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(CYBER)BULLYING AND SCHOOL AND TEACHER BONDING

Short-Term Longitudinal Relationships between Adolescents' (Cyber)Bullying  
Perpetration and Bonding to School and Teachers

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**Short-Term Longitudinal Relationships between Adolescents' (Cyber)Bullying  
Perpetration and Bonding to School and Teachers**

Abstract

The purpose of this study was to test bidirectional relationships between (cyber)bullying and a) bonding to school and b) bonding to teachers. These relationships were examined while controlling for traditional and cyberbullying victimization, as well as gender and age. The sample consisted of 2,128 Flemish early adolescents, who participated in a two-wave panel study with a six-month time interval. The data were analyzed using cross-lagged panel analyses. The results indicate the robust temporal stability of being bonded to school and teachers, bullying perpetration (traditional and cyber), and bullying victimization (traditional and cyber). For teacher bonding, a small negative bidirectional relationship was found with cyberbullying perpetration. Low levels of teacher bonding at time 1 predicted subsequent cyberbullying at time 2; cyberbullying at time 1 led to later poor teacher bonding at time 2. On the other hand, the expected longitudinal associations between school bonding and (cyber)bullying perpetration were not confirmed. The results of the current study implicate that a positive bonding to teachers in particular could be a protective factor against bullying via the Internet or mobile phone. Further implications of these results for prevention and intervention with regard to (cyber)bullying are discussed.

*Keywords:* Traditional bullying perpetration, Cyberbullying perpetration, School bonding, Teacher bonding, Early adolescents

## **Introduction**

Bullying can be defined as “an aggressive, intentional act carried out by a group or individual, repeatedly and over time against a victim who cannot easily defend him or herself” (Olweus, 1993; Smith et al., 2008). During the last decade, research has focused on cyberbullying as a new form of bullying, one in which electronic means of contact are used. For both traditional and cyber bullying, poor school and teacher bonding have been proposed as possible determinants but also as outcomes of perpetration. Based on cross-sectional research, there is clear evidence that a poor connection to school and teachers is associated with traditional bullying perpetration; however, additional evidence on the causality of the association is needed (e.g., Cunningham, 2007; Hemphill et al., 2012). With regard to cyberbullying perpetration, there is only preliminary evidence that poor bonding to school and teachers is also associated with cyberbullying perpetration (e.g., Guarini, Passini, Melotti, & Brighi, 2012).

Hence, the goal of the present study was to examine the bidirectional association between bonding to school and teachers and (cyber)bullying perpetration across time among adolescents. Therefore, a short-term longitudinal dataset was used to establish causality. The following literature overview first provides insights and key findings of multiple studies on the association between school and teacher bonding and general problem behavior. Thereafter, an overview is presented of the available literature relating to school and teacher bonding and (cyber)bullying perpetration.

## **Definition of School and Teacher Bonding and Their Relation With Problem**

### **Behavior**

School bonding, school commitment, and school attachment generally refer to the connection that an individual has with his/her school (e.g., being happy at school), the school personnel (e.g., feeling that teachers do their best to help students), and the academic ideals embraced by the school (e.g., desire to do well at school) (Haynie et al., 2001; Maddox & Prinz, 2003). Some researchers distinguish between general school bonding and teacher bonding. The latter refers to the students' experience of interpersonal connections to teachers, such as feeling supported and understood by the personnel (e.g., Freidenfelt Liljeberg, Eklund, Fritz, & af Klinteberg, 2011).

Previous (cross-sectional) research found negative relationships between school and teacher bonding and (early) adolescents' problem behavior, such as substance use (e.g., Henry & Slater, 2007), delinquency (e.g., Freidenfelt Liljeberg et al., 2011), antisocial behavior in general (e.g., Catalano & Hawkins, 1996), bullying (e.g., Cunningham, 2007), and illegitimate media use (e.g., Roe, 2000). Studies that differentiate general school bonding from teacher bonding have found somewhat stronger negative relations for teacher bonding and adolescents' problem behavior in comparison to general school bonding (e.g., Freidenfelt Liljeberg et al., 2011; McNeely & Falci, 2004; Rosenbaum & Lasley, 1990). This indicates that adolescents' poor interpersonal connections to teachers seem to play a more important role in the association with problem behavior compared to their more general connection with multiple aspects of the school. However, these relations seem to differ for boys and girls. Research shows that, for males, both school and teacher bonding are associated with deviant behavior, whereas for girls, only poor teacher attachment is related to deviant behavior (Freidenfelt Liljeberg et al., 2011; Rosenbaum & Lasley, 1990).

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In sum, research has shown a clear negative association between school and teacher bonding and adolescent problem behavior; however, there might be some gender differences. Different explanations have been suggested for these findings. Some theories, such as the *control theory of delinquency* of Hirschi (1972) and the *social development model* of Catalano, Kosterman, Hawkins, Newcomb, and Abbott (1996), suggest that feeling disconnected to school in general and to teachers in particular is a risk factor for problem behavior. Other authors (e.g., Catalano & Hawkins, 1996; Freidenfelt Liljeberg et al., 2011; Maddox & Prinz, 2003; Simons, 1998) suggest that past problem behavior negatively influences school commitment. Evidence for a reciprocal relationship, whereby poor school bonding leads to antisocial behavior and antisocial behavior leads to decreased school bonding, has been provided by, for instance, Demaray (2002) and Klein and colleagues (2012). In this way, “patterned behavior development” takes place through social interactions with socialization units (such as the school in general and teachers in particular) over time (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996, p. 151). A strong bond creates an informal control on future behavior and inhibits deviant behaviors (Catalano et al., 1996, p. 156). The establishment of an individual’s stake in conforming to the norms and values of the socializing unit creates an even stronger bond with the socializing unit. When one has a weak bond with the social group, it can create an antisocial pathway, whereby one feels less inhibited and is therefore more likely to perform antisocial behavior. By performing antisocial behavior, individuals further diverge from the unit’s norms and values.

### **School and Teacher Bonding and Traditional Bullying**

The present study focuses on two specific forms of antisocial behavior, namely traditional bullying and cyberbullying. Previous research on traditional bullying has consistently identified a negative relationship between traditional bullying and school bonding (e.g., Cunningham, 2007; Haynie et al., 2001; Hemphill et al., 2012). Adolescents who report non-involvement in bullying perpetration and victimization appear to be the most strongly bonded to school, followed by “pure” victims (Cunningham, 2007; Haynie et al., 2001). Bullies and bully-victims, on the other hand, are least bonded to school (Cunningham, 2007; Haynie et al., 2001). In the study of Cunningham (2007), female bully-victims scored the lowest of all groups (including male bullies and bully-victims) on school bonding. In comparison to school bonding, fewer studies have investigated the relation between teacher bonding (separately from school bonding) and bullying. Also, for teacher bonding, adolescents who are not involved in bullying as a bully and/or a victim feel most closely connected to teachers (Demantet & Van Houtte, 2012). In the study of Demantet and Van Houtte (2012), bullies were less bonded to teachers in comparison to non-involved adolescents, but more bonded in comparison to victims and bully-victims (Demantet & Van Houtte, 2012, p. 108). The latter reported the lowest levels of bonding to teachers. In the study of Akiba and colleagues (2010), bullies reported a significantly lower level of teacher bonding, whereas victims reported a significantly higher level of teacher bonding.

Longitudinal research that establishes causality with regard to the association between traditional bullying and bonding to school and teachers is scarce. In the study of Hemphill and colleagues (2012), low commitment to school at grade 7 was not found to be a significant predictor of traditional bullying in grade 9. The reverse direction (traditional bullying predicting subsequent commitment to school) was not examined.

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No empirical longitudinal study was found that examined the relationship between teacher bonding and traditional bullying.

### **School and Teacher Bonding and Cyberbullying**

Limited research has linked attributes of the offline school environment and school experience to bullying behavior via the Internet or mobile phone. However, as Hinduja and Patchin (2012) note: “what happens among youth via electronic devices might affect what happens at school (offline) and what goes on at school (offline) might also influence the nature and content of students’ interactions while being online (outside the school)” (p. 78). This statement not only implies that there is an interaction between traditional bullying at school and online bullying after school; it also suggests that an individual’s school experience might provide a basis for—and be affected by—both types of bullying.

Several studies have provided first, but sometimes contradictory, results with regard to the interplay of school climate or school and teacher bonding, on the one hand, and cyberbullying, on the other. School climate can be defined as the unwritten beliefs, values, and attitudes that become the style of interaction between students, teachers, and administrators (Welsh, Greene, & Jenkins, 1999). The school climate is regarded as the contextual level of school bonding, whereas school bonding is an individual’s emotional attachment to the school (Henry & Slater, 2007). For instance, Williams and Guerra (2007) found that the more negatively adolescents rated their *school climate*, the more frequently they reported Internet bullying. A broad measure was used for measuring school climate with nine items (summed to form an additive index) about teachers, school staff and administrators, school policy, and the student’s perceived personal connection to the school (school bonding). Hinduja and Patchin (2012) too, showed that

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adolescents who admitted to cyberbully perceived a poorer climate at their school than those who were not involved in cyberbullying perpetration. No significant gender differences were reported in either study with regard to cyberbullying and school climate. Fanti and others (2012), however, did not find a relation between cyberbullying perpetration and supportive social relations in the school context, encompassing different parts of the school environment (e.g., “The staff at my school provides me the support and encouragement that I need”).

Ybarra and Mitchell (2004) and Hemphill and colleagues (2012) studied the relationship between Internet harassment, or cyberbullying, and *school commitment*, which is comparable with the definition and measurement of school bonding that is used in the current paper. In the study of Ybarra and Mitchell (2004), a significantly higher percentage of adolescents that were Internet aggressors and/or Internet aggressor-victims scored lower on school commitment in comparison to victims and non-involved adolescents. Similar results were found in the two-wave longitudinal study of Hemphill and colleagues (2012). Low commitment to school in grade 7 was a significant predictor of cyberbullying in grade 9. Finally, Guarini and colleagues (2012) studied the relationship between bullying perpetration (both traditional and cyber) and the perception of a negative relationship with teachers. A negative relationship with teachers was a significant risk factor for traditional and cyberbullying perpetration (Guarini et al., 2012).

While most of the previous literature suggests a negative relationship between school and teacher bonding, on the one hand, and cyberbullying on the other, the (bidirectional) causal links are again not clear.

### **The Present Study**

The current paper examines the bidirectional relationships between school and teacher bonding and being a perpetrator of traditional and cyberbullying over a period of one school year, with two measurement points. This longitudinal approach allows for testing the (bidirectional) causal nature of the relationship, as suggested by previous literature on the origin and consequences of antisocial behavior. The current study compares the relation between (cyber)bullying perpetration and school bonding with the relation between (cyberbullying) perpetration and teacher bonding, and examines potential sex and age differences. Since traditional and cyberbullying perpetration overlap with victimization (e.g., Kowalski, Giumetti, Schroeder, & Lattanner, 2014; Slonje, Smith, & Frisé, 2013), the current study will take into account the relations between all the bullying concepts within and across the time points.

### **Method**

#### **Design**

The data were collected in October 2011 and April 2012, in the context of a large scale longitudinal study in Belgium (Flanders), which was aimed at investigating the link between adolescents' developmental trajectories and involvement in (cyber)bullying. The six-month time interval between each wave of the study allows a fuller understanding of developmental trajectories of personal characteristics and (cyber)bullying. For each measurement point, an identical paper-and-pencil survey was administered during school time in the presence of at least one researcher. Before the survey was administered, we obtained institutional approval and (passive) parental consent. During the administration, students were assured verbally and in writing that their responses would be confidential.

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### Sample

Random stratified cluster sampling was applied to select the respondents. The sampling criteria were grade and type of schooling (general, technical, and vocational secondary education). The sample was limited to adolescents in the last two years of elementary school and the first three years of secondary school (comparable to the 5<sup>th</sup> to 9<sup>th</sup> grade in the United States) at baseline, as this age group is at the highest risk of being involved in traditional and cyberbullying (e.g., Kowalski et al., 2014; Slonje et al., 2013).

In total, 2,333 students completed the questionnaire at baseline and 2,128 students completed the questionnaires during the two measurement points (total attrition: 8.79%). Some students preferred not to fill in identification information (date of birth and first letter of the names of their biological parents) during one or two measurement points, which made it impossible to connect data from both waves. Students could also drop out due to being absent during one or more measurement points. The analytical sample thus consisted of 2,128 students (49.5% boys and 50.5% girls) with a mean age of 12.70 years ( $SD = 1.81$ ; range 10–17). Most respondents had the Belgian nationality (94.8%). A set of *t*-tests and Pearson chi-squared tests explored whether there were significant differences for bullying involvement (T1) and levels of school and teacher bonding (T1) between adolescents with data for the two waves ( $N = 2,128$ ) and adolescents who had missing data for the second wave ( $N = 205$ ). The results revealed that there was a significant difference between those who participated in both waves and those who dropped out with regard to cyberbullying ( $\chi^2(5) = 16.05, p < .007$ ). The percentage of cyberbullies (those who had bullied others at least once in the past six months at time 1) among dropouts was slightly higher in comparison to the percentage of cyberbullies among adolescents of the analytic sample (15.5% vs. 10.0%). A

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significant difference was also found for school and teacher bonding. The subjects that participated in both waves felt somewhat more strongly connected to the school ( $M = 2.62$ ,  $SD = 0.66$ ) and the teachers ( $M = 2.83$ ,  $SD = 0.67$ ) than those who completed only one questionnaire (school:  $M = 2.46$ ,  $SD = 0.70$ ; teachers:  $M = 2.60$ ,  $SD = 0.68$ ) (school:  $t(2255) = -3.185$ ,  $p < .01$ ; teachers:  $t(2249) = -4.470$ ,  $p < .001$ ).

### Measures

The questionnaire consisted of a wide range of existing and newly developed questions and scales concerning adolescents' experience with traditional bullying and cyberbullying as a bully, victim, or bystander. Adolescents were also asked about their sociodemographic and personality traits. The measures of the current study are presented below in the same sequence as their appearance in the questionnaire.

**Self-reported cyberbullying involvement.** In order to measure involvement in cyberbullying, a definition was first presented to the respondents. The widely cited definition of Olweus (1993) describes bullying as an aggressive, intentional act or behavior that is carried out by a group or an individual repeatedly and over time against a victim who cannot easily defend him or herself. Following this definition, examples of cyberbullying were given: "Bullying can happen in school, on the street, and in youth or sport clubs. Bullying can also happen via the Internet or mobile phone, for instance by texting mean messages via mobile phone or chat, disseminating hurtful pictures via the Internet or mobile phone, posting offensive reactions on message boards and spreading rumors via websites." Next, the respondents were asked how often they were bullied via the Internet or mobile phone in the past six months (*cyberbullying victimization*). The students could answer "never," "once in the past six months," "a few times in the past six months," "once a month," "a few times a month," and "several times a week." In order to measure *cyberbullying perpetration*, respondents were asked how often they

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have bullied someone via the Internet or mobile phone in the past six months. The answer options ranged from 1 (*never*) to 6 (*weekly*).

**Self-reported traditional bullying involvement.** In line with the measurement of cyberbullying involvement, a definition of traditional bullying was first provided before questioning traditional bullying victimization and perpetration: “The previous questions involved bullying via the Internet or mobile phones. Bullying can also happen in the “real world,” for example, in school, in the street, in youth movements, or in sport clubs. Someone who bullies in the real world can, for example, say mean things, laugh at others, exclude or ignore others, hit or push someone, or tell lies about someone. The next questions involve bullying in the real world.” The respondents were asked how often they were bullied “in the real world” in the past six months (*never* (1) to *weekly* (6)) to measure *traditional bullying victimization*. Subsequently, they were asked how often they have bullied others “in the real world” (*traditional bullying perpetration*; *never* (1) to *weekly* (6)).

**School and teacher bonding.** A 10-item Dutch-language school commitment scale was used to measure respondents’ level of school bonding. The scale is based on Murdock and Phelps (1973)’s scale and was adapted and translated by Muijs (1997) to make it suitable for children (aged 9 to 12). In the study of Muijs (1997), Cronbach’s alpha reliability for this scale (all 10 items) was satisfactory: .84 in the first wave of the study and .86 in the second wave. The response options ranged from 1 (*totally disagree*) to 4 (*totally agree*). Six items were reverse coded in order to indicate stronger bonding to school with a higher score. In order to conduct further analyses, an exploratory factor analysis was carried out first to identify possible factors in our data. The first factor measured general school bonding with seven items. An example of an item is “I usually enjoy school.” For both measurement points the factor had good reliability scores ( $\alpha$

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wave 1: .87;  $\alpha$  wave 2: .89). The second factor consisted of three items to measure teacher bonding, for instance, “The teachers always try to help us.” The factor was internally consistent ( $\alpha$  wave 1: .74;  $\alpha$  wave 2: .76). A measurement model was tested in Mplus 6 (Muthén & Muthén, 2010) using confirmatory factor analysis (CFA) to examine whether the observed variables (items of school and teacher bonding) reliably reflect the hypothesized latent variables for each wave. Maximum likelihood parameter estimation with robust standard errors (MLR) was used, as this is a suitable estimation method for non-normal observations and to deal with missing values (Muthén & Muthén, 2010). School bonding and teacher bonding at time 1 were allowed to covary with school bonding and teacher bonding at time 2. The results indicate a good fit for the measurement model, except for the chi-square (due to its sensitivity to large sample sizes) (Byrne, 2012): comparative fit index (CFI) = 0.948; root mean square error of approximation (RMSEA) = 0.051 [0.048 – 0.055];  $\chi^2(154) = 822.784$ ,  $p < .001$ . The factor loadings were substantial and varied between .56 and .84 (Mean  $\beta = .72$ ,  $SD = 0.09$ ).

### **Strategy of Statistical Analyses**

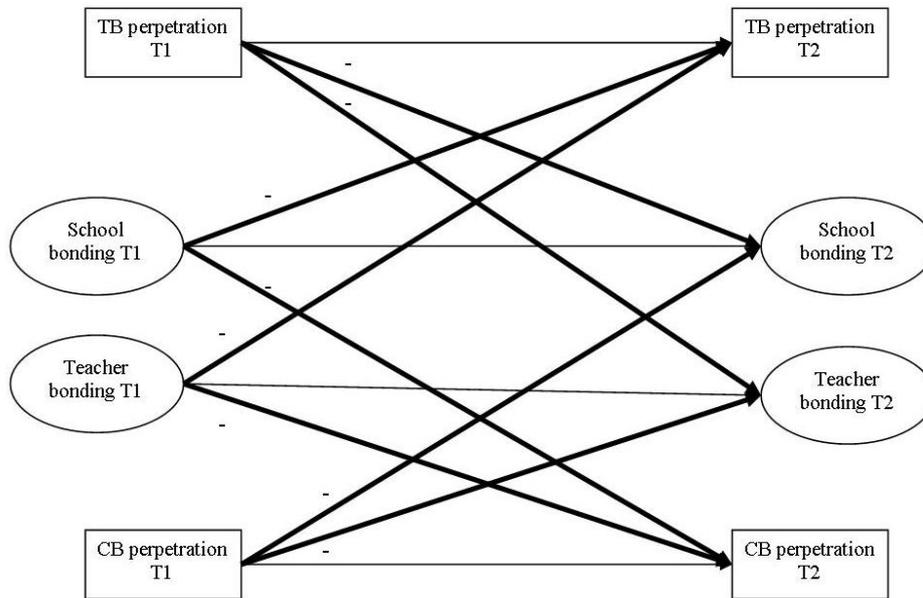
As a first step, univariate and bivariate analyses were performed. Second, a cross-lagged structural equation model was calculated to test the longitudinal relationships between the latent constructs (school and teacher bonding) and the observed variables (traditional and cyberbullying perpetration, traditional and cyberbullying victimization, gender, and age) (cf. Figure 1). Data were analyzed in Mplus 6, using MLR (cf. supra). Although the data are nested in schools, multilevel analysis was not used. The unconditional null model (Garson, 2013) showed that there was no significant school effect. The aim of the analysis was to test the bidirectional

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relationships (see Figure 1) between cyberbullying perpetration and bonding to school and teachers, while controlling for three factors that are related to cyberbullying perpetration: traditional bullying perpetration, cyberbullying victimization, and traditional bullying victimization (e.g., Slonje et al., 2013). Simultaneously, reciprocal relations between traditional bullying perpetration and bonding to school and teachers will be tested, while controlling for cyberbullying perpetration, traditional bullying victimization, and cyberbullying victimization. This cross-lagged analysis was performed with all latent and observed variables regressed on the sociodemographic variables gender and age. In order to enhance visibility, the latter are not included in the presentation of the structural model (see Figure 1), as well as the correlations between all the variables of the study and the cross-lagged relations between the bullying variables. This structural model specified the parameter estimates for the whole sample. In a next step, a multigroup model allowed different parameter estimates for boys and girls. To compare the two models, a chi-square difference test was performed, using Satorra-Bentler rescaling because of multivariate non-normality (Satorra & Bentler, 2001). Additionally, gender differences were assessed for each path by comparing the model with cross-group equality constraints with models in which a single parameter was free to differ between both genders (Badaly, Kelly, Schwartz, & Dabney-Lieras, 2013). The same procedure was used to assess age differences.

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Figure 1. Graphical representation of the proposed research model.



Note. TB = Traditional bullying, CB = Cyberbullying.

## Results

### Univariate and Bivariate Statistics

Table 1 presents the frequencies of traditional bullying perpetration, cyberbullying perpetration, traditional bullying victimization, and cyberbullying victimization, for each measurement point. About one out of five students indicated that they had bullied someone in real life at least once in the past six months (Time 1: 24.2%, Time 2: 16.2%). Lower perpetration rates were found for having bullied others via the Internet or mobile phone during the past six months (Time 1: 10.2%, Time 2: 10.3%). Most of the perpetrators stated that they (cyber)bullied others once in the past six months, whereas few indicated having (cyber)bullied others several times in the past six months. With regard to victimization, about 24 to 30% (Time 1: 30.6%, Time 2: 24.1%) indicated to be a victim of traditional bullying at least once in the past six months, and

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about 12% (Time 1: 11.2%, Time 2: 11.1%) indicated that they had been cyberbullied at least once in the past six months.

Table 1. *Frequencies of (cyber)bullying perpetration and victimization for each wave.*

Time	Frequency	TBP % (N)	CBP % (N)	TBV % (N)	CBV % (N)
1	Never	75.8 (1577)	89.8 (1877)	69.4 (1452)	88.8 (1863)
	Once in the past six months	14.6 (304)	6.7 (141)	12.2 (254)	6.7 (140)
	Several times in the past six months	6.8 (141)	2.2 (45)	10.2 (214)	2.6 (54)
	Once a month	1.0 (20)	0.3 (6)	1.5 (32)	0.5 (10)
	Several times per month	1.0 (22)	0.7 (15)	3.7 (77)	0.9 (19)
	Several times a week	0.8 (17)	0.3 (7)	2.9 (61)	0.6 (12)
	2	Never	83.8 (1748)	89.7 (1872)	75.9 (1602)
Once in the past six months		9.0 (187)	6.0 (126)	8.6 (182)	6.5 (137)
Several times in the past six months		5.2 (109)	3.0 (62)	8.7 (184)	3.1 (66)
Once a month		0.3 (5)	0.2 (5)	1.5 (32)	0.6 (13)
Several times per month		1.3 (27)	0.5 (10)	2.6 (55)	0.5 (10)
Several times a week		0.4 (9)	0.6 (13)	2.6 (56)	0.5 (11)

*Note.* % represents valid percents, TBP = Traditional Bullying Perpetration, CBP = Cyberbullying Perpetration, TBV = Traditional Bullying Victimization, CBV = Cyberbullying Victimization.

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Table 2. Descriptive statistics and zero-order correlations for indicator variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Sex <sup>a</sup>														
2.Age	.03													
3.SBOND T1	.16***	-.06*												
4.TBOND T1	-.01	-.13***	.42***											
5.CBP T1	.00	.02	-.13***	-.13***										
6.TBP T1	-.08***	.01	-.13***	-.07**	.40***									
7.CBV T1	.06**	.01	-.03	-.02	.23***	.11***								
8.TBV T1	.00	-.05*	-.05*	.07**	.12***	.24***	.33***							
9.SBOND T2	.17***	-.07**	.68***	.34***	-.14***	-.16***	-.05*	-.05*						
10.TBOND T2	.04	-.13***	.34***	.62***	-.10***	-.07**	-.03	.04	.48***					
11.CBP T2	-.03	.02	-.10***	-.14***	.40***	.30***	.16***	.11***	-.12***	-.10***				
12.TBP T2	-.05*	-.02	-.10***	-.06**	.30***	.33***	.17***	.18***	-.10***	-.08***	.46***			
13.CBV T2	.06**	-.05*	-.06**	.02	.16***	.13***	.37***	.30***	-.07**	-.01	.21***	.23***		
14.TBV T2	.01	-.06*	-.06**	.10***	.07**	.15***	.24***	.49***	-.04	.08***	.10***	.26***	.39	
														***
M	.51	12.70	2.62	2.83	1.16	1.38	1.19	1.58	2.54	2.80	1.16	1.27	1.17	1.48
SD	.50	1.81	.66	.67	.57	.84	.67	1.16	.68	.68	.60	.75	.60	1.09
Range	0-1	10-17	1-4	1-4	1-6	1-6	1-6	1-6	1-4	1-4	1-6	1-6	1-6	1-6

Note. <sup>a</sup>girl = 1, \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ , CBP = Cyberbullying Perpetration, TBP = Traditional Bullying Perpetration, CBV = Cyberbullying Victimization, TBV = Traditional Bullying Victimization.

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Descriptive statistics and zero-order correlations for the study variables are presented in Table 2. The zero-order correlations show for both waves significant relationships between some of the main study variables. First, small significant negative links between the bonding variables and the variables with regard to bullying perpetration were found (correlations varying between  $-.06$  and  $-.14$ ). A weak bond to school and teachers is associated with a higher frequency of traditional and cyberbullying perpetration, both within and across the two time points. Second, girls were associated with higher levels of school bonding (T1:  $.16$ ; T2:  $.17$ ) and higher frequencies of being a victim of cyberbullying (T1:  $.06$ ; T2:  $.06$ ) than boys. The latter are more involved in traditional bullying perpetration (T1:  $-.08$ ; T2:  $-.05$ ), compared to girls. With regard to age, younger adolescents have higher levels of bonding to school (T1:  $-.06$ ; T2:  $-.07$ ) and teachers (T1:  $-.13$ ; T2:  $-.13$ ), and have greater odds of being a victim of traditional bullying (T1:  $-.05$ ; T2:  $-.06$ ), in comparison to older adolescents. Furthermore, both within and across the two time points, traditional bullying perpetration was significantly related to cyberbullying perpetration (correlations varying between  $.30$  and  $.46$ ), traditional bullying victimization (correlations varying between  $.15$  and  $.26$ ), and cyberbullying victimization (correlations varying between  $.11$  and  $.23$ ). Also, cyberbullying perpetration correlated positively with cyberbullying victimization (correlations varying between  $.16$  and  $.23$ ), and traditional bullying victimization (correlations varying between  $.07$  and  $.12$ ). These findings not only indicate a strong association between both forms of bullying (traditional and cyber), but they also show that adolescents with higher frequencies of bullying perpetration are at greater odds of being victimized both online as well as in real life. Finally, moderate-to-high stability correlations were found for all the main study variables: bonding to school ( $.68$ ) and teachers ( $.62$ ), traditional bullying perpetration ( $.33$ ), cyberbullying perpetration ( $.40$ ), traditional bullying victimization ( $.49$ ), and cyberbullying victimization ( $.37$ ).

**Bidirectional Relations Between Adolescents' Bonding to School and Teachers and Perpetration of Cyber and Traditional Bullying**

Table 3 displays standardized parameter estimates and their two-tailed  $p$ -value of the different paths of the structural model. The model fit indices indicate a good fit for the data:  $\chi^2(314) = 886.44$ ,  $p < .001$ ; CFI = 0.954; RMSEA = 0.037 [0.035–0.040]. The explained variances of the main variables of the present study ranged from .14 to .61 (traditional bullying perpetration T2: .18; cyberbullying perpetration T2: .14; traditional bullying victimization T2: .26; cyberbullying victimization T2: .22; school bonding T2: .59; teacher bonding T2: .61).

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Table 3. *Standardized parameter estimates of the structural model.*

Path	$\beta$	Two-tailed <i>p</i> -value
Stability between variables over time		
School bonding T1 to School bonding T2	0.76 (.67, .85)	.000
Teacher bonding T1 to Teacher bonding T2	0.74 (.65, .84)	.000
TBP T1 to TBP T2	0.27 (.17, .37)	.000
CBP T1 to CBP T2	0.27 (.16, .39)	.000
TBV T1 to TBV T2	0.38 (.30, .46)	.000
CBV T1 to CBV T2	0.31 (.19, .44)	.000
Cross-lagged relations between bullying perpetration and bonding variables		
School bonding T1 to TBPT2	-0.08 (-.19, .02)	.103
TBP T1 to School bonding T2	-0.02 (-.06, .02)	.314
Teacher bonding T1 to TBP T2	0.00 (-.1, .09)	.952
TBP T1 to Teacher bonding T2	0.00 (-.04, .05)	.862
School bonding T1 to CBP T2	0.00 (-.08, .08)	.960
CBP T1 to School bonding T2	-0.02 (-.08, .04)	.481
Teacher bonding T1 to CBP T2	-0.11(-.19, -.03)	.040
CBP T1 to Teacher bonding T2	-0.07 (-.15, -.00)	.019
Cross-lagged relations between bullying victimization and bonding variables		
School bonding T1 to TBV T2	-0.07 (-.20, .06)	.038
TBV T1 to School bonding T2	-0.01 (-.01, .03)	.365
Teacher bonding T1 to TBV T2	0.16 (.03, .28)	.013
TBV T1 to Teacher bonding T2	-0.01 (-.04, .02)	.599
School bonding T1 to CBV T2	-0.07(-.14, -.00)	.039
CBV T1 to School bonding T2	-0.04 (-.09, .01)	.092
Teacher bonding T1 to CBV T2	0.04 (-.03, .11)	.392
CBV T1 to Teacher bonding T2	0.03 (-.03, .09)	.309
Cross-lagged relations between bullying variables		
TBP T1 to CBP T2	0.16 (.09, .23)	.000
CBP T1 to TBP T2	0.15 (-.01, .31)	.002
TBV T1 to CBV T2	0.16 (.12, .20)	.000
CBV T1 to TBV T2	0.11 (-.03, .25)	.007
TBP T1 to TBV T2	0.09 (-.01, .19)	.019
TBV T1 to TBP T2	0.03 (-.01, .08)	.143
TBP T1 to CBV T2	0.05 (-.01, .10)	.088
CBV T1 to TBP T2	0.02 (-.07, .11)	.645
CBP T1 to TBV T2	-0.08 (-.24, .08)	.021
TBV T1 to CBP T2	-0.01 (-.04, .02)	.474
CBP T1 to CBV T2	0.08 (-.05, .21)	.226
CBV T1 to CBP T2	0.06 (-.00, .12)	.066

*Note.* TBP = Traditional Bullying Perpetration, CBP = Cyberbullying Perpetration, TBV = Traditional Bullying Victimization, CBV = Cyberbullying Victimization.

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First, the results indicate clear stability for all of the main study variables over time (cf. Table 3). Secondly, Table 3 displays estimates for cross-lagged relations between bullying and bonding variables. While controlling for autoregressive and concurrent associations, teacher bonding at T1 significantly predicted cyberbullying perpetration T2 ( $\beta = -.11, p < .05$ ). Also, an opposite pathway was found from cyberbullying perpetration T1 to subsequent teacher bonding at T2 ( $\beta = -.07, p < .05$ ). These associations were negative, indicating that cyberbullying perpetration at T1 would decrease bonding to teachers at T2. In addition, low teacher bonding at T1 predicts later cyberbullying perpetration. Neither the pathway from school bonding T1 to cyberbullying perpetration T2, nor the pathway from cyberbullying perpetration T1 to school bonding T2 was found to be significant. With regard to traditional bullying perpetration, no significant causal relation was found with bonding to school and teachers. Furthermore, some significant longitudinal associations were found between victimization and bonding to school and teachers. Bonding to school at time 1 predicted traditional ( $\beta = -.07, p < .05$ ) and cyber ( $\beta = -.07, p < .05$ ) bullying victimization at time 2. In other words, poor school bonding increases the risk of later victimization. Furthermore, teacher bonding at time 1 predicted subsequent traditional bullying victimization ( $\beta = .16, p < .05$ ), but not cyberbullying victimization ( $\beta = .04, p = .392$ ). A strong bonding to teachers increases the risk of being a victim of traditional bullying. The results indicated no support for inverse relationships (victimization to later bonding).

Thirdly, Table 3 also represents cross-lagged relations between bullying variables. A reciprocal relationship was found between both forms of bullying. Higher involvement in traditional and/or cyberbullying perpetration at T1 predicts later involvement in cyber and/or traditional bullying perpetration ( $\beta = .15, p < .05$ ;  $\beta = .16, p < .001$ ). Traditional bullies at T1 are at greater odds of being a victim of traditional bullying at T2 ( $\beta = .09, p < .05$ ), whereas

cyberbullies at T1 have a lower probability of being a victim of traditional bullying ( $\beta = -.08$ ,  $p < .05$ ) at T2.

### **Test for Gender and Age Differences in the Bidirectional Relations**

A multigroup analysis was performed to assess whether the associations differed between male and female respondents. The step-by-step procedure described by van de Schoot, Lugtig, and Hox (2012) was applied. For the multigroup estimation, the same model was used for boys and girls, and all longitudinal paths were allowed to vary by gender. The resulting chi-square goodness-of-fit index was compared to that of the fully constrained model (with all paths fixed to be equal for boys and girls). This comparison showed a significant difference between the multigroup model and the fully constrained model ( $\Delta SB\chi^2 = 775.10$ ,  $\Delta df = 90$ ,  $p < .001$ ). Additionally, potential gender differences were investigated for each longitudinal association separately. Chi-square difference tests were calculated between the fully constrained model and the models in which one path was free to differ between boys and girls. The results showed that the chi square value significantly changed when gender-specific estimates for stability in school bonding were allowed ( $\Delta SB\chi^2 = 4.60$ ,  $\Delta df = 1$ ,  $p = .032$ ). School bonding was more strongly related over time for girls ( $\beta = .61$ ,  $p < .001$ ) than for boys ( $\beta = .59$ ,  $p < .001$ ). Finally, a significant gender difference was found for the relationship between traditional bullying perpetration and later cyberbullying perpetration ( $\Delta SB\chi^2 = 6.02$ ,  $\Delta df = 1$ ,  $p < .05$ ). Traditional bullying perpetration significantly predicted later cyberbullying perpetration among girls ( $\beta = .26$ ,  $p < .001$ ), but not among boys ( $\beta = .08$ ,  $p = .103$ ). These analyses did not support gender differences in the cross-lagged associations between (cyber)bullying perpetration and school and teacher bonding.

A second multigroup analysis was performed in order to look for age differences. More precisely, elementary school students' longitudinal associations were compared with those of secondary school students. The comparison between the chi-square goodness-of-fit

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index of the multigroup model, with all paths free to differ between elementary school students and secondary school students and the chi-square value of the fully constrained model (with all paths fixed to be equal), showed a significant difference between both models ( $\Delta SB\chi^2 = 697.84$ ,  $\Delta df = 78$ ,  $p < .001$ ).

Next, each longitudinal path was tested separately. The results showed significant differences between elementary school students and secondary school students for five longitudinal associations. First, a significant difference was found in the relationship between teacher bonding at time 1 and traditional bullying perpetration at time 2 ( $\Delta SB\chi^2 = 3.94$ ,  $\Delta df = 1$ ,  $p < .05$ ). For elementary school students, there was a positive relationship between teacher bonding and later traditional bullying perpetration ( $\beta = .04$ ,  $p = .738$ ), whereas for secondary school students, there was a negative relationship ( $\beta = -.04$ ,  $p = .471$ ); however, none of these standardized regression coefficients were found to be significant. Secondly, an age difference was found for traditional bullying victimization and its association with later levels of bonding to school ( $\Delta SB\chi^2 = 8.11$ ,  $\Delta df = 1$ ,  $p < .01$ ) and teachers ( $\Delta SB\chi^2 = 5.02$ ,  $\Delta df = 1$ ,  $p < .05$ ). The direction and the strength of these associations differed for elementary school students ( $\beta$  school bonding = .03,  $p = .263$ ;  $\beta$  teacher bonding =  $-.04$ ,  $p = .311$ ) and secondary school students ( $\beta$  school bonding =  $-.00$ ,  $p = .908$ ;  $\beta$  teacher bonding = .01,  $p = .760$ ), but traditional bullying victimization was not a significant predictor for later levels of school and teacher bonding for either group. Finally, two significant age differences were found for the relationship between traditional bullying perpetration and later cyberbullying perpetration ( $\Delta SB\chi^2 = 7.59$ ,  $\Delta df = 1$ ,  $p < .01$ ) and the relationship between cyberbullying victimization and later traditional bullying perpetration ( $\Delta SB\chi^2 = 7.94$ ,  $\Delta df = 1$ ,  $p < .01$ ). Traditional bullying perpetration significantly predicted later cyberbullying perpetration among secondary school children ( $\beta = .16$ ,  $p < .01$ ), but not amongst elementary school children ( $\beta = .11$ ,  $p = .140$ ). Cyberbullying victimization was a positive predictor of traditional bullying perpetration

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among elementary school children ( $\beta = .14, p < .05$ ); this relation was rather negative among secondary school children ( $\beta = -.06, p = .107$ ).

### Discussion

The goal of this paper was to increase current knowledge on the association between bonding to school and teachers and bullying perpetration (both traditional and cyber). A longitudinal approach was used to examine the (bidirectional) causal nature of the relationship, as suggested by previous literature. These relationships were examined while controlling for victimization and the sociodemographic factors gender and age, since previous research showed overlaps between victimization and perpetration, and underscored the moderating role of gender. To this aim, data were gathered amongst a sample of 2,128 Flemish early adolescents who participated in a two-wave panel study with a six-month time interval.

With regard to the cross-lagged associations between bonding and perpetration, the findings of the present study suggest a bidirectional relationship between cyberbullying perpetration and teacher bonding. In line with our expectations and with the findings of previous research (e.g., Guarini et al., 2012), a low level of teacher bonding increases the subsequent risk of perpetrating cyberbullying. This relationship is reciprocal, which means that bullying others via the Internet or a mobile phone also influences later levels of feeling connected to teachers. Although the zero-order correlations and cross-lagged paths show that these effects are rather small, their sizes do not differ from those of the previously described meaningful behavioral and psychological predictors and outcomes of (cyber)bullying (for an overview, see for instance the meta-analyses of Kowalski et al., 2014, p. 44). Contrary to what was expected, neither a bidirectional nor a unidirectional relationship was found between (general) school bonding and cyberbullying perpetration across time. Also, no evidence was found for bidirectional or unidirectional associations between traditional bullying perpetration and bonding to school and teachers (cf. *infra*). Within the time points, however, zero-order

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correlations suggest negative links between bonding with school and teachers and the perpetration of bullying (traditional and cyber). Additional analyses did not support gender differences in the cross-lagged associations between (cyber)bullying perpetration and school and teacher bonding. Significant age differences were found for several cross-lagged associations between traditional bullying involvement and school and teacher bonding; however, these relationships were not significant for both groups of students.

This study shows that adolescents' school experience, and more specifically their relationship with teachers, helps to explain their later involvement in bullying behavior, which often occurs outside school hours. These results are in line with the control theory and with related frameworks suggesting that adolescents who are less attached to teachers (and school in general) are more likely to deviate from conventional norms. An individual's level of bonding to teachers is a significant predictor of one's probability of perpetrating cyberbullying. The results suggest that these weak ties with teachers could possibly be converted immediately into cyberbullying behavior (cf. the correlation between teacher bonding and cyberbullying within the same measurement point), for instance, because it helps adolescents to process and release negative emotions (e.g., school frustrations) (Pabian & Vandebosch, 2014). The findings also indicate that these negative experiences with teachers may lead to more profound changes over time (cf. the cross-lagged reciprocal relationship), resulting in cyberbullying behavior. The significant negative relationship between teacher bonding and later cyberbullying perpetration might, for instance, be explained by the gradual development of anti-conventional attitudes and greater involvement in anti-conventional peer groups (as suggested by, for instance, the control theory). Earlier research on cyberbullying has already convincingly demonstrated the importance of attitudes, perceived peer norms, and concrete peer behavior in explaining this behavior (e.g., Heirman & Walrave, 2012). The idea of a "negative spiral" in which some students might get caught is also supported by the fact

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that bonding to teachers and cyberbullying perpetration were both significantly consistent over time. However, the stability coefficients for school and teacher bonding were higher than those for cyberbullying perpetration. This might indicate that cyberbullying perpetration decreases at a certain point of time (cf. the observed peaks in the prevalence rates of cyberbullying; see, for instance, Tokunaga, 2010) and is then replaced by other “deviant” behavior, as is often the case with traditional bullying perpetration (e.g., Pepler et al., 2006).

The small zero-order correlations and the small cross-lagged pathways show that some of the expected relationships were not confirmed by our study. First of all, no unidirectional or reciprocal relationship was found between bullying perpetration (both traditional and cyber) and school bonding across time. Also, the expected relationship between traditional bullying and bonding to teachers was not confirmed. The zero-order correlations, however, suggested significant negative relationships. A possible explanation for the lack of significant cross-lagged relations between school bonding and perpetration (traditional and cyber) is related to the measurement of school bonding. In the present study, school bonding might indicate rather a general feeling with regard to attending school. Teacher bonding, on the other hand, refers to the specific relations that individuals have with their teachers and, therefore, might be able to exert a stronger influence on adolescents’ behavior. Previous studies on school bonding and teacher bonding found negative relations between adolescents’ problem behavior and both forms of bonding, but also indicated that these were stronger for teacher bonding (e.g., McNeely & Falci, 2004).

As mentioned earlier, the current study also did not find a significant relationship between teacher bonding and the perpetration of traditional bullying over time. A strong relationship with teachers only seemed to be a protective factor for cyberbullying perpetration. Cyberbullying, which is a more recent form of bullying, may possibly evoke more resistance from those who promote conventional norms due to its current novelty and unfamiliarity.

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Nonetheless, the findings that school bonding is not related to bullying (traditional and cyber) over time and that teacher bonding is not related to traditional bullying over time is counterintuitive. Clearly, more longitudinal research is needed here.

Additional analyses were performed to examine gender and age differences in the longitudinal associations. Even though previous research has found gender-specific associations between school and teacher bonding and adolescent problem behavior (e.g., Freidenfelt Liljeberg et al., 2011), this was not demonstrated in the present study. A possible explanation is that the moderating factor of gender depends on the type of problem behavior being investigated. Future research on gender differences should consider the type of problem behavior being studied.

The findings of the current study emphasize the possibly important role of adults, specifically teachers, in preventing cyberbullying. For prevention programs that target cyberbullying, the results indicate that increasing individuals' bonding to teachers might be a suitable strategy to prevent cyberbullying. Research on traditional bullying already shows that bullying rates in classes are lower when teachers' and school's rules and actions are perceived to be fair (Santinello, Vieno, & Vogli, 2011), when school discipline is enforced, and when the teacher has a caring attitude (Gregory et al., 2010). Good student-teacher relations can be enhanced by techniques such as proactive classroom management, whereby a supportive classroom and school environment is created that allows students to take ownership of rules, encourages student involvement in decision making, and uses cooperative learning and peer tutoring (Berryhill & Prinz, 2003; Centers for Disease Control and Prevention, 2009). Research also suggests that actions in the domains of information and communication technology (ICT) and cyberbullying may contribute to the general school and class climate, as well as to students' feeling of bonding. Toshack and Colmar (2012), for instance, show that the knowledge and use of ICT by the school and teachers not only influence students' online

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behavior directly (through the transfer of ICT skills and adequate online behaviors), but they also indicate that students feel stronger connected to teachers and schools with policies regarding (cyber)bullying that are clear to, accepted by, and/or (partly) outlined by students. Other authors (e.g., Teclehaimanot, 2011) also suggest that the use of ICT inside and outside the school (e.g., teachers creating a Facebook group for their class) can strengthen bonding between teachers and students.

Although not the main goal of the present study, the results yielded interesting associations between the bullying variables across time. While many previous studies have illustrated the links between traditional bullying and cyberbullying, as well as between bullying perpetration (traditional and cyber) and victimization (also both traditional and cyber), little is known about the sequence of events (Slonje et al., 2013). This study found a reciprocal relationship between traditional bullying perpetration and cyberbullying perpetration: Involvement in traditional bullying perpetration predicted an increase in later cyberbullying perpetration among girls and secondary school students, while cyberbullying perpetration also predicted an increase in subsequent traditional bullying perpetration for the whole sample. Furthermore, the results suggest that traditional bullies have greater odds of being a victim of traditional bullying across time, whereas cyberbullies are at lower odds of being a victim of traditional bullying across time. Finally, cyberbullying victims have a higher probability of being a traditional bully, although this was only true for elementary school children.

### **Limitations**

The current study has shortcomings, which might open avenues for future research. Firstly, only self-report questionnaires were used to gather the data. This assessment depends on the subjective experience of the respondents (Juvonen, Nishina, & Graham, 2001). Moreover, although the students were assured verbally and in writing that their responses

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would be anonymous and confidential, their responses might have been skewed due to the respondents' desire to give socially acceptable answers. A social desirability scale was not included in the questionnaire; therefore, it cannot be excluded that some responses were influenced by impression management (Pornari & Wood, 2010). Even though it has been suggested that self-reports are the most reliable and valid for measuring peer aggression (Smith & Sharp, 1994), future research may consider using reports from multiple informants (peers, teachers, and parents) to measure (cyber)bullying involvement (Pornari & Wood, 2010). Aggregated data from multiple informants may reduce bias and increase reliability (Pellegrini & Long, 2002). Another problem that might be related to social desirability is the differences found between students who completed the questionnaire twice and those who dropped out. The dropouts had higher perpetration rates for cyberbullying and felt less connected to school and teachers, which might indicate that the reported rates were underestimated and reported levels of school and teacher bonding were overestimated for the population under study.

A second limitation might be the operationalization of school and teacher bonding. A 10-item school commitment scale was used to measure the respondents' level of school bonding (Muijs, 1997). As noted earlier, the measurement of school bonding seems to indicate a general feeling with regard to attending school instead and might not be specific enough. Some of the items seem to address boredom at school (e.g., "I am usually bored at school") and lack of control (e.g., "The teachers are not interested in the students"). Therefore, the scale might also implicitly measure "sensation seeking" and "perceived control by teachers," concepts that are also linked to (cyber)bullying perpetration. Individuals high in sensation seeking are characterized by a high tendency to look for new and potentially more risky experiences (Zuckerman, 1979). Consequently, they are more inclined towards risky behavior on- and offline, such as bullying (Baumgartner, Sumter, Peter, & Valkenburg, 2012;

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Görzig & Frumkin, 2013). With regard to perceived teacher control, individuals who believe that teachers (or adults in general) have little control over their behavior have a higher probability of being involved in cyberbullying (Pabian & Vandebosch, 2014). Future research on (cyber)bullying and bonding to school and teachers could control for these variables or could use school and teacher bonding scales with more dimensions.

Thirdly, the current study only investigated the influence of school and teacher bonding, and not the influence of other types of bonding (e.g., that with parents and peers) that might be relevant in the context of studying problem behavior, according to the control theory and the social development model (Catalano & Hawkins, 1996; Hirschi, 1972; Maddox & Prinz, 2003). Furthermore, the present study did not add variables to the model that have been proven to influence (cyber)bullying perpetration more directly, such as the perceived attitudes and norms of teachers, classmates, and peers with regard to (cyber) bullying (Heirman & Walrave, 2012; Pabian & Vandebosch, 2014).

A fourth remark involves the operationalization of (cyber)bullying. The widely cited definition of Olweus (1993) describes bullying as an aggressive, intentional act or behavior that is carried out by a group or an individual repeatedly and over time against a victim who cannot easily defend him or herself. This definition was presented to the respondents. Subsequently, they could indicate on a six-point scale how often this “bullying” happened both off- and online in the past six months (never to weekly). Adolescents who indicated at least “once in the past six months” were regarded as bullies. The impression could be given that the repeated character of bullying was not taken into account. However, the respondents who indicated that they had bullied only once could have regarded it as (cyber)bullying because bullying “once” referred, in their eyes, to one episode of bullying (consisting of several intentional, hurtful acts online against someone who had difficulties in defending him or herself). The respondents who indicated that they had bullied others only once in real life

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or once in cyberspace could have also regarded it as traditional bullying/ cyberbullying because it was part of a larger, mainly online/offline bullying pattern.

Even when a respondent (despite the presented definition) indicates to have bullied someone via the Internet or mobile phone when this in fact referred to a single intentional, hurtful act against a person who could not easily defend him or herself (without carrying out other acts on- or offline), this might be regarded as cyberbullying. Several authors (e.g., Langos, 2012; Sticca & Perren, 2013) argue (theoretically) that bullying acts performed online are often visible for a long(er) period of time and sometimes to a large audience (that may join the bully), and therefore have as a high impact as repeated (offline) bullying acts. A last remark with regard to the measurement of (cyber)bullying relates to the target. While our study took into account all (cyber)bullying behavior (disregarding the nature of the target), future studies that investigate the relationship between school and teacher bonding and (cyber)bullying might consider distinguishing between (cyber)bullying aimed at people from school (e.g., pupils and teachers) versus people from outside this context.

### **Conclusion**

In sum, the present findings provide evidence that feeling disconnected to teachers is a risk factor for bullying others via the Internet or mobile phone. The current study also demonstrates the opposite direction: Cyberbullying also causes a disconnection with teachers. Hereby, a possible link between the offline school experience and (one sort of) online risk behavior of adolescents is provided. It seems vital that future prevention programs in schools continue to create a connection between students and teachers that is pleasant for, accepted by, and supported by all parties.

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