratory analysis of factors related to offending and victimization. *Deviant Behavior*, doi:10.1080/01639620701457816.

Hinduja, S., & Patchin, J. W. (2009). *Bullying beyond the schoolyard: Preventing and responding to cyberbullying*. Thousand Oaks, CA: Sage Publications.

Hirschstein, M. K., Van Schoiack Edstrom, L., Frey, K. S., Snell, J. L., & MacKenzie, E. P. (2007). Walking the talk in bullying prevention: Teacher implementation variables related to initial impact of the steps to respect program. *School Psychology Review, 36*(1), 3–21.

Juvonen, J. & Gross, E. F. (2008). Extending the school grounds? Bullying experiences in cyberspace. *Journal of School Health*, doi:10.1111/j.1746-1561.2008.00335.x.

Kärnä, A., Voeten, M., Little, T.D., Alanen, E., Poskiparta, E., & Salmivalli, C. (2012). Effectiveness of the KiVa antibullying program: Grades 1–3 and 7–9. *Journal of Educational Psychology*, doi:10.1037/a0030417.

Kärnä, A., Voeten, M., Little, T. D., Poskiparta, E., Alanen, E., & Salmivalli, C. (2011a). Going to scale: A nonrandomized nationwide trial of the KiVa antibullying program for Grades 1–9. *Journal of Consulting and Clinical Psychology*, doi:http://dx.doi.org/10.1037/a0025740.

Kärnä, A., Voeten, M., Little, T. D., Poskiparta, E., Kaljonen, A., & Salmivalli, C. (2011b). A large-scale evaluation of the KiVa antibullying program: Grades 4–6. *Child Development*, doi:10.1111/j.1467-8624.2010.01557.x.

Kiriakidis, S. P., & Kavoura, A. (2010). Cyberbullying: A review of the literature on harassment through the internet and other electronic means. *Family & Community Health*, doi:10.1097/FCH.0b013e3181d593e4.

Kowalski, R. M., & Limber, S. P. (2007). Electronic bullying among middle school students. *Journal of Adolescent Health*, doi:10.1016/j.jadohealth.2007.08.017.

Kyriakides, L., Kaloyirou, C. & Lindsay, G. (2006). An analysis of the Revised Olweus Bully/Victim Questionnaire using the Rasch measurement model. *British Journal of Educational Psychology*, doi:10.1348/000709905X53499.

Law, D. M., Shapka, J. D., Hymel, S., Olson, B. F., & Waterhouse, T. (2011). The changing face of bullying: An empirical comparison between traditional and internet bullying and victimization. *Computers in Human Behavior*, doi:10.1016/j.chb.2011.09.004.

Li, Q. (2006). Cyberbullying in schools: A research of gender differences. *School Psychology International*, doi:10.1177/0143034306064547.

Menesini, E., Nocentini, A., & Calussi, P. (2011). The measurement of cyberbullying: Dimensional structure and relative item severity and discrimination. *Cyberpsychology, Behavior, and Social Networking*, doi:10.1089/cyber.2010.0002.

Mishna, F., Saini, M., & Solomon, S. (2009). Ongoing and online: Children and youth's perceptions of cyber bullying. *Children and Youth Services Review*, doi:10.1016/j.childyouth.2009.05.004.

Muthén, L. K. and Muthén, B. O. (1998–2012). *Mplus user's guide*. Seventh Edition. Los Angeles, CA: Muthén & Muthén.

Newgent, R. A., Lounsbery, K. L., Keller, E. A., Baker, C. R., Cavell, T. A., & Boughfman, E. M. (2009). Differential perceptions of bullying in the schools: A comparison of student, parent, teacher, school counselor, and principal reports. *Journal of School Counseling, 7*(38), 1–33.

O'Connell, P., Pepler, D., & Craig, W. (1999). Peer involvement in bullying: Insights and challenges for intervention. *Journal of Adolescence*, doi:10.1006/j.jado.1999.0238.

Olweus, D. (1993). *Bullying at school: What we know and what we can do*. Cambridge, MA: Blackwell.

Olweus, D. (1996). *The revised Olweus bully/victim questionnaire*. University of Bergen, Research Center for Health Promotion.

Ortega, R., & Mora-Merchán, J. A. (1999). Spain. In P. K. Smith, Y. Morita, J. Junger-Tas, D. Olweus, R. Catalano, & P. Slee (Eds.), *The nature of school bullying: A cross-national perspective* (pp. 157–173). London, England: Routledge.

Osborne, J. W. (2006). Bringing balance and technical accuracy to reporting odds ratios and the results of logistic regression analyses. *Practical Assessment Research & Evaluation*, doi:10.4135/9781412995627.

Patchin, J. W. & Hinduja, S. (2006). Bullies move beyond the schoolyard: A preliminary look at cyberbullying. *Youth Violence and Juvenile Justice*, doi:10.1177/1541204006286288.

Raskauskas, J., & Stoltz, A. D. (2007). Involvement in traditional and electronic bullying among adolescents. *Developmental Psychology*, doi:10.1037/0012-1649.43.3.564.

Reynolds, W. M. (2003). *Reynolds' bully-victimization scales for schools*. San Antonio, TX: Psychological Corporation.

Rigby, K. (2004). Addressing bullying in schools: Theoretical perspectives and their implications. *School Psychology*, doi:10.1177/0143034304046902.

Rigby, K. (2005). Why do some children bully at school? The contributions of negative attitudes towards victims and the perceived expectations of friends, parents, and teachers. *School Psychology International*, doi:10.1177/0143034305052910.

Rigby, K., & Slee, P. (1991). Bullying among Australian school children: Reported behavior and attitudes toward victims. *Journal of Social Psychology*, doi:10.1080/00224545.1991.9924646.

Rodkin, P. C., & Hodges, E. V. E. (2003). Bullies and victims in the peer ecology: Four questions for psychologists and school professionals. *School Psychology Review, 32*(3), 384–400.

Salmivalli, C. (2001). Group view on victimization: Empirical findings and their implications. In J. Juvonen & S. Graham (Eds.), *Peer harassment in schools: The plight of the vulnerable and victimized* (pp. 318–419). New York, NY: Guilford Press.

Salmivalli, C., Kärnä, A., & Poskiparta, E. (2010). From peer putdowns to peer support: A theoretical model and how it translated into a national antibullying program. In S. R. Jimerson, S. M. Swearer, & D. L. Espelage (Eds.), *Handbook of bullying in schools: An international perspective* (pp. 441–454). New York, NY: Routledge.

Salmivalli, C., Kaukiainen, A., & Voeten, M. (2005). Anti-bullying intervention: Implementation and outcome. *British Journal of Educational Psychology*, doi:10.1348/000709905X26011.

Salmivalli, C., Lagerspetz, K., Björkqvist, K., Österman, K., & Kaukiainen, A. (1996). Bullying as a group process: Participant roles and their relations to social status within the group. *Aggressive Behavior*, doi:10.1002/(SICI)1098-2337(1996)22:1<1::AID-AB1>3.0.CO;2-T.

Salmivalli, C., Lappalainen, M., & Lagerspetz, K. M. J. (1998). Stability and change of behavior in connection with bullying in schools: A two-year follow-up. *Aggressive Behavior*, doi:10.1002/(SICI)1098-2337(1998)24:3<205::AID-AB5>3.0.CO;2-J.

Salmivalli, C., & Voeten, M. (2004). Connections between attitudes, group norms, and behaviour in bullying situations. *International Journal of Behavioral Development*, doi:10.1080/01650250344000488.

Scholte, R., Sentse, M., & Granic, I. (2010). Do actions speak louder than words? Classroom attitudes and behavior to bullying in early adolescence. *Journal of Clinical Child and Adolescent Psychology*, doi:10.1080/15374416.2010.517161.

Shariff, S., & Hoff, D. L. (2007). Cyber bullying: Clarifying legal boundaries for school supervision in cyberspace. *International Journal of Cyber Criminology, 1*(1), 76–118.

Slonje, R., & Smith, P. K. (2007). Cyberbullying: Another main type of bullying? *Scandinavian Journal of Psychology*, doi:10.1111/j.1467-9450.2007.00611.x.

Smith, P. K., Mahdavi, J., Carvalho, M., Fisher, S., Russell, S., & Tippett, N. (2008). Cyberbullying: Its nature and impact in

secondary school pupils. *Journal of Child Psychology and Psychiatry*, doi:10.1111/j.1469-7610.2007.01846.x.

Snijders, T., & Bosker, R. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling* (2nd ed.). London: Sage.

Solberg, M. E., & Olweus, D. (2003). Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. *Aggressive Behavior*, doi:10.1002/ab.10047.

Sourander, A., Klomek, A. B., Ikonen, M., Lindroos, J., Luntamo, T., Koskelainen, M., et al. (2010). Psychosocial risk factors associated with cyberbullying among adolescents: A population-based study. *Archives of General Psychiatry*, doi:10.1001/archgenpsychiatry.2010.79.

Stevens, V., Van Oost, P., & De Bourdeaudhuji, I. D. (2000). The effects of an anti-bullying intervention programme on peers' attitudes and behaviour. *Journal of Adolescence*, doi:10.1006/jado.1999.0296.

Sutton, J. & Smith, P. K. (1999). Bullying as a group process: An adaptation of the participant role approach. *Aggressive Behavior*, doi:10.1002/(SICI)1098-2337(1999)25:2<97::AID-AB3>3.0.CO;2-7.

Tokunaga, R. S. (2010). Following you home from school: A critical review a synthesis of research on cyberbullying victimization. *Computers in Human Behavior*, doi:10.1016/j.chb.2009.11.014.

van Goethem, A. A. J., Scholte, R. H., & Wiers, R. W. (2010). Explicit- and implicit bullying attitudes in relation to bullying behavior. *Journal of Abnormal Child Psychology*, doi:10.1007/s10802-010-9405-2.

Wade, A., & Beran, T. (2011). Cyberbullying: The new era of bullying. *The Canadian Journal of School Psychology*, doi:10.1177/0829573510396318.

Williams, K. R. & Guerra, N. G. (2007). Prevalence and predictors of internet bullying. *Journal of Adolescent Health*, doi:10.1016/j.jadohealth.2007.08.018.

Williford, A., Boulton, A., Noland, B., Kärnä, A., Little, T. D., & Salmivalli, C. (2012). Effects of the KiVa antibullying program on adolescents' perception of peers, depression, and anxiety. *Journal of Abnormal Child Psychology*, doi:10.1007/s10802-011-9551-1.

Ybarra, M. L., & Mitchell, K. J. (2004). Youth engaging in online harassment: Associations with caregiver-child relationships, internet use, and personal characteristics. *Journal of Adolescence*, doi:10.1016/j.adolescence.2004.03.007.

Ybarra, M. L., & Mitchell, K. J. (2007). Prevalence and frequency of internet harassment instigation: Implications for adolescent health. *Journal of Adolescent Health*, doi:10.1016/j.jadohealth.2007.03.005.

Ybarra, M.L., Mitchell, K.J., Wolak, J., & Finkelhor, D. (2006). Examining characteristics and associated distress related to internet harassment: Findings from the second youth internet safety survey. *Pediatrics*, doi:10.1542/peds.2006-0815.

Zumbo, B. D., Gadermann, A. M., & Zeisser, C. (2007). Ordinal versions of coefficients alpha and theta for Likert rating scales. *Journal of Modern Applied Statistical Methods, 6*(1), 21–29.

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Anne Williford is an Assistant Professor in the School of Social Welfare at the University of Kansas. She received her PhD in Social Work at the University of Denver. Her research interests broadly include bullying, peer victimization, school-based prevention, school social work practice, and minority and low-income populations.

Aaron J. Boulton is a graduate student in the Department of Quantitative Psychology at the University of Kansas. His research focuses on applied SEM and developmental processes related to bullying and peer victimization.

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Christina Salmivalli is a professor of psychology at the University of Turku, Finland, where she also received her doctorate. She is currently the director of the KiVa project in Finland, in which she spearheaded the development of the new antibullying program (KiVa) based on her extensive scholarship on understanding participant roles in bullying interactions (see Salmivalli et al. 1996). Broadly, her major research interests include peer relations among children and youth, especially school bullying and its evidence-based prevention.