J Youth Adolescence (2016) 45:1192–1207
DOI 10.1007/s10964-016-0414-5

EMPIRICAL RESEARCH

Behavioral Engagement, Peer Status, and Teacher–Student Relationships in Adolescence: A Longitudinal Study on Reciprocal Influences

Maaike C. Engels[1] · Hilde Colpin[1] · Karla Van Leeuwen[2] · Patricia Bijttebier[1] · Wim Van Den Noortgate[3] · Stephan Claes[4] · Luc Goossens[1] · Karine Verschueren[1]

Received: 29 October 2015 / Accepted: 4 January 2016 / Published online: 12 January 2016

Abstract Although teachers and peers play an important role in shaping students' engagement, no previous study has directly investigated transactional associations of these classroom-based relationships in adolescence. This study investigated the transactional associations between adolescents' behavioral engagement, peer status (likeability and popularity), and (positive and negative) teacher–student relationships during secondary education. A large sample of adolescents was followed from Grade 7 to 11 ($N = 1116$; 49 % female; M age = 13.79 years). Multivariate autoregressive cross-lagged modeling revealed only unidirectional effects from teacher–student relationships and peer status on students' behavioral engagement. Positive teacher–student relationships were associated with more behavioral engagement over time, whereas negative teacher–student relationships, higher likeability and higher popularity were related to less behavioral engagement over time. We conclude that teachers and peers constitute different sources of influence, and play independent roles in adolescents' behavioral engagement.

Keywords Adolescents · Behavioral engagement · Likeability · Peer status · Popularity · Teacher–student relationships

✉ Maaike C. Engels
Maaike.Engels@ppw.kuleuven.be

[1] School Psychology and Child and Adolescent Development, Faculty of Psychology and Educational Sciences, KU Leuven - University of Leuven, Tiensestraat 102, Box 3717, 3000 Leuven, Belgium

[2] Parenting and Special Education Research Unit, Faculty of Psychology and Educational Sciences, KU Leuven - University of Leuven, Leopold Vanderkelenstraat 32, Box 3765, 3000 Leuven, Belgium

[3] Methodology of Educational Sciences, Faculty of Psychology and Educational Sciences, KU Leuven - University of Leuven, Tiensestraat 102, Box 3762, 3000 Leuven, Belgium

[4] Research Group Psychiatry, Department of Neurosciences, KU Leuven - University of Leuven, UZ Herestraat 49, Box 7003 37, 3000 Leuven, Belgium

Introduction

During the past decades, researchers studied the concept of behavioral engagement as an important factor in adolescents' educational outcomes. Behavioral engagement is described as adolescents' effort, attention and persistence during the initiation and execution of learning activities (Skinner et al. 2008). Research found that behavioral engagement is beneficial for adolescents' academic outcomes (e.g., grades and performance), emotional outcomes (e.g., emotion regulation and conflict resolution skills), and social outcomes (e.g., social awareness and relationship skills) (Christenson et al. 2012). In contrast, early problems with behavioral engagement have long-lasting negative outcomes, such as academic failure (Johnson et al. 2006), and internalizing and externalizing problem behaviors (Li and Lerner 2011).

Prior research has used various indicators of behavioral engagement, such as attendance (i.e., absences), participation (i.e., classroom, extracurricular) and behavioral incidents (i.e., office referrals, suspensions, detentions) (Christenson et al. 2012). The current study follows a motivational conceptualization of engagement, and focuses on students' active behavioral participation during learning activities in the classroom (Skinner et al. 2008). In search of antecedents of behavioral engagement, researchers found that classroom social relationships play a role in how

engaged or disengaged adolescents are in learning activities (Fredricks et al. 2004). Research has indeed shown that by providing students with social support, teachers and peers can influence the level of behavioral engagement over time (De Laet et al. 2015; Wang and Eccles 2012). Other scholars have argued for a reverse effect, such that students' effort and participation in learning activities predict the quality of teacher–student relationships and their peer status (Nurmi 2012; Skinner and Belmont 1993). Although these studies suggest transactional associations between students' relationships with teachers and peers, no previous study has directly examined these transactional links in adolescence between adolescents' behavioral engagement and their relationships with teachers and peers. The current study was designed to fill this gap. Moreover, this study adopts a multidimensional approach by including both positive and negative teacher–student relationship dimensions and two types of peer status (i.e., peer likeability and popularity).

Teacher–Student Relationships

Research has shown that the quality of teacher–student relationships is important for various developmental outcomes. Positive teacher–student relationships are characterized by warm, sensitive and responsive interactions. These relationships contribute to students' behavioral and academic gains (Hamre and Pianta 2001), prosocial behavior (Birch and Ladd 1998), academic motivation, effort, achievement (Ryan et al. 1994), and engagement (Furrer and Skinner 2003). In contrast, negative teacher–student relationships are characterized by higher levels of teacher conflict and lack of security. These relationships are associated with difficulties in students' academic and socioemotional adjustment (Hamre and Pianta 2001; Roorda et al. 2011). A meta-analysis confirmed the associations of positive (i.e., support and warmth) and negative (i.e., conflict) teacher–student relationships with students' engagement (Roorda et al. 2011). In particular, associations between positive teacher–student relationships and academic engagement were stronger in secondary compared to primary education, whereas associations between negative teacher–student relationships and engagement were stronger in primary education (Roorda et al. 2011). Nevertheless, prior research predominately used single-source informants, which could have biased the findings (Roorda et al. 2011). Furthermore, most studies used designs that do not allow to test transactional links. As adolescence is an important developmental period characterized by socio-emotional growth and changing social relationships, this study aims to test the possibility of transactional links in a sample of adolescents.

In elementary school, Skinner and Belmont (1993) examined the transactional associations between behavioral engagement and teacher behavior. They found that students with higher initial levels of behavioral engagement reported more teacher involvement and autonomy support, and vice versa. Their results indicate that behaviorally engaged students receive more teacher behavior that stimulates their motivation, whereas behaviorally disengaged students receive teacher responses that further undermine their motivation (Skinner and Belmont 1993). Another study on elementary school children revealed that positive teacher–student relationships measured in first grade encouraged students' active classroom participation in fourth grade (Archambault et al. 2013). However, no reciprocal associations were found. Taken together, scarce previous research in elementary school showed inconclusive results on the transactional associations between teachers and students' engagement. However, bio-ecological models of development suggest that teachers and students reciprocally influence each other over time (Bronfenbrenner and Morris 2006).

In adolescence, academic engagement begins to decline (Archambault et al. 2013). Especially during this period, students have an increased need for positive and supportive relationships with peers and non-parental adults, such as teachers (Roorda et al. 2011). Adolescents with positive teacher–student relationships may experience more emotional security and, consequently, have more resources for their learning activities (Bergin and Bergin 2009). Also, positive teacher–student relationships may fulfill their sense of belonging, which, in turn, can stimulate their adaptation to the environment (Martin and Dowson 2009). Moreover, these relationships can contribute to more positive self-perceptions regarding academic competence (Verschueren et al. 2012), which can increase students' level of academic engagement. In turn, in adolescence, students' role in actively shaping teacher–student relationships may be more pronounced due to increases in self-regulatory capacities (Ryan and Patrick 2001). The current study extends previous research by using peer perceptions of teacher–student relationships. The advantage of asking all classmates to report about which fellow classmates have a good or bad relationship with the teacher is that the identification of positive and negative teacher–student relationships is based on multiple observers, in contrast to self-report measures (Kindermann 2007). Also, same-source bias is prevented when examining associations with student-reported engagement. Furthermore, research showed that peer perceptions of teacher–student relationships are consistent with both teacher and student perceptions (Doumen et al. 2009).

Peer Status

In adolescence, the role of peer status becomes increasingly important and more complex (Cillessen and Mayeux 2004;

Rubin et al. 2006). Peer status is a multidimensional construct reflecting the social position of an individual in his or her peer group. The current study focuses on two aspects of peer status: likeability and popularity. Peer likeability reflects the degree to which a student is accepted by his or her peer group. Likeability is determined by the difference between acceptance (i.e., being liked) and rejection (i.e., being disliked). Popularity expresses the social visibility or social prominence of an adolescent in the peer group (Cillessen et al. 2011). Popularity is determined by the difference between popularity (i.e., being popular) and unpopularity (i.e., being unpopular) (Cillessen et al. 2011). Although both peer likeability and popularity are aspects of peer status, they are related to different behavioral profiles. Students with a high degree of likeability are generally described as more cooperative, helpful, considerate, and socially outgoing (Asher and Coie 1990). Students with a high degree of popularity are characterized as highly prominent, dominant, and as showing manipulative behavior to maintain their high status (Farmer et al. 2003). The distinction between likeability and popularity becomes especially pronounced in early adolescence (LaFontana and Cillessen 2010; van den Berg et al. 2015).

Prior research on peer status and students' engagement has primarily focused on the separate dimensions of peer likeability, that is acceptance and rejection (Fredricks et al. 2004). Research in kindergarten and elementary school revealed that peer acceptance positively predicted students' school affect, liking, performance and engagement, whereas peer rejection was a predictor of school avoidance (Perdue et al. 2009). For instance, Buhs (2005) examined a cohort of 5th graders and found that peer rejection, through social exclusion (i.e., negative peer treatment), was a negative predictor of classroom engagement. Using peer likeability scores, De Laet et al. (2015) found that high initial levels of peer likeability buffered the general decline in students' behavioral engagement (i.e., effort, concentration, and asking questions) between Grade 4 and 6. In secondary education, Wang and Eccles (2012) found that perceived peer acceptance (i.e., level of self-reported peer acceptance and support) was associated with reduced declines of behavioral engagement (i.e., participation in extracurricular activities).

In general, these studies show that higher levels of acceptance are positively related to a variety of indicators of behavioral engagement (i.e., affect, performance, participation in extracurricular activities, effort, concentration, and asking questions). However, it remains unclear whether students' level of engagement can determine students' likeability. As far as we know, no study thus far investigated this reverse relationship. Yet, from a theoretical point of view, it could be argued that adolescents who show helpful, cooperative, effortful and persistent behavior during learning activities will be more liked by their peers, as they positively contribute to the classroom's attainment of school values (Rubin et al. 2015). The current study addresses this gap in literature by investigating the transactional links between peer likeability and behavioral engagement.

Popularity is a relatively new construct in the investigation of academic engagement. The limited amount of research showed that popularity was negatively associated with indicators of behavioral engagement. For instance, a longitudinal study by De Laet et al. (2015) found that more popular students in Grade 5 showed less behavioral engagement in Grade 6. These results were consistent in a similar study in 9th and 10th Grade. Schwartz, Hopmeyer Gorman, Nakamoto, and McKay (2006) found that, for highly aggressive adolescents, increases in popularity predicted lower academic engagement (e.g., increases in illegitimate absences). In addition, the relationship between popularity and engagement might be age-related. For instance, a cross-sectional study by Galván, Spatzier, and Juvonen (2011) showed that younger popular children (i.e., those who were nominated as "cool" by peers) were more likely to be nominated as academically engaged in Grades 4 and 5, but were more likely to be nominated as academically disengaged when they were older (i.e., Grades 6 and 7).

Whereas these studies indicate that higher levels of popularity predict lower levels of behavioral engagement, it is unclear whether the reverse effect is true. Yet, based on the work of Galván et al. (2011) it could be assumed that, when they show less behavioral engagement, adolescents may increase their popularity, as this is considered to be cool behavior in this developmental period. The current study adds to this scarce knowledge base by examining transactional associations between popularity and behavioral engagement in adolescence.

Teachers and Peers: Interrelated, but Independent Roles?

In addition to examining the transactional links between behavioral engagement and social classroom relationships, this study aims to shed light on how both classroom relationships are interrelated and how they contribute to students' behavioral engagement. Previous research in elementary school has found that increases in peer likeability were associated with more teacher support, which, in turn, was related to increases in peer likeability (De Laet et al. 2014). Popularity predicted more teacher–student conflict, which, in turn, was associated with increases in popularity (De Laet et al. 2014). Thus, in elementary school, there are indications of transactional links between relationships with teachers and peers. However, for

adolescents, the peer group increasingly becomes a separate social world with less supervision by adults (LaFontana and Cillessen 2010). Thus, the social worlds of teachers and peers may become less interrelated over development.

With respect to students' motivational and academic outcomes over time, teachers and peers have been found to play independent, additive roles (Wentzel 1998). Specifically, Wang and Eccles (2012) found that in adolescence (Grade 7 to 11), perceived teacher support and peer support were independently associated with academic engagement. Furthermore, De Laet et al. (2015) found additive and unique effects of teacher–student relationships and peer status (likeability and popularity) on behavioral engagement in late elementary school. In addition, De Laet et al. (2015) found no support for mediation (i.e., one social relationship shapes the other, which in turn affects behavioral engagement) or moderation effects (i.e., effect of one social relationship on behavioral engagement is enhanced or buffered by the other).

The Current Study

This study investigates the transactional links between adolescents' behavioral engagement and their relationships with teachers and peers. It extends prior research in three important ways. First, the current study uses a multidimensional approach by including both positive and negative teacher–student relationships and two types of peer status (i.e., likeability and popularity). Second, this study addresses the need for cross-lagged longitudinal research, which allows for an investigation of the direction of effects of both classroom social relationships and their joint effects on adolescents' behavioral engagement (Nurmi and Kiuru 2015). Third, peers are used as informants of both teacher–student relationships and peer status. This allows us to compare teacher and peer effects, as any difference obtained across these social classroom relationships does not depend on the type of informant used.

A schematic overview of the hypotheses are presented in Fig. 1. Previous research showed that positive teacher–student relationships are associated with higher academic motivation, effort, achievement (Ryan et al. 1994) and engagement (Furrer and Skinner 2003). Negative teacher–student relationships are related with more difficulties in these areas (Hamre and Pianta 2001). Therefore, we expected that positive teacher–student relationships are positively associated with behavioral engagement (hypothesis a) and that negative teacher–student relationships are negatively related to behavioral engagement (hypothesis b). In turn, adolescents could shape the relationships with their teachers more actively compared to younger children (Ryan and Patrick 2001). Consequently, we expected to find reciprocal effects between teacher–student relationships and adolescents' engagement.

In line with previous research on peer likeability, we also expected that higher levels of peer likeability are positively related to behavioral engagement in adolescence (Wang and Eccles 2012) (hypothesis c). As for the reverse effect, we hypothesized that adolescents who show lower behavioral engagement may be more liked by their peers, as this behavior tends to be consistent with early adolescents' peer group values (Rubin et al. 2015). For popularity, we expected that higher levels of popularity are related to lower levels of behavioral engagement, which in turn, increases popularity (hypothesis d) (De Laet et al. 2015; Galván et al. 2011; Schwartz et al. 2006). Especially in adolescence, students could experience concerns about their social prominence, which might interfere with meeting academic demands.

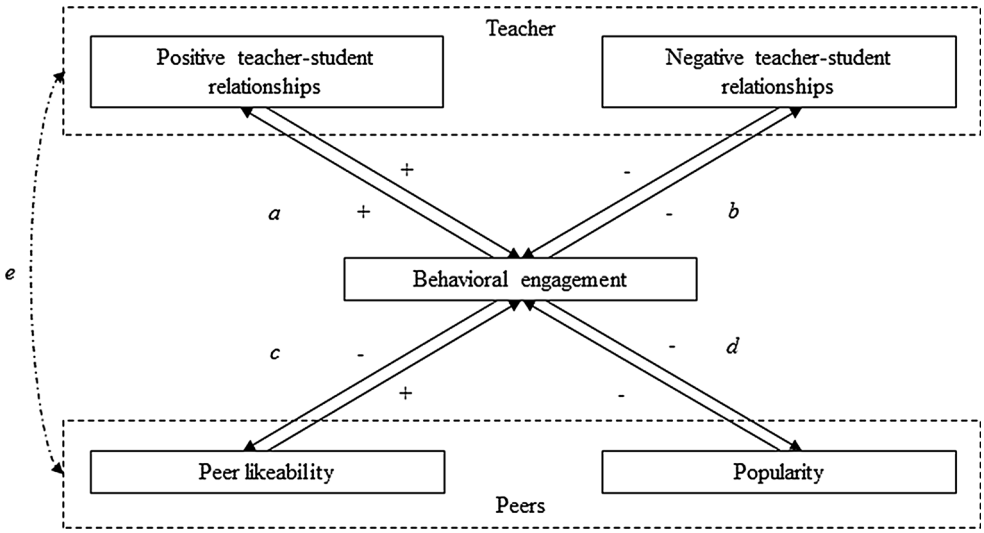

Fig. 1 Schematic overview of the hypotheses. *Arrows* imply the directionality between classroom social dynamics and behavioral engagement: *plus sign* indicates a positive association, *minus sign* indicates a negative association

With respect to the relationship between teachers and peers, evidence from elementary school suggests that relationships with teachers and peers influence each other. However, in adolescence, the peer group increasingly becomes a separate social world that is less supervised by adults (LaFontana and Cillessen 2010). This may imply that the social worlds of teachers and peers become less interrelated over time, and that they constitute separate sources of influence (hypothesis e). Consequently, we hypothesized that the role of teacher and peers in adolescents' behavioral engagement is additive and independent rather than compensatory (De Laet et al. 2015; Wang and Eccles 2012).

In addition, previous research revealed mean-level differences in behavioral engagement for boys and girls. Compared to boys, girls often display higher levels of behavioral engagement (Li and Lerner 2011; Wang et al. 2011). Despite these mean-level differences, results from a large scale international study indicated that boys and girls were similar in their association between teachers, peers, and engagement (Lam et al. 2012; Wang et al. 2011). Moreover, no indications were found for the moderating effect of gender, which suggests that the relationships between teachers, peers and engagement are similar for boys and girls (Wang and Eccles 2012). To control for the mean-level differences, we included sex (0 = male; 1 = female) as a covariate in the cross-lagged analyses.

Method

This study was part of a large-scale ongoing longitudinal project STRATEGIES (i.e., Studying Transactions in Adolescence: Testing Genes in Interaction with Environments). This project adopted an accelerated longitudinal design to investigate individual and contextual predictors of adolescents' development. The current study used data from students in Grade 7, 8, and 9 who were followed over three annual waves. Thus, in the remainder of this article, Wave 1 represents students from Grades 7, 8, and 9, Wave 2 refers to students from Grades 8, 9, and 10, and Wave 3 includes students from Grades 9, 10, and 11.

Participants

The sample consisted of 1116 adolescents (49 % female and M age = 13.79, SD = 0.93) from 121 classes across 9 secondary schools. All schools were located in the Flemish community of Belgium. At the start of the study, 36 % of the participants were in Grade 7, 37.4 % in Grade 8, and 26.6 % in Grade 9. The vast majority of the participants and their parents were born in Belgium (i.e., 95 % of the students and 88 % of their parents), and lived in intact families (75.3 % of the students). Sixty-three percent of the mothers and 58 % of the fathers completed higher education.

Following the recommendation of Wargo Aikins and Cillessen (2007), at least 60 % of the classmates had to participate in the peer nomination procedure in order to obtain a valid and reliable view of students' status. If this was not the case, the class was removed from the study. In this way, sociometric nominations were available for 622 participants at Wave 1 (N = 42 classes from Grade 7, 8, and 9), 424 participants at Wave 2 (N = 38 classes from Grade 8, 9, and 10) and 532 participants at Wave 3 (N = 58 classes from Grade 9, 10, and 11). Participants were followed in their (new) grades as much as possible. At Wave 1 and Wave 3, no significant differences in behavioral engagement were found between participants with and without missing values on the sociometric nominations. At Wave 2, participants with missing values scored, on average, 0.11 points lower on behavioral engagement compared to participants without missing values [$t(922) = 2.58$, $p = .01$, $r = .08$].

Procedure

The STRATEGIES project was approved by the Institutional Review Board of the Faculty of Medicine at the researchers' university. For the current study, 121 classes from 9 schools were randomly selected (N = 2254), and all students from these classes were invited to participate. For approximately 50 % of the students, both the students and their parents agreed to participate. Active consent was requested from participants and parents. For the peer nominations passive consent was obtained for non-participating classmates (i.e., students who were not directly involved in the study). All participants were informed about the purpose of the study and received instructions from research assistants. Starting in spring 2011, adolescents were questioned annually in the classroom about themselves and their social relationships. For the peer nominations, each student received an alphabetical list of names of the classmates preceded by a number.

Measures

Behavioral Engagement

Behavioral engagement was assessed annually by means of 7 items (e.g., "I pay attention in class") from the Student Report on Engagement Versus Disaffection with Learning (Skinner et al. 2008). Two items from the RAPS (Institute for Research and Reform in Education 1998) were added to the questionnaire: "I work hard on my schoolwork" and "Trying hard is the best way for me to do well in school". The 9 items (Wave 1 α = .89, Wave 2 α = .89, Wave 3

$\alpha = .90$) were answered on a 4-point scale ranging from 1 (*not true at all)* to 4 (*completely true*). A sum score was computed with a high value referring to higher levels of behavioral participation in learning activities.

Peer Status

In the Flemish educational system, students are assigned to a class with whom they take courses throughout the school year. As a result, most social interactions are with classmates instead of peers from other grades. Consequently, a peer nomination procedure within the classroom was most appropriate to capture students' peer interactions. Following recommendations by Cillessen et al. (2011) regarding peer nomination procedures, this study used unlimited classroom-based peer nominations to obtain measures of students' popularity and differentiated between peer likeability and popularity. In line with Coie, Dodge, and Coppotelli (1982), peer likeability was operationalized as the difference between acceptance ("Whom do you like most?") and rejection ("Whom do you like least?") nominations. Popularity was operationalized as the difference between popularity ("Who is most popular?") and unpopularity ("Who is least popular?") nominations (Cillessen et al. 2011). The program SocStat (Thissen and Bendermacher 2012) was used to compute two z-scores for peer likeability and popularity. First, for the four items raw scores were derived from the total number of times a participant is nominated. Next, four z-scores were computed by subtracting the class mean from the raw score, and then dividing the resulting score by its standard deviation. Subsequently, standardized scores for peer likeability and popularity represent the standardized difference between the standardized acceptance-rejection score, and popular-unpopular score, respectively (Coie et al. 1982).

The peer status measures were considered to be reliable as at least 60 % of the classmates participated in the peer nomination procedure (Wargo Aikins and Cillessen 2007). The stability of likeability (between .46 and .65) and popularity (between .65 and .76) was high. This was consistent with previous research (Jiang and Cillessen 2005). Correlations between likeability and popularity (.45 to .67) were in line with prior research, indicating that both are related but different measures (Cillessen et al. 2011). In addition, to demonstrate the unique construct validity of likeability and popularity, correlations with general measures of aggression are presented (Achenbach 1991; Cillessen et al. 2011). As expected, likeability showed no significant correlations with aggression, whereas popularity was significantly and positively correlated with aggression (.10 to .16) (Cillessen et al. 2011).

Teacher–Student Relationships

A peer nomination procedure was used. Students were asked to nominate peers with positive teacher–student relationships (i.e., "Who gets along well with the teacher?") and negative teacher–student relationships (i.e., "Who does not get along well with the teacher?"). The program SocStat (Thissen and Bendermacher 2012) was used to compute standardized scores for positive and negative nominations teacher–student relationships by subtracting the class mean from the raw score, and then dividing the score by its standard deviation. These scores were standardized within classrooms.

Following the 60 %-criterion of Wargo Aikins and Cillessen (2007), the teacher–student relationship measures were considered to be reliable. The stability of positive (between .43 and .60) and negative teacher–student relationships (between .40 and .51) was high. Discriminant validity was confirmed by the small correlations between positive and negative teacher–student relationships (−.11 to.−.28). These correlations indicate separate constructs. Also, previous research showed that peer perceptions of teacher–student relationships converge with both teacher and student perceptions (Doumen et al. 2009).

Statistical Analysis

First, to investigate mean-level changes in the study variables, repeated measures analyses of variance were performed. The three measurement waves were specified as the within-subjects variable. Second, multivariate autoregressive cross-lagged modeling (Jöreskog 1970) with three measurement waves was used to examine the direction of effects between behavioral engagement, likeability and popularity, and positive and negative teacher–student relationship. This statistical procedure allows for accurate estimates of cross-time effects (i.e., the correlation between a variable and a variable at a later time point), while accounting for all within-time associations (i.e., the correlation between the different variables at one point in time) and stability coefficients (i.e., prediction of a variable by its level at previous time points). Mplus 6.1 software (Muthén and Muthén 1998–2010) was used. The clustering of students in classes was taken into account by applying the "complex analysis" option (Williams 2000). The Full Information Maximum Likelihood estimator was used to handle non-normality of the data (Enders 2010).

In all models tested, sex (0 = boy; 1 = girl) and age (measured at Wave 1) were controlled for by allowing paths from sex and age to the study variables at each time point. Four separate models were specified, linking behavioral engagement to: (a) likeability and positive teacher–student relationships, (b) likeability and negative

teacher–student relationships, (c) popularity and positive teacher–student relationships, and (d) popularity and negative teacher–student relationships. All cross-lagged models were estimated in a nested hierarchical manner. First, a baseline model was tested, which allowed autoregressive and cross-sectional correlations between the main study variables. Second, a partial reciprocal model was specified by adding bidirectional cross-lagged paths between behavioral engagement and the two social classroom relationships (i.e., teacher–student relationships and peer status). Third, a full reciprocal model was estimated by including cross-lagged paths between the two social relationships. Finally, the final unconstrained model (cross-lagged paths were allowed to vary across groups) was compared to a constrained model (cross-lagged paths were set equal across groups). A significant difference in fit between the unconstrained and constrained model indicates subgroup differences, Δ Santorra-Bentler Chi square (S-B χ^2) <.05. Additionally, an indirect effects model was tested in which one social relationship shaped the other (i.e., teacher–student relationship affects peer status, or vice versa), which in turn, affected behavioral engagement. Model fit was evaluated based on the Tucker-Lewis Fit Index (TLI), average Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). TLI and CFI values of ≥.90 are seen as indications of acceptable fit, and values of ≥.95 as indications of good model fit (Byrne 2012). For the RMSEA, values of ≤.06 are considered as indications of good model fit, ≤.08 of sufficient model fit, between .08 and .10 of mediocre fit and values ≥.10 of poor model fit (Byrne 2012).

Results

Correlations and Mean-Level Changes

Table 1 presents correlations among the key variables. Medium to large correlations were found for cross-year stability of behavioral engagement (rs = .52 to .66), positive teacher–student relationship (rs = .43 to .60), negative teacher–student relationship (rs = .40 to .51), likeability (rs = .46 to .65), and popularity (rs = .65 to .76). At each wave, behavioral engagement was positively correlated with a positive teacher–student relationship (rs = .13 to .33), and negatively with a negative teacher–student relationship (rs = −.16 to −.29) and popularity (rs = −.10 to −.19). Concurrent negative associations between positive and negative teacher–student relationships were found (rs = −.19 to −.28). For likeability and popularity these associations were positive (r = .59 to .67).

Repeated measures analysis of variance with measurement wave as the within-subjects variable was conducted to examine mean-level changes in the key variables. Mauchly's test indicated that the assumption of sphericity was violated (i.e., $p < .05$) for behavioral engagement ($\varepsilon = .95$, $p < .001$), positive teacher–student relationship ($\varepsilon = .98$, $p = .047$), negative teacher–student relationship ($\varepsilon = .97$, $p = .023$), likeability ($\varepsilon = .96$, $p = .005$), and popularity ($\varepsilon = .95$, $p < .001$). This indicates unequal variances and an increase in Type I error. To overcome this problem, corrections were applied to the degrees of freedom using Greenhouse-Geisser (Field 2009). This correction lowers the degrees of freedom and increases the p value for the significance of the F-values. Behavioral engagement showed significant mean-level change, $F(1.91, 1387.13) = 69.18$, $p < .001$, $\eta^2 = .087$. Students at Wave 1 ($M = 3.29$, $SD = .02$) reported significantly higher levels of behavioral engagement than students at Wave 2 ($M = 3.15$, $SD = .02$) and Wave 3 ($M = 3.06$, $SD = .02$), $p < .001$. Moreover, pairwise comparison with a Bonferroni correction indicated that in all waves girls reported higher levels of behavioral engagement than boys, $F(1.91, 1387.34) = 4.63$, $p = .01$, $\eta^2 = .006$. Mean levels changed significantly for likeability, $F(1.93, 559.87) = 3.61$, $p = .03$, $\eta^2 = .012$. Likeability at Wave 1 ($M = .18$, $SD = .05$) was significantly higher compared to Wave 2 ($M = .07$, $SD = .04$). No significant mean-level changes were found for positive teacher–student relationship, $F(1.96, 566.10) = 0.34$, $p = .71$, $\eta^2 = .001$, negative teacher–student relationship, $F(1.95, 563.47) = 0.65$, $p = .52$, $\eta^2 = .002$, and popularity, $F(1.90, 551.33) = 0.66$, $p = .51$, $\eta^2 = .002$. No significant sex differences were found for teacher–student relationship, likeability and popularity.

Cross-Lagged Analysis

Likeability and Teacher–Student Relationships

Cross-lagged analysis for behavioral engagement, likeability, and positive teacher–student relationship were conducted following the procedure described above. As can be seen from Table 2 (Model 1), model fit indices of the baseline, partial and full model revealed acceptable model fit. The model fit improved significantly by adding cross-lagged paths between the main study variables. Moreover, the fully unconstrained model was compared to a constrained model with all cross-lagged paths constrained to be equal over time and indicated that all cross-lagged paths could be considered equal across time. Figure 2 presents the full reciprocal model with cross-lagged paths constrained over time. It shows that positive teacher–student relationships, likeability and behavioral engagement were stable over time. In line with our

Table 1 Bivariate correlations

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Behavioral engagementW1	1														
2. Behavioral engagementW2	.63***	1													
3. Behavioral engagementW3	.52***	.66***	1												
4. Positive T–SR W1	.28***	.29***	.33***	1											
5. Positive T–SR W2	.22***	.32***	.32***	.55***	1										
6. Positive T–SR W3	.13**	.15**	.24***	.43***	.60***	1									
7. Negative T–SR W1	−.22***	−.24***	−.26***	−.28***	−.11*	−.11*	1								
8. Negative T–SR W2	−.19***	−.29***	−.29***	−.20***	−.28***	−.19***	.48***	1							
9. Negative T–SR W3	−.16***	−.18***	−.20***	−.05	−.21***	−.19***	.40***	.51***	1						
10. Likeability W1	.05	−.01	−.07	−.03	.03	.04	−.10*	−.04	−.08	1					
11. Likeability W2	.02	.07	−.02	−.14**	.02	−.04	.02	.00	−.00	.65***	1				
12. Likeability W3	−.02	−.06	−.06	−.12*	−.05	.04	.04	.02	−.10*	.46***	.61***	1			
13. Popularity W1	−.18***	−.17***	−.19***	−.10*	−.03	−.06	.20***	.16**	.06	.59***	.52***	.45***	1		
14. Popularity W2	−.09	−.13*	−.10	−.13*	−.02	−.09	.15**	.12*	.11*	.54***	.67***	.52***	.71***	1	
15. Popularity W3	−.10*	−.12**	−.16***	−.19***	−.04	−.04	.18**	.14**	.13**	.47***	.59***	.61***	.65***	.76***	1

W1 wave 1, *W2* wave 2, *W3* wave 3, *T−SR* teacher–student relationship

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

Table 2 Model fit indices of the four cross-lagged analyses

Model	S-Bχ^2	*Df*	*P* value	CFI	TLI	RMSEA	ΔS-Bχ^2	Δdf
1. Likeability and positive T–SR								
Baseline	50.94***	18	.000	.977	.931	.041		
Partial	14.22	10	.163	.997	.984	.020	38.92***	8
Full unconstrained	8.67	6	.193	.998	.983	.020	41.48***	12
Full constrained	17.63	12	.127	.996	.982	.021	8.95	6
2. Likeability and negative T–SR								
Baseline	42.23***	18	.001	.983	.948	.035		
Partial	13.65	10	.190	.997	.986	.018	27.52***	8
Full unconstrained	5.98	6	.425	1.00	1.00	.000	35.60***	12
Full constrained	13.88	12	.308	.999	.994	.012	7.95	6
3. Popularity and positive T–SR								
Baseline	49.27***	18	.000	.980	.941	.040		
Partial	16.33	10	.091	.996	.978	.024	32.39***	8
Full unconstrained	12.48	6	.052	.996	.963	.031	36.32***	12
Full constrained	23.34	12	.025	.993	.968	.029	10.93	6
4. Popularity and negative T–SR								
Baseline	30.19*	18	.036	.992	.976	.025		
Partial	10.11	10	.431	1.00	1.00	.003	19.18*	8
Full unconstrained	6.02	6	.421	1.00	1.00	.002	23.81*	12
Full constrained	11.42	12	.494	1.00	1.00	.000	5.41	6

T–SR teacher–student relationship

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

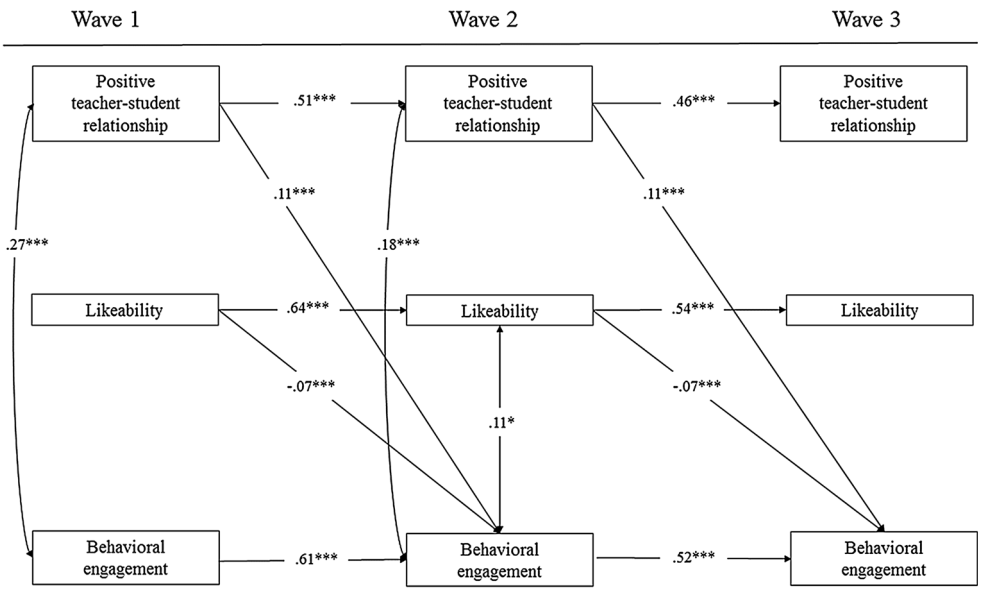

Fig. 2 Significant paths in the final cross-lagged model for positive teacher–student relationship, likeability and behavioral engagement. Non-significant paths were not displayed. * $p \leq .05$. ** $p < .01$. *** $p < .001$

hypothesis, positive teacher–student relationships predicted higher behavioral engagement (hypothesis a). Above and beyond the stability paths and within-time associations, likeability negatively predicted behavioral engagement. This was inconsistent with our expectations (hypothesis c). Furthermore, the effects of positive teacher–student relationships and likeability on behavioral engagement were unidirectional.

The same procedure was followed to investigate the relationships between behavioral engagement, likeability, and negative teacher–student relationships. The baseline, partial and full reciprocal model revealed acceptable and significant improvements in model fit (Table 2, Model 2). Furthermore, constraining all cross-lagged paths to be equal over time was justified. Figure 3 shows that in the full reciprocal model negative teacher–student relationship,

likeability and behavioral engagement were stable over time. Above and beyond the stability paths and within-time associations, negative teacher–student relationships predicted relative decreases in behavioral engagement over time. This was consistent with our expectations (hypothesis b). Contrary to our expectations, likeability negatively predicted behavioral engagement over time (hypothesis c). The model showed unidirectional effects of negative teacher–student relationships and likeability on behavioral engagement. In addition, in both model 1 and 2, we found support for our hypothesis that teachers and peers constitute separate worlds of influence regarding adolescents' behavioral engagement (hypothesis e), as no relationships over time were found between both classroom social relationships.

Popularity and Teacher–Student Relationships

The baseline, partial and full reciprocal model of behavioral engagement, popularity and positive teacher–student relationship revealed acceptable and significant improvements in model fit (Table 2, Model 3). Comparing the full unconstrained model to the full constrained model indicated no significant differences in model fit. Figure 4 presents the full reciprocal model with cross-lagged paths constrained equal over time. It shows that positive teacher–student relationships, popularity, and behavioral engagement were stable over time. Above and beyond the stability paths and within-time associations, higher popularity consistently predicted lower behavioral engagement over time: the more popular students were, the less they became engaged in school. This was congruent to our expectations (hypothesis d). Support was also found for the positive effect of positive teacher–student relationships on behavioral engagement over time (hypothesis a). The effects of both classroom relationships were unidirectional.

Last, cross-lagged models were specified for behavioral engagement, popularity, and negative teacher–student relationship. All models revealed acceptable and significant improvements in model fit (Table 2, Model 4). Constraining the cross-lagged paths to be equal over time did not result in a significant decrease of model fit. Figure 5 shows that in the full reciprocal model negative teacher–student relationship, popularity, and behavioral engagement were stable over time. Negative teacher–student relationship consistently predicted relative decreases in behavioral engagement (hypothesis b). Popularity was also negatively related to behavioral engagement at the next wave (hypothesis d): the more popular students were, the less they became engaged in school. Above and beyond the stability paths and within-time associations, negative teacher–student relationship positively predicted popularity in subsequent waves. This indicates that when peers perceive the relationship with the teacher as more negative, students' popularity among peers increases in the next wave. The indirect effect from negative teacher–student relationship on behavioral engagement through perceived popularity was not significant ($\beta = -0.002$, $p = .17$). Furthermore, all effects were unidirectional.

Discussion

Although teachers and peers play an important role in shaping students' engagement, no previous study has directly investigated transactional associations of these classroom-based relationships in adolescence. This study investigated the transactional associations between

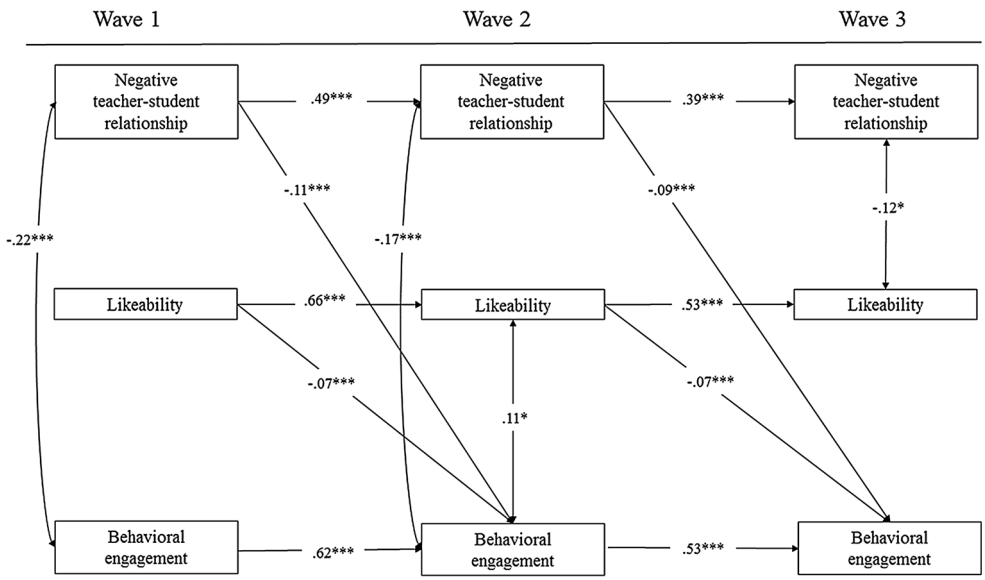

Fig. 3 Significant paths in the final cross-lagged model for negative teacher–student relationship, likeability and behavioral engagement. Non-significant paths were not displayed. * $p \leq .05$. ** $p < .01$. *** $p < .001$

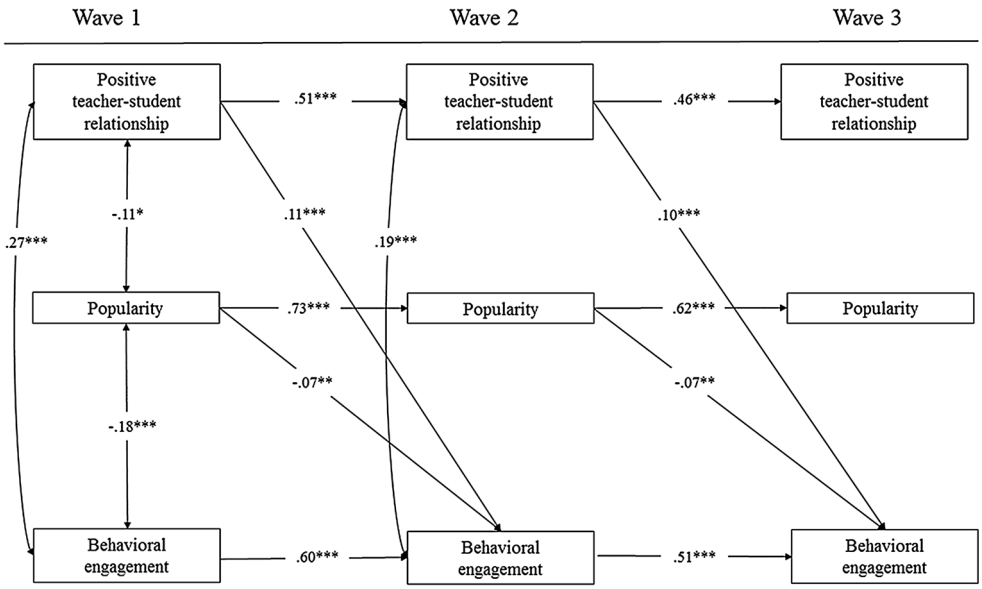

Fig. 4 Significant paths in the final cross-lagged model for positive teacher-student relationship, popularity and behavioral engagement. Non-significant paths were not displayed. * $p \leq .05$. ** $p < .01$. *** $p < .001$

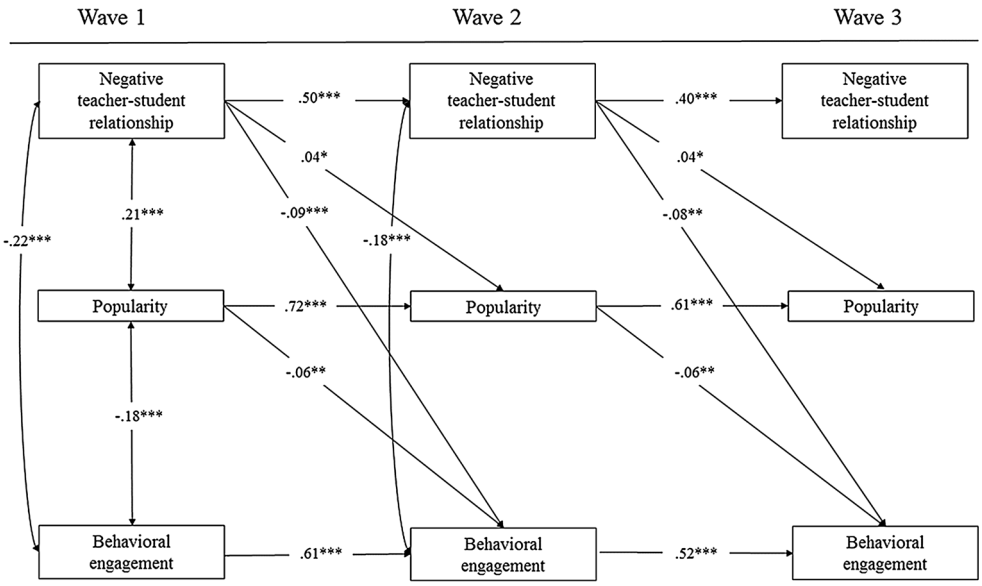

Fig. 5 Significant paths in the final cross-lagged model for negative teacher–student relationship, popularity and behavioral engagement. Non-significant paths were not displayed. * $p \leq .05$. ** $p < .01$. *** $p < .001$

adolescents' behavioral engagement, peer status (likeability and popularity), and (positive and negative) teacher–student relationships during secondary education. Particularly in adolescence, classroom social dynamics might be changing, as students become more independent in their judgments of their teacher and peers (Chang et al. 2007), and the peer group gains in importance (LaFontana and Cillessen 2010). This study extends previous research using a multidimensional approach by including both positive and negative teacher–student relationships and two types of peer status (i.e., peer likeability and popularity). Moreover, it addresses the need for cross-lagged longitudinal research that allows for investigating the direction of effects of both classroom social relationships and their joint effects on adolescents' behavioral engagement (Nurmi and Kiuru 2015). Furthermore, the current study used peers as informants of both teacher–student relationships and peer status. This allowed us to compare teacher and peer effects, as differences found across these social classroom relationships do not depend on the type of informant used.

Consistent with prior research, our results revealed that adolescents' behavioral engagement declined during secondary education (e.g., Fredricks et al. 2004). Furthermore, mean-level changes in behavioral engagement were found between boys and girls. In line with previous research, girls reported higher levels of behavioral engagement, suggesting that girls had more active, goal-directed, flexible and positive actions and practices towards learning activities than boys (Wang et al. 2011). The multivariate cross-lagged analyses revealed a consistent effect of positive and

negative teacher–student relationships on behavioral engagement over time, above and beyond within-time and between-time associations. As expected, students with positive teacher–student relationships had higher levels of behavioral engagement over time (hypothesis a), whereas students with negative teacher–student relationships showed lower levels of behavioral engagement over time (hypothesis b). Possibly, adolescents with positive teacher–student relationships experience more emotional security (Bergin and Bergin 2009), fulfillment of their sense of belonging (Martin and Dowson 2009), and more positive self-perceptions regarding academic competence (Verschueren et al. 2012), which could increase their behavioral engagement. Conversely, students with negative teacher–student relationships could experience a lack of emotional security and belonging and negative self-perceptions, contributing to lower levels of engagement. Although previous research in elementary school was inconclusive regarding transactional associations between teachers and students' engagement, this study showed that adolescents' relationships with their teachers were not affected by their behavioral engagement in learning activities.

Our study confirmed the importance of teacher–student relationships for adolescents' academic engagement as found in previous predominantly cross-sectional research (Roorda et al. 2011). In addition, this study showed that, when peers perceive the relationship between students and their teachers as more negative, students' popularity among peers increases in the next wave, confirming findings by De Laet et al. (2014) who used student self-perceptions of the relationship with their teacher. Thus, despite the fact that adolescence is a period in which students experience decreases in teacher support (Eccles et al. 1993), the quality of teacher–student relationships remains of great concern for adolescents' academic engagement and peer status. The current study confirms earlier longitudinal research and provides support for the effect of both positive and negative teacher–student relationships. Furthermore, associations are not inflated by the use of same-informants, as this study used peer perceptions of the teacher–student relationship and self-perceptions of academic engagement.

This study showed that, besides teachers, peers are equally important for student behavioral engagement. Contrary to our expectations, we found that students who are well-liked by their peers had *lower* levels of behavioral engagement in the next wave (hypothesis c). An explanation for this finding could be that the classroom context generates the pressure to conform to the group norms posed in the classroom (Schwartz and Gorman 2011). Well-liked students could experience pressure to create group similarity and join in the development of shared classroom norms (Kindermann and Gest 2009). Based on these "normative guideposts" for adolescents' behavior, well-liked students might express less behavioral engagement. Especially in the case of behavioral engagement, this process could play a role, as students' behavioral engagement is more directly observable for other classmates and the teacher compared to the emotional dimensions of engagement (i.e., school liking, happiness, boredom) (Fredricks et al. 2004).

In line with our expectations, students who are seen as popular had lower levels of behavioral engagement (hypothesis d). Popular students reported, on average, less effort, persistence, concentration and attention over time. This was in line with previous research (De Laet et al. 2015). An explanation could be that popular adolescents express less engaged behaviors in order to maintain their high status. This explanation is supported in a study on the social value of effort, which showed that 8th graders were more reluctant to present themselves as effortful and hard working to popular peers than to teachers, in contrast to younger students (Grade 4 and 6) who were equally willing to show themselves as effortful to both teachers and popular peers (Juvonen and Murdock 1995). It seems that, especially in adolescence, concerns about peer status peak and interfere with meeting academic demands.

With regard to the interconnections of relationships with teachers and peers, the current study generally supported the assumption that teachers and peers constitute "separate worlds" in adolescence, as no relationships over time were found between both classroom social relationships. The only exception was that negative teacher–student relationships at Wave 1 predicted popularity at Wave 2. In the same line, support was found for the hypothesis that each classroom relationship has its own unique effect and that both matter as they contribute additively to students' academic engagement (hypothesis e).

Limitations and Future Directions

Despite the strengths of this study, several limitations should be taken into account when interpreting the results. First, although academic engagement is a multidimensional concept with behavioral and emotional dimensions (Fredricks et al. 2004), the current study investigated only one dimension. Studying the different dimensions in combination with each other could yield important insights in the current knowledge base about academic engagement (Kindermann 2007). Therefore, we suggest incorporating multiple dimensions in future studies. Second, this study investigated a selection of classroom social relationships. Future research could also explore the role of other social dynamics, such as friendships and cliques, as these relationships could be even more influential for adolescents' academic engagement (Berndt et al. 1999). A third limitation concerns the cross-lagged design of the study, which does not allow to draw conclusions about causation. Cross-

lagged analyses are considered as rigorous analyses in terms of controlling for within-time and between-time associations. However, experimental studies with school-based interventions (e.g., aimed at promoting positive teacher–student relationships) could examine whether they effectively cause changes in adolescents' behavioral engagement. Finally, our measurement of teacher–student relationships was based on peer nominations. Although this measure can be considered as an indirect measurement, research indicated that peer assessments are a valid method for measuring teacher–student relationships (Li et al. 2012). For instance, research has consistently shown alignment between peer, teacher and student perceptions of teacher–student relationships (Doumen et al. 2009; Li et al. 2012). Also, peer perceptions of teacher–student relationships were stable over time and related to current and future behavior and adjustment, including engagement (Hughes et al. 2001, 2014).

Practical Implications

Based on this study, two practical implications can be put forward. First, interventions aimed at increasing adolescents' engagement should focus on stimulating positive teacher–student relationships, as this social relationship is found to be positively associated with students' behavioral engagement. For instance, the intervention My Teaching Partner—Secondary provides personalized coaching and systematic feedback to teachers to strengthen their relationships with students and their use of instructional and classroom management strategies that promote academic engagement (Mikami et al. 2011). Research on this intervention found significant increases in students' academic achievement (Allen et al. 2011) and improvements in students' observed in-class engagement (Gregory et al. 2014).

Second, teachers should become aware of the peer group dynamics in terms of peer status. In adolescence, students experience increasing concerns about their peer status. This may interfere with meeting academic demands in general, and with showing academic engagement in particular. By stimulating more positive adolescents' norms about academic engagement that support learning, the negative effects of peer status might be countered. This could be achieved, for instance, by identifying and engaging adolescents with a high social status in the teaching process to promote more positive attitudes towards schooling (Hamm et al. 2010).

Conclusion

Behavioral engagement predicts various important developmental outcomes. Research on the antecedents of behavioral engagement points to the role of classroom social dynamics (Fredricks et al. 2004; Wang and Eccles 2012). However, it remains unclear how classroom social dynamics and engagement reciprocally influence each other over time. Especially in adolescence, social dynamics might be changing, as the peer group becomes increasingly important (Gifford-Smith and Brownell 2003). Nevertheless, adolescents also have an increased need for positive and supportive relationships with peers and non-parental adults, such as teachers (Roorda et al. 2011). The current study supplements adolescent research by examining the transactional associations between two classroom based social relationships and adolescents' behavioral engagement. Moreover, a multidimensional approach was used to study teacher–student relationships (i.e., positive and negative) and peer status (likeability and popularity). This longitudinal study showed that both teachers and peers matter in the development of adolescents' behavioral engagement. In particular, adolescents with negative teacher–student relationships and a high status (i.e., either well-liked or popular) showed less behavioral engagement over time. On the other hand, adolescents with positive teacher–student relationships had higher levels of behavioral engagement over time. Thus, also for adolescents, positive relationships with their teachers could protect them from becoming behaviorally disengaged over time. It is concluded that both teachers and peers play a unique and independent role in adolescents' behavioral engagement over time.

Author Contributions ME performed the statistical analysis, participated in the interpretation of the data, and provided input on the intellectual content of the manuscript. HC designed the study and the specific research hypotheses, participated in the interpretation of the data, and provided input on the intellectual content of the manuscript. KVL designed the study and provided feedback on the intellectual content of the manuscript. PB designed the study and provided feedback on the intellectual content of the manuscript. WVDN supervised the methodological and statistical aspects of the study, and provided feedback on the methodological and statistical content of the manuscript. SC designed the study and provided feedback on the intellectual content of the manuscript. LG designed and coordinated the study, and provided feedback on the intellectual content of the manuscript. KV designed the study and the specific research hypotheses, supervised the data analysis and interpretation of the data, and provided input on the intellectual content of the manuscript. All authors read and approved the final manuscript.

Funding This research project was funded by FWO (Research Fund – Flanders, G.0728.14) and by the research council of KU Leuven (Grant GOA/12/009: "STRATEGIES project").

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the Institutional Review Board of the Faculty of Medicine at KU Leuven.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

Achenbach, T. (1991). *Manual for the youth self-report and 1991 profile*. Burlington, VT: University of Vermont, Department of Psychiatry.

Allen, J. P., Pianta, R. C., Gregory, A., Mikami, A. Y., & Lun, J. (2011). An interaction-based approach to enhancing secondary school instruction and student achievement. *Science, 333*(6045), 1034–1037. doi:10.1126/science.1207998.

Archambault, I., Pagani, L. S., & Fitzpatrick, C. (2013). Transactional associations between classroom engagement and relations with teachers from first through fourth grade. *Learning and Instruction, 23*, 1–9. doi:10.1016/j.learninstruc.2012.09.003.

Asher, S., & Coie, J. D. (1990). In S. Asher & J. D. Coie (Eds.), *Peer rejection in childhood*. New York: Cambridge University Press.

Bergin, C., & Bergin, D. (2009). Attachment in the classroom. *Educational Psychological Review, 21*(2), 141–170. doi:10.1007/s10648-009-9104-0.

Berndt, T. J., Hawkins, J. A., & Jiao, Z. (1999). Influences of friends and friendships on adjustment to junior high school. *Merrill-Palmer Quarterly, 45*(1), 13–41.

Birch, S. H., & Ladd, G. W. (1998). Children's interpersonal behaviors and the teacher–child relationship. *Developmental Psychology, 34*(5), 934–946. doi:10.1037//0012-1649.34.5.934.

Bronfenbrenner, U., & Morris, A. A. (2006). The bioecological model of human development. In R. M. L. W. Damon (Ed.), *Handbook of child psychology: Theoretical models of human development* (6th ed., Vol. 1, pp. 793–828). Hoboken, NJ: Wiley.

Buhs, E. S. (2005). Peer rejection, negative peer treatment, and school adjustment: Self-concept and classroom engagement as mediating processes. *Journal of School Psychology, 43*(5), 407–424. doi:10.1016/j.jsp.2005.09.001.

Byrne, B. M. (2012). *Structural equation modeling with mplus: Basis concepts, applications, and programming*. New York: Routledge.

Chang, L., Liu, H., Fung, K. Y., Wang, Y., Wen, Z., Li, H., & Farver, J. M. (2007). The mediating and moderating effects of teacher preference on the relations between students' social behaviors and peer acceptance. *Merrill-Palmer Quarterly, 53*(4), 603–630. doi:10.1353/mpq.2008.0006.

Christenson, S. L., Reschly, A. L., & Wylie, C. (2012). *Handbook of research on student engagement*. New York: Springer.

Cillessen, A. H. N., & Mayeux, L. (2004). From censure to reinforcement: Developmental changes in the association between aggression and social status. *Child Development, 75*(1), 147–163. doi:10.1111/j.1467-8624.2004.00660.x.

Cillessen, A. H. N., Schwartz, D., & Mayeux, L. (2011). *Popularity in the peer system*. New York: The Guilford Press.

Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology, 18*(4), 557–570. doi:10.1037/0012-1649.19.2.224.

De Laet, S., Colpin, H., Van Leeuwen, K., Janssens, A., Goossens, L., & Verschueren, K. (2015). Developmental trajectories of student behavioral engagement in late elementary school: Both teachers and peers matter. *Developmental Psychology, 51*(9), 1292–1306. doi:10.1037/a0039478.

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*(4), 1647–1662. doi:10.1111/Cdev.12216.

Doumen, S., Verschueren, K., Buyse, E., De Munter, S., Max, K., & Moens, L. (2009). Further examination of the convergent and discriminant validity of the student–teacher relationship scale. *Infant and Child Development, 18*(6), 502–520. doi:10.1002/icd.635.

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist, 48*(2), 90–101. doi:10.1037/0003-066X.48.2.90.

Enders, C. (2010). *Applied missing data analysis*. New York, NY: Guilford Press.

Farmer, T. W., Estell, D. B., Bishop, J. L., O'Neal, K. K., & Cairns, B. D. (2003). Rejected bullies or popular leaders? The social relations of aggressive subtypes of rural african american early adolescents. *Developmental Psychology, 39*(6), 992–1004. doi:10.1037/0012-1649.39.6.992.

Field, A. P. (2009). *Discovering statistics using spss*. London, England: SAGE.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109. doi:10.3102/00346543074001059.

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology, 95*(1), 148–162. doi:10.1037/0022-0663.95.1.148.

Galván, A., Spatzier, A., & Juvonen, J. (2011). Perceived norms and social values to capture school culture in elementary and middle school. *Journal of Applied Developmental Psychology, 32*(6), 346–353. doi:10.1016/j.appdev.2011.08.005.

Gifford-Smith, M. E., & Brownell, C. A. (2003). Childhood peer relationships: Social acceptance, friendships, and peer networks. *Journal of School Psychology, 41*(4), 235–284. doi:10.1016/s0022-4405(03)00048-7.

Gregory, A., Allen, J. P., Mikami, A. Y., Hafen, C. A., & Pianta, R. C. (2014). Effects of a professional development program on behavioral engagement of students in middle and high school. *Psychology in the Schools, 51*(2), 143–163. doi:10.1002/pits.21741.

Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72*(2), 625–638. doi:10.1111/1467-8624.00301.

Hughes, J. N., Cavell, T. A., & Willson, V. (2001). Further support for the developmental significance of the quality of the teacher–student relationship. *Journal of School Psychology, 39*(4), 289–301. doi:10.1016/s0022-4405(01)00074-7.

Hughes, J. N., Im, M. H., & Wehrly, S. E. (2014). Effect of peer nominations of teacher–student support at individual and classroom levels on social and academic outcomes. *Journal of School Psychology, 52*(3), 309–322. doi:10.1016/j.jsp.2013.12.004.

Institute for Research and Reform in Education, I. (1998). Research assessment package for schools (raps). *Manual for elementary and middle school assessments*.

Jiang, X. L., & Cillessen, A. H. N. (2005). Stability of continuous measures of sociometric status: A meta-analysis. *Developmental Review, 25*(1), 1–25. doi:10.1016/j.dr.2004.08.008.

Johnson, W., Mcgue, M., & Iacono, W. G. (2006). Genetic and environmental influences on academic achievement trajectories during adolescence. *Developmental Psychology, 42*(3), 514–532. doi:10.1037/0012-1649.42.3.514.

Jöreskog, K. G. (1970). A general method for analysis of covariance structures. *Biometrika, 57*(2), 239–251. doi:10.1093/biomet/57.2.239.

Juvonen, J., & Murdock, T. B. (1995). Grade-level differences in the social value of effort: Implications for self-presentation tactics of early adolescents. *Child Development, 66*(6), 1694–1705. doi:10.1111/j.1467-8624.1995.tb00959.x.

Kindermann, T. A. (2007). Effects of natural existing peer groups on changes in academic engagement in a cohort of sixth graders.

Child Development, 78(4), 1186–1203. doi:10.1111/j.1467-8624.2007.01060.x.

Kindermann, T. A., & Gest, S. D. (2009). Assessment of the peer group: Identifying naturally occuring social networks and capturing their effects. In K. H. Rubin, W. M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups* (pp. 100–117). New York: Guilford.

LaFontana, K. M., & Cillessen, A. H. N. (2010). Developmental changes in the priority of perceived status in childhood and adolescence. *Social Development, 19*(1), 130–147. doi:10.1111/j.1467-9507.2008.00522.x.

Lam, S.-F., Jimerson, S., Kikas, E., Cefai, C., Veiga, F. H., Nelson, B., & Zollneritsch, J. (2012). Do girls and boys perceive themselves as equally engaged in school? The results of an international study from 12 countries. *Journal of School Psychology, 50*(1), 77–94. doi:10.1016/j.jsp.2011.07.004.

Li, Y., Hughes, J. N., Kwok, O. M., & Hsu, H.-Y. (2012). Evidence of convergent and discriminant validity of child, teacher, and peer reports of teacher–student support. *Psychological Assessment, 24*(1), 54–65. doi:10.1037/a0024481.

Li, Y., & Lerner, R. M. (2011). Trajectories of school engagement during adolescence: Implications for grades, depression, delinquency, and substance use. *Developmental Psychology, 47*(1), 233–247. doi:10.1037/a0021307.

Martin, A. J., & Dowson, M. (2009). Interpersonal relationships, motivation, engagement, and achievement: Yields for theory, current issues, and educational practice. *Review of Educational Research, 79*(1), 327–365. doi:10.3102/0034654308325583.

Mikami, A. Y., Gregory, A., Allen, J. P., Pianta, R. C., & Lun, J. (2011). Effects of a teacher professional development intervention on peer relationships in secondary classrooms. *School Psychology Review, 40*(3), 367–385.

Muthén, L. K., & Muthén, B. O. (1998–2010). Mplus user's guide. Los Angeles, CA: Muthén & Muthén.

Nurmi, J.-E. (2012). Students' characteristics and teacher-child relationships in instruction: A meta-analysis. *Educational Research Review, 7*(3), 177–197. doi:10.1016/j.edurev.2012.03.001.

Nurmi, J.-E., & Kiuru, N. (2015). Students' evocative impact on teacher instruction and teacher-child relationships: Theoretical background and an overview of previous research. *International Journal of Behavioral Development, 39*(5), 1–13. doi:10.1177/0165025415592514.

Perdue, N. H., Manzeske, D. P., & Estell, D. B. (2009). Early predictors of school engagement: Exploring the role of peer relationships. *Psychology in the Schools, 46*(10), 1084–1097. doi:10.1002/pits.20446.

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*(4), 493–529. doi:10.3102/0034654311421793.

Rubin, K. H., Bukowski, W. M., & Bowker, J. C. (2015). Children in peer groups. In R. M. Lerner, M. H. Bornstein, & T. Leventhal (Eds.), *Handbook of child psychology and developmental science* (pp. 175–222). Hoboken, New Jersey: John Wiley & Sons Inc.

Rubin, K. H., Bukowski, W. M., & Parker, J. G. (2006). Peer interactions, relationships, and groups. In N. Eisenberg, W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology* (6th ed., Vol. 3, pp. 571–645). New York: Wiley.

Ryan, A., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal, 38*(2), 437–460. doi:10.3102/00028312038002437.

Ryan, R. M., Stiller, J. D., & Lynch, J. H. (1994). Representations of relationships to teachers, parents, and friends as predictors of academic motivation and self-esteem. *Journal of Early Adolescence, 14*(2), 226–249. doi:10.1177/027243169401400207.

Schwartz, D., & Gorman, A. H. (2011). The high price of high status: Popularity as a mechanism of risk. In A. H. N. Cillessen, D. Schwartz, & L. Mayeux (Eds.), *Popularity in the peer system* (pp. 245–270). New York: The Guilford Press.

Schwartz, D., Hopmeyer Gorman, A., Nakamoto, J., & McKay, T. (2006). Popularity, social acceptance, and aggression in adolescent peer groups: Links with academic performance and school attendance. *Developmental Psychology, 42*(6), 1116–1127. doi:10.1037/0012-1649.42.6.1116.

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement. *Journal of Educational Psychology, 85*, 571–581. doi:10.1037//0022-0663.85.4.571.

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology, 100*(4), 765–781. doi:10.1037/a0012840.

Thissen, M., & Bendermacher, N. (2012). *Kunst socstat: Sociometric status*. Nijmegen: Radboud university.

van den Berg, Y. H. M., Burk, W. J., & Cillessen, A. H. N. (2015). Identifying subtypes of peer status by combining popularity and preference: A cohort-sequential approach. *Journal of Early Adolescence, 35*(8), 1108–1137. doi:10.1177/0272431614554704.

Verschueren, K., Doumen, S., & Buyse, E. (2012). Relationships with mother, teacher, and peers: Unique and joint effects on young children's self-concept. *Attachment and Human Development, 14*(3), 233–248. doi:10.1080/14616734.2012.672263.

Wang, M. T., & Eccles, J. S. (2012). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. *Child Development, 83*(3), 877–895. doi:10.1111/j.1467-8624.2012.01745.x.

Wang, M. T., Willett, J. B., & Eccles, J. S. (2011). The assessment of school engagement: Examining dimensionality and measurement invariance by gender and race/ethnicity. *Journal of School Psychology, 49*(4), 465–480. doi:10.1016/j.jsp.2011.04.001.

Wargo Aikins, J., & Cillessen, A. H. N. (2007). *Stability and correlates of sociometric status in early adolescence*. Storrs, CT: Department of Psychology, University of Connecticut.

Wentzel, K. R. (1998). Social relationships and motivation in middle school: The role of parents, teachers, and peers. *Journal of Educational Psychology, 90*(2), 202–209.

Williams, R. L. (2000). A note on robust variance estimation for cluster-correlated data. *Biometrics, 56*(2), 645–646. doi:10.1111/j.0006-341X.2000.00645.x.

Maaike Engels is Ph.D. student at KU Leuven - University of Leuven (Belgium), Department of School Psychology and Child and Adolescent Development. She received her Research Masters' Degree in Educational Sciences from the University of Utrecht (the Netherlands). Her research interests focus the role of peer and teacher relationships in shaping the development of adolescents' academic engagement.

Hilde Colpin is professor at KU Leuven - University of Leuven (Belgium), Department of School Psychology and Child and Adolescent Development. She received her Ph.D. in Educational Sciences from the same university. Her research mainly focuses on (interventions targeted at) proximal interactions affecting children's behavioral development in school settings.

Karla Van Leeuwen associate professor at KU Leuven - University of Leuven (Belgium), the Parenting and Special Education Research

Unit. She received her Ph.D. in Psychology from Ghent University. Her research interests include child/adolescent characteristics (temperament, personality, genes) by environment interactions in the prediction of child/adolescent outcome, and assessment of parenting.

Patricia Bijttebier is professor at KU Leuven - University of Leuven (Belgium), Department of School Psychology and Child and Adolescent Development. She received her Ph.D. in 1998. Her research focuses on temperamental and cognitive vulnerabilities to behavioral and emotional problems.

Wim Van Den Noortgate is professor at the research group of Methodology of Educational Sciences at KU Leuven - University of Leuven (Belgium). He received his Ph.D. in Educational Sciences in 2001 from the same university. His research interests include multilevel analysis, meta-analysis, and item response theory.

Stephan Claes is professor of Psychiatry at the KU Leuven - University of Leuven, Department of Neurosciences & University Psychiatric Center. He obtained his Ph.D. in Human Genetics from the same university. His main research interest is the genetic and epigenetic background of stress sensitivity and mood disorders.

Luc Goossens is full professor at KU Leuven - University of Leuven (Belgium), Department of School Psychology and Child and Adolescent Development. He obtained his Ph.D. in Psychology from the same university. His major research interests include adolescent identity, loneliness, and gene–environment interactions.

Karine Verschueren is full professor at KU Leuven - University of Leuven (Belgium), Department of School Psychology and Child and Adolescent Development. She received her Ph.D. in Developmental Psychology from the same university. Her major research interests include teacher–child and peer relationships, self-concept, and academic engagement.