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EMPIRICAL RESEARCH

Reciprocal Links Between Teacher-Student Relationships and Peer Victimization: A Three-Wave Longitudinal Study in Early Adolescence

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Abstract

Although teachers play a central role in tackling peer victimization at school, no study so far has investigated transactional associations between positive and negative teacher-student relationship dimensions and peer victimization in early adolescence. Investigating both dimensions simultaneously in upper elementary school allows to examine differential effects on peer victimization (and vice versa) and could aid tailored prevention and intervention efforts. At three time points within one school year, self-reported teacher-student closeness and conflict and self- and peer-reported peer victimization were assessed in a sample of 930 fourth to sixth grade students ($M_{age} = 10.55$ years, 53.1% girls). Cross-lagged models revealed negative within-time associations between closeness and self-reported peer victimization, and positive within-time associations between conflict and self-reported peer victimization at most time points. Whereas closeness and conflict negatively predicted each other across the school year, no bidirectional longitudinal effects were found between teacher-student relationships and peer victimization. The current findings highlight the need for early prevention and intervention efforts to tackle peer victimization, build positive teacher-student relationships, and especially reduce negative teacher-student relationships.

Introduction

Teachers are key adults in the prevention and reduction of peer victimization at school (Yoon et al., 2020). The current paper focuses on bullying victimization, in which students are the target of intentional and repeated aggression by one or more peers and find it difficult to defend themselves (Olweus, 1993). Since victimized students are at risk of experiencing many negative consequences that can persist into adulthood (e.g., Arsenault, 2018), it is vital to investigate which factors can increase peer victimization or buffer against it. Ecological and transactional frameworks propose that children develop through bidirectional interactions with their environment, if these interactions occur on a relatively regular basis over an extended period of time (Bronfenbrenner & Morris, 2006; Sameroff, 2009). Hence, teacher-student interactions have the potential to influence peer victimization and vice versa. Teachers' affective relationship with students (i.e., the emotional quality of interactions) has already shown to be associated with peer relationships in early adolescence (e.g., De Laet et al., 2014), including peer victimization (e.g., Demol et al., 2020). However, the extent to which positive teacher-student relationships (i.e., characterized by closeness) and negative teacher-student relationships (i.e., characterized by conflict) uniquely contribute to peer victimization over time has hardly been examined. Investigating their relative impact on peer victimization could aid targeted prevention and intervention efforts. Moreover, although peer victimization is especially prevalent among early adolescents (Inchley et al., 2020; Tokunaga, 2010), several studies investigating its association with teacher-student relationships have focused on younger students (e.g., Reavis et al., 2010; Runions & Shaw, 2013). Furthermore, the way in which peer victimization may affect teacher-student relationships has received little research attention so far. If teachers let their relationship with individual students depend on students' victimization status, it is vital that

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teachers are aware of this. The scarce longitudinal studies on this topic have mainly focused on positive teacher-student relationships (e.g., Demol et al., 2020; Leadbeater et al., 2015) or only examined the pathway from teacher-student relationships to peer victimization (e.g., Runions & Shaw, 2013; Troop-Gordon & Kopp, 2011). The current study investigated reciprocal associations between two dimensions of the teacher-student relationship (i.e., closeness and conflict) and peer victimization across three time points within one school year in upper elementary school.

Teacher-Student Relationships and Peer Victimization

Several scholars have discussed the role of teachers in classroom peer dynamics. An attachment perspective on teacher-student relationships has often been used to explain why affective teacher-student relationships may impact peer relationships. Although attachment theory originally focused on parent-child relationships (Bowlby, 1982), teachers have been argued to serve as ad hoc attachment figures to whom students may turn when they experience challenges or distress (Verschueren & Koomen 2012; Zajac & Kobak, 2006). Specifically, teachers can promote or undermine individual students' feelings of comfort and security through their mutual interactions (Pianta et al., 2003; Verschueren & Koomen, 2012). By being a secure base to students for exploration of their social environment and a safe haven in times of distress, teachers are able to promote students' peer relationships. In addition to attachment theory, social referencing theory states that young children turn to their adult caregivers for constructing their own meaningful interpretations of situations (Walden & Ogan, 1988). It is likely that teachers' relationships with individual students function as an affective filter for peers: the way in which peers in the class group evaluate a certain student can be either positively or negatively influenced by peers' perceptions of teachers' affective relationship with this student (Hughes, 2012). Translating this theory to peer dynamics in the classroom, students at-risk of low peer status have shown to be disliked less and liked more by peers when they perceived that these students were disliked less and liked more by the teacher (Hendrickx et al., 2017a).

When conceptualizing affective teacher-student relationships from an attachment perspective (Verschueren and Koomen 2012), scholars often distinguish between closeness and conflict as markers of positive and negative relationship dimensions (Pianta & Steinberg, 1992). In close teacher-student relationships (i.e., characterized by open communication and warm interactions), students are argued to use their teacher as a secure base and safe haven, which increases the likelihood that they confidently form positive relationships with their peers (Verschueren & Koomen, 2012). Also, in close teacher-student relationships, students may be more likely to tell their teacher about peer problems they experience, which might decrease the risk of peer victimization. Teachers themselves may also be more prone to detect and tackle peer victimization when it involves a student with whom they have a close relationship (Reavis et al., 2010). Conversely, teacher-student conflict (i.e., disharmony, insecurity, and negativity in the relationship) is viewed as a negative relationship dimension in which students fail to use their teacher as a secure base and safe haven (Verschueren & Koomen, 2012). This may hamper these students' dealing with conflicts and poses them at risk for problematic peer relationships (e.g., Pianta et al., 2003), including peer victimization. Moreover, teacher-student conflict may make students less likely to trust their teacher and disclose peer victimization. For example, students may believe their teacher will not take them seriously, blame them for the situation, or make the bullying worse (Bjereld, 2018). Similarly, teachers may be less aware of or interested in the emotions and needs of students with whom they have a lot of conflict, making it harder to detect and tackle peer victimization (Reavis et al., 2010).

Both positive and negative dimensions of the teacher-student relationship have been examined in association with peer victimization, with mixed results. Regarding positive teacher-student relationships, some studies found negative cross-sectional links with peer victimization (e.g., Bae et al., 2019; Raskauskas et al., 2010), whereas others did not find a significant association between the two constructs (e.g., Košir et al., 2020). In a longitudinal study focusing on grades 3 and 4, positive teacher-student relationships have shown to predict subsequent lower levels of peer victimization within and across grades (Leadbeater et al., 2015). However, others found that a close teacher-student relationship did not decrease peer victimization over time in late elementary school (Elledge et al. 2016; Troop-Gordon & Kopp, 2011). Research focusing on negative teacher-student relationships is more limited. Concurrently, positive associations between negative teacher-student relationships and peer victimization have been demonstrated (Marengo et al., 2019; Shin & Kim, 2008). In scarce longitudinal research, Runions and Shaw (2013) also found positive associations between teacher-student conflict in prekindergarten and concurrent and later levels of peer victimization. However, in upper elementary school, this longitudinal association was not confirmed (Troop-Gordon & Kopp, 2011). One potential explanation for these inconclusive findings concerns the informant used to measure peer victimization. For example, correspondence between self- and peer-reported measures of victimization is generally low to moderate (e.g., Košir et al., 2020; Pellegrini & Bartini, 2000), which may yield different associations with teacher-student relationship measures.

Although previous research indicates that closeness and conflict have small to moderate negative correlations (Engels et al., 2016; Reavis et al., 2010) and negative reciprocal longitudinal links between positive and negative relationship dimensions have been found (De Laet et al., 2016), both dimensions have hardly been examined together and over time in association with peer victimization. Yet, investigating closeness and conflict simultaneously allows to examine differential effects on students' victimization. Prior studies examining both relationship dimensions and other student outcomes have already found evidence for such differential effects. For example, inspired by social referencing theory, Hendrickx et al. (2017b) found that negative comments by fifth grade teachers towards specific students in fall were linked to peers' perceptions of teacher disliking of these students in winter, which predicted peers' own subsequent disliking of these students in spring. On the other hand, positive teacher behavior did not affect subsequent peer-perceived teacher and peer liking of specific students (Hendrickx et al., 2017b). Additionally, a meta-analysis covering students from kindergarten to high school showed that indicators of negative teacher-student relationships were more strongly related to students' externalizing behavior problems than indicators of positive teacher-student relationships (Lei et al., 2016). In order to reveal whether mainly positive or negative relationships (or both) affect peer victimization across the school year, it is vital to examine the unique contribution of each relationship dimension to peer victimization. Findings can inspire tailored prevention and intervention efforts and can potentially highlight two ways to reduce peer victimization (i.e., increasing closeness and decreasing conflict).

Moreover, existing research regarding the link between the two relationship dimensions and peer victimization has mostly focused on young children instead of early adolescents. As stated above, teacher-student conflict in prekindergarten has been positively associated with the initial likelihood of peer victimization and the severity of first grade peer victimization (Runions & Shaw, 2013). Additionally, results revealed that higher teacher-student closeness in prekindergarten predicted less severe peer victimization in first grade (Runions & Shaw, 2013). Furthermore, Reavis et al. (2010) showed that kindergarten teacher-student conflict was associated with more initial peer victimization but did not predict changes in peer victimization over time. Moreover, this study did not find evidence for a prediction of (changes in) peer victimization by teacher-student closeness (Reavis et al., 2010). Investigating the link between both relationship dimensions and peer victimization in upper elementary school could offer tools to prevent peer victimization and its negative consequences from persisting into adolescence (Arsenault, 2018).

In line with transactional models (cf. supra, Sameroff, 2009), it is also possible that peer victimization affects teacher-student relationships. This reverse pathway has rarely been examined, which could be due to the traditional focus on teachers as influential socializing agents in student outcomes (e.g., Gest & Rodkin, 2011). Yet, it is likely that teacher-student relationships are shaped in response to peer victimization. In line with principles of attachment theory (Bowlby, 1982), teachers could offer more support towards students who experience peer victimization and seek help from their teacher. Conversely, more peer victimization could predict less positive teacher-student relationships. Peer victimization has shown to increase the likelihood of subsequent externalizing (e.g., aggression, tantrums) and internalizing (e.g., depression, anxiety) problem behaviors (Leadbeater & Hoglund, 2009), making it more challenging for teachers to sympathize with and provide help to victimized students. Limited existing studies provide more support for the second hypothesis. Although these studies only focused on positive teacher-student relationships, more peer victimization in grades 3 and 4 has shown to predict less positive teacher-student relationships within and across grades (Leadbeater et al., 2015). Moreover, more peer victimization at the beginning of the school year predicted less supportive teacher-student relationships in the middle of the school year in grades 4 to 6 (Demol et al., 2020). However, similar effects were not found between the middle and towards the end of the school year (Demol et al., 2020). If teachers let their relationship with individual students depend on students' victimization status, it is crucial to enhance teachers' awareness of these influential peer dynamics, offer tools to adequately support victimized students and minimize negative teacher-student interactions. In order to shed light on transactional processes of influence occurring in the classroom, it is relevant to investigate whether and in which direction teacher-student relationships and peer victimization affect each other over time.

Developmental Considerations

The transition period from childhood to adolescence may be especially relevant for studying reciprocal links between teacher-student relationships and peer victimization. First, peer victimization is likely to be more prevalent among early adolescents than among younger or older students. Meta-analytic findings demonstrated a curvilinear association between age and frequency of victimization, with a peak in early adolescence (Tokunaga, 2010). Additionally, a recent large-scale study among 11- to 15-year-olds showed a decline in peer victimization at school as students grew older (Inchley et al., 2020). Second, research demonstrated that 43% of the students who were victimized in upper elementary school were also victimized in high school three years later (Scholte et al., 2007). Knowing which victimization predictors to address in upper elementary school is

important, as tackling these may prevent students from developing stable or chronic victimization and related mental health problems later on (Arsenault, 2018). Third, students usually have only one homeroom teacher in elementary school. Therefore, the impact of teacher-student relationships on peer dynamics might be larger in elementary as opposed to high school, where students spend less time with a single teacher. In line with this idea, research in upper elementary school has shown that teacher-student relationship quality predicts peer likeability over time (De Laet et al., 2014; Hendrickx et al., 2017a), suggesting that teachers may still function as social referents for those students. In contrast, a cross-lagged study in high school found hardly any longitudinal links between teacher-student relationships and peer likeability (Engels et al., 2016). Thus, upper elementary school may function as a unique transition period to implement resources aimed at the prevention and reduction of peer victimization.

Current Study

Although teachers are viewed as key adults to address peer victimization and their affective relationship with students has shown to impact peer dynamics, reciprocal links between teacher-student relationship quality and peer victimization have rarely been studied in early adolescence. Prior studies on this topic were mostly cross-sectional, focused only on positive teacher-student relationships, investigated younger students or did not take the reverse effect of peer victimization on teacher-student relationships into account. The current study extends prior research by investigating reciprocal links between two affective teacher-student relationship dimensions (i.e., closeness and conflict) and peer victimization in a large sample of upper elementary school students (grades 4–6), using a one-year three-wave longitudinal study. Based on theoretical frameworks (i.e., attachment theory, social referencing theory, transactional models) and previous empirical studies, multiple hypotheses were formulated. Close teacher-student relationships were expected to be predictive of lower peer victimization across the school year (Hypothesis A). Regarding the opposite path, more peer victimization was expected to predict less close teacher-student relationships over time (Hypothesis B). Moreover, teacher-student relationships characterized by higher conflict were expected to predict more peer victimization over time (Hypothesis C). Similar reverse effects were anticipated: more peer victimization was expected to predict more teacher-student conflict across the school year (Hypothesis D). Lastly, negative cross-time associations were expected from closeness to conflict (Hypothesis E) and from conflict to closeness (Hypothesis F). Figure 1 shows a schematic overview of the hypothesized pathways. To assess the robustness of findings across different informants of peer victimization, effects were investigated for self- and peer-reported victimization separately.

Methods

Participants and Procedure

Data were collected among fourth- to sixth-grade elementary school students from the Flemish community of Belgium, at three time points within school year 2018–2019. Data collection occurred in November (Wave 1; W1), February (Wave 2; W2), and April (Wave 3; W3), with a time interval of approximately ten weeks between the waves. Prior to the start of the data collection, the Institutional Review Board of KU Leuven provided ethical approval. Schools that implemented an anti-bullying program (e.g., KiVa) were not recruited. Once a school's principal and the classroom teachers decided to participate in the study, active parental consent was sought for all students and 1,051 (81.5%) students received informed consent. Data were missing on at least two waves for 121 students (i.e., "dropout group"), mostly due to one school that refrained from participation after W1. This resulted in a final sample of 930 students who were present during at least two waves of data collection. Students in the dropout group did not differ from the other students in terms of gender, teacher-student closeness, and peer victimization. However, students in the dropout group were older, $t(1049) = 2.03$, $p = 0.043$, $d = 0.90$, and reported lower levels of conflict with their teacher, $t(1021) = -2.95$, $p = 0.003$, $d = 0.64$.

The 930 participants in the study were located in 55 classrooms within 12 elementary schools. They ranged in age from 8 to 13 years ($M = 10.55$ years, $SD = 0.90$), and 53.1% were girls. Of these students, 30.9% were in fourth grade, 36.0% were in fifth grade, and 33.1% were in sixth grade. The majority of participants was born in Belgium (92.1%). Most participants indicated that they spoke Dutch at home (86.6%), the remaining 13.4% spoke another language (e.g., French, Turkish, English). Questionnaires were administered during school time, through a paper-and-pencil survey, and under supervision of at least one master or doctoral student from the Faculty of Psychology and Educational Sciences of KU Leuven. Books or ring binders were placed between participants to enhance privacy and reduce distractions, and confidentiality of students' responses was assured. Moreover, participants received a definition of bullying before completing the questionnaires in order to leave less room for subjective interpretations. The supervisor read a description out loud in line with the definition of Olweus (1993). Participants could read the description again at any time during the administration on

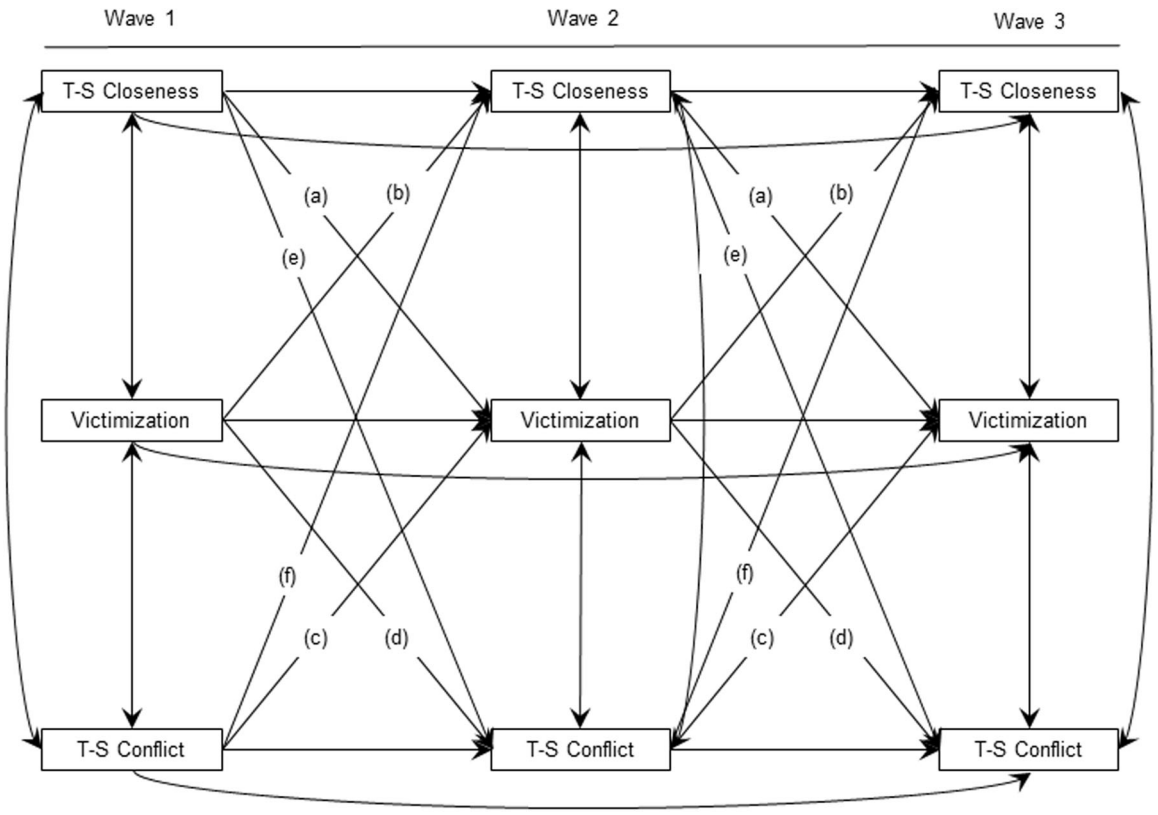

Fig. 1 Hypothesized associations between teacher-student closeness, teacher-student conflict, and peer victimization. Note. Path labels reflect the formulated hypotheses; T-S = teacher-student

their own printed copy. Students' answers were matched across the three waves using individual identification codes.

Measures

Teacher-student relationship (self-report)

The quality of the affective teacher-student relationship was measured with the Child Appraisal of the Relationship with Teachers Scale (CARTS; Vervoort et al., 2015). In the current study, the dimensions closeness and conflict were used. Closeness was measured with four items (e.g., "I like to be with my teacher") and conflict was measured with seven items (e.g., "I often quarrel with my teacher"). Items were scored on a 5-point Likert scale, ranging from 1 ("not true") to 5 ("true"), and mean scores were used in the analyses. Previous research supported the reliability and construct validity of the CARTS (Gregoriadis et al., 2020; Vervoort et al., 2015). In this study, reliability across the three waves was high for closeness ($\alpha = 0.84$ - 0.88) and for conflict ($\alpha = 0.82$ - 0.86).

Peer victimization (self-report)

Self-reported peer victimization was assessed with the Social Experiences Questionnaire (Crick & Grotpeter, 1998), using a Dutch translation (cf. Demol et al., 2020). Students responded to ten items assessing their experienced relational victimization (e.g., "How often are you left out on purpose when it's time to play or do an activity?") and physical/verbal victimization (e.g., "How often do you get pushed or shoved?"). Items were scored on a Likert scale (1 = "never" to 5 = "always"). Subscales showed a large correlation at each time point ($r = 0.58$ - 0.74). Therefore, and since this study focused on comparing general self- and peer-reported victimization, the procedure of Leadbeater et al. (2015) was adopted by creating a composite score of peer victimization. Subsequently, mean scores across the items were calculated and used in the analyses. Reliability was high at each wave ($\alpha = 0.88$ - 0.89).

Peer victimization (peer-report)

Peer-reported peer victimization was assessed at all three waves with a peer nomination item of the Participant Role Questionnaire (Salmivalli et al., 1996). Participants responded to the following question: "Which classmates are bullied at school by other students?". An unlimited number of peer nominations was allowed to increase ecological validity (Marks et al., 2013); self-nomination was not allowed. Proportion scores were calculated by dividing the number of received nominations by the number of possible

nominations. Although some sociometric constructs can be measured reliably with lower participation rates (Marks et al., 2013), a strict participation rate of at least 60% in each class was used to ensure reliability of the nomination procedure (Cillessen, 2009). Therefore, six classes in the sample with participation rates below 60% ($n = 80$) were excluded, resulting in 850 students. Additionally, three classes in which less than 10 students participated in the study ($n = 20$) were excluded from the analyses to prevent biased estimates of the key variables. This resulted in a final subsample of 830 students for the analyses with peer-reported peer victimization.

Statistical Analyses

SPSS Statistics Version 27 was used to calculate descriptive statistics and correlations, and Mplus Version 8.4 was used for the main analyses (Muthén & Muthén, 1998-2017). Longitudinal reciprocal associations between teacher-student relationships (i.e., closeness and conflict) and peer victimization were examined with cross-lagged models (Jöreskog, 1970). This analytical technique can indicate a temporal sequence of longitudinally measured variables by estimating three types of relations among these variables. The first type are autoregressive or stability relations, consisting of predictions of a variable based on prior measures of this variable (e.g., W3 closeness predicted by W1 closeness). The second type are within-time relations, or associations between variables measured at the same time point. This includes initial correlations at W1 (e.g., W1 closeness with W1 peer victimization), and residual correlations at W2 and W3 reflecting correlated change in variables over time (Klimstra et al., 2013). The third type are cross-lagged relations, predicting a variable based on prior measures of another variable (e.g., W2 closeness predicted by W1 peer victimization). Importantly, cross-lagged models assess reciprocal associations while controlling for all concurrent and previous levels of the variables in the model (Jöreskog, 1970).

Prior to analyzing the data, classroom-level intraclass correlations (ICCs) and design effect statistics (Peugh, 2010) were calculated, as students were clustered within classrooms. Since multiple variables had medium to large ICCs (Hox, 2010) and design effect estimates larger than 2, the "complex analysis" option in Mplus was used to account for the hierarchical structure of the data by correcting the standard errors of estimates (Muthén and Muthén 1998-2017). Moreover, the Maximum Likelihood with Robust standard errors (MLR) estimator was used. MLR estimates are robust to non-normality and non-independence of observations in combination with the "complex analysis" feature. Lastly, Full Information Maximum Likelihood (FIML) estimation was used to handle missing data. FIML reduces bias resulting from missing data and gives more accurate hypothesis tests than other estimators (Newman, 2014).

Two models were specified: one model investigating reciprocal longitudinal paths between teacher-student relationships (i.e., closeness and conflict) and self-reported peer victimization (Model A), and another model investigating reciprocal longitudinal paths between teacher-student relationships and peer-reported peer victimization (Model B). Whereas Model A was based on the entire sample of 930 students, Model B used the subsample of 830 students. In both models, students' gender (0 = boy; 1 = girl) and age at W1 were controlled for by allowing paths from gender and age to closeness, conflict, and peer victimization at each time point. For each model, three types of nested models were compared in an hierarchical manner to indicate the best fitting model for the data. In the first step, a model was tested in which all paths were unconstrained. In the second step, since this was the focus of the current study, cross-lagged paths were constrained to be equal over time (e.g., the path from W1 closeness to W2 peer victimization constrained to be equal to the path from W2 closeness to W3 peer victimization). In the third and final step, both cross-lagged and stability paths were constrained to be equal over time (e.g., the path from W1 closeness to W2 closeness constrained to be equal to the path from W2 closeness to W3 closeness). Because the MLR estimator was selected, the chi-square difference test with Satorra-Bentler (S-B) scaling correction was used to compare the fit of the nested models (Satorra and Bentler, 2010). In case of a significant difference ($p < 0.05$), model fit of the constrained model is considered worse than the unconstrained model. To assess model fit, the average comparative fit index (CFI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA) were calculated (Hu and Bentler 1999; Steiger, 2007). Following their cut-off scores (Hu & Bentler, 1999), CFI values of ≥ 0.95 and ≥ 0.90 are considered as indicators of good and acceptable fit, respectively. SRMR values of ≤ 0.08 are considered as indicators of good fit, and RMSEA values of ≤ 0.06 and ≤ 0.08 are considered as indicators of good and reasonable fit, respectively (Hu & Bentler, 1999).

Results

Descriptive Statistics and Correlations

Descriptive statistics and bivariate correlations among the key variables are presented in Table 1. Mean scores on peer victimization (both self- and peer-report) were low. With regard to teacher-student relationships, mean scores on closeness were relatively high and mean scores on conflict

Table 1 Descriptive statistics and correlations among study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Vict. self W1														
2. Vict. self W2	0.72**													
3. Vict. self W3	0.63**	0.75**												
4. Vict. peer W1	0.34**	0.29**	0.22**											
5. Vict. peer W2	0.33**	0.36**	0.29**	0.67**										
6. Vict. peer W3	0.28**	0.30**	0.25**	0.60**	0.66**									
7. T-S closeness W1	−0.08*	−0.08*	−0.04	−0.02	−0.04	−0.01								
8. T-S closeness W2	−0.05	−0.09*	−0.05	−0.01	−0.01	−0.01	0.67**							
9. T-S closeness W3	−0.06	−0.08*	−0.07*	−0.01	−0.01	−0.01	0.59**	0.74**						
10. T-S conflict W1	0.24**	0.20**	0.09**	0.01	0.05	0.01	−0.53**	−0.44**	−0.41**					
11. T-S conflict W2	0.18**	0.19**	0.13**	−0.01	0.02	0.01	−0.43**	−0.56**	−0.50**	0.66**				
12. T-S conflict W3	0.13**	0.13**	0.14**	0.01	0.02	−0.00	−0.39**	−0.49**	−0.61**	0.57**	0.72**			
13. Age	−0.18**	−0.21**	−0.16**	−0.23**	−0.17**	−0.16**	−0.05	−0.05	−0.09**	0.05	0.07*	0.09**		
14. Gender	0.02	0.03	0.03	−0.00	0.03	0.05	0.23**	0.22**	0.20**	−0.21**	−0.26**	−0.26**	0.01	
N	908	888	905	930	930	929	907	886	905	907	887	905	930	927
Mean (SD)	1.92 (0.68)	1.84 (0.68)	1.74 (0.63)	0.05 (0.09)	0.04 (0.08)	0.03 (0.07)	4.02 (0.93)	3.93 (0.98)	3.86 (1.04)	1.53 (0.66)	1.61 (0.74)	1.56 (0.68)	10.55 (0.90)	0.53 (0.50)
Observed range	1.00–4.30	1.00–4.20	1.00–4.20	0.00–0.75	0.00–0.79	0.00–0.53	1.00–5.00	1.00–5.00	1.00–5.00	1.00–4.86	1.00–5.00	1.00–5.00	8.77–13.46	0.00–1.00

Note. N = number of participants; SD = standard deviation; Vict. = peer victimization; self = self-report; peer = peer-report; W1 = wave 1; W2 = wave 2; W3 = wave 3; T-S = teacher-student.
*$p < 0.05$. **$p < 0.01$

relatively low. As for the stability of the main variables, significant high and positive correlations were found for self-reported peer victimization (rs = 0.63 to 0.75), peer-reported peer victimization (rs = 0.60 to 0.67), closeness (rs = 0.59 to 0.74), and conflict (rs = 0.57 to 0.72) across the school year (Cohen, 1988). Moreover, at each time point, self-reported peer victimization was significantly and positively associated with peer-reported peer victimization (rs = 25. to 0.36) and conflict (rs = 14. to 0.24), and negatively with closeness (rs = −0.07. to -0.09). Significant high and negative correlations were also found between closeness and conflict at each time point (rs = −0.53. to −0.61). Next, self- and peer-reported peer victimization were significantly, negatively related with age (rs = −0.16 to − 0.23). Specifically, students' W3 closeness was lower (r = −0.09) and students' W2 and W3 conflict was higher (rs = 0.07 and 0.09, respectively) among older students. Lastly, girls reported significantly more closeness (rs = 0.20 to 0.23) and less conflict (rs = −0.21 to −0.26) than boys at each time point.

Cross-Lagged Analyses

To examine reciprocal longitudinal associations between teacher-student relationships and self-reported (Model A) and peer-reported (Model B) peer victimization, cross-lagged analyses were first tested using the unconstrained baseline model. This model showed a good fit, Model A: CFI = 1.000, SRMR = 0.006, RMSEA = 0.004; Model B: CFI = 1.00, SRMR = 0.004, RMSEA = 0.000. Next, the model with constraints on the cross-lagged paths was tested and did not indicate a significantly worse fit than the unconstrained model, Model A: S–Bχ2(6) = 6.00, p = 0.423; Model B: S–Bχ2(6) = 5.66, p = 0.462. Therefore, this more parsimonious model was preferred. The model demonstrated a good fit, Model A: CFI = 1.000, SRMR = 0.009, RMSEA = 0.003; Model B: CFI = 1.00, SRMR = 0.011, RMSEA = <0.001. Subsequently, the fully constrained model was tested, in which both the cross-lagged and autoregressive paths were set equal. This model showed a significantly worse fit than the model with only constrained cross-lagged paths, Model A: S–Bχ2(3) = 9.94, p = 0.019; Model B: S–Bχ2(3) = 12.62, p = 0.006. Hence, for both Model A and B, the models in which only the cross-lagged paths could be considered equal across time were selected to interpret the results. The final models are displayed in Fig. 2 (Model A) and Fig. 3 (Model B). Only significant associations are presented.

In Model A (Fig. 2), all constructs were relatively stable over time. In addition, teacher-student closeness and conflict were negatively associated at W1. Moreover, changes in closeness and conflict at W2 and W3 were strongly, negatively associated with one another. Results also revealed

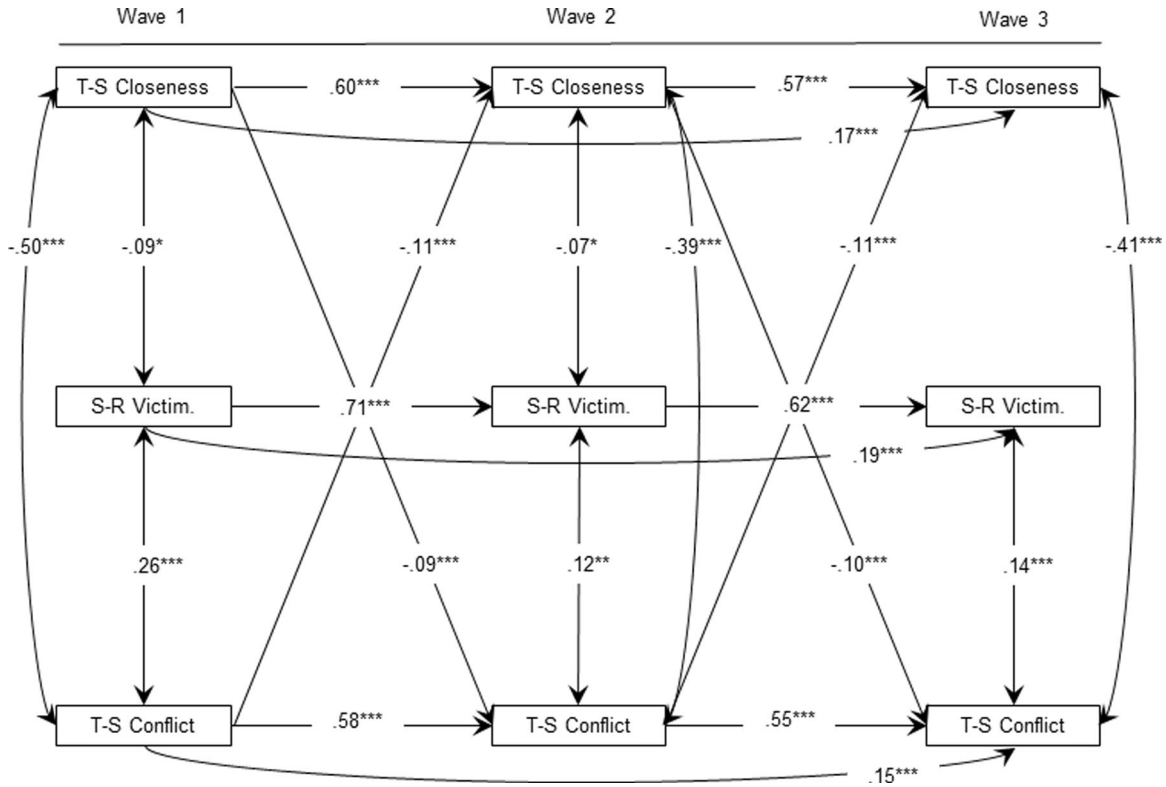

Fig. 2 Cross-lagged model of teacher-student relationships and self-reported peer victimization. Note. The figure presents significant paths with standardized coefficients; T-S = teacher-student; S-R = self-report; Victim. = victimization. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

cross-lagged associations, indicating that closeness negatively predicted conflict across the school year and conflict negatively predicted closeness over time. Regarding self-reported peer victimization and closeness, a negative within-time association was found at W1. Changes in peer victimization and changes in closeness from the beginning (W1) towards the middle (W2) of the school year were also negatively correlated. This pattern did not persist until the end of the school year. That is, changes in peer victimization were no longer significantly associated with changes in closeness at W3. A positive within-time associations between self-reported peer victimization and conflict was found at W1, and changes in peer victimization and changes in conflict were positively correlated at W2 and W3. However, no cross-lagged effects of teacher-student relationships on self-reported peer victimization and vice versa were found.

In Model B (Fig. 3), focusing on peer-reported peer victimization, constructs were relatively stable over time as well. Again, teacher-student closeness and conflict were bidirectionally and longitudinally associated over time. That is, closeness predicted less conflict across the school year and conflict predicted decreased closeness over time. No within-time and cross-lagged associations were found between teacher-student relationships and peer-reported peer victimization, when controlling for the clustered nature of the data, gender, age, and all previous and concurrent levels of the variables.

Supplementary Analyses

Although model estimation terminated normally, a warning message appeared when using the "complex analysis" option in Mplus to account for the nested nature of the data. This warning message indicated a potential problem with the trustworthiness of the standard errors of two parameter estimates in the model, probably due to having more parameters than the number of clusters minus the number of strata with more than one cluster. Therefore, as a sensitivity analysis, results were compared against results of models in which the clustered data were not accounted for (i.e., without using robust standard errors). Again, the models with constrained cross-lagged paths were a better fit to the data than the unconstrained models, Model A: S–B$\chi 2(6) = 5.26$, $p = 0.511$; Model B: S–B$\chi 2(6) = 5.37$, $p = 0.498$. In addition, the fully constrained models (i.e., both cross-lagged and stability paths constrained equal) had a significantly worse fit than the models with only constrained cross-lagged paths, Model A: S–B$\chi 2(3) = 10.45$, $p = 0.015$; Model B: S–B$\chi 2(3) = 17.86$, $p < 0.001$. Hence, for both Model A and B, the models with only constrained cross-lagged paths were used

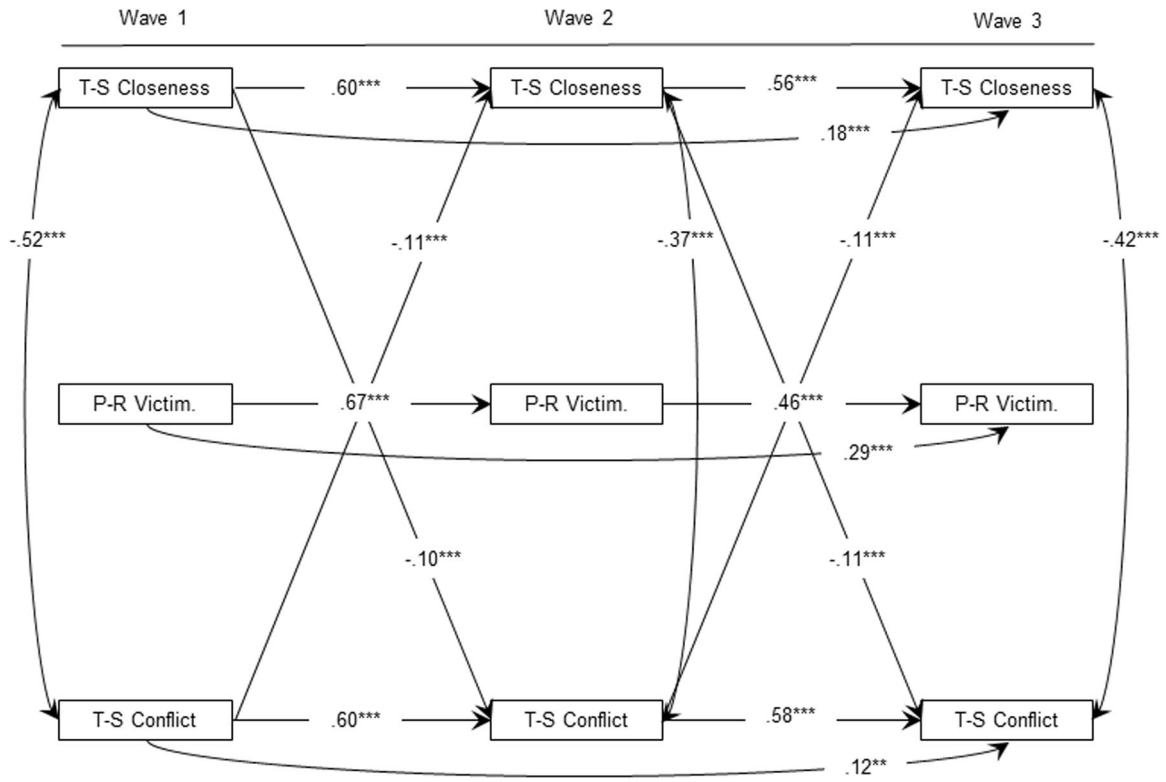

Fig. 3 Cross-lagged model of teacher-student relationships and peer-reported peer victimization. *Note*. The figure presents significant paths with standardized coefficients; T-S = teacher-student; P-R = peer-report; Victim. = victimization. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$

to interpret the results. The models demonstrated a good fit, Model A: CFI = 1.000, SRMR = 0.009, RMSEA = <0.001; Model B: CFI = 1.00, SRMR = 0.011, RMSEA = <0.001. The estimates were similar to those of the models with robust standard errors, and all significant paths remained significant.

Discussion

Researchers have underscored the importance of teachers as key adults to tackle the persistent problem of peer victimization at school (Yoon et al., 2020). Prior studies have indicated the potential of teachers' affective relationships with students to shape peer dynamics, including peer victimization. However, existing literature on teacher-student relationships and peer victimization has mostly been cross-sectional, focused mainly on positive teacher-student relationships, or did not examine or control for the reverse effect of peer victimization on teacher-student relationships. Specifically in early adolescence, bidirectional associations between the variables are rarely studied. To address these gaps in the literature and aid targeted prevention and intervention efforts to tackle peer victimization, the present study investigated reciprocal links between teacher-student relationships and peer victimization among early adolescents. Specifically, a three-wave longitudinal study across one school year was conducted in a large sample of elementary school students in grades 4 to 6. A multidimensional (i.e., positive and negative teacher-student relationships) and multi-informant (i.e., self and peer) approach was used to investigate bidirectional associations. Cross-lagged analyses revealed that teacher-student relationships and peer victimization were mainly related within time but did not predict each other across the school year. Teacher-student closeness and conflict were longitudinally and negatively related over time. Below, these findings will be discussed in more detail.

Links Between Teacher-Student Relationships and Peer Victimization

On top of the high stability of all constructs across the school year, results demonstrated that teacher-student closeness was negatively related to self-reported peer victimization at the beginning of the school year. Moreover, changes in these variables towards the middle of the school year were negatively correlated (Klimstra et al., 2013). Specifically, when closeness increased towards the middle of the school year, self-reported peer victimization decreased. These findings are in line with and extend previous cross-sectional research demonstrating that more positive teacher-student relationships

are associated with less peer victimization (e.g., Bae et al., 2019; Raskauskas et al., 2010). Moreover, more teacher-student conflict was related to more self-reported peer victimization at the beginning of the school year and positive changes in conflict were related to increased peer victimization towards the middle and at the end of the school year. These results confirm and extend prior cross-sectional research about the positive association between negative teacher-student relationships and peer victimization (e.g., Marengo et al., 2019; Shin & Kim, 2008). The present findings regarding closeness and conflict are also in line with an attachment perspective on teacher-student relationships (Verschueren and Koomen, 2012), as they highlight that teachers may help to promote or undermine students' feelings of security and comfort in the classroom. The findings also show that, although students move towards adolescence, teacher-student relationships and peer dynamics are still connected in upper elementary school. As such, they are in line with previous cross-lagged research examining these associations in early adolescence (Demol et al., 2020; Weyns et al., 2018). Although the current study revealed correlated change between teacher-student relationships and peer victimization, it did not examine mediating mechanisms possibly explaining this association. For example, it would be relevant to link teacher-student relationships and peer victimization to peer evaluations of individual students (e.g., likeability) in future studies. Namely, peers' (dis)liking of certain students has shown to be affected by peers' perceptions of whether the teacher (dis)liskes this student (Hendrickx et al., 2017a). This way, the mechanism behind social referencing theory (i.e., the teacher functioning as an affective filter for peers' perceptions of individual students) could be more explicitly tested.

In contrast, no within-time associations were found between teacher-student relationships and peer-reported peer victimization. Several explanations can be given for this discrepancy. First, the findings could indicate a single source bias. Previous research has shown higher associations between teacher-student relationships and student outcomes when the same informant reported about both constructs (Roorda et al., 2011). Alternatively, peer nominations might not capture the experience of bullying victimization accurately. For example, it is difficult for peers to notice all subtle forms of bullying. To grasp the three key characteristics involved in bullying victimization (i.e., intentionality, repetition, and power imbalance), the self-report measure used in this study might have been more suitable than the single peer nomination item (Olweus, 2013). Third, peer-nominated and self-reported victimization scores are calculated in a different way and do not necessarily reflect exactly the same phenomena. That is, peer nominations measure the relative frequency of nominations of certain (extreme) students and most students are not nominated at all, while self-reports measure the experienced frequency or seriousness of peer victimization (Olweus, 2013). Future studies are encouraged to be aware of a single-source bias, justify their chosen informant(s), and when possible, compare outcomes across multiple informants to get better insight into the robustness of findings.

No evidence for longitudinal effects of teacher-student relationships on peer victimization was found. These findings differ from expectations based on attachment literature (Verschueren & Koomen, 2012) and social referencing theory (Walden & Ogan, 1988), and they contrast findings of several prior studies demonstrating significant associations between teacher-student relationships and peer victimization over time (Demol et al., 2020; Leadbeater et al., 2015; Runions & Shaw, 2013). However, the results are in line with other studies that did not find strong evidence for teacher-student relationships as antecedents of later peer victimization among upper elementary school students (Elledge et al., 2016; Troop-Gordon & Kopp, 2011). One possible explanation for the current findings is that peer dynamics, including victimization, could already be relatively established in upper elementary school. This was evidenced by the high stability of peer victimization across the school year and by the similar findings across multiple informants of peer victimization. Further, the short time-interval between the three waves (i.e., approximately ten weeks) possibly left little room to detect changes in teacher-student relationships and peer victimization. Consequently, cross-lagged effects on top of the stability of constructs may have been difficult to notice. Relatedly, a strict analytical approach was used compared to several other studies by taking all previous and concurrent levels of the variables into account. A final explanation concerns the skills associated with high-quality teacher-student relationships. As theorized by Troop-Gordon and Kopp (2011), warmth, obedience, and politeness might not be suitable skills to protect students from being victimized. It is worthwhile to further investigate underlying characteristics linking closeness and conflict with peer victimization.

The study design allowed to examine the reverse link as well. Based on transactional models (Sameroff, 2009), it was tested whether more peer victimization predicted lower-quality teacher-student relationships over time. No support was found for this hypothesis. Put differently, teacher-student relationship quality did not appear to depend on students' prior victimization status. These null findings held for closeness and conflict, and for self- and peer-reported peer victimization. Despite the fact that looking at the reverse pathway is a relatively new line of research, the current findings contrast those of Demol et al. (2020). Among students in grades 4–6, more peer victimization at the beginning of the school year predicted less supportive teacher-student relationships in the middle of the school

year (Demol et al., 2020). Although these limited findings call for more research and correlated change in the variables was found, the non-significant cross-lagged paths suggest that teacher and peer relationships may become more "separate worlds" in early adolescence in their influence on each other over time (Engels et al., 2016). Furthermore, the results underscore the importance of investigating constructs bidirectionally and over time instead of cross-sectionally. This transactional approach helps researchers to draw conclusions about the importance of teachers as social referents for subsequent peer victimization and simultaneously clarify the possible reverse effects of peer dynamics on teacher-student relationships. Hence, future researchers are encouraged to adopt cross-lagged designs when studying risk and protective factors of peer victimization across different time points in childhood and adolescence.

Lastly, bidirectional longitudinal associations between teacher-student closeness and conflict were found. Specifically, more closeness consistently predicted less conflict across the school year and more conflict predicted less closeness over time. The cross-lagged findings are in line with results from De Laet et al. (2016), showing that teacher-student affiliation and teacher-student dissatisfaction were reciprocally and negatively related across three annual waves from grades 7 to 9. Also within time points, the present study showed that both constructs were highly and negatively associated. These associations were higher than those of other studies, which found only small to moderate correlations (Engels et al., 2016; Reavis et al., 2010). One potential explanation for this difference could be that Engels et al. (2016) used peers and Reavis et al. (2010) used teachers as informants of teacher-student relationships, who may each have different perspectives on the affective relationship quality than students themselves. Future studies could benefit from a multidimensional approach as well, in order to investigate how positive and negative dimensions of the teacher-student relationship uniquely relate to each other and to other student outcomes.

Practical Implications

Based on the current study findings, three practical implications can be put forward. First, peer victimization appeared relatively stable across the school year. This highlights the need for teachers to be attentive to potential signs of peer victimization and to set the tone for a supportive classroom atmosphere from the first days of the school year. Introductory activities such as getting to know each other and establishing rules with the class group about bullying could help to build a positive group atmosphere (Kincade et al., 2020), and may thereby aid to minimize peer victimization and its negative consequences later on (Arsenault, 2018). Second, beyond the high stability of constructs, both teacher-student closeness and conflict were uniquely associated with self-reported peer victimization within time and change in the variables was correlated at most time points. Although no cross-lagged effects were found, both relationship dimensions seem to deserve attention in prevention and intervention efforts. Especially avoidance of teacher-student conflict may be worthwhile, as consistent positive links with self-reported peer victimization were found across the school year. Third, results demonstrated that closeness and conflict negatively predict each other over time. This indicates two ways in which high-quality dyadic teacher-student relationships may be promoted: by decreasing conflict and by promoting closeness from the start of the school year. Several interventions targeted at improving teacher-student relationship quality have already shown to enhance closeness and reduce conflict between teachers and students (Duong et al., 2019; Spilt et al., 2012; Vancraeyveldt et al. 2015).

Strengths and Limitations

Strengths of the current study include the large sample of early adolescents that was examined at three time points within one school year. In contrast to most prior (cross-sectional) research, this longitudinal study was able to examine the temporal sequence of variables. Relatedly, rigorous cross-lagged analyses allowed to assess reciprocal associations between teacher-student relationships and peer victimization while controlling for all previous and concurrent levels of the variables, which helped to pinpoint links between the variables within and across the school year. Furthermore, a multidimensional approach was adopted by including positive and negative teacher-student relationships (i.e., closeness and conflict). This way, more insight was gathered into differential effects of each relationship dimension on peer victimization, and vice versa. In addition, self- and peer-reported measures of peer victimization were included to prevent a single-source bias and examine the robustness of study findings. Lastly, this study added to the current knowledge base about social referencing theory (Walden & Ogan, 1988) and an attachment perspective on teacher-student relationships (Verschueren and Koomen, 2020).

Nevertheless, the current results must be considered in light of several limitations. First, regarding the sample, this study made use of convenience sampling. Schools who actively try to tackle bullying may have been more willing to participate in the study and continue participation as compared to schools who do not view this as a priority. Relatedly, students who missed questionnaire data on at least two time points were not included in the analyses. Meanwhile, those students were older and experienced less teacher-student conflict than the rest of the students.

Hence, retention of the dropout group may have resulted in slightly different findings. Second, only student-reported measures of the teacher-student relationship were used. Therefore, the question remains whether students' own interpretations of their relationship with teachers align with the perspectives of teachers and peers. Peer and teacher reports of dyadic teacher-student relationships could provide new insights into the role of teachers as social referents. Third, regarding teacher-student relationships, only the dimensions closeness and conflict were taken into account. Dependency (i.e., age-inappropriate overreliance of students on their teacher) was not included in the models (Pianta, 2001). To improve insight into this understudied dimension (Verschueren & Koomen, 2020), it would be valuable to consider the relative impact of all three dimensions in future research. Fourth, only students' gender and age were included as confounding variables in the analyses. Nevertheless, other time-invariant student characteristics (e.g., self-control) might have affected both teacher-student relationships and peer victimization. Future studies are encouraged to improve their identification strategy of unobserved confounding variables (Allison et al., 2017).

Conclusion

Peer victimization can have numerous detrimental consequences for victimized students that can persist into adulthood (Arsenault, 2018), making it critical to investigate risk and protective factors associated with peer victimization. The current study aimed to improve existing understanding of peer victimization in schools by focusing on the teacher, a key interaction partner whose affective relationships with students can shape peer dynamics. Although teachers are key adults in the prevention and reduction of peer victimization at school (Yoon et al., 2020), no studies so far have assessed reciprocal links between positive and negative teacher-student relationships and peer victimization in early adolescence. The current three-wave longitudinal study used a multi-dimensional (i.e., positive and negative teacher-student relationships) and multi-informant (i.e., self- and peer-reports) approach to assess cross-lagged associations in a large sample of upper elementary school students. This study showed that teacher-student closeness and conflict were uniquely and independently associated with self-reported peer victimization within time and change in variables was correlated at most time points. However, no evidence was found for cross-lagged associations relating teacher-student relationships to later peer victimization or vice versa. Teacher-student closeness and conflict did show reciprocal and negative links over time. As all three constructs were relatively stable over time, the current findings highlight the need for early prevention and intervention efforts to tackle peer victimization, build positive teacher-student relationships, and especially reduce negative teacher-student relationships. In sum, the present study underscores that upper elementary school is a unique transition period to target teacher-student relationships and prevent peer victimization from stabilizing into adolescence.

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Data Sharing and Declaration The data sets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Ethical Approval This study was conducted in line with ethical principles of the Declaration of Helsinki. The Social and Societal Ethics Committee (SMEC) of KU Leuven provided ethical approval.

Consent to Participate Active informed consent was obtained from legal guardians of all individual participants included in the study.

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