



# Universiteit Utrecht

**The Role of School Climate in Preventing Cyberbully Perpetration: Evaluating the  
Impact of Student-Teacher Relationships, Classmate Relationships, and Friend Support**

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### **Abstract**

Cyberbullying perpetration among adolescents has emerged as a significant public health concern, characterised by aggressive acts facilitated through digital platforms. This research explored which aspect of the school climate—perceived student-teacher relationship quality, perceived classmate relationship quality, or perceived friend support—serves as the strongest protective factor against cyberbullying among adolescents. Data from the Health Behaviour in School-aged Children (HBSC) 2021 survey, consisting of 6851 adolescents aged 9 to 20 years old, were used. A logistic regression revealed that positive relationships with classmates, friend support and student-teacher relationships are significant protective factors against cyberbullying isolation. However, when combined, positive classmate relationship was not significant. Positive student-teacher relationship emerged as the most influential predictor. Because of this, the study concludes that schools should implement practices to improve student-teacher relationships.

## **The Role of School Climate in Preventing Cyberbullying Perpetration: Evaluating the Impact of Student-Teacher Relationships, Classmate Relationships, and Friend Support**

Bullying perpetration and victimisation are pervasive among youth, constituting a significant public health issue (Chester et al., 2015). As with many other social phenomena, bullying has found its way into the digital world, which is called cyberbullying. Cyberbullying is, as with traditional bullying, characterised by being an aggressive act through online media (Smith, 2016). Prevalence rates of cyberbullying among adolescents vary greatly in research due to the absence of a single definition, variation in measurement instruments, and the recall period during which cyberbullying occurred (Brochado et al., 2017). However, it is clear that cyberbullying peaks around the age of 13-14 (Williams & Guerra, 2007), and the amount of frequent cyberbullying perpetration within the Netherlands has doubled between 2017 and 2021 (Trimbos, 2021). The effects of cyberbullying are severe and are arguably even worse than those of traditional bullying due to the unique characteristics of cyberbullying (Gillespie, 2006; Kowalski et al., 2014; Rostam-Abadi et al., 2024; Vandebosch & van Cleemput, 2009).

Numerous studies have explored various predictors and protective factors of cyberbullying, but which are most important remains unclear (Camerini et al., 2020; Guo, 2016; Kowalski et al., 2014; Zych et al., 2019). Adolescents spend around one-third of their time on school-related activities, most of which are spent at school with peers and teachers (Jackson & Goossens, 2006). School climate, encompassing school safety, interpersonal relations, teaching and learning methods, and the physical school environment (Kohl et al., 2013; Thapa et al., 2013), has proven to predict cyberbullying perpetration (Shi et al., 2021; Wang et al., 2019; Williams & Guerra, 2007). Consequently, improving school climate is increasingly recognised as a strategy for cyberbullying prevention. However, due to a lack of studies comparing different aspects of school climate and the varied ways scholars measure

and interpret those aspects, it is unclear which factors of school climate are most important in cyberbullying prevention (Kohl et al., 2013; Shi et al., 2021; Thapa et al., 2013).

This study aims to contribute to existing knowledge by examining peer and teacher relationships within the school climate. The focus will be on the relationship with teachers since they are considered to be one of the most fundamental aspects of the school climate (Haynes et al., 1997; Mitic et al., 2021; Taiariol, 2010). Peer relationships play an essential role in adolescents' development (Barnes et al., 2007) and are seen as the most valued aspect of adolescents' school experience (Gowing, 2019). This study advances previous work by investigating which of these relationships is most influential on cyberbullying perpetration.

There remains a significant lack of knowledge on effective methods to address and mitigate cyberbullying issues (Poole, 2017). Research showed that traditional bullying and cyberbullying often occur together, with traditional bullying perpetrators often also being cyberbullying perpetrators (Kowalski et al., 2014; Wang et al., 2019; Williams & Guerra, 2007). This has supported the notion that traditional bullying interventions should also be implemented to target cyberbullying (Olweus & Limber, 2018; Pearce et al., 2011). However, these traditional bullying interventions lack effectiveness in reducing cyberbullying perpetration compared to traditional bullying. Being a cyberbullying victim or perpetrator has, among others, been linked to depression, drug use, reduced life satisfaction, and suicidal ideation (Kowalski et al., 2014; Marciano et al., 2020). This underscores the importance of gaining knowledge about protective factors against cyberbullying perpetration to improve interventions (Gaffney et al., 2019). Therefore, the present study aims to answer the question: *Which aspect of the relationship dimension of the school climate - perceived classmate relationship quality, student-teacher relationship, or friend support - acts as the strongest protective factor against cyberbullying perpetration?*

## **Cyberbullying Perpetration**

Within the literature on cyberbullying, there appears to be ambiguity regarding the term and its definition that requires clarification. Terms such as "online bullying," "electronic bullying," and "Internet harassment", alongside "cyber aggression" (Corcoran et al., 2015), are frequently used to refer to cyberbullying (Corcoran et al., 2015; Tokunaga, 2010). Corcoran et al. (2015) Suggest abandoning the term "cyberbullying" due to its divergence from traditional bullying, proposing "cyber aggression" instead. However, this definition is insufficient as it focuses solely on aggression, lacking comprehensiveness. Additionally, the term "cyberbullying" is confusing as it can be unclear whether it refers to the act itself or the victim. This paper will use the term "cyberbullying perpetration" to refer to the act of cyberbullying.

According to Tokunaga (2010), all definitions of cyberbullying involve "aggressive, hostile, or harmful acts perpetrated by a bully through an unspecified type of electronic device" (p. 278). Differences among definitions stem from debates about whether cyberbullying involves groups or individuals, requires deliberate action, and necessitates repetition over time (Slonje & Smith, 2008; Tokunaga, 2010).

Indeed, unlike traditional bullying, large groups can easily get involved (Poole, 2017), but that is not a requirement for cyberbullying (Slonje & Smith, 2008). Regarding deliberate action, it can indeed happen that a victim perceives an action as cyberbullying without it being the intention of the perpetrator. However, since this paper focuses on cyberbullying perpetration, intentionality is included in the definition. Additionally, repetition can occur when a single harmful post or video is viewed or shared multiple times by people other than the initial perpetrator. (Slonje & Smith, 2008). Hence, this paper defines cyberbullying perpetration as an action performed through electronic or digital media by individuals or

groups that potentially repeatedly communicates aggressive, hostile, or harmful content (messages and/or visual media) intended to inflict harm or discomfort on others.

### **Perceived Classmate Relationship Quality and Cyberbully Perpetration**

When looking at the perceived quality of student relationships within a classroom, the term classmate relationship quality is used and is defined as the quality of interpersonal relationships among peers within a classroom (Shim et al., 2013; Thornberg et al., 2022). Barlett (2023) states that cyberbullying is a learned behaviour and highlights the importance of peers in this learning process. Following this, the social learning theory (Bandura, 1977) can explain the relation between perceived classmate relationship quality and cyberbullying perpetration. According to this theory, individuals can adopt prosocial and antisocial behaviour and norms through observational learning (Huesmann, 2018; van Hoorn et al. 2016). The rule of reciprocity plays an important role in learning prosocial behaviour. This means that an individual is inclined to show prosocial behaviour towards someone who has previously treated them similarly (Penner et al., 2005). So, being in a classroom with positive classmate relationships should result in the individual showing positive behaviour.

Adolescents spend a substantial amount of time with their classmates (Smith et al., 2004), making classrooms an adequate environment for social learning to take place (Busching & Krahe, 2020). In line with the social learning theory, individuals in classrooms with higher levels of prosocial behaviour show less aggressive behaviour (Barnes et al., 2007; Barth et al., 2004) and more prosocial behaviour (Busching & Krahe, 2020). Also, adolescents who are accepted by their classmates are more likely to form social relationships and accept others compared to individuals who are not accepted by their classmates (Farrington, 1993). Seeing that cyberbullying perpetration qualifies as antisocial and aggressive behaviour (Doty et al., 2017; Tokunaga, 2010), positive classmate relationships

could reduce cyberbullying perpetration. This notion is also supported by Wang et al. (2021) and Williams and Guerra (2007), who found that positive classmate relationships act as a protective factor against cyberbullying perpetration.

### **Perceived Student-Teacher Relationship Quality and Cyberbully Perpetration**

Besides classmates, adolescents interact much with teachers, making them influential actors in the behavioural development of their students (Luckner & Pianta, 2011). The quality of student-teacher relationships ranges from positive and close to negative and conflictual (Roorda et al., 2017). Positive student-teacher relationships are characterised as being caring, emotionally supportive, and trust-building (Sulkowski & Simmons, 2018). Student-teacher relationship quality, as perceived by the student, is defined as a student-teacher interaction characterized by the student's perception that the teacher cares for and accepts them as an individual, alongside the trust the student feels towards their teacher (García-Moya et al., 2020).

A theory that explains the association between cyberbullying perpetration and student-teacher relationship quality is the attachment theory (Bowlby, 1979 as cited in Goldberg et al., 1995). According to attachment theory, children form representations of previous attachments to caregivers, called internal working models, which they use to anticipate, interpret, and guide current and future interactions (Bretherton, 2008). Parents are generally considered to be the caregivers that children attach to, but this notion also extends to nonfamily members, making teachers key figures for adolescents to attach to (Riley, 2009). Positive relationships with other adults, like teachers, can positively influence the internal working models, possibly resulting in positive behaviour (Buyse et al., 2011). This suggests that a better quality student-teacher relationship can reduce cyberbullying perpetration.

Moreover, positive student-teacher relationships are also associated with increased prosocial behaviour (Longobardi et al., 2021; Luckner & Pianta, 2011; Wentzel, 1994). On top of that, research has shown that a secure attachment to a teacher reduces students' aggression (Jungert et al., 2016; Longobardi et al., 2018; Marengo et al., 2018), but even more interesting, could have a remedial influence on aggressive students' trajectories. This suggests that students with a negative attachment history or at-risk students also benefit from a positive relationship (McGrath & Van Bergen, 2015). Previous research by Casas et al. (2013), Del Rey et al. (2019) and Paniagua et al. (2022) found that positive student-teacher relationships are linked to reduced cyberbullying perpetration.

### **Perceived Friend Support and Cyberbully Perpetration**

Although adolescents spend a substantial amount of time in school interacting with classmates and teachers, they increasingly turn to friends for support and social interaction during adolescence; making friends important for behaviour of adolescents (Brown & Larson, 2009). Friend support is a form of social support and refers to the function and quality of social relationships between friends (Schwarzer & Knoll, 2007). It includes perceived emotional, instrumental, companionship, informational, and esteem support provided by friends (Barrera, 1986). Friend support, whether inside or outside school, is considered part of the school climate (Kohl et al., 2013) and can thus be considered an aspect of school climate.

Regarding friend support, the primary socialization theory can help explain its relation to cyberbullying perpetration (Oetting & Donnermeyer, 1998). According to this theory, which is an addition to the social learning theory, individuals learn social behaviour through interaction with peers in their primary social groups. According to Oetting and Donnermeyer (1998), peers are the main socialization agents for adolescents and act as socialization agents,



influencing prosocial and antisocial behaviours. The strength of the social bonds between individuals and the socialization agents determines how effective social norms are passed on. Because of the increased importance of friends and the voluntary nature of their relationship, it is argued that friend groups are the primary social group of adolescents (Bokhorst et al., 2010). Following this theory, adolescents with supportive friends are likely to treat others in a similar supportive way and discourage antisocial behaviours, such as cyberbullying perpetration.

Research shows that adolescents with friends are more likely to behave prosocial than those without friends (Mcguire & Weisz, 1982). Additionally, the prosocial behaviour of friends is linked to the prosocial behaviour of the individual (Barry & Wentzel, 2006). This also counts for cyberbullying since Hinduja and Patchin (2013) found that adolescents whose friends rarely engage in cyberbullying are also less likely to engage in cyberbullying themselves. Regarding friend support specifically, individuals with higher perceived friend support are more likely to engage in positive behaviour compared to adolescents with less friend support (Traylor et al., 2016). Arató et al. (2022) found that friend support acts as a protective factor against cyberbullying perpetration and is a stronger protective factor than family support. Interestingly, Marengo et al. (2021) found that friend support is a protective factor for cyberbullying perpetration among boys, but it can increase cyberbullying perpetration among 13 year old girls.

### **Strongest Protective Factor**

Student-teacher support, classmate support, and friend support will be compared since support refers to the quality of social relationships (House et al., 1988; Schwarzer & Knoll, 2007). Relationships with teachers are considered one of the most fundamental aspects of school climate (Haynes et al., 1997; Mitic et al., 2021; Taiariol, 2010). However, for the

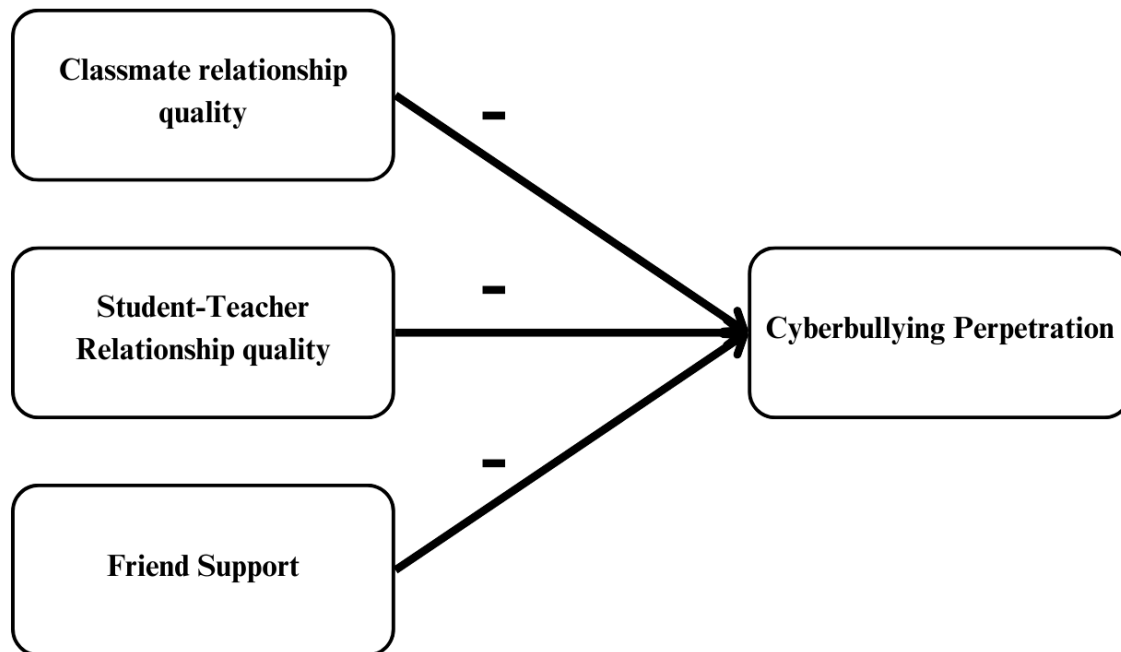
student-teacher relationships, the perceived quality and frequency of support they provide decreases during the transition from primary to secondary school (Bokhorst et al., 2010; Furman & Buhrmester, 1992; Hombrados-Mendieta et al., 2012). Bokhorst et al. (2010) compared the quality and frequency of adolescents' perceived support from teachers, friends and classmates. Based on their results, it can be concluded that the frequency and quality of perceived student-teacher support drastically drop between the ages of 9 and 18. The perceived frequency and quality of classmate support and friend support both increase, but friend support was consistently higher.

The following hypotheses are constructed based on the previously described theories and the provided literature (Figure 1). First, this study hypothesizes that adolescents who perceive their classmate relationships as positive are less likely to be cyberbullies than those who perceive their classmate relationships as less positive (Wang et al., 2021; Williams & Guerra, 2007).

Second, based on the literature, it is hypothesized that adolescents who perceive their relationship with their teacher as positive are less likely to be cyberbullies compared to adolescents who perceive their relationship with their teacher as less positive (Casas et al. 2013; Del Rey et al. 2019; Paniagua et al 2022).

The third hypothesis is that adolescents who perceive more friend support are less likely to be cyberbullying perpetrators compared to adolescents who perceive less friend support (Arató et al., 2021)

Lastly, this paper hypothesizes that friend support is a stronger protective factor against cyberbullying perpetration than a positive student-teacher relationship and a positive classmate relationship (Bokhorst et al. (2010).

**Figure 1***Theoretical Model*

## Methods

### Design

Data from the Health Behaviour in School-aged Children (HBSC) research is used for this research. The HBSC 2021 survey in the Netherlands was designed as a part of an international study in collaboration with the World Health Organization (WHO) to monitor the health and well-being of school-aged children. It uses a cross-sectional survey design to collect data from a nationally representative sample of students from 6th grade of Dutch primary school (groep 8) and secondary education students. In order to achieve a representative national distribution of schools and students, sampling was done in multiple stages. First, schools were randomly selected from Dienst Uitvoering Onderwijs (DUO)

records. During this selection process stratification was applied based on Public Health Services (GGD) regions. Also, a representative balance between rural and urban areas in the sample was ensured, after which the classes were selected. Classes with less than 10 students or classes containing only students who receive special educational support (leerweg ondersteuning) were excluded. One group was selected if there were multiple 6th-grade groups in primary education. When there were vertical- or combined classes, all students from the 6th grade were selected. In secondary schools, classes were randomly selected using a list of all classes provided by the school. The number of selected classes depended on the size of the school (measured in the number of students). In schools with less than 500 students, three classes were selected. If the school contained 550 – 1,000 students, four classes were selected, and five classes were selected when the school had more than 1,000 students (Trimbos, 2022).

## **Participants**

A total of 132 primary schools were invited to take part in this research, of which 68 schools participated, including 75 different classes. For secondary education, 171 schools were invited, of which 71 participated, consisting of 288 different classes. The total sample consisted of 1,525 primary and 5,733 secondary school students. Participants with missing data on any of the items were excluded. This resulted in a sample of 6,851 participants, including 1,422 primary and 5,429 secondary school students. Approximately half of the participants were male (53.8% in primary school and 50.8% in secondary school). The ages of the participants ranged from 9 to 20, with an average of 13.5 years. Data collection took place at the school between October 2021 and January 2022 under the supervision of the research assistants from Trimbos Institute and the teacher (HBSC 2021).

## **Procedure**

For the Dutch HBSC 2021 research, paper-based questionnaires for primary school students and digital questionnaires for secondary school students were used, which participants could fill in themselves. If secondary school students could not complete the questionnaire online, they would get a paper version instead. Research assistants from Trimbos Institute were present during data collection to answer questions about the research and the survey. The teacher was also asked to be present during the data collection. The adolescents were informed that participation was voluntary and that they were allowed to leave questions unanswered. Also, the schools informed the parents and/or caretakers of the adolescents about the research and gave the option to decide for their children not to participate. In total, 34 adolescents did not want to partake in the research, and 42 did not participate due to objections from their parents or caretakers. To ensure anonymity, the research assistant collected all primary school questionnaires and put them in a sealed envelope. In secondary schools, all participants randomly received a piece of paper with a code to access the online questionnaire, which they did not have to return to the research assistant. For this research, ethical approval was obtained from the ethical board of the Trimbos Institute (no. 202109).

## **Measurements**

### ***Cyberbullying Perpetration***

Cyberbullying perpetration was measured by a single item. Examples of cyberbullying perpetration were included in the questionnaire. They were sending mean messages, making fun of someone on a website or posting pictures of someone looking bad or funny without their permission (Trimbos, 2021). The question participants were asked was, 'How often did you partake in bullying someone via the internet during the last couple of

months?'. There were five response options regarding frequency, ranging from 0 = 'never happened' till 4 = 'a couple of times each week'. Because the data was very skewed, cyberbullying perpetration was dichotomized. The original 0 was renamed 0 = 'No, have not cyberbullied' and 2 till 4 got combined into 1 = 'Yes, have cyberbullied'.

### ***Classmate Relationship Quality***

Classmate relationship was measured using a 3-item subscale from the Teacher and Classmate Support Scale (TCMS). The teacher and classmate support scale showed adequate construct validity and test-retest reliability (Torsheim, 2000). The three items included are: "The students in my class enjoy being together", "Most of the students in my class are kind and helpful", and "Other students accept me as I am". These items were measured using a 5-point Likert scale, which has been reverse coded into 0 = 'Strongly disagree' till 4 = 'strongly agree'. Classmate relationship was calculated using the average mean score, with higher scores representing better perceived Classmate relationship quality. The Cronbach's Alpha in this study is .82, showing good internal reliability.

### ***Student-Teacher Relationship Quality***

Student-teacher relationship quality was measured using the other subscale from the Teacher and Classmate Support Scale (TCMS; Torsheim et al., 2000). The following three items were included: 'I feel that my teachers accept me as I am', 'I feel that my teachers care about me as a person', and 'I feel a lot of trust in my teachers'. These items were answered using a 5-point Likert scale, which was reverse-coded to range from 0 = 'strongly disagree' to 4 = 'strongly agree'. These items were combined using the mean score, with a higher score reflecting better student-teacher relationship quality as perceived by the student. The Cronbach's Alpha in this current study is .85, showing good internal reliability.

### ***Friend Support***

Friend Support is a subscale containing four items derived from the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet & Zimet, 1988), consisting of 12 items. The MSPSS showed good internal reliability, test-retest reliability, and factorial validity (Bruwer et al., 2008; Kazarian & McCabe, 1991; Zimet et al., 1990). This subscale contains items like: 'My friends really try to help me' and 'I can talk about my problems with my friends' (see Appendix A for all items). Participants could answer on a 7-point Likert scale, ranging from 0 = 'very strongly disagree' to 6 = 'very strongly agree'. A mean score of the four items was calculated, with a higher score representing more perceived friend support. The Cronbach's Alpha in this study is .93, showing excellent internal reliability.

### **Analysis**

For the analysis, JASP version 0.18.3.0 was used. First, descriptives were run for all the variables, including some demographics (age and gender). Because the dependent variable, cyberbully perpetration, is binary (yes/no), a logistic regression was required. In order to do so, three assumptions needed to be met (Goss-Sampson, 2022; Harris, 2021). First, the assumption of no multicollinearity was checked, with VIF-values  $> 2.5$  considered inadequate (Senaviratna & A. Cooray, 2019). Also, it was checked whether there is a linear relation between the continuous independent variables and the log-odds of the predicted probabilities for the outcome. However, JASP does not allow for a Box-Tidwell transformation test or another test to check linearity. Therefore, this was attempted manually by running a logistic regression with the dependent variable, a continuous predictor, the natural logarithm of the same predictor, and the interaction terms (continuous variable x Log (continuous variable)). Lastly, the data was examined for the presence of influential outliers

by assessing the Cook's distance values. Values with a Cook's distance  $> 1$  were considered too influential. After checking the assumptions, the binary logistic regression was performed by creating 4 models. All models contain cyberbullying perpetration as the dependent variable. In the first three models, one of the predictors was introduced, and in the last model, all three predictors were introduced.

## **Results**

### **Assumptions**

First, the VIF values were checked to account for the assumption of multicollinearity. All VIF-values were  $< 2.5$ , with the highest being 1.42. Therefore, the assumption of no multicollinearity was met. There were no outliers with a Cook's distance  $> 1$ , meaning no outliers were too influential. Also, all interaction terms for each predictor were insignificant ( $p > .05$ ), suggesting the assumption of linearity was met.

### **Descriptive Analyses**

Table 1 shows the descriptive statistics of classmate relationship, student-teacher relationship, friend support, and cyberbullying perpetration, as well as age and gender. When examining the means of the variables, it is evident that the mean of cyberbullying perpetration is very low. This suggests that a very small portion of the participants reported having cyberbullied someone else in the last couple of months. Looking at the independent variables, the means are all relatively high, especially those of classmate relationship and friend support. Further, Table 1 shows the correlations between the variables. All correlations were significant except the relation between age and cyberbullying perpetration. Moreover, all correlations were in the negative direction, which is in line with the theory. The correlation between classmate relationship and student-teacher relationship was noticeably high.



Additionally, all correlations involving student-teacher relationship were relatively high, suggesting that student-teacher relationship could be an important variable in the context of school climate and cyberbullying perpetration.

**Table 1**

*Means, Standard Deviations and Pearson Correlations Between Classmate Relationship, Student-Teacher Relationship, Friend Support and Cyberbully Perpetration as Well as Age and Gender*

	<i>M (SD)</i>	1	2	3	4	5	6
1 Classmate relationship	3.00 (0.72)		.52*	.26*	-.10*	-.11*	-.09*
2 Student-teacher relationship	2.83 (0.86)			.21*	-.13*	-.23*	-.08*
3 Friend support	4.58 (1.42)				-.10*	-.04*	.13*
4 Cyberbully perpetration	0.07 (0.25)					.00	-.07*
5 Age	13.50 (1.90)						.00
6 Gender	1.49 (0.50)						

*Note.* To perform the correlation analyses using binary variables (cyberbully perpetration and gender), Pearson correlation was used. Gender was coded 1 = boy, 2 = girl.

\*  $p < .001$ .

### **Binary Logistic Regression**

In total, four logistic regressions were conducted to identify the strongest predictor among the independent variables (see Table 2). First, Models 1 - 3 contained one of the three predictors in isolation. The first model containing classmate relationships was significant ( $\chi^2(6,849) = 58.00, p < .001$ ). The second model containing student-teacher relationship quality

was also significant ( $\chi^2(6,849) = 104.19, p < .001$ ). Model 3 with friend support was also significant ( $\chi^2(6,849) = 57.51, p < .001$ ). Additionally, AIC and BIC values for these models were calculated. Model 2 had the lowest AIC and BIC values (AIC = 3,267.79, BIC = 3,281.46), suggesting it fits the data best among the three models.

The odds ratios for classmate relationships, student-teacher relationships, and friend support were below one, indicating negative associations. Additionally, comparing the pseudo- $R^2$  values of the first three models revealed that Model 2 explained the most variance in cyberbully perpetration (Nagelkerke  $R^2 = .03$ ). Therefore, student-teacher relationship quality emerges as the strongest protective factor among the three predictors considered in isolation.

Model 4 included all three predictors. This model was statistically significant ( $\chi^2(6,847) = 139.35, p < .001$ ). Comparing all models revealed that Model 4 fits the data best (AIC = 3,236.63, BIC = 3,263.96). Additionally, Model 4 explained more of the variance in cyberbullying perpetration than the other models (Nagelkerke  $R^2 = .052$ ).

The odds ratios of all independent variables in Model 4 were below one, which indicates negative associations. However, classmate relationship was not a significant predictor of cyberbullying perpetration when put together with student-teacher relationship and friend support. The correlation matrix (Table 1) showed that classmate relationship and student-teacher relationship correlate relatively strongly, suggesting they explain similar aspects of the variance in cyberbullying perpetration. This could result in the classmate relationship being significant in Model 1 but not in Model 4.

The standardized coefficients of Model 4 indicate that student-teacher connectedness has the highest relative importance ( $\beta = -0.363$ ) for explaining cyberbullying perpetration in our data. Thus, Model 4 best fits the data and explains most of the variance in cyberbullying

perpetration. Within Model 4, student-teacher relationship quality is the most important variable in predicting cyberbullying perpetration.

**Table 2**  
*Logistic Regression Analysis Predicting Cyberbully Perpetration*

	<i>B</i>	<i>SE (B)</i>	$\beta$	OR	<i>p</i>	95% CI	
						Lower	Upper
<b>Model 1</b>							
Classmate relationship	-0.46	0.06	-0.34	.63	< .001	-0.58	-0.35
<b>Model 2</b>							
Student-teacher relationship	-0.53	0.13	-0.46	.59	< .001	-0.63	-0.43
<b>Model 3</b>							
Friend support	-0.23	0.03	-0.33	.79	< .001	-0.29	-0.18
<b>Model 4</b>							
(Intercept)	-0.46	0.20	-2.76	.66	.036	-0.801	-0.03
Classmate relationship	-0.13	0.07	-0.09	.88	.074	-0.27	0.01
Student-teacher relationship	-0.42	0.06	-0.36	.66	< .001	-0.54	-0.30
Friend support	-0.17	0.03	-0.24	.85	< .001	-0.23	-0.10

*Note.* OR = Odds Ratio; CI = Confidence Interval.

## Discussion

This research aimed to broaden the knowledge on protective factors related to school climate for cyberbullying perpetration. Therefore, this study examined which of the three social aspects of school climate functions as the strongest protective factor for cyberbullying perpetration among adolescents. Aspects included are perceived classmate relationship quality, perceived student-teacher relationship quality and perceived friend support. Results

showed that, individually, all three social aspects of school climate function as a protective factor. However, when examining these aspects together classmate relationship was not a protective factor. The student-teacher relationship was the strongest protective factor against cyberbullying perpetration.

In line with Hypothesis 1, this study found that adolescents who perceive their classmate relationships as more positive are less likely to be cyberbullies compared to adolescents who perceive their classmate relationships as less positive. Previous research found similar results, adding to the knowledge that classmate relationships can function as a protective factor against cyberbullying perpetration (Wang et al., 2021; Williams & Guerra, 2007). Since cyberbullying is a learned behaviour (Doty et al., 2017; Barlett, 2023), this study confirms the association between classmate relationships and social behaviour (Barth et al., 2004; Busching & Krahé, 2020; Farrington, 1993; Hofmann & Müller, 2018). In this study, friendly and accepting classmates who enjoy being together create a positive social environment. Students are more likely to observe and imitate these positive behaviours, leading to decreased antisocial behaviours like cyberbullying. This aligns with the social learning theory (Bandura, 1977) that states that individuals learn behaviour, whether good or bad, by observing others. However, in the presence of student-teacher relationships and friend support, classmate relationships did not act as a protective factor. A possible explanation is that the attachment relationship with a teacher could be more potent within a classroom compared to the informal classmate relationship.

Hypothesis 2 stated that adolescents who perceive their student-teacher relationship as more positive are less likely to be cyberbullies compared to adolescents who perceive their student-teacher relationship as less positive. The findings of this study confirm this hypothesis, which is in line with previous research done by Casas et al. (2013) and Paniagua et al. (2022). In light of the attachment theory (Bowlby, 1979), attachment types can

influence behaviour. As theorized, positive attachment with teachers can positively alter the internal working models of adolescents. This reduces the display of problematic behaviour like cyberbullying. Therefore, these findings are consistent with the attachment theory.

Consistent with Hypothesis 3, the findings show that adolescents with better perceived friend support are less likely to be cyberbullying perpetrators compared to adolescents with worse perceived friend support. This result is consistent with the primary socialization theory that suggests that the support of friends contributes to reduced antisocial behaviour like cyberbullying (Barry & Wentzel, 2006). This is also similar to previous findings from Arató et al. et al. (2022). Marengo et al. (2021) also found results consistent with those presented in this paper, except for 13-year-old girls. However, this study did not distinguish between gender and age, preventing a direct comparison of those specific findings.

Lastly, Hypothesis 4 stated that friend support was the strongest protective factor against cyberbullying perpetration. The findings of this study were not in line with this hypothesis. This hypothesis was based on the increase of friend support during adolescents and the importance of friends for the development of behaviour (Gowing, 2019; Brown & Larson, 2009; Wang et al., 2011). However, student-teacher relationship quality appeared to be the strongest protective factor.

The attachment theory states that adolescents can attach to teachers as key adult figures. According to Beam et al. (2002), teachers are in a unique position since they can provide adult qualities and simultaneously provide a peer-like relationship. Even though friend support could lead to the transmission of positive norms, it could be the case that attachment to teachers is more potent for cyberbullying reduction since it provides formal and informal aspects. Adolescence could be seen as a transition period where peers become more important and adult figures, like teachers and parents, less important (Brown & Larson,

2009). Following this, it could be argued that the niche relationship teachers provide is of increased importance, resulting in teachers being better equipped to change the internal working models associated with cyberbullying positively.

The findings of this study have several important implications for future policies and practices. Due to the finding that perceived student-teacher relationship quality was a stronger protective factor against cyberbullying than classmate relationship quality and friend support, strategies should be implemented to improve perceived student-teacher relationships. Due to the interrelatedness of bullying and cyberbullying, some scholars suggest implementing intervention programs that target both traditional bullying and cyberbullying (Olweus & Limber, 2018; Pearce et al., 2011; Tanrikulu, 2018). Also, intervention programs are most effective when implemented at every level within the school (Pearce et al., 2011). When investigating school-based interventions aimed at bullying and cyberbullying, it becomes clear that most interventions already target every level, including teachers (Cantone et al., 2015), but lack effective implementation (Della Cioppa et al., 2015). Kincade et al. (2020) identified effective practices to increase student-teacher relationships that are cheap and easy to implement within existing school-based interventions. These practices do not put additional strain on the already existing implementation challenge of interventions.

Moreover, secondary schools should establish positive student-teacher relationships, especially with first-year students who transitioned from primary school. After transitioning to secondary school, adult figures become less important compared to friends (Furman & Buhrmester, 1992) and the frequency and quality of perceived support from teachers drops (Bokhorst et al., 2010; Furman & Buhrmester, 1992; Hombrados-Mendieta, 2012). This is also the moment when cyberbullying peaks (Williams & Guerra, 2007). Providing a smooth transition that promotes student-teacher relationships subsequently acts as a protective factor against cyberbullying when it is most prominent. Especially since a negative relationship

with a teacher has been linked to subsequent cyberbullying perpetration (Pabian & Vandebosch, 2016), suggesting the long-term significance of student-teacher relationships.

Polanin et al. (2022) argue that interventions aimed specifically at cyberbullying should be used instead of universal bullying interventions to reduce cyberbullying perpetration more effectively. Currently, most interventions do not include components regarding school climate improvement (Polanin et al., 2022). This study showed that interpersonal relationships within the school climate function as a protective factor. Therefore, this study can be used by program developers or policymakers as a rationale to increase the inclusion of school climate relationship improvement within policies or interventions.

### **Limitations**

While the findings provide valuable insights and contributions, it is important to acknowledge the inherent limitations of this research. First, this study used cross-sectional data, so it does not allow for statements about causality. Additionally, due to the cross-sectional design, it is impossible to identify directionality, meaning that it cannot be determined whether strong student-teacher relationships reduce cyberbullying or if students who do not engage in cyberbullying are more likely to develop strong relationships with their teachers (Mann, 2003). The latter could possibly be the case since a longitudinal study among Belgian adolescents showed that cyberbullying predicted negative student-teacher relationships the other way around (Pabian & Vandebosch, 2016).

Another limitation of this study is that the data was gathered between October 2021 and January 2022, during the COVID-19 pandemic, when restrictions such as night curfews and school lockdowns were in place (Rijksoverheid, 2022b). These restrictions significantly limited real-world social contact and shifted many daily activities online. Consequently, the pandemic may have impacted the findings. Screen time increased beyond pre-pandemic

expectations, with significantly more Dutch adolescents spending entire days interacting online (Trimbos, 2021). Research has linked increased social media use to cyberbully perpetration (Kowalski et al., 2014; Lee & Shin, 2017; Rice et al., 2015), and cyberbully perpetration significantly rose during the pandemic (Barlett et al., 2021). On top of that, schools were closed for a substantial part of the pandemic, which could have led to the participants not having a student-teacher relationship quality similar to one of non-pandemic times. Therefore, the data could have been influenced significantly during the COVID-19 pandemic. This could result in findings that might only apply to the abnormal pandemic period and may not be generalizable to current times when most daily activities occur offline.

Lastly, it should be noted that this study utilized self-reported data collected via questionnaires. Self-reported data is susceptible to various biases, including social desirability bias. Social desirability bias may cause respondents to exaggerate positive social behaviour by providing answers that align with social norms rather than reflecting their actual behaviour (Krumpal, 2013). Adolescents perceive cyberbullying as socially undesirable behaviour (Doty et al., 2017). Consequently, they may underreport instances of cyberbullying. Consequently, the prevalence of cyberbullying perpetration in the data may be underestimated, potentially affecting the study's findings. Because of this, it is important to interpret the results with caution and be aware that the actual numbers regarding cyberbully perpetrations might be higher.

Based on this study's results and limitations, several recommendations for future research can be made. First, future studies should employ longitudinal designs to determine whether causal relationships exist between the variables over a longer period of time (Pabian & Vandebosch, 2016). Additional research could determine whether there is a causal effect among Dutch adolescents over a longer period of time. If this is the case, the role and



importance of teachers in reducing cyberbullying will increase due to the possible long-term effects.

Secondly, given the potential influence of the COVID-19 pandemic on the data, leading to possibly non-representative results, future research should aim to replicate this study in a post-pandemic context. This will help verify if the relationships between student-teacher relationship quality, classmate relationship quality, friend support, and cyberbullying perpetration remain consistent in more typical circumstances.

Lastly, it is recommended that future research adopt a multi-level systems approach to better understand and address cyberbullying perpetration. This study focused solely on individual-level factors, and although the results were significant, the explained variance was relatively low. To improve the effectiveness of interventions specifically against cyberbullying perpetration, future studies should investigate factors from multiple levels, including school, classroom, home, and individual levels (Pearce et al., 2011), to find the most influential factors.

## **Conclusion**

This study aimed to widen the scope of knowledge on predictors of cyberbullying. Findings showed that perceived classmate relationships, student-teacher relationships and friend support in isolation function as protective factors against cyberbullying perpetration. In the context of school climate, student-teacher relationships proved to be the strongest predictive factor compared to classmate relationships and friend support. Based on this, the suggestion has been made that school-based interventions to reduce cyberbullying should incorporate practices to improve student perceptions of student-teacher relations. These practices could be especially relevant during the transition period from primary to secondary

school. Social media is only going to grow, and so is the risk of cyberbullying. Thus, invest in offline connections to protect against online bullying.

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## Appendix A: Measurement Scales

**Table 2**

### *Student-Teacher Relationship and Classmate Relationship Instruction*

*Below are a few statements about your classmates and teachers. Select what you think of these statements*

Statement	Helemaal mee eens	Mee eens	Niet eens/niet oneens	Niet mee eens	Helemaal niet mee eens
Mijn klasgenoten vinden het fijn bij elkaar te zijn					
De meeste klasgenoten zijn vriendelijk en hulpvaardig					
Andere klasgenoten accepteren me zoals ik ben					
Ik heb het gevoel dat mijn leraren mij accepteren zoals ik ben					
Ik heb het gevoel dat mijn leraren om mij geven					
Ik heb veel vertrouwen in mijn leraren					

*Note.* Teacher and Classmate Support Scale

**Table 3**

### *Friend support*

*Below are statements about your friends. We would like to know what you think about these statements*

Statement	Heel erg niet mee eens	2	3	4	5	6	Heel erg mee eens
Mijn vrienden proberen mij echt te helpen							
Ik kan op mijn vrienden rekenen als er iets fout gaat							
Ik heb vrienden met wie ik lief en leed kan delen							
Ik kan met mijn vrienden over mijn problemen praten							

*Note.* Items come from the Multidimensional Scale of Perceived Social Support.

## **Appendix B: Interdisciplinarity**

This study addresses cyberbullying among adolescents, with a specific focus on identifying the strongest protective social relationship within the school environment. To address this, the study examined perceived classmate relationship quality, student-teacher relationship quality, and friend support. Given the social nature of these components, theories from various social sciences were essential to construct a comprehensive theoretical framework.

Each type of relationship involves different actors and dynamics, necessitating tailored theories. Student-teacher relationships involve interactions between adolescents and adult figures, which differ from peer relationships. Attachment theory, introduced by Bowlby (1979), was used to explore student-teacher relationships. This theory highlights the unique attachment bonds formed with caregivers and how these bonds influence behaviour. Applying attachment theory allows for an in-depth understanding of how supportive student-teacher relationships can act as a protective factor against cyberbullying.

Regarding classmate relationships, social learning theory, developed by Bandura (1977), was applied to classmate relationship quality. This theory explains how individuals learn behaviours through observation, fitting well with the classroom setting where students observe and interact with each other regularly. The primary socialization theory, proposed by Oetting and Donnermeyer (1998), was applied to friend support since this theory emphasizes the influence of primary social groups, which fits well with friendships' seeing their importance to adolescents (Bokhorst et al., 2010; Brown & Larson, 2019)

Psychology provides the foundation for both social learning theory and attachment theory. Social learning theory explains behaviour acquisition through observational learning, making it suitable for analyzing classmate interactions where students learn behaviours by observing their peers. Attachment theory offers a developmental and pedagogical perspective,



emphasizing the impact of attachment bonds on behaviour. This perspective is particularly relevant for analyzing student-teacher relationships, where the quality of attachment can significantly influence students' social and emotional development (Bretherton, 2008).

Sociology and criminology offer insights through primary socialization theory. This theory provides a sociological perspective on behaviour development by focusing on the influence of primary social groups. It is particularly relevant for analyzing friend support, as it emphasizes how friends act as socialization agents. Drawing on these varied disciplines, the study constructs a comprehensive theoretical framework that accounts for the different types of relationships and their unique characteristics.

Stakeholders beyond academia, such as program developers and school staff, offer practical insights that complement academic theories. Program developers provide information on effective interventions and evidence-based practices, bridging the gap between theory and practice. Their practical experience highlights which theoretical approaches work in real-world settings.

School staff, including teachers and board members, are crucial for implementing the study's recommendations. They can provide insights into practical constraints, such as limited resources, which inform the feasibility of implementing suggested practices. This study's implications include practices to promote positive student-teacher relationships, designed to be practical and cost-effective based on feedback from school staff.

This study employed a cross-sectional design to address the research question. However, cyberbullying is a complex social phenomenon, and a mixed-methods approach could provide deeper insights. Quantitative methods allow for broad data collection from large samples, providing generalizable findings. Qualitative methods, such as interviews, can uncover nuances and context-specific details.

For instance, qualitative interviews could explore why student-teacher relationships are the strongest protective factor, revealing characteristics beyond those measured in questionnaires. Combining qualitative and quantitative methods can yield richer insights and more robust conclusions, making a mixed methods approach a desirable addition.

While this study focused on individual-level social relationships, employing multiple analytical levels could enhance understanding of the problem. A systems perspective can contextualize cyberbullying within broader environmental factors. Different levels, such as school policies (e.g., cell phone bans), cultural norms, and interactions between schools and parents, can influence cyberbullying. Analyzing these levels together provides a comprehensive view of how various factors interact to impact cyberbullying. For example, examining the interaction between parental involvement and school policies could reveal how combined efforts influence students' social environments. A systems perspective allows for a more inclusive analysis, incorporating relevant factors from different levels to provide a holistic understanding of the problem.