

**This is a self-archived version of an original article. This version may differ from the original in pagination and typographic details.**

**Author(s):** Pakarinen, Eija; Silinskas, Gintautas; Hamre, Bridget K.; Metsäpelto, Riitta-Leena; Lerkkanen, Marja-Kristiina; Poikkeus, Anna-Maija; Nurmi, Jari-Erik

**Title:** Cross-lagged associations between problem behaviors and teacher-student relationships in early adolescence

**Year:** 2018

**Version:** Accepted version (Final draft)

**Copyright:** © The Author(s) 2017.

**Rights:** In Copyright

**Rights url:** <http://rightsstatements.org/page/InC/1.0/?language=en>

**Please cite the original version:**

Pakarinen, E., Silinskas, G., Hamre, B. K., Metsäpelto, R.-L., Lerkkanen, M.-K., Poikkeus, A.-M., & Nurmi, J.-E. (2018). Cross-lagged associations between problem behaviors and teacher-student relationships in early adolescence. *Journal of Early Adolescence*, 38(8), 1100-1141.  
<https://doi.org/10.1177/0272431617714328>

NOTICE: This is the author's version of a work that was accepted for publication in *Journal of Early Adolescence*. Changes resulting from the publishing process, such as peer review, editing, corrections, structural formatting, and other quality control mechanisms may not be reflected in this document. Changes may have been made to this work since it was submitted for publication. A definitive version was subsequently published in *Journal of Early Adolescence*, 38 (8), 1100-1141. [doi:10.1177/0272431617714328](https://doi.org/10.1177/0272431617714328)

Cross-lagged Associations between Problem Behaviors and Teacher–Student Relationships in  
Early Adolescence

Eija Pakarinen, Gintautas Silinskas, Bridget K. Hamre, Riitta-Leena Metsäpelto, Marja-Kristiina  
Lerkkanen, Anna-Maija Poikkeus, & Jari-Erik Nurmi

Author Note

Eija Pakarinen, Gintautas Silinskas, Riitta-Leena Metsäpelto, Marja-Kristiina Lerkkanen, Anna-Maija Poikkeus, and Jari-Erik Nurmi, University of Jyväskylä, P.O. Box 35, 40014 University of Jyväskylä, Finland. Bridget K. Hamre, University of Virginia, P.O. Box 800784, Charlottesville, VA 22904, US.

This study was supported by a grant from the Academy of Finland to the first author (No. 277 299 for 2015-2017), and other grants from same funding agency (No. 263 891, 268 586).

Correspondence concerning this article should be addressed to Eija Pakarinen, Department of Teacher Education, University of Jyväskylä, P.O. Box 35, 40014 University of Jyväskylä, Finland. E-mail may be sent to: [eija.k.pakarinen@jyu.fi](mailto:eija.k.pakarinen@jyu.fi).

### Abstract

This study investigated the cross-lagged associations between teacher–student relationships and problem behaviors in a sample of 440 Finnish students (half of them identified as being at risk for reading difficulties). The degree to which these associations were moderated by a child’s gender, academic performance, risk for reading difficulties, parental education, and having the same teacher over two years was examined. The teachers evaluated the students’ problem behaviors and reported closeness and conflict with a particular student. The results showed that the higher the students scored on externalizing problems in Grade 4, the more conflict teachers reported two years later. Moderator analyses revealed that internalizing problems predicted higher levels of closeness for boys only. Conflict predicted internalizing problems among students who had the same teacher across the two years. The results emphasize the importance of investigating the transactional links in different subgroups.

*Keywords:* teacher–student relationships; externalizing problems; internalizing problems; primary school; middle childhood; moderator effects

### Cross-lagged Associations between Problem Behaviors and Teacher–student Relationships in Early Adolescence

One of the most important challenges children face in school is that of forming warm and positive relationships with their teachers (Ladd, Herald, & Kochel, 2006). Previous literature has highlighted the benefits of positive teacher–student relationships for both academic and socio-emotional outcomes (Hamre & Pianta, 2001; Howes, Hamilton, & Philipsen, 1998; Hughes, Luo, Kwok, & Loyd, 2008; O’Connor & McCartney, 2007). However, student characteristics, such as problem behaviors, have also been found to contribute to the quality of the teacher–student relationship (Baker, Grant, & Morlock, 2008; Jerome, Hamre, & Pianta, 2009; Nurmi, 2012). Evidence shows that students exhibiting externalizing and internalizing problems are at greater risk of having problematic relationships with their teachers than other students are (e.g., Birch & Ladd, 1998; Howes, Philipsen, & Peisner-Feinberg, 2000). The majority of the previous research has focused on young children, and relatively little is known about the associations between the teacher–student relationships and problem behaviors in middle childhood and early adolescence. Moreover, only a few previous studies have investigated the reciprocal links between teacher–student relationship quality and children’s problem behaviors. Consequently, the present study investigated the cross-lagged associations between teacher–student relationships and students’ externalizing and internalizing problems in a Finnish longitudinal study of students moving from fourth to sixth grade (10- to 12-year-olds). In addition, the degree to which these associations was moderated by a child’s gender, academic performance, risk status, parental educational background, and having the same teacher across Grades 4 and 6 was examined.

#### **Problem Behaviors and Teacher–student Relationships**

Socio-emotional and behavioral problems are typically described in terms of internalizing or externalizing problems. Internalizing problems are characterized by depressive, anxiety-like symptoms and social withdrawal, whereas externalizing problems refer to a broad category of disruptive behaviors, such as aggressiveness, oppositional behavior, conduct problems, hyperactivity, and attention-deficit problems (McMahon, 1994). There is some evidence showing that externalizing problems are more disruptive to teacher–student relationships than internalizing problems are (Birch & Ladd, 1998; for a meta-analysis, see Nurmi, 2012). This may be because internalizing problems are directed to the self and are characterized by difficulties in coping with negative emotions (Zahn-Waxler, Klimes-Dougan, & Slattery, 2000), whereas externalizing problems and “out-of-bounds” behavior disturb classroom routines and instruction (Birch & Ladd, 1998; Ladd & Burgess, 2001) and often force teachers to intervene. However, because students with internalizing behaviors tend to withdraw and avoid social interactions, they are also at risk of developing less close and less positive relationships with their teachers (Birch & Ladd, 1998; Buyse et al., 2008; Ladd, Birch, & Buhs, 1999).

Teacher–student relationships form an important developmental context that shapes students’ experiences, achievement and behavioral adjustment (Bergin & Bergin, 2009; Hamre & Pianta, 2001; Roorda et al., 2011). A widely used measure in the research field, the Student–Teacher Relationship Scale (STRS) (Pianta, 2001), evaluates the quality of the teacher–student relationship based on a teacher’s perception of closeness and conflict. Closeness refers to high levels of warmth, open communication, approachability, and trustworthiness between teacher and child (Pianta, 1999; Pianta et al., 1995), whereas conflict is typified by strained interactions and perceived negativity within the relationship (Pianta, 1999).

It has been suggested that the links between teacher–student relationship quality and externalizing and internalizing problems can be relationship-driven, child-driven, or bi-directional (Mejia & Hoglund, 2016). First, the attachment theory (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1982) posits that warm and supportive relationships between children and caring adults are crucial for favorable developmental outcomes (Bergin & Bergin, 2009; Pianta, 1999; Sabol & Pianta, 2012; Verschueren & Koomen, 2012). For example, although teachers’ major responsibility is instruction and guidance, to be effective, teachers also need to be warm, caring, respectful, and supportive (Bergin & Bergin, 2009; Hamre & Pianta, 2001; Malecki & Demaray, 2003; Verschueren & Koomen, 2012). In line with the attachment perspective, scholars have proposed that low quality of the teacher–student relationship may contribute to children’s externalizing and internalizing problems (e.g., Hamre & Pianta, 2001; O’Connor et al., 2011; for a review, see Roorda et al., 2011).

Second, children’s socio-emotional and behavioral problems may also influence the quality of their relationships with teachers (e.g., Birch & Ladd, 1998; Henricsson & Rydell, 2004; Howes et al., 2000; Silver et al., 2005). Propositions concerning children’s evocative impact on their interpersonal environments (Nurmi, 2012; Scarr & McCartney, 1983) have suggested that various child characteristics evoke different responses from significant adults in their lives, such as teachers and parents, and, for example, influence the formation of teacher–student relationships (Pianta, 1999; Saft & Pianta, 2001).

Third, the transactional theory (Sameroff & MacKenzie, 2003) assumes that interactions between teachers and students are reciprocal in that children bring with them experiences and characteristics that influence the way in which they interact with teachers and the way in which teachers perceive the relationships with them. The way in which teachers respond to children is

then likely to influence children’s subsequent behaviors. There is also empirical evidence showing that behavioral problems and teacher–student relationships form a reciprocal transactional cycles (Birch & Ladd, 1998; Doumen et al., 2008; Hughes et al., 1999).

### **Teacher–student Relationships and Externalizing Problems**

Previous research has provided consistent evidence of the links between teacher–student conflict and externalizing problems (e.g., Buyse, Verschueren, Verachtert, & Van Damme, 2009; Ewing & Taylor, 2009; Roorda et al., 2014). On the one hand, scholars have provided evidence of the predictive role of conflict in increased externalizing problems (teacher-driven model; Mejia & Hoglund, 2016). For example, Silver et al. (2005) found that teacher–child conflict during the school transition period predicted increase in externalizing problems from kindergarten through the third grade. Buyse et al. (2009) showed that children who had a conflictual relationship with their teachers in the first grade demonstrated more behavior that was aggressive in the third grade. Pianta and Stuhlman (2004) found that if teachers reported more conflict in kindergarten, children showed more externalizing problems in the first grade. Hamre and Pianta (2001) demonstrated that teacher-perceived conflict in kindergarten exposed children to behavioral problems in upper elementary and middle school. Koomen and Jellesma (2015) showed recently that student-perceived conflict was related to higher levels of teacher-rated hyperactivity/attention problems.

On the other hand, some scholars have suggested that teacher-student conflict may be largely a reaction to children’s behavioral problems (Doumen et al., 2008; Hughes et al., 2008; Silver et al., 2005; cf. child-driven model, Mejia & Hoglund, 2016). Jerome et al. (2009), for example, found that externalizing problems in early childhood longitudinally predicted teacher-perceived conflict in elementary school. Henricsson and Rydell (2004) showed that children with

externalizing problems in the first grade had a conflictual relationship with their teacher in the second grade. Birch and Ladd (1998) found that children who were more aggressive and disruptive in kindergarten had more conflictual relationships with teachers in the first grade.

Finally, there is also increasing evidence to show that teacher–student relationship quality and child adjustment problems are mutually related. For example, Roorda et al. (2014) reported that teacher-perceived conflict had reciprocal associations with externalizing problem behaviors among Belgian preschool boys at an early phase of the school year. Similarly, recent studies by Skalická, Stenseng et al. (2015) and Skalická, Belsky et al. (2015) showed that teacher–child conflict and externalizing problems had a reciprocal pattern from preschool to the first grade. Zhang and Sun (2011) showed among Chinese preschoolers that externalizing problems positively predicted conflict, and conflict positively predicted subsequent externalizing problems. Furthermore, Doumen et al. (2008) found that children’s aggressive behavior at the start of the school year predicted teacher-perceived conflict in the middle of the school year, which, in turn, was related to children’s increased aggressiveness at the end of the school year. Mejia and Hoglund (2016) demonstrated that externalizing problems predicted teacher-perceived conflict over a school term but not vice versa. A recent study by De Laet et al. (2016) reported that adolescents who display more rule-breaking behavior experienced increased dissatisfaction with their teachers, which, in turn, further increased their adjustment problems. Ly and Zhou (2016) found that teacher-rated conflict positively predicted parent-rated externalizing problems in a sample of Chinese American immigrant children.

The results regarding teacher-perceived closeness and externalizing problems are less consistent. First, there are only a few studies showing that a close and warm relationship between teacher and student is associated with low levels of externalizing problems (Baker et al., 2006;



Spilt, Koomen, & Mantzicopoulos, 2010). For instance, Koomen and Jellesma (2015) recently reported that in a sample of Dutch fourth to sixth graders, student-perceived closeness was related to fewer hyperactivity/attention problems. However, most longitudinal studies have shown no significant links between closeness and externalizing problems (e.g., Buyse et al., 2009; Ewing & Taylor, 2009). Second, although some cross-sectional studies have shown that externalizing problems are related to lower teacher-perceived closeness (Buyse et al., 2008; Thijs, Westhof, & Koomen, 2012), longitudinal studies have not been able to confirm this predictive role (Henricsson & Rydell, 2004; Jerome et al., 2009; Roorda et al., 2014). Third, studies have not been able to show reciprocal relations between externalizing problems and teacher-perceived closeness (see Roorda et al. 2014, as an example). Skalická, Belsky et al. (2015), however, demonstrated in a Norwegian sample that the effects of teacher-perceived closeness on later externalizing problems were moderated by group size: Greater closeness in preschool predicted reduced externalizing problems in the first grade only for children in small groups. Ly and Zhou (2016) showed in a sample of Chinese American immigrant children that teacher-rated externalizing problems negatively predicted child-rated closeness.

### **Teacher-student Relationships and Internalizing Problems**

The evidence for the links between internalizing problems and teacher–student conflict is not consistent. Although some studies have shown that teacher–child conflict predicts higher numbers of internalizing problems among preschoolers with low effortful control (Myers & Morris, 2009), many other longitudinal studies have not found that conflict predicts increases in internalizing problems, however (e.g., Henricsson & Rydell, 2006; O’Connor, Collins, & Supplee, 2012). The same is true for internalizing problems and teacher–student closeness. Pianta and Stuhlman (2004) found that when teachers reported less close relationships with

children in pre-kindergarten, the children subsequently showed higher levels of internalizing problems in the first grade. Similarly, teacher–child closeness has been linked to preschoolers’ fewer socio-emotional difficulties over time (Myers & Morris, 2009; Pianta & Stuhlman, 2004). Some studies have shown that internalizing problems predict low closeness in teacher-student relationships (Arbeau, Coplan, & Weeks, 2010; Roorda et al., 2014; Rudasill, 2011), whereas some other studies have not found this link (Ewing & Taylor, 2009; Henricsson & Rydell, 2004; Jerome et al., 2009). A study by Thijs et al. (2012), conducted with Dutch and Moroccan fourth- to sixth-grade students in the Netherlands, demonstrated a positive link between internalizing problems and teacher-rated closeness.

Some studies have also examined the transactional relations between internalizing problems and teacher–student relationship quality. Roorda et al. (2014) found that teacher-perceived conflict had reciprocal associations with preschool boys’ internalizing problems at an early phase of the school year but not during the second half of the school year. A recent study by Ly and Zhou (2016) showed among a sample of Chinese American immigrant elementary school children that those with higher levels of teacher-rated internalizing problems scored lower on teacher-rated conflict later on, whereas Zhang and Sun (2011) demonstrated a significant path from internalizing behavior to teacher-perceived conflict in Chinese preschoolers. Ly and Zhou (2016) found that the quality of the teacher–student relationship did not predict children’s internalizing problems over time. However, children with higher parent-rated internalizing problems had lower subsequent teacher-perceived closeness. Interestingly, Roorda et al. (2014) demonstrated that internalizing problems positively predicted subsequent teacher-perceived closeness in a sample of preschool-aged boys.

### **Moderating Factors**

Several factors are likely to moderate the links between students' externalizing and internalizing problems, and the quality of the teacher–student relationship. Academic risk hypothesis, for example, suggests that students who are at risk of school failure may have the most to gain, or lose, through their ability to adapt to the social environment of the classroom (Hamre & Pianta, 2001).

Previous research has shown that boys typically experience greater levels of conflict in their relationships with teachers, and girls experience more closeness (e.g., Baker, 2006; Hamre & Pianta, 2001; Jerome et al., 2009; Ladd, Birch, & Buhs, 1999; Saft & Pianta, 2001). A host of studies has also shown that boys typically show higher rates of externalizing problems than girls do (e.g., Bongers et al., 2003; Ewing & Taylor, 2009; Silver et al., 2005), whereas girls more typically show internalizing problems compared to boys (e.g., Leadbeater et al., 1999; Sterba, Prinstein, & Cox, 2007). In line with the academic risk perspective, we hypothesized that teacher–student relationships can be assumed to have a larger impact on the school adjustment of boys compared to girls (Baker, 2006; Hamre & Pianta, 2001; Roorda et al., 2011).

The SES of a child's family has also been linked with teacher–student relationships and students' problem behaviors, such that children who come from low SES families typically have poorer relationships with their teachers (Buyse et al., 2008; Ewing & Taylor, 2009; Pianta & Stuhlman, 1994; Saft & Pianta, 2001) and show more problem behaviors (Dodge, Pettit, & Bates, 2008) than other children do. Again, along the assumptions of academic risk hypothesis (Sabol & Pianta, 2012), we expected that externalizing problems would be associated with teacher-perceived conflict among students with low-educated parents in particular (see Roorda et al., 2011).

Academic performance and academic risk status are also important predictors of teacher–student relationship quality (Ladd et al., 1999; Rudasill et al., 2006). Jerome et al. (2008), for example, demonstrated that children who had lower academic performance had higher levels of teacher-perceived conflict and lower levels of closeness in kindergarten. In the present study, on the basis of the academic risk hypothesis (Hamre & Pianta, 2001; Roorda et al., 2011; Sabol & Pianta, 2012), we assumed that the linkages between behavioral problems and the teacher–student relationship would be stronger among students with a low academic performance and among students identified as being at risk for reading difficulties (Hamre & Pianta, 2001).

Further, Ewing and Taylor (2009) proposed the gender role socialization perspective, which could explain why the developmental significance of teacher–child relationships may be different for boys and girls. The gender role socialization hypothesis suggests that girls are more sensitive to interpersonal relationship quality because they are more socially oriented (Ewing & Taylor, 2009). It can be suggested that girls profit more from close teacher–child relationships but also that they will be more negatively affected by poor relationships. Baker (2006), for instance, demonstrated that girls benefited more from positive relationships with teachers compared to boys with similar quality relationships in terms of better academic outcomes. In line with the gender role socialization hypothesis, closeness, for example, was expected to play a more important role for girls’ adjustment than that of boys (Baker, 2006; Roorda, et al., 2011). In addition, because it is more typical for girls to internalize and for boys to act out and behave disruptively (Bongers et al., 2003; Ewing & Taylor, 2009; Silver et al., 2005; Sterba et al., 2007), insecure and conflicted relationship with teachers could increase internalizing problems in girls and externalizing problems in boys.

The length of the time that a teacher has known and instructed a particular student may also be related to linkages between teacher–student relationship quality and children’s problem behaviors. However, no previous studies, to our knowledge, have investigated this issue. In the present study, we assumed that the associations between teacher–student relationship quality and children’s problem behaviors would be stronger in a group having the same teacher for several years, because long-lasting interpersonal relationships may have a higher developmental significance for children. For example, a higher level of trust between teacher and students may require some time to be built.

### **Teacher–Student Relationships and Problem Behaviors in Middle Childhood and Early Adolescence**

Much of what we know about the associations between teacher–student relationships and students’ problem behaviors is based on studies among preschoolers, kindergarteners, and early elementary school students (for exceptions, see O’Connor et al., 2011; Rudasill, Reio, Stipanovic, & Taylor, 2010), while research on these associations is rare in middle childhood and early adolescence. A lack of such research a serious limitation for three reasons. First, teacher–student relationship quality in middle childhood and early adolescence (ages 10–14) establishes developmental needs for students that differ from those in childhood (Eccles, 1999). Second, early adolescence is a vulnerable period of development that is characterized by rapid physiological and cognitive changes (Eccles, 1999). For example, there is some evidence to suggest that early adolescents, particularly girls, may be prone to an increase in internalizing problems because of their pubertal maturation (Wichstrom, 1999). Third, the importance of school as a major developmental context increases during early adolescence, and teachers become the primary figures helping students with learning and encouraging them to pursue their

academic goals (Hamre & Pianta, 2001). It has been argued (Roorda et al., 2011) that in adolescence, students have an increased need for supportive and positive relationships with non-parental adults, such as teachers. Positive relationships with teachers provide young adolescents with an important source of adult guidance and support that act as a protective factor in the development of behavioral difficulties (Baker, 2006; Buyse et al., 2008; Hamre & Pianta, 2001; Hughes et al., 1999). Conversely, negative interactions with teachers may reinforce disengagement and lack of connectedness to school (Juvonen, 2007), increase problem behaviors (Baker et al., 2008), and expose students to a negative progression of development (Hamre & Pianta, 2001). Moreover, such need of positive teacher-student relationships may be particularly important for children who are more vulnerable in terms of learning and behavioral problems (Verschueren, 2015). As there are only a few empirical studies focusing on early adolescence (for exceptions, see De Laet, Colpin, et al., 2014; De Laet, Doumen et al., 2014; Jellesma et al., 2015; Koomen & Jellesma, 2015; Rudasill et al., 2010), the present study investigated the reciprocal associations between the teacher–student relationship, and students’ externalizing and internalizing problems among Finnish young adolescents when they moved from the fourth to the sixth grade of elementary school.

### **Research Questions**

The present study aimed to investigate the reciprocal associations between teacher–student relationships and students’ problem behaviors. On the one hand, we investigated the extent to which teacher-perceived closeness and conflict predicted students’ subsequent externalizing and internalizing problems when controlling for autoregressive effects. On the other hand, we examined the extent to which students’ externalizing and internalizing problems predicted subsequent teacher–student closeness or conflict when controlling for autoregressive effects. We

assumed to find transactional associations between teacher-perceived conflict and externalizing problems (Hypothesis 1; Roorda et al., 2014; Skalická, Belsky et al., 2015; Skalická, Stenseng et al., 2015; Zhang and Sun, 2011). We also assumed to find negative predictive effects from externalizing problems (Hypothesis 2a; Nurmi, 2012) and from internalizing problems (Hypothesis 2b; Arbeau & al, 2010; Rudasill, 2011) to teacher-perceived closeness.

As the next step of our analyses, the moderating effects of gender, parental education, academic risk status, and students' academic performance in the associations between the teacher–student relationship and problem behaviors were examined. We expected that the association between problem behaviors and the teacher–student relationship would be stronger among boys (Hypothesis 3a), and among children whose parents have low level of education (Hypothesis 3b), among children with at-risk status (reading difficulties) (Hypothesis 3c), and low academic performance (a composite of reading and math performance) (Hypothesis 3d). In addition, we investigated whether the models would be similar in terms of having the same teacher across Grades 4 and 6. We hypothesized (Hypothesis 3e) that that teacher-student relationship quality would be more stable when having the same teacher for multiple years versus having a different teacher.

## Method

### Participants

The present sample comprised 440 Finnish students (48% girls; 52% boys;  $M_{age} = 121.95$  months,  $SD = 3.57$ ) at the beginning of Grade 4 and 140 teachers from 70 schools. The participants of this subsample were drawn from a longitudinal study (Lerkkanen et al., 2006-2016) that followed approximately 2,000 children from the beginning of kindergarten to the end

of the sixth grade. The original sample was drawn from four Finnish municipalities. Only students whose parents had given their written consent to participate (80%) were tested.

The subsample of the present study consisted of children identified as at risk for reading difficulties at the end of kindergarten ( $n = 206$ ) and randomly selected control children from the same classrooms ( $n = 234$ ). Risk for reading difficulty (RD) (Lerkkanen et al., 2011) was determined on the basis of kindergarten assessment for pre-reading skills (i.e., letter knowledge, phonemic awareness, and rapid automatized naming) and information on the parents' reading difficulties, indicated by either mother or father self-reporting "mild" or "severe" problems with reading at school age. A child was identified as being at risk for RD if he or she scored at or below the 15th percentile (of the total sample) in at least two of the measured skill areas or if the child scored at or below the 15th percentile in one of the skill areas and the parental questionnaire indicated a family risk. From the other participants of the follow-up ( $n = 1,690$ ), a random sample of non-risk children who did not meet the risk criteria was also included in the individual follow-up assessment from the first grade onward. The random selection of the non-risk sample was conducted from classrooms in a stratified fashion. Because of the variation in class size, the number of non-risk children from different classrooms ranged between one and six, with a median of three children. Target sampling of children for the individual follow-up was necessary to ensure that the data collection demands placed on the teachers were not too heavy.

The at-risk children had somewhat higher levels of externalizing problems at both time points and higher levels of internalizing problems in Grade 4. However, the at-risk children and control children did not differ in terms of teacher-rated closeness and conflict in Grades 4 and 6. Boys and girls were equally distributed across the low-achieving and high-achieving subgroups,



$\chi^2(1) = .694, p = .407$ , Cramer's  $V = .034$ , Approx. Sig. = .405. Children from low-educated and high-educated families were not equally distributed across the low-achieving and high-achieving groups,  $\chi^2(1) = 21.996, p = .000$ , Cramer's  $V = .250$ , Approx. Sig. = .000. Children from low-educated families were more likely to belong to a low-achieving group, whereas children from high-parental-education families were more likely to be high achievers.

The demographic statistics of the study sample are shown in Table 1. The sample was highly homogeneous in ethnic and cultural background, which is typical of a school population outside the metropolitan regions of Finland. The representativeness of the students' family background with respect to the general Finnish population was good (Statistics Finland, 2012). Drop-out rates across Grades 4 and 6 varied between 50.5% and 51% (see Table 2 for descriptive statistics). Participants dropped out mainly due to the fact that the new data gathering at Grade 6 required new parental consent for their offspring's participation (previous consent was received for a data collection across kindergarten and Grade 4). In the present sample, 179 students dropped out between Grades 4 and Grade 6. However, 30 of them were students who repeated a class, so they were not asked to participate in Grade 6. Therefore, the true attrition between Grades 4 and 6 was 149 students. Teachers also changed between Grades 4 and 6, and 41.1% of teachers were not willing to participate in the study. Overall, 58.9% of the teachers participated (the response rates varied between 49.1% and 81.3% across different cities), and the rest of the students dropped out because parental consent was not given.

**Teachers.** In the fourth grade, 140 teachers from 70 schools participated in the study. Of the fourth-grade teachers, 64.9% were female and 35.1% male. Forty-five percent of the teachers had more than 15 years' teaching experience, 36% had from six to 15 years of experience, 15% had from one to five years of experience, and 4% had less than one year of experience (mode =

more than 15 years). Eighty percent of the teachers had at least a master's degree in education (five-year university degree), and the remaining 20% had a bachelor's degree in education (class teacher training program prior to year 1979). All teachers had an elementary teacher's qualification. The teachers had given their written consent for participation. Teachers received a movie ticket when filling in the questionnaires and rating the individual students. Due to attrition, 85 sixth-grade teachers from 53 schools participated in the study and rated 252 students (218 of them were also rated in Grade 4). Slightly more than half (56.3%) of the teachers changed after the fourth grade, and 43.7% of the students had the same class teacher in both grades.

**Procedure.** The students' reading and math skills were examined at the end of the third grade (April). Trained investigators administered group tests in reading and math during normal school hours in the classroom. At the end of the fourth and sixth grades, the teachers filled in a questionnaire concerning the students' externalizing and internalizing problem behaviors and rated the closeness and conflict in their relationship with each student.

**Education in Finland.** The present study was conducted in Finland, where compulsory education consists of nine years of comprehensive school. Elementary school (Grades 1–6) begins at age seven, which is later than in many other countries. The same teacher typically teaches a class for several years in elementary school (typically, the same teacher teaches the same students across Grades 1–2 and 3–4 or 3–6) by teaching almost all the subjects up to Grade 6. At the age of 13, the children go to lower secondary school (Grades 7–9), where they are taught by subject teachers. The class sizes are relatively small in Finland: an average of 20.7 students in Grade 6 in 2013 (Ministry of Education and Culture, 2014). The only high-stakes

national standardized test is the matriculation exam at the end of the upper secondary school academic track (typically at the age of 18).

The teachers are highly qualified: they are required to have a master’s degree and pedagogical training. Schools do not select their students or test students’ achievement. Students are typically allocated a place in a nearby school, although it is also possible for parents to choose another school. The local education authorities and the schools themselves draw up their own curricula for kindergarten and comprehensive school within the framework of the national core curriculum designed by the Finnish National Board of Education.

### **Measures**

The psychometric properties for all study variables, including valid sample size for each variable and the reliabilities of the scales, are presented in Table 2.

**Teacher–student relationship.** To measure the quality of the teacher–student relationship, the teachers were asked to fill in the short version of the STRS, consisting of closeness and conflict subscales. The items are shown in Table 3. The scale was translated into Finnish, and blind back translation was done into English. As this was the first time that the STRS had been used in Finland, we conducted a principal axis factoring analysis with oblimin rotation on the 15 items of the short form. The two distinct factors emerged with eigenvalues over 1 at both measurement points. The items and information concerning the factor analysis are presented in Table 3. One item (“*This child experiences physical closeness or touch expressed by me as uncomfortable*”), loading on both factors equally weakly, was excluded from the subsequent analyses. For the final factor structure, seven items were indicative of conflict dimension (Cronbach’s alphas were .91 at both measurement points), and seven items were indicative of the dimension of closeness (Cronbach’s alphas were .86 at both measurement points). Teacher-rated

closeness in Grade 4 positively correlated with teachers' self-reported positive emotions ( $r = .47$ ,  $p < .001$ ) and negatively with their negative emotions ( $r = -.24$ ,  $p < .001$ ) toward a particular child. Conflict negatively correlated with teachers' positive emotions ( $r = -.50$ ,  $p < .001$ ) and positively with their negative emotions ( $r = .65$ ,  $p < .001$ ) toward a particular child.

**Students' externalizing and internalizing problems.** Students' externalizing and internalizing problems at the ends of the fourth and sixth grades were assessed using a teacher rating form of the Finnish version of the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 2001) consisting of 25 items rated on a scale of 1 to 3 (1 = *not true*, 2 = *somewhat true*, 3 = *certainly true*). As an indicator of externalizing problem behavior, a mean score was used from the SDQ's Hyperactivity scale (five items—e.g., is restless, overactive, cannot stay still for long; thinks things out before acting [reversed]; sees tasks through to the end, good attention span [reversed]) and the Conduct problems scale (five items—e.g., often fights with other children or bullies them; is generally obedient, usually does what adults request [reversed]) (Goodman, Lamping, & Ploubidis, 2010). A mean score of the Emotional problems scale (five items—e.g., has many worries, seems often to be worried; is often unhappy or tearful; complains often about headache, stomachache, or nausea) was used to form an indicator of internalizing problem behavior. The SDQ questionnaire has been shown to have good psychometric properties among Finnish children and adolescents (Koskelainen, Sourander, & Kaljonen, 2000). The correlations between teacher ratings and student ratings at Grade 6 were .43 and .29 for externalizing problems and internalizing problems, respectively.

### **Moderating Variables**

**Students' academic performance.** Students' academic performance was determined, first, by calculating z-scores for both reading and math and then calculating the mean score of the

standardized reading and math scores. Reading performance was tested in a group situation at the end of Grade 3 using a subtest of the standardized national reading achievement test battery for first through sixth grades, 6- to 12-year-old students (ALLU; Lindeman, 1998). In the word-reading task, the student was asked to select the correct word from four phonologically similar alternatives and to link this word to its picture by drawing a line between them. The test allowed for a maximum of 80 tasks to be attempted within a two-minute time limit. The score corresponded to the number of correct responses made within that time. Math skills were tested in a group situation at the end of the third grade using a basic arithmetic test (BAT) (Räsänen & Aunola, 2007) consisting of 14 addition tasks (e.g.,  $2 + 1$ ;  $3 + 4 + 6$ ) and 14 subtraction tasks (e.g.,  $4 - 1$ ;  $20 - 2 - 4$ ). The test allowed for a maximum of 28 sums to be attempted within a three-minute time limit. The score corresponded to the number of correct responses made within that time. The reliability and validity information concerning a combination of speed and accuracy of math performance have been reported in a number of earlier publications (e.g., Räsänen et al., 2009; Zhang et al., 2014). For example, the test-retest reliability of this index has been shown to be .86 (Räsänen et al., 2009).

**Highest education in the family.** Highest education in the family was measured on a seven-point scale. In 2.8% of cases, family members had no vocational education; in 1.4% of cases, short vocational courses comprised the highest education in the family; in 25.4% of the families, the highest education was a vocational school qualification; in 23.9%, the highest education was a vocational college qualification; in 14.1%, a polytechnic degree or bachelor's degree was the highest level of education; in 27.3%, a master's degree was the highest level of education; and in 5.1% of the families, there was a parent with a licentiate or doctoral degree. The correlation between fathers' and mothers' vocational education was .69 ( $p < .001$ ).

### **Analysis Strategy**

We examined the cross-lagged associations between teacher–student relationships and externalizing and internalizing problems by using the structural equation modeling (SEM) approach in Mplus Version 7.3 (Muthén & Muthén, 1998–2008). Separate models were tested for conflict and closeness. For both dimensions, four nested models were tested and compared in order to find the most parsimonious model. The first model (M1; stability model) contained only the autoregressive paths and cross-sectional associations. The second model (M2) contained the autoregressive paths and cross-sectional associations, as well as cross-lagged paths from externalizing and internalizing problem behaviors to conflict or closeness. The third model (M3) contained the autoregressive paths and cross-sectional associations, as well as cross-lagged paths from conflict or closeness to externalizing and internalizing problem behaviors. The last model (M4) contained all the cross-lagged paths. To test the differences between the nested models, the Satorra-Bentler scaled chi-square difference test for maximum likelihood estimation with robust standard errors (MLR) (Satorra & Bentler, 2001) was used (see Table 5).

Next, in order to investigate the moderator effects, the groups were formed on the basis of a child’s gender (girls vs. boys), at-risk status (reading difficulty risk vs. no risk), academic performance (33.3% of lowest-achieving students [ $n = 146$ ], 33.3% of the average-achieving students [ $n = 144$ ], and 33.3% of highest-achieving students [ $n = 150$ ]), and parental educational level (the highest education in the family is not higher than vocational school degree [ $n = 149$ ; 35.9%], average education (i.e., where the highest education in the family was a vocational college degree or a bachelor’s degree [ $n = 150$ ; 36.1%]), versus the highest education in the family is at least a master’s degree [ $n = 116$ ; 28%]). The cut-offs were chosen to make the groups as equal in size as possible. In addition, we examined whether the final models differed

for those students who had the same teacher across Grades 4 and 6 from those who did not. As the last step in our analyses, we compared the extent to which the final models differed for children having missingness in the study variables ( $n = 235$ ) from those with complete data ( $n = 205$ ). Using multiple-group path analysis, we tested whether the path coefficients in the models (Tables 6 and 7) differed significantly by group by computing the chi-square difference statistic (Satorra & Bentler, 2001), comparing the constrained models (in which all paths were constrained to be invariant by groups) to the unconstrained models (in which some paths were allowed to vary by group).

The proportion of missing data on the study variables ranged from 3.4% to 61.5% ( $M = 33.3\%$ ,  $SD = 22.32\%$ ). The high proportion of missing data was due to two years in between the measurement occasions in the larger follow-up. The data were not “Missing Completely At Random” (Little’s MCAR test:  $\chi^2 [56] = 8.193$ ,  $p < .05$ ). Consequently, we used the standard MAR approach for missingness (Muthén & Muthén, 1998–2008). Because distributions of the variables were skewed, the model parameters were estimated using the MLR FIML with robust standard errors estimator (Muthén & Muthén, 1998–2008).

Next, we performed independent sample  $t$ -tests to investigate the possible differences between the teachers and students with and without missing data on any of the study variables. The results showed that students with missing data in any of the study variables had somewhat higher scores in internalizing problems in Grade 4 ( $\Delta M = .078$  ( $S.E. = .033$ ),  $t([438]) = 2.344$ ),  $p < .059$ ), had lower parental education ( $\Delta M = -.509$  ( $S.E. = .140$ ),  $t([413]) = -3.632$ ),  $p < .001$ ), and performed lower in reading ( $\Delta M = -2.133$  ( $S.E. = .714$ ),  $t([440]) = -2.984$ ),  $p < .01$ ) and in math tests ( $\Delta M = -1.188$  ( $S.E. = .480$ ),  $t([440]) = -2.474$ ),  $p < .05$ ) at the end of Grade 3 compared to students who did not have any missing data. To ensure that the relatively high amount of missing

data would not change the results, we also conducted multi-group models with participants having the complete data ( $n = 205$ , 46.59%) and participants with missingness in any of the study variables ( $n = 235$ , 53.41%).

Because the data were hierarchical in nature (i.e., each teacher assessed more than one student: range = 1–6;  $M = 3.14$  students), we calculated intraclass correlations (ICCs) for the key study variables. The ICCs of the main study variables ranged from .09 to .33 ( $.05 < p < .001$ ). Because part of the variance in the observed variables was due to differences between teachers, we used the “complex” approach in our subsequent analyses (Muthén & Muthén, 1998–2008), which corrects for distortions in standard errors in estimates caused by the clustering of observations. Grouping was based on the teachers’ ID in Grade 4.

For all the models, goodness-of-fit was evaluated using five indicators:  $\chi^2$ , Bentler’s comparative fit index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). According to Hu and Bentler (1999), TLI and CFI values above .95, RMSEA values below .06, and SRMR values close to .08 can be considered indicators of a good model fit to the data.

## Results

Descriptive statistics and psychometric properties of all study variables are presented in Table 2. Zero-order correlations among major study variables and control variables are presented in Table 4.

### Teacher-perceived Conflict and Problem Behaviors

The model including autoregressive paths and cross-lagged paths from problem behaviors to conflict (M2) was chosen as the most parsimonious model (see Table 5) because it differed significantly from the baseline autoregressive model (M1),  $\Delta\chi(\Delta df = 2) = 8.44$ ,  $p < .05$ . A



comparison of the other models (i.e., M1 versus M3, M2 versus M4, and M3 versus M4) did not yield any further significant increase in model fit. The fit of the final model was good:  $\chi^2 [4, N = 440] = 2.394, p = .663$ ; TLI = 1.017; CFI = 1.000; RMSEA = .000; SRMR = .035 (Hu & Bentler, 1999). The results showed (Table 6) that the higher the students scored on externalizing problem behavior in Grade 4, the more conflict the teachers reported in the relationship with that particular student two years later ( $R^2 = .43$ ). Conflict did not predict subsequent externalizing problems, however. In addition, internalizing problems did not predict subsequent conflict, and conflict did not predict internalizing problems (Table 6).

### **Moderating Effects**

Next, we investigated the moderating effect of children's gender, academic performance, at-risk status, parental education, and having the same teacher versus not on the links between conflict in teacher–child relationships and child problem behaviors. All paths were constrained to be equal across subgroups when comparing models, and modification indices (MIs) suggested by the Mplus statistical program were examined.

First, we tested the model including gender as a possible moderator. The fit of the multi-group model for children's gender was poor:  $\chi^2 [19] = 45.155, p < .001$ ; TLI = .878; CFI = .904; RMSEA = .079; SRMR = .260 (Hu & Bentler, 1999). The modification indices suggested that the model fit could be improved by allowing the association between externalizing problems and conflict to be freely estimated for boys and girls at both time points (Grade 4 and Grade 6). After these two modifications, we obtained a well-fitting model:  $\chi^2 [17] = 20.146, p = .267$ ; TLI = .984; CFI = .988; RMSEA = .029; SRMR = .099. The results showed that, for girls ( $n = 189$ ) and boys ( $n = 251$ ), the association between externalizing problem behavior in Grade 4 and conflict in Grade 6 was not significant for girls ( $\beta = .129, p = .132$ ) and boys ( $\beta = .143, p = .135$ ).

Second, the multi-group model for the lowest-achieving students ( $n = 146$ ), average-achieving students ( $n = 139$ ), and highest-achieving students ( $n = 155$ ) fitted the data well:  $\chi^2 [34] = 35.261, p = .408$ ; TLI = .996; CFI = .996; RMSEA = .016; SRMR = .129. Thus, the level of academic performance did not moderate the associations between conflict in teacher–child relationships and child externalizing problem behaviors.

Third, the fit of the multi-group model for children coming from families with low parental education ( $n = 149$ ), average education ( $n = 150$ ), and high parental education ( $n = 116$ ) was poor:  $\chi^2 [34] = 71.675, p < .001$ ; TLI = .848; CFI = .856; RMSEA = .090; SRMR = .256. To improve a poor model fit, the stability paths from conflict at Grade 4 to conflict at Grade 6 and from internalizing problems at Grade 4 to internalizing problems at Grade 6, as well as concurrent association between conflict and externalizing problems at Grade 6 were set free. A good model fit was obtained— $\chi^2 [28] = 27.691, p = .481$ ; TLI = 1.002; CFI = 1.000; RMSEA = .000; SRMR = .153 (Hu & Bentler, 1999). The stability of internalizing problems ( $\beta = .653, p < .001$ ) was much higher among the children coming from the lowest educated families when compared to children from average and high-educated families ( $\beta = .120, p = .283$  and  $.366, p < .01$ ). Conflict, in turn, was more stable among children from the lowest and highest educated families ( $\beta = .502$ – $.593, p < .001$ ) when compared to children from average educated families ( $\beta = .287, p < .05$ ).

Next, we estimated a multi-group model for children being at risk for reading difficulties ( $n = 206$ ) vs. not being at risk ( $n = 234$ ). A good model fit was obtained— $\chi^2 [19] = 17.308, p = .569$ ; TLI = 1.007; CFI = 1.000; RMSEA = .000; SRMR = .057. No modification indices were suggested. Thus, the risk for reading difficulties did not moderate the associations between teacher-perceived conflict and externalizing problems.

Finally, we also tested whether a change in classroom teacher between Grades 4 and 6 moderated the examined links between conflict and problem behaviors. A poor model fit was obtained— $\chi^2 [19] = 50.992, p < .001$ ; TLI = .887; CFI = .911; RMSEA = .098; SRMR = .124—with a suggestion for improvement if a path from conflict in Grade 4 to internalizing behavior in Grade 6 for the same teachers was estimated. In addition, the modification indices suggested to freely estimate the stability path from conflict at Grade 4 to conflict at Grade 6 and the concurrent associations between externalizing problems and conflict in Grade 6 and internalizing problems and conflict in Grade 6. The results of the improved multi-group model for conflict showed a good fit to the data:  $\chi^2 [15] = 12.671, p = .628$ ; TLI = 1.010; CFI = 1.000; RMSEA = .000; SRMR = .067. The results showed that for the group for which the teacher remained the same across Grades 4 to 6 ( $n = 91$ ), conflict predicted subsequent internalizing problem behaviors. That is, the more conflict teachers reported with children in Grade 4, the more children were rated as having internalizing problems in Grade 6 ( $\beta = .278, p < .01$ ;  $R^2 = .37$ ).

### **Teacher-Perceived Closeness and Problem Behaviors**

For closeness, the stability model with the autoregressive paths and cross-sectional correlations (M1) was chosen as the most parsimonious model, because adding cross-lagged paths (i.e., models M2, M3, and M4) did not improve the baseline autoregressive model (see Table 5). The fit of the final model was good:  $\chi^2 [6, N = 440] = 3.339, p = .765$ ; TLI = 1.032; CFI = 1.000; RMSEA = .000; SRMR = .032 (Hu & Bentler, 1999). The results showed (Table 7) that closeness and internalizing problems exhibited moderate stability and that externalizing problem behaviors were highly stable across two years.

### **Moderating Effects on the Autoregressive Model**

We also investigated the moderating effect of a child's gender, academic performance, at-risk status, parental educational level, and having the same teacher versus not on the baseline autoregressive model of closeness and children's problem behaviors (see Table 9).

First, we applied a multi-group procedure for children's gender and obtained a poor model fit:  $\chi^2 [21] = 39.524, p = .009$ ; TLI = .874; CFI = .890; RMSEA = .063; SRMR = .122 (Hu & Bentler, 1999). Careful investigation of the modification indices suggested an improvement of the model fit if the path from internalizing behavior in Grade 4 to closeness in Grade 6 was estimated separately for boys and girls. In addition, the model fit would improve if the concurrent association between internalizing and externalizing problems at Grade 6 and concurrent association between externalizing problems and closeness in Grade 6 would be freely estimated across the groups. The modified model had a better model fit— $\chi^2 [18] = 23.489, p = .172$ ; TLI = .956; CFI = .967; RMSEA = .037; SRMR = .105—and no further modifications were suggested. The results showed (Table 9) that for boys ( $n = 251$ ), internalizing problem behaviors increased teacher-perceived subsequent closeness ( $\beta = .27, p < .01$ ;  $R^2 = .20$ ).

Second, a multi-group procedure was applied to contrast the lowest-achieving students ( $n = 146$ ), the average-achieving students ( $n = 147$ ), and the highest-achieving students ( $n = 145$ ) based on children's reading and math performance in Grade 3. A good model fit was obtained for the autoregressive model— $\chi^2 [36] = 42.486, p = .212$ ; TLI = .970; CFI = .970; RMSEA = .035; SRMR = .157—with a suggestion to freely estimate the stability path from internalizing problems at Grade 4 to internalizing problems at Grade 6 across groups to increase the model fit even more. The fit of the final model was good:  $\chi^2 [34] = 35.076, p = .417$ ; TLI = .995; CFI = .995; RMSEA = .015; SRMR = .122. The stability of internalizing problems was much higher

among the lowest achieving students ( $\beta = .693, p < .001$ ) when compared to the average and high-achieving students ( $\beta_s = .320\text{--}.322, p < .01$ ).

Then, we estimated a model for children coming from families with low parental education ( $n = 149$ ), average education ( $n = 147$ ), and children from families with high parental education ( $n = 116$ ). The model fitted the data satisfactorily— $\chi^2 [36] = 51.817, p = .043$ ; TLI = .913; CFI = .913; RMSEA = .057; SRMR = .174 (Hu & Bentler, 1999)—with no suggestions for improving the model fit by estimating any cross-lagged paths. The modification indices, however, suggested that estimating freely the stability paths of internalizing problems and externalizing problems across the groups would improve the model fit. The fit of the final model was good:  $\chi^2 [32] = 27.989, p = .670$ ; TLI = 1.025; CFI = 1.000; RMSEA = .000; SRMR = .098. The stability of internalizing problems was higher among children coming from the lowest educated families ( $\beta_{\text{low}} = .643, p < .001$ ) when compared to children coming from the average and high-educated families ( $\beta_{\text{average}} = .144, p = .126$ , and  $\beta_{\text{high}} = .362, p < .01$ ), and stability of externalizing problems ( $\beta_{\text{low}} = .785, p < .001$ ) was somewhat higher when compared to children coming from the average and high-educated families ( $\beta_s = .715\text{--}.607, p < .001$ ).

Next, we estimated a multi-group model for children being at risk for reading difficulties ( $n = 206$ ) versus not being at risk ( $n = 234$ ). A satisfactory model fit was obtained— $\chi^2 [21] = 34.858, p = .029$ ; TLI = .927; CFI = .936; RMSEA = .055; SRMR = .145—with a suggestion of modification indices to improve the model fit by freeing the stability path of closeness. The fit of the final model was good:  $\chi^2 [20] = 20.063, p = .454$ ; TLI = 1.000; CFI = 1.000; RMSEA = .004; SRMR = .065. The stability of teacher-perceived closeness between Grades 4 and 6 was much higher among the children being not at risk for reading difficulties ( $\beta = .605, p < .001$ ) when compared to children being at risk ( $\beta = .140, p = .223$ ).

Finally, we also tested whether a change in classroom teacher between Grades 4 and 6 moderated the examined links between closeness and problem behaviors. A good model fit was obtained:  $\chi^2 [21] = 14.485$ ,  $p = .848$ ; TLI = 1.040; CFI = 1.000; RMSEA = .000; SRMR = .083. No MIs were suggested to improve the model fit. Thus, having the same or different teachers across Grades 4 and 6 made no difference for the relationship between closeness in teacher–child relationship and externalizing and internalizing problem behaviors.

### **Complete Data vs. Incomplete Data across Grades 4 and 6**

As the last step in our analyses, we compared the extent to which the final models differed for children having missingness in the study variables ( $n = 235$ ) from those with complete data ( $n = 205$ ). The results showed that the models did not differ significantly for students having complete data from those having missing values in some of the study variables.

### **Discussion**

The present study contributes to the existing literature by examining the cross-lagged associations between teacher–student relationships, and students’ externalizing and internalizing problem behaviors in early adolescence. The results showed that the higher the student scored on externalizing problem behaviors in Grade 4, the more conflict their teachers perceived in the relationship with the same student two years later. Moderator analyses revealed that internalizing problems predicted higher levels of closeness for boys only. Moreover, if the teacher stayed the same across Grades 4–6, conflict was related to increase in internalizing problems. The results of the present study are of particular importance because the study is among the first attempts to investigate transactional associations between teacher–student relationships and problem behaviors in a sample of early adolescents (4<sup>th</sup> and 6<sup>th</sup> graders). One further strength of this study is that we were able to investigate the longitudinal associations between teacher–student

relationships and problem behaviors, as we had cross-lagged longitudinal data with two years in between the measurement occasions.

### **Links between Teacher–Student Relationships and Externalizing Problems**

The results of the present study showed that the higher levels of externalizing problems the students showed, the more conflict their teachers reported in the relationship with the particular students two years later. In addition, teacher-perceived conflict was strongly associated with concurrent externalizing problems in both grades. In contrast to our assumption (Hypothesis 1) and many recent findings (Doumen et al., 2008; Ly & Zhou, 2016; Roorda et al., 2014; Skalická, Belsky et al., 2015, Skalická, Stenseng et al., 2015; Zhang & Sun, 2011), cross-lagged effects from conflict to externalizing problems were not found. The results of the present study suggest that student characteristics influence teacher–student relationships in middle childhood rather than the other way around. This result provides evidence for children’s evocative impact on their interpersonal environments (Nurmi, 2012; Saft & Pianta, 2001; Scarr & McCartney, 1983) and for a child-driven model (Mejia & Hoglund, 2016).

The results of the present study highlight that students with externalizing problems—those who would be most likely to benefit from warm and supportive relationships with caring adults—are most at risk for conflictual and less supportive interactions with their teachers, increasing their risk of failure in school (Doumen et al., 2008; Ladd & Burgess, 2001). The “out-of-bounds” behavior of students with poor self-regulation skills, such as breaking rules and disturbing classroom routines and instruction (Ladd & Burgess, 2001), causes stress and negative reactions among teachers (Birch & Ladd, 1998; Hamre & Pianta, 2001) and often forces them to intervene. Students’ disruptive behavior may also cause the students to overlook vital information and thus fail to follow teachers’ instructions (Atkins, McKay, Talbott, & Arvanitis,

1996). In the present study, externalizing problems and teacher-perceived conflict showed high inter-individual stability, although nearly half of the teachers changed between the fourth and sixth grades, suggesting that teacher perceptions of conflict may be largely a reaction to students' behavioral problems (see Doumen et al., 2008; Hughes et al., 2008; Silver et al., 2005).

In contrast to our expectations (Hypothesis 2a), we found only concurrent associations between externalizing problems and teacher-perceived closeness. The results of our study are different from some previous findings. For example, Ly and Zhou (2016) showed in a sample of Chinese American immigrant children that teacher-rated externalizing problems negatively predicted child-perceived closeness. Skalická, Belsky et al. (2015) demonstrated in a Norwegian sample that greater closeness in preschool predicted reduced externalizing problems in the first grade only for children in small groups. There are several reasons why the findings of the present study are different from those of some previous studies. For example, the fact that we examined older students may partly explain the insignificant link from relationship quality to externalizing problems. Students in lower secondary school are likely to begin to value their peer interactions and relationships more than their interactions with parents and teachers (Eccles, 1999), and the nature of the teacher–student relationship may change in middle childhood (Verschueren, 2015). Moreover, it may be that teacher–child relationship quality does not affect the problem behaviors of young adolescents because inter-individual differences in problem behaviors have grown more stable (Broidy et al., 2003). One difference between the present study and many other studies that may have created differences is that we had two years in between the measurement points, whereas other studies (e.g., Roorda et al., 2011; Zhang & Sun, 2011) investigated the cross-lagged associations during a single school year.

### **Links between Teacher-student Relationships and Internalizing Problems**



In contrast to our expectations (Hypothesis 2b), we found only concurrent associations between internalizing problems and teacher–student relationship quality. It should be noted, however, that the concurrent links between teacher-perceived closeness and internalizing problems were significant in Grade 4 but not in Grade 6, whereas concurrent associations between teacher-perceived conflict and internalizing problems were significant at both grades. In contrast to the previous cross-lagged longitudinal studies by Roorda et al. (2014) and Zhang and Sun (2011), students' internalizing problems were not associated with subsequent teacher–student conflict. Ly and Zhou (2016) also found that parent-rated internalizing problems negatively predicted teacher-perceived closeness, and teacher-rated internalizing problems negatively predicted teacher-perceived conflict. Our insignificant result may be due to the fact that our study investigated students in middle childhood, the age at which the nature of the teacher–student relationship may change from proximity and comfort to secure base (Baker, 2006; Verschueren, 2015), whereas many of the previous cross-lagged studies (e.g., Roorda et al., 2014; Zhang & Sun, 2011) have examined preschoolers. Teachers may expect more proximity and open communication from younger children and may thus report more conflict and less closeness with younger students who are shy and withdrawn. By contrast, teachers may interpret early adolescents' internalizing problems as a kind of normative, age-related behavior and, therefore, as not disturbing the quality of their relationship. Another difference from the prior cross-lagged studies was that in our study, the time between the two waves was two years, whereas other studies have investigated the links between teacher–student relationships and problem behaviors across one school year.

### **Moderator Effects**

The moderator analyses revealed that only gender and having the same versus different classroom teachers across Grades 4 and 6 moderated the associations between problem behaviors and teacher–student relationships. Interestingly, our results revealed that teachers reported a closer relationship with boys showing internalizing problems. Similarly, Roorda et al. (2014) showed in their study among preschoolers that teachers consistently reported more closeness with boys exhibiting internalizing problems. By contrast, most of the previous studies have shown that high internalizing problems are associated with low teacher-perceived closeness (e.g., Buyse et al., 2008; Thijs & Koomen, 2009). One explanation for the results of the present study is that teachers expect a greater degree of open communication and approachability from girls, whereas teachers are more satisfied with their relationship with boys who direct their problems to the self and not to the environment. As boys are typically more active and less self-disciplined (Duckworth & Seligman, 2006) or less willing to comply with what is expected of them, teachers think that shy and withdrawn boys are better to have in the classroom because they do not disturb classroom routines.

The fact that the same classroom teacher teaches the same students for several years in primary school is a somewhat distinctive characteristic of the Finnish school system when compared to those of many other countries. This allowed us to examine whether the results would be the same among students who had the same teacher and those who had different teachers across Grades 4 to 6. The results of the present study showed that when students had the same teacher for two years, conflict predicted students' subsequent higher level of internalizing problems. A conflictual relationship with the teacher over longer time period seems to increase students' anxious and withdrawn behaviors. One possible explanation for this finding is that when children do not get emotional support from their teachers, they see themselves and their

competencies increasingly negatively. Interestingly, long-term insecurity or lack of confidence in the relationship with the teacher is manifested in withdrawn behaviors rather than in disruptive or acting-out behavior. In a similar vein, O'Connor et al. (2011) showed that low-quality teacher–child relationships that declined in quality over time were risk factors for high levels of internalizing problems in elementary school. Jellesma et al. (2015) recently demonstrated that child perceptions about the teacher—the negative appraisals in particular—matter for children having internalizing problems.

Although more than half of the teachers changed between Grades 4 and 6, a child-driven effect (Mejia & Hoglund, 2016) from externalizing problems to conflict was also found among the new teachers. The fact that externalizing problems predicted teacher-perceived conflict both among students who had the same teacher for several years and among students whose teacher changed between Grades 4 and 6 provides further evidence for the assumption that student behavior drives teacher–student relationship quality (Doumen et al., 2008; Hughes et al., 2008; Silver et al., 2005). As externalizing problems are quite stable over time (Broidy et al., 2003), the risk of also having problems with the new teacher is high.

In contrast to our hypotheses and academic risk hypothesis (Hamre & Pianta, 2001; Roorda et al., 2011), the associations did not significantly differ according to being at risk of reading difficulties (Hypothesis 3c), academic performance (Hypothesis 3d), and parental level of education (Hypothesis 3b). The moderator analyses showed that externalizing problems were associated with subsequent conflict similarly among boys and girls, among children coming from low- versus high-educated families, among children having low versus high academic achievement, and among children identified as being at risk of reading difficulties versus children being not at risk. Consequently, our results did not confirm previous results indicating

that externalizing problems typically interact with other risk factors, such as male gender, low academic performance, at-risk status, and low educational background.

### **Limitations and Future Directions**

The present study is not without limitations. First, although our study had a longitudinal design, we had only two time points. Consequently, caution is warranted in making causal inferences. Second, given the low participation rate of teachers at Grade 6, the results may be biased. Third, this study focused on teacher-perceived closeness and conflict in their relationships with students and relied on teacher reports on students' problem behaviors. Although we found that teacher ratings correlated moderately with students' self-ratings of externalizing and internalizing problems, we have to keep in mind that we did not actually measure problem behaviors but teacher reports of problem behaviors. Thus, the associations between teacher–student relationships and problem behaviors may be inflated because of shared method variance. Although teacher ratings have been shown to be reliable measures of behavioral adjustment (e.g., Goodman, 2001; Koskelainen et al., 2000) and relationship quality (e.g., Doumen, Koomen, Buyse, Wouters, & Verschueren, 2012), future studies would benefit from using multiple measures of both problem behaviors (parental or observer ratings) and teacher–student relationship quality (student or observer ratings; Jellesma et al., 2015; Malecki & Demaray, 2003; Murray & Zvoch, 2015). Fourth, the present study did not focus on actual teacher–student interactions in the classrooms. Future studies should thus also use measures of actual classroom interactions in order to investigate the possible protective factors and to shed light on the processes by which these effects occur. Fifth, internalizing problems in our study consisted only of an emotional symptoms scale, whereas in some studies, peer problems have also been included as an indicator of internalizing problems (Goodman et al., 2010). Moreover,

because internalizing problems are difficult to observe, future studies should be complemented by self-ratings of internalizing problems (Kolko & Kazdin, 1993). Sixth, there is the possibility that some unmeasured “third factors” could have explained some of these results, such as the characteristics of the teacher, school climate, classroom context, or peer status in the classroom (De Laet, Doumen et al. 2014). For example, as peers become increasingly important in this developmental period, future studies should examine peer effects in tandem with students’ problem behaviors and teacher–student relationships. Finally, it should be noted that half of the sample were children who were identified as being at risk of reading difficulties. However, the moderation analyses did not find any significant differences between the children who were at risk and those who were not at risk.

### **Practical Implications**

The present study has some potential implications for pre- and in-service teachers and for children with problem behaviors. First, early screening of students with problem behaviors and interventions focused on such students seem to be of importance in order to prevent the development of negative teacher–student relationships and to prevent the continuance of externalizing behaviors because they seem to be especially stable over time. It has been shown (Spilt, Koomen, Thijs, & van der Leij, 2012) that teachers express more anger and helplessness concerning the child they perceive as disruptive in their class as compared to a nondisruptive child. Second, teachers may also need extra help to be able to form positive, non-conflictual relationships with students showing externalizing problems. Interventions that might help are interventions that focus on relationships with students with externalizing problems to prevent the further development of conflictual and less warm relationships. As an example, the relationship-focused reflection program (Spilt et al., 2012) has been developed to promote teachers’

relationships with behaviorally at-risk kindergarteners. Moreover, because problem behaviors are typically rated by teachers, it would be important to reflect on how teacher cognitions about problem behaviors (rather than actual problem behaviors) may be changed in such a way that the relationship is no longer at risk. For example, interventions focusing on teacher efficacy beliefs might be useful for declining teacher perceptions of conflict. The reason for this is, as Thijs et al. (2008) have shown, that teacher perceptions of teacher–student relationships are associated with their pedagogical practices, which may make it particularly important for teachers to learn how to monitor and foster their relationships with students who evidence behavioral problems. Because teachers may be more able to provide support, praise, and constructive feedback than to decrease their negative affect, interventions and teacher preparation programs should focus on building and fostering the positive aspects of a relationship with challenging and disruptive children. Third, the result showing that conflictual relationship with teacher predicted students' internalizing problems when the students had the same teacher for multiple years suggests that, as children start to internalize if they are exposed to a less positive interpersonal relationship at school for several years, teachers should be aware of the influence of their negative relationship with students and teacher–student interactions, especially if such negative relationships last for a long time.

### **Conclusions**

The results of the present study provide a new understanding of the associations between conflictual and less warm relations with teachers and students' problem behaviors in middle childhood. Overall, the results suggest that, in the Finnish context of young adolescents, student characteristics influence the quality of the teacher–student relationship rather than the quality of the teacher–student relationship impacting students' subsequent externalizing and internalizing

problems. However, future studies are needed to investigate more deeply the moderating effects of gender and having the same teacher for multiple years versus having a different teacher each year in the reciprocal associations between students' externalizing and internalizing problems and teacher–student relationships.

## References

- Ainsworth, M. D., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Hillsdale, NJ: Lawrence Erlbaum.
- Arbeau, K. A., Coplan, R. J., & Weeks, M. (2010). Shyness, teacher-child relationships, and socio-economic adjustment in grade 1. *International Journal of Behavioral Development, 34*, 259–269.
- AUTHORS (2006).
- AUTHORS (2011).
- Baker, J. A. (2006). Contributions of teacher-child relationships to positive school adjustment during elementary school. *Journal of School Psychology, 44*, 211–229.
- Baker, J. A., Grant, S., & Morlock, L. (2008). The teacher–student relationships as a developmental context for children with internalizing or externalizing behavior problems. *School Psychology Quarterly, 23*, 3–15.
- Bergin, C., & Bergin, D. (2009). Attachment in the classroom. *Educational Psychology Review, 21*, 141–170.
- Birch, S. H., & Ladd, G. W. (1998). Children’s interpersonal behaviors and the teacher–child relationship. *Developmental Psychology, 34*, 934–946
- Bongers, I. L., Koot, H. M., van der Ende, J., & Verhulst, F. C. (2003). The normative development of child and adolescent problem behavior. *Journal of Abnormal Psychology, 112*, 179–192.
- Bowlby, J. (1982). *Attachment and loss: Vol. 1. Attachment (2nd Ed.)*. New York: Basic Books.



- Broidy, L. M., Nagin, D. S., Tremblay, R. E., Bates, J. E., Brame, B., Dodge, K. A., et al. (2003). Developmental trajectories of childhood disruptive behaviors and adolescent delinquency: A six-site, cross-national study. *Developmental Psychology, 39*, 222–245.
- Buyse, E., Verschueren, K., Doumen, S., Van Damme, J., & Maes, F. (2008). Classroom problem behavior and teacher–child relationships in kindergarten: The moderating role of the classroom climate. *Journal of School Psychology, 46*, 367–391.
- Buyse, E., Verschueren, K., Verachtert, P., & Van Damme, J. (2009). Predicting school adjustment in early elementary school: Impact of teacher-child relationship quality and relational classroom climate. *Elementary School Journal, 110*, 119–141.
- De Laet, S., Colpin, H., Van Leeuwen, K., Van Den Nootgate, W., Claes, S., Janssens, A., Goossens, L., & Verschueren, K. (2016). Transactional links between teacher–student relationships and adolescent rule-breaking behavior and behavioral school engagement: Moderating role of a dopaminergic genetic profile score. *Journal of Youth and Adolescence, 45*, 1226–1244.
- De Laet, S., Colpin, H., Goossens, L., Van Leeuwen, K., & Verschueren, K. (2014). Comparing parent–child and teacher–child relationships in early adolescence: Measurement invariance of perceived attachment-related dimensions. *Journal of Psychoeducational Assessment, 32*, 521–532.
- De Laet, S., Doumen, S., Vervoort, E., Colpin, H., Van Leeuwen, K., Goossens, L., & Verschueren, K. (2014). Transactional links between teacher–child relationship quality and perceived versus sociometric popularity: A three-wave longitudinal study. *Child Development, 85*, 1647–1662.

- Doumen, S., Koomen, H. M. Y., Buyse, E., Wouters, S., & Verschueren, K. (2012). Teacher and observer views on student-teacher relationships: Convergence across kindergarten and relations with student engagement. *Journal of School Psychology, 50*, 61–76.
- Doumen, S., Verschueren, K., Buyse, E., Germeijs, V., Luyckx, K., & Soenens, B. (2008). Reciprocal relations between teacher–child conflict and externalizing behavior in kindergarten: A three-wave longitudinal study. *Journal of Clinical Child and Adolescent Psychology, 37*, 588–599.
- Duckworth, A.L. & Seligman, M.E.P. (2006). Self-discipline gives girls the edge: Gender in self-discipline, grades, and achievement test scores. *Journal of Educational Psychology, 98*, 198–208.
- Eccles, J. S. (1999). The development of children ages 6 to 14. *The Future of Children: When School is Out, Vol 9*, 30–44. Retrieved February, 5, 2015, from [http://www.princeton.edu/futureofchildren/publications/docs/09\\_02\\_02.pdf](http://www.princeton.edu/futureofchildren/publications/docs/09_02_02.pdf)
- Ewing, A. R., & Taylor, A.R. (2009). The role of child gender and child ethnicity in teacher-child relationship quality and children’s behavioral adjustment in preschool. *Early Childhood Research Quarterly, 24*, 92–105.
- Goodman, R. (2001). Psychometric properties of the Strengths and Difficulties Questionnaire. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*, 1337–1345.
- Goodman, A., Lamping, D. L., & Ploubidis, G. B. (2010). When to use broader internalising and externalising subscales instead of the hypothesised five subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British parents, teachers and children. *Journal of Abnormal Child Psychology, 38*, 1179–1191.

- Hamre, B. K., & Pianta, R. C. (2001). Early teacher–child relationship and the trajectory of children’s school outcomes through eighth grade. *Child Development, 72*, 625–638.
- Henricsson, L. & Rydell, A.-M. (2004). Elementary school children with behavior problems: Teacher–child relations and self-perception. A prospective study. *Merrill–Palmer Quarterly, 50*, 111–138.
- Howes, C., Hamilton, C. E., & Philipsen, L. C. (1998). Stability and continuity of child-caregiver and child-peer relationships. *Child Development, 69*, 418–426.
- Howes, C., Philipsen, L. C., & Peisner-Feinberg, E. (2000). The consistency of perceived teacher–child relationships between preschool and kindergarten. *Journal of School Psychology, 38*, 113–132.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.
- Hughes, J. N., Cavell, T. A., & Jackson, T. (1999). Influence of teacher–student relationship on childhood aggression: A prospective study. *Journal of Clinical Child Psychology, 28*, 173–184.
- Hughes, J. N., Luo, W., Kwok, O.-M., & Loyd, L. K. (2008). Teacher-student support, effortful engagement, and achievement: A 3-year longitudinal study. *Journal of Educational Psychology, 100*, 1–14.
- Jellesma, F. C., Zee, M., & Koomen, H. M. Y. (2015). Children's perceptions of the relationship with the teacher: Associations with appraisals and internalizing problems in middle childhood. *Journal of Applied Developmental Psychology, 36*, 30–38.

- Jerome, E. M., Hamre, B.K., & Pianta, R. C. (2009). Teacher–child relationships from kindergarten to sixth grade: Early childhood predictors of teacher-perceived conflict and closeness. *Social Development, 18*, 915–945.
- Kolko, D.J., & Kazdin, E. (1993). Emotional/behavioral problems in clinic and nonclinic children: Correspondence among child, parent, and teacher reports. *Journal of Child Psychology and Psychiatry, 34*, 991–1006.
- Koomen, H. M. Y., & Jellesma, F. C. (2015). Can closeness, conflict, and dependency be used to characterize students’ perceptions of the affective relationship with their teacher? Testing a new child measure in middle childhood. *British Journal of Educational Psychology, 85*, 479–497.
- Koskelainen, M., Sourander, A., & Kaljonen, A. (2000). The Strengths and Difficulties Questionnaire among Finnish school-aged children and adolescents. *European Child and Adolescent Psychiatry, 9*, 277–284.
- Ladd, G. W., Birch, S. H., & Buhs, E. S. (1999). Children’s social and scholastic lives in kindergarten: Related spheres of influence? *Child Development, 70*, 1373–1400.
- Ladd, G. W., & Burgess, K. B. (1999). Charting the relationship trajectories of aggressive, withdrawn, and aggressive/withdrawn children during early grade school. *Child Development, 70*, 910–929.
- Ladd, G. W., & Burgess, K. B. (2001). Do relational risks and protective factors moderate the linkages between childhood aggression and early psychological and school adjustment? *Child Development, 72*, 1579–1601.
- Ladd, G. W., Herald, S. L., & Kochel, K. P. (2006). School readiness: Are there social prerequisites? *Early Education and Development, 17*, 115–150.

- Lerkkanen, M.-K., Niemi, P., Poikkeus, A.-M., Poskiparta, E., Siekkinen, M., & Nurmi, J.-E. (2006-2016). *The First Steps Study* (Alkuportaati). (Unpublished data). Finland: University of Jyväskylä.
- Lerkkanen, M.-K., Ahonen, T., & Poikkeus, A.-M. (2011). The development of reading skills and motivation and identification of risk at school entry. In M. Veisson, E. Hujala, P. K. Smith, M. Waniganayake, & E. Kikas (Eds.), *Global perspectives in early childhood education: Diversity, challenges and possibilities* [Baltische Studien zur Erziehungs- und Sozialwissenschaft]. (Vol. 20, pp. 237-258). Frankfurt am Main: Peter Lang.
- Lindeman, J. (1998). Allu—Ala-asteen lukutesti [Reading test for primary school]. Turku, Finland: University of Turku.
- Ly, J. & Zhou, Q. (2016). Bidirectional associations between teacher–child relationship quality and Chinese American immigrant children’s behavior problems. *Journal of Clinical Child & Adolescent Psychology*, DOI:10.1080/15374416.2016.1183496
- Malecki, C. K., & Demaray, M. K. (2003). What type of support do they need? Investigating student adjustment as related to emotional, informational, appraisal, and instrumental support. *School Psychology Quarterly*, 18, 231–252.
- McMahon, R. J. (1994). Diagnosis, assessment, and treatment of externalizing problems in children: The role of longitudinal data. *Journal of Consulting and Clinical Psychology*, 62, 901–917.
- Mejia, T M., & Hoglund, W., L. G. (2016). Do children’s adjustment problems contribute to teacher–child relationship quality? Support for a child-driven model. *Early Childhood Research Quarterly*, 34, 13–26.

- Murray, C., & Zvoch, K. (2015). The Inventory of Teacher–Student Relationships: Factor structure, reliability, and validity among African American youth in low-income urban schools. *Journal of Early Adolescence, 31*, 493–525.
- Muthén, L., & Muthén, B. O. (1998–2013). Mplus users guide and Mplus version 7.1. Retrieved from <http://www.statmodel.com/index2.html>.
- Myers, S. S., & Morris, A. S. (2009). Examining relations between emotional reactivity, regulation, and the teacher-child relationship in predicting Head Start children’s socioemotional adjustment. *Early Education and Development, 20*, 756–774.
- Nurmi, J.-E. (2012). Students’ characteristics and teacher–child relationships in instruction: A meta-analysis. *Educational Research Review, 7*, 177–197.
- O’Connor, E. E., Collins, B. A., & Supplee, L. (2012). Behavior problems in late childhood: The roles of early maternal attachment and teacher–child trajectories. *Attachment & Human Development, 14*, 265–288.
- O’Connor, E., Dearing, E., & Collins, B. A. (2011). Teacher-child relationship and behavior problem trajectories in elementary school. *American Educational Research Journal, 48*, 120–162.
- O’Connor, E., & McCartney, K. (2007). Examining teacher-child relationships and achievement as part of an ecological model of development. *American Educational Research Journal, 44*, 340–369.
- Pianta, R. C. (1999). *Enhancing Relationships between Children and Teachers*. Washington, D.C.: American Psychological Association.
- Pianta, R. C. (2001). *Student–Teacher Relationship Scale-Short Form*. Odessa, FL: Psychological Assessment Resources, Inc.

- Pianta, R. C., Steinberg, M. S., & Rollins, K. B. (1995). The first two years of school: Teacher-child relationships and deflections in children's classroom adjustment. *Development and Psychopathology, 7*, 295–312.
- Pianta, R. C., & Stuhlman, M. W. (2004). Teacher-child relationships and children's success in the first years of school. *School Psychology Review, 33*, 444–458.
- Räsänen, P., & Aunola, K. (2007). *A Three-Minutes Basic Arithmetic Test*. Jyväskylä, Finland: University of Jyväskylä.
- Räsänen, P., Salminen, J., Wilson, A. J., Aunio, P., & Dehaene, S. (2009). Computer-assisted intervention for children with low numeracy skills. *Cognitive Development, 24*, 450–472.
- Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher-student relationships on students' school engagement and achievement: A meta-analytic approach. *Review of Educational Research, 81*, 493–529.
- Roorda, D. L., Verschueren, K., Vancraeyveldt, C., Van Craeyevelt, S., & Colpin, H. (2014). Teacher-child relationships and behavioral adjustment: Transactional links for preschool boys at risk. *Journal of School Psychology, 52*, 495–510.
- Rudasill, K. M. (2011). Child temperament, teacher-child interactions, and teacher-child relationships: A longitudinal investigation from first to third grade. *Early Childhood Research Quarterly, 26*, 147–156.
- Rudasill, K. M., Reio, T. G. Jr., Stipanovic, N., & Taylor, J. E. (2010). A longitudinal study of student-teacher relationship quality, difficult temperament, and risky behavior from childhood to early adolescence. *Journal of School Psychology, 48*, 389–412.

- Rudasill, K. M., Rimm-Kaufman, S.E., Justice, L.M., & Pence, K. (2006). Temperament and language skills as predictors of teacher–child relationships in preschool. *Early Education and Development, 17*, 271–291.
- Sabol, T. J., & Pianta, R. C. (2012). Recent trends in research on teacher–child relationships. *Attachment & Human Development, 14*, 213–231.
- Saft, E. W., & Pianta, R. C. (2001). Teachers’ perceptions of their relationships with student: Effects of child age, gender, and ethnicity of teachers and children. *School Psychology Quarterly, 16*, 125–141.
- Scarr, S., & McCartney, K. (1983). How people make their own environments: A theory of genotype → environment effects. *Child Development, 54*, 424–435.
- Silver, R. B., Measelle, J. R., Armstrong, J. M., & Essex, M. J. (2005). Trajectories of classroom externalizing behavior: Contributions of child characteristics, family characteristics, and the teacher-child relationship during the school transition. *Journal of School Psychology, 43*, 39–60.
- Skalická, V., Belsky, J., Stenseng, F., & Wichstrøm, L. (2015). Reciprocal relations between student–teacher relationship and children's behavioral problems: Moderation by child-care group size. *Child Development, 86*, 1557-1570.
- Skalická, V., Stenseng, F., & Wichstrøm, L. (2015). Reciprocal relations between student–teacher conflict, children’s social skills and externalizing behavior: A three-wave longitudinal study from preschool to third grade. *International Journal of Behavioral Development, 39*, 413–425.



- Spilt, J. L., Koomen, H. M. Y., & Mantzicopoulos, P. Y. (2010). Young children's perceptions of teacher–child relationships: An evaluation of two instruments and the role of child gender in kindergarten. *Journal of Applied Developmental Psychology, 31*, 428–438.
- Spilt, J. L., Koomen, H. M. Y., Thijs, J. T., & van der Leij, A. (2012). Supporting teachers' relationships with disruptive children: the potential of relationship-focused reflection. *Attachment & Human Development, 14*, 305–318.
- Statistics Finland. (2012). Statistical database. Retrieved from [http://www.stat.fi/tup/tilastotietokannat/index\\_en.html](http://www.stat.fi/tup/tilastotietokannat/index_en.html)
- Sterba, S. K., Prinstein, M. J., & Cox, M. J. (2007). Trajectories of internalizing problems across childhood: Heterogeneity, external validity, and gender differences. *Development and Psychopathology, 19*, 345–366.
- Thijs, J., & Koomen, H. M. Y. (2009). Toward a further understanding of teachers' reports of early teacher-child relationships: Examining the roles of behavior appraisals and attributions. *Early Childhood Research Quarterly, 24*, 186–197.
- Thijs, J. T., Koomen, H.M.Y. & van der Leij, A. (2008). Teacher-child relationships and pedagogical practices: considering the teacher's perspective. *School Psychology Review, 37*, 244–260.
- Thijs, J., Westhof, S., & Koomen, H. (2012). Ethnic incongruence and the student-teacher relationship: The perspective of ethnic majority teachers. *Journal of School Psychology, 50*, 257–273.
- Verschueren, K. (2015). Middle childhood teacher–child relationships: Insights from an attachment perspective and remaining challenges. In G. Bosmans & K. A. Kerns (Eds.),

- Attachment in middle childhood: Theoretical advances and new directions in an emerging field. New Directions for Child and Adolescent Development, 148, 77–91.*
- Verschueren, K., & Koomen, H. M. Y. (2012). Teacher–child relationships from an attachment perspective. *Attachment & Human Development, 14, 205–211.*
- Wichstrom, L. (1999). The emergence of gender difference in depressed mood during adolescence: The role of intensified gender socialization. *Developmental Psychology, 35, 232–245.*
- Zahn-Waxler, C., Klimes-Dougan, B., & Slattery, M.J. (2000). Internalizing problems of childhood and adolescence: Prospects, pitfalls, and progress in understanding the development of anxiety and depression. *Development and Psychopathology, 12, 443–466.*
- Zhang, X., Koponen, T., Räsänen, P., Aunola, K., Lerkkanen, M.-K., & Nurmi, J.-E. (2014). Linguistic and spatial skills predict early arithmetic development via counting sequence knowledge. *Child Development, 85, 1091–1107.*
- Zhang, X., & Sun, J. (2011). The reciprocal relations between teachers' perceptions of children's behavior problems and teacher–child relationships in the first preschool year. *The Journal of Genetic Psychology, 172, 176–198.*

Table 1

*Demographic Background Characteristics of the Sample*

	<i>n</i>	<i>%</i>	<i>M</i>	<i>SD</i>
<i>Child characteristics</i>				
Age in months	440		121.95	3.57
Child's gender:	440			
girl		43.2		
boy		56.8		
<i>Family characteristics</i>				
Parental basic education (highest):	410			
less than comprehensive school (basic education)		.5		
completion of comprehensive school		37.3		
completion of general upper secondary school		62.2		
Vocational education in the family <sup>a</sup> (highest):	410			
no vocational education		2.7		
vocational course (min. 4 months)		2.4		
vocational school degree		30.7		
vocational college degree		21.0		
Polytechnic degree or Bachelor's degree		14.9		
Master's degree		23.2		
Licentiate or Doctoral degree		5.1		
Parental socio-economic status (highest)	409			
entrepreneur		11.6		
higher white collar		36.4		
lower white collar		41.8		
workers		9.8		
others		.4		
Family structure	410			
Married parents with biological children (nuclear families)		65.4		
Unmarried parents with their biological children		13.4		
Blended families		9.8		
Single parents		11.0		
Other		.4		
<i>Teacher characteristics</i>				
Gender	116			
Female		65.5		
Male		34.5		
Teaching experience	116			
More than 15 years		51.3		
11-15 years of experience		21.7		
6-10 years of experience		11.3		
1-5 years of experience		14.8		
Less than a year		.9		

---

Teacher education	116	
Bachelor's degree in education		6
Master's degree in education		94

---

Table 2

*Descriptive Statistics/Psychometric Properties of All Study Variables*

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	Reliability	Range		Skewness
					Potential	Actual	
Conflict (Grade 4)	440	1.66	.80	.91	1–5	1–4.43	1.28
Conflict (Grade 6)	218	1.67	.80	.91	1–5	1–4.43	1.18
Closeness (Grade 4)	440	3.75	.70	.86	1–5	2–5	–.35
Closeness (Grade 6)	218	3.53	.64	.86	1–5	2–5	.03
Externalizing problems (Grade 4)	440	1.42	.41	.88	1–3	1–3	1.00
Externalizing problems (Grade 6)	216	1.40	.40	.88	1–3	1–2.90	1.21
Internalizing problems (Grade 4)	440	1.25	.35	.75	1–3	1–3	1.53
Internalizing problems (Grade 6)	216	1.22	.31	.74	1–3	1–2.60	1.61
Reading skills (Grade 3)	438	22.84	7.64	.97 <sup>a</sup>	0–80	3–58	.43
Math skills (Grade 3)	437	15.15	5.09	.89 <sup>a</sup>	0–28	2–28	.03
Gender (0 = girl; 1 = boy)	440	.57	.50		0–1	0–1	–.28
Parental education <sup>b</sup>	410	4.33	1.44		1–7	1–7	.03

*Note.* <sup>a</sup> The Kuder-Richardson reliability, a measure of internal consistency for dichotomous variables.

<sup>b</sup> Mothers' and fathers' education was assessed on a 7-point scale: no vocational education; short vocational courses; a vocational school qualification; a college qualification; a bachelor's degree from university; a master's degree; and a licentiate or doctoral degree.

Table 3

*Exploratory Factor Analysis Results on the Finnish Version of the Student–Teacher Relationship Scale (STRS)*

Student–Teacher Relationship Scale (short version)	Grade 4			Grade 6		
	Extraction	Factor		Extraction	Factor	
		Conflict	Closeness		Conflict	Closeness
1. <i>"I have a close, warm relationship with this child"</i>	.59	–.36	<b>.75</b>	.56		<b>.67</b>
2. <i>"There always seem to be difficulties between this child and me"</i>	.59	<b>.73</b>	–.41	.65	<b>.78</b>	
3. <i>"If this child is upset, s/he seeks comfort from me"</i>	.52		<b>.72</b>	.37		<b>.62</b>
4. <i>"This child experiences physical closeness or touch expressed by me as uncomfortable"</i>	.24	.37	–.40	.27	.35	–.32
5. <i>"This child values her/his relationship with me"</i>	.47	–.36	<b>.66</b>	.48	–.31	<b>.55</b>
6. <i>"When I praise this child, s/he shines with pride"</i>	.25		<b>.50</b>	.27		<b>.52</b>
7. <i>"This child tells spontaneously about herself/himself"</i>	.64		<b>.79</b>	.59		<b>.79</b>
8. <i>"This child easily gets angry at me"</i>	.64	<b>.80</b>		.68	<b>.84</b>	
9. <i>"It is easy to perceive how this child feels"</i>	.41		<b>.64</b>	.51		<b>.73</b>
10. <i>"This child becomes persistently angry or resistant, should I have limit her/his behavior"</i>	.64	<b>.80</b>		.52	<b>.73</b>	
11. <i>"Working with this child takes a tremendous amount of energy from me"</i>	.56	<b>.75</b>		.53	<b>.74</b>	
12. <i>"If this child is on bad mood, I will have a long and difficult day ahead of me"</i>	.73	<b>.84</b>		.70	<b>.86</b>	
13. <i>"The feelings of this child toward me might be unpredictable or they may suddenly change"</i>	.64	<b>.80</b>		.69	<b>.83</b>	
14. <i>"This child is dishonest or manipulative in her/his relationship with me"</i>	.49	<b>.70</b>		.50	<b>.66</b>	
15. <i>"This child openly tells me about her/his feelings and experiences"</i>	.67		<b>.81</b>	.62		<b>.79</b>
Eigenvalue		5.23	2.83		5.16	34.42
% explained variance		34.87	18.88		2.78	18.53

*Note.* Principal Axis Factoring, Oblimin rotation. Loadings below .30 are not presented. In **bold**, the final factor structure.

Table 4

*Correlations between All Study Variables*

	1	2	3	4	5	6	7	8	9	10	11
1 Conflict (Grade 4)											
2 Conflict (Grade 6)	.638**										
3 Closeness (Grade 4)	-.229**	-.045									
4 Closeness (Grade 6)	-.104	-.197**	.392**								
5 Externalizing problems (Grade 4)	.764**	.580**	-.155**	-.118							
6 Externalizing problems (Grade 6)	.545**	.714**	-.076	-.140*	.748**						
7 Internalizing problems (Grade 4)	.229**	.028	-.179**	-.047	.221**	.040					
8 Internalizing problems (Grade 6)	.126	.342**	-.030	-.196**	.092	.275**	.404**				
9 Reading skills (Grade 3)	-.085	-.033	-.001	.089	-.170**	-.066	-.163**	-.019			
10 Math skills (Grade 3)	-.098*	-.110	.015	.050	-.227**	-.218*	-.154**	-.101	.491**		
11 Parental education	-.149*	-.149*	-.062	.114*	-.200**	-.286**	-.195**	-.160*	.122**	.174**	.015

*Note.* \*  $p < .05$ ; \*\*  $p < .01$ .

Table 5

*The Goodness-of-Fit Statistics (Chi-square) for the Nested Models for Conflict and Closeness Separately*

<i>Conflict</i>			<i>Scaling</i>	<i>Model comparisons</i>
<i>Tested models</i>	$\chi^2$	<i>df</i>	<i>correction</i>	<i>Satorra-Bentler scaled <math>\chi^2</math> difference test index (CFI)</i>
<i>1. No cross-lagged paths (M<sub>1</sub>)</i>	<i>11.492</i>	<i>6</i>	<i>1.256</i>	
<i>2. Conflict on problem behavior (M<sub>2</sub>)</i>	<i>9.938</i>	<i>4</i>	<i>1.184</i>	<i>M<sub>1</sub> vs. M<sub>2</sub>: <math>\Delta\chi^2</math> (<math>\Delta df = 2</math>) = 8.440; <math>p = .015</math></i>
<i>3. Problem behavior on conflict (M<sub>3</sub>)</i>	<i>2.394</i>	<i>4</i>	<i>1.199</i>	<i>M<sub>1</sub> vs. M<sub>3</sub>: <math>\Delta\chi^2</math> (<math>\Delta df = 2</math>) = 1.907; <math>p = .385</math></i>
<i>4. All cross-lagged paths* (M<sub>4</sub>)</i>	<i>.300</i>	<i>2</i>	<i>1.071</i>	<i>M<sub>1</sub> vs. M<sub>4</sub>: <math>\Delta\chi^2</math> (<math>\Delta df = 4</math>) = 10.464; <math>p = .033</math></i> <i>M<sub>2</sub> vs. M<sub>4</sub>: <math>\Delta\chi^2</math> (<math>\Delta df = 2</math>) = 1.921; <math>p = .383</math></i> <i>M<sub>3</sub> vs. M<sub>4</sub>: <math>\Delta\chi^2</math> (<math>\Delta df = 2</math>) = 8.826; <math>p = .012</math></i>
<i>Closeness</i>				<i>Model comparisons</i>
<i>Tested models</i>	$\chi^2$	<i>df</i>		<i>Satorra-Bentler scaled <math>\chi^2</math> difference test</i>
<i>1. No cross-lagged paths (M<sub>1</sub>)</i>	<i>3.339</i>	<i>6</i>	<i>1.208</i>	
<i>2. Closeness on problem behavior (M<sub>2</sub>)</i>	<i>2.820</i>	<i>4</i>	<i>1.130</i>	<i>M<sub>1</sub> vs. M<sub>2</sub>: <math>\Delta\chi^2</math> (<math>\Delta df = 2</math>) = .621, <math>p = .730</math></i>
<i>3. Problem behavior on closeness (M<sub>3</sub>)</i>	<i>2.730</i>	<i>4</i>	<i>1.168</i>	<i>M<sub>1</sub> vs. M<sub>3</sub>: <math>\Delta\chi^2</math> (<math>\Delta df = 2</math>) = .656, <math>p = .720</math></i>



4. All cross-lagged paths* ( $M_4$ )	2.428	2	.961	$M_1$ vs. $M_4$ : $\Delta\chi^2$ ( $\Delta df = 4$ ) = 1.277, $p = .865$
				$M_2$ vs. $M_4$ : $\Delta\chi^2$ ( $\Delta df = 2$ ) = .657; $p = .720$
				$M_3$ vs. $M_4$ : $\Delta\chi^2$ ( $\Delta df = 2$ ) = .622; $p = .734$

---

Note. \* all cross-lagged paths did not include cross-lagged paths among problem behavior (externalizing and internalizing).

In bold – significant results at  $p < .05$ .

Table 6

*Standardized and Unstandardized Estimates for the Conflict Model (N = 440)*

			<i>Unstand. estimate</i>	<i>SE</i>	<i>Stand. estimate</i>	<i>SE</i>	<i>p-value</i>
<i>Stability paths</i>							
Conflict (Grade 4)	→	Conflict (Grade 6)	.471	.070	.478	.077	<.001
Externalizing (Grade 4)	→	Externalizing (Grade 6)	.711	.063	.742	.041	<.001
Internalizing (Grade 4)	→	Internalizing (Grade 6)	.381	.082	.434	.081	<.001
<i>Cross-lagged paths</i>							
Externalizing (Grade 4)	→	Conflict (Grade 6)	.417	.162	.219	.083	.009
Internalizing (Grade 4)	→	Conflict (Grade 6)	-.104	.105	-.046	.047	.323
<i>Covariances/correlations</i>							
Conflict (Grade 4)	↔	Externalizing (Grade 4)	.257	.024	.766	.025	<.001
Conflict (Grade 4)	↔	Internalizing (Grade 4)	.065	.018	.231	.058	<.001
Externalizing (Grade 4)	↔	Internalizing (Grade 4)	.033	.009	.223	.057	<.001
Conflict (Grade 6)	↔	Externalizing (Grade 6)	.089	.027	.554	.084	<.001
Conflict (Grade 6)	↔	Internalizing (Grade 6)	.057	.021	.337	.087	<.001
Externalizing (Grade 6)	↔	Internalizing (Grade 6)	.024	.010	.317	.092	.001

*Note.* *Unstand. estimate* – unstandardized coefficient, *Stand. estimate* – standardized coefficient, *SE* – standard error

Table 7

*Standardized and Unstandardized Estimates for the Closeness Model (N = 440)*

			<i>Unstand. estimate</i>	<i>SE</i>	<i>Stand. estimate</i>	<i>SE</i>	<i>p-value</i>
<i>Stability paths</i>							
Closeness (Grade 4)	→	Closeness (Grade 6)	.355	.066	.391	.070	<.001
Externalizing (Grade 4)	→	Externalizing (Grade 6)	.706	.062	.738	.042	<.001
Internalizing (Grade 4)	→	Internalizing (Grade 6)	.383	.082	.435	.081	<.001
<i>Covariances/correlations</i>							
Closeness (Grade 4)	↔	Externalizing (Grade 4)	-.045	.017	-.155	.056	.005
Closeness (Grade 4)	↔	Internalizing (Grade 4)	-.044	.015	-.179	.060	.003
Externalizing (Grade 4)	↔	Internalizing (Grade 4)	.032	.009	.221	.056	<.001
Closeness (Grade 6)	↔	Externalizing (Grade 6)	-.021	.017	-.137	.099	.169
Closeness (Grade 6)	↔	Internalizing (Grade 6)	-.025	.018	-.151	.099	.128
Externalizing (Grade 6)	↔	Internalizing (Grade 6)	.024	.010	.318	.092	.001

*Note.* *Unstand. estimate* – unstandardized coefficient, *Stand. estimate* – standardized coefficient, *SE* – standard error

Table 8

*Unstandardized Estimates for the Conflict Model: Moderation of Children’s Gender, Academic Performance, Parental Education, At-Risk Status, and Having the Same Teacher (Versus Not)*

			Children’s gender <sup>a</sup>		Academic performance <sup>b</sup>		Parental education <sup>c</sup>		At-risk status <sup>d</sup>		Same teacher <sup>e</sup>	
			<i>Unstand. estimate</i>	<i>SE</i>	<i>Unstand. estimate</i>	<i>SE</i>	<i>Unstand. estimate</i>	<i>SE</i>	<i>Unstand. estimate</i>	<i>SE</i>	<i>Unstand. estimate</i>	<i>SE</i>
<i>Stability paths</i>												
Conflict (Grade 4)	→	Conflict (Grade 6)	.461***	.073	.475***	.072	.475***/ .204*/ .713***	.084/ .097/ .087	.461***	.071	.362***/ .721***	.074/ .081
Externalizing (Grade 4)	→	Externalizing (Grade 6)	.634***	.060	.703***	.068	.628***	.055	.707***	.059	.727***	.063
Internalizing (Grade 4)	→	Internalizing (Grade 6)	.384***	.082	.368***	.082	.658***/ .082/ .373**	.110/ .075/ .139	.380***	.078	.399***	.082
<i>Cross-lagged paths</i>												
Externalizing (Grade 4)	→	Conflict (Grade 6)	.264	.176	.403*	.171	.317*	.140	.432**	.160	.404**	.155
Internalizing (Grade 4)	→	Conflict (Grade 6)	-.059	.100	-.099	.108	-.113	.103	-.111	.102	-.121	.090
Conflict (Grade 4)	→	Internalizing (Grade 6)									.000/ .092**	.000/ .030
<i>Covariances/correlations</i>												
Conflict (Grade 4)	↔	Externalizing (Grade 4)	.143***/ .291***	.027/ .027	.247***	.023	.233***	.024	.252***	.024	.240***	.028
Conflict (Grade 4)	↔	Internalizing (Grade 4)	.067***	.016	.058***	.016	.052**	.016	.062***	.017	.026	.016
Externalizing (Grade 4)	↔	Internalizing (Grade 4)	.034***	.008	.026**	.008	.021**	.008	.030**	.009	.007	.009
Conflict (Grade 6)	↔	Externalizing (Grade 6)	.045***/ .108*	.013/ .034	.088**	.027	.105**/ .037*/ .127**	.034/ .019/ .047	.087**	.026	.117***/ .036*	.034/ .015

---

Conflict (Grade 6)	↔	Internalizing (Grade 6)	.048*	.018	.056**	.021	.050**	.019	.056**	.021	.062**/	.020/
											.016	.012
Externalizing (Grade 6)	↔	Internalizing (Grade 6)	.018*	.007	.022*	.009	.019*	.008	.022*	.009	.019**	.007

---

*Note.* *Unstand. estimate* – unstandardized coefficient, *SE* – standard error

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

<sup>a</sup> girls ( $N = 189$ ) / boys ( $N = 251$ )

<sup>b</sup> low ( $N = 146$ ) / average ( $N = 139$ ) / high ( $N = 155$ )

<sup>c</sup> low ( $N = 149$ ) / average ( $N = 147$ ) / high ( $N = 116$ )

<sup>d</sup> not at-risk ( $N = 234$ ) / at-risk ( $N = 206$ )

<sup>e</sup> not same ( $N = 309$ ) / same ( $N = 91$ )

Table 9

*Unstandardized Estimates for the Closeness Model: Moderation of Children’s Gender, Academic Performance, Parental Education, At-Risk Status, and Having the Same Teacher (Versus Not)*

			Children’s gender <sup>a</sup>		Academic performance <sup>b</sup>		Parental education <sup>c</sup>		At-risk status <sup>d</sup>		Same teacher <sup>e</sup>	
			<i>Unstand. estimate</i>	<i>SE</i>	<i>Unstand. estimate</i>	<i>SE</i>	<i>Unstand. estimate</i>	<i>SE</i>	<i>Unstand. estimate</i>	<i>SE</i>	<i>Unstand. estimate</i>	<i>SE</i>
<i>Stability paths</i>												
Closeness (Grade 4)	→	Closeness (Grade 6)	.388***	.062	.348***	.063	.382***	.066	.573***/ .120	.068/ .098	.360***	.071
Externalizing (Grade 4)	→	Externalizing (Grade 6)	.616***	.057	.700***	.060	.842***/ .516***/ .584***	.100/ .059/ .110	.703***	.058	.704***	.062
Internalizing (Grade 4)	→	Internalizing (Grade 6)	.374***	.081	.628***/ .299*/ .256**	.118/ .124/ .092	.657***/ .098/ .367**	.116/ .061/ .130	.378***	.077	.421***	.084
<i>Cross-lagged paths</i>												
Internalizing (Grade 4)	→	Closeness (Grade 6)	.000/ .504*	.000/ .204								
<i>Covariances/correlations</i>												
Closeness (Grade 4)	↔	Externalizing (Grade 4)	-.019	.013	-.047**	.017	-.047**	.017	-.043*	.017	-.047*	.023
Closeness (Grade 4)	↔	Internalizing (Grade 4)	-.048**	.016	-.043**	.016	-.037*	.015	-.042**	.016	-.037	.023
Externalizing (Grade 4)	↔	Internalizing (Grade 4)	.034***	.008	.029*	.008	.019*	.008	.029***	.008	.008	.009
Closeness (Grade 6)	↔	Externalizing (Grade 6)	.002	.012	-.020	.016	-.012	.013	-.011	.014	-.021	.014
Closeness (Grade 6)	↔	Internalizing (Grade 6)	-.023	.016	-.023	.016	-.024	.013	-.016	.015	-.017	.016
Externalizing (Grade 6)	↔	Internalizing (Grade 6)	.010	.005	.022*	.010	.020*	.008	.021*	.009	.020*	.008

---

*Note. Unstand. estimate* – unstandardized coefficient, *SE* – standard error

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

<sup>a</sup> girls ( $N = 189$ ) / boys ( $N = 251$ )

<sup>b</sup> low ( $N = 146$ ) / average ( $N = 147$ ) / high ( $N = 145$ )

<sup>c</sup> low ( $N = 149$ ) / average ( $N = 147$ ) / high ( $N = 116$ )

<sup>d</sup> not at-risk ( $N = 234$ ) / at-risk ( $N = 206$ )

<sup>e</sup> not same ( $N = 309$ ) / same ( $N = 91$ )