

Depressive Symptoms and Academic Achievement: The Role of Adolescents' Perceptions of Teachers' and Peers' Behaviors

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This present study, using a longitudinal design, investigated how depressive symptoms are related to academic achievement and whether the perceptions of teachers' and peers' behaviors moderated this relation. A sample of 302 adolescents (60.10% girls, $M_{\text{age}} = 17.35$) completed scales measuring the depressive symptoms and perception of their teachers' support/equity and peers' cooperation/cohesiveness behaviors at Time 1. The adolescents' average grades were also collected. The adolescents' depressive symptoms and average grades were measured again at Time 2. The results showed that depressive symptoms measured at Time 1 were negatively associated with academic achievement measured at Time 2. The adolescents' perception of their peers' cooperation/cohesiveness moderated the relation between depressive symptoms and academic achievement. The results' implications for educational practice are discussed.

Academic and emotional difficulties (e.g., low academic achievement and depressive symptoms) are among the main concerns during the period of adolescence, having important consequences both on adolescents' future social and school functioning (e.g., Masten et al., 2005; Suldo, Thalji, & Ferron, 2011; Whaley & Noel, 2013) and on their personal well-being (see Hammen, Rudolph, & Abaied, 2014, for a review). Accumulating empirical evidence shows that depressive symptoms and achievement are longitudinally related, indicating either adolescents' academic achievement are predictive factors of their depressive symptoms (see Huang, 2015, for a meta-analysis) or reverse relation (e.g., Needham, Crosnoe, & Muller, 2004; Roeser, Eccles, & Sameroff, 1998). Little research has focused on the co-occurrence of academic achievement and depressive symptoms (see Weidman, Augustine, Murayama, & Elliot (2015) for an exception); however, previous literature suggests a decrease in academic motivation and achievement during adolescence (Eccles & Roeser, 2009; Eccles & Roeser, 2011) as well an increase in depressive symptoms, especially during the late period of adolescence (Hankin, 2015; Yap, Pilkington, Ryan, & Jorm, 2014). To fill this gap in the literature, our study investigated, using a longitudinal design, the bidirectional relation between depressive symptoms and academic achievement.

Adolescents spend a significant amount of time in school (Eccles & Roeser, 2010); thus, the

classroom environment that includes all the influences in a classroom, such as the teacher and peers, is relevant for their achievement and psychological well-being (Ryan & Deci, 2017; Wigfield et al., 2015). In addition, less is known about the contribution of the socializers' behaviors on the relation among these outcomes. Exploring the role of classroom environment is particularly important in older adolescent, previous literature revealing a widening of social networks, with peers and friends increasingly becoming a more important source of support, the support from adults (e.g., teachers) still being important through the adolescence period (Eccles & Roeser, 2009). To advance the literature, a second goal was to simultaneously evaluate whether teachers' and peers' behaviors explained as moderators the relation between achievement and depressive symptoms in a sample of older Romanian adolescents.

Depressive Symptoms and Academic Achievement

Theoretical models (e.g., competency-based model of depression, Cole, 1991; Cole, Jacquez, & Maschman, 2001; or International Classification of Functioning, Disability and Health; World Health Organization, 2002) emphasize that depressive symptoms could be causes or consequences of low academic achievement. According to the competency-based model of depression (Cole, 1991; Cole et al., 2001), cumulative primary negative evaluations from significant others (e.g., parents, peers,

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teachers) incrementally contribute to children's perceptions of their own lack of competence, which in turn increases the risk of depressive problems. Related to school context, low academic achievement was associated with low perceptions of competence, feelings of hopelessness, and low self-esteem, which in turn increased depressive symptoms (Moilanen, Shaw, & Maxwell, 2010). Previous studies provide empirical support for this direction of the relation, showing that children and adolescents who reported lower levels of academic achievement reported greater depressive symptoms over time (see Huang, 2015, for a meta-analysis). Alternatively, previous literature suggests that depressive problems may cause adolescents' poor functioning in different domains, including school (World Health Organization, 2001, see also Riglin, Petrides, Frederickson, & Rice, 2014). Symptoms of depression, such as negative emotions (e.g., sadness), a loss of interest in pleasurable activities, trouble concentrating, or rumination, could distract students from their academic work and reduce their ability to learn new information and consequently decrease their academic achievement (Gotlib & Joormann, 2010; Rudolph, Hammen, & Daley, 2006). There is evidence for this idea, the depressive problems being linked to unfavorable academic outcomes, such as lower rates of high school completion, school attendance, more frequent school absences, and lower engagement in classroom activities (e.g., Fröjd et al., 2008; Suldo et al., 2011; see also Riglin et al., 2014, for a meta-analysis). Longitudinal studies exploring how depressive symptoms are related to achievement over time reported mixed findings. Some studies found that children and adolescents who reported high levels of depressive symptoms also reported low levels of achievement (i.e., lower grade point averages and grades) over time (e.g., Kellam, Rebok, Mayer, Ialongo, & Kalodner, 1994; Needham et al., 2004; Roeser et al., 1998). Other studies found that depressive symptoms were not related to academic achievement over time on samples of adolescents with behavioral problems (e.g., Ansary & Luthar, 2009).

A particularly limited bulk of longitudinal studies explored the bidirectional relation between depressive symptoms and academic achievement; the reported evidence is contradictory. Two studies found a bidirectional link; depressive symptoms (i.e., self-report and parents' report) negatively predicted adolescents' achievement (i.e., teachers' ratings of students' performance and grades) in each school year, and the achievement in any given

school year negatively predicted depression in the following year on samples of early and older adolescents (Verboom, Sijtsema, Verhulst, Penninx, & Ormel, 2014; Weidman et al., 2015). Another study found that older adolescents, who reported higher depressive symptoms (i.e., self-report and parents' report), also showed lower levels of academic achievement (i.e., self-report grades and lower grade point averages), whereas achievement did not predict changes to depression over time (Hishinuma, Chang, McArdle, & Hamagami, 2012). In addition, two studies found that early adolescents who have lower achievement (i.e., standardized vocabulary performance tests) have a tendency to report higher levels of depressive symptoms (i.e., self-report) over time and did not find support for the depressive symptoms to academic achievement relation (Grimm, 2007; Masten et al., 2005). Finally, another study found no support for the relation between depressive symptoms (i.e., depressive affect self-report) and achievement (i.e., grades) in any direction on a sample of adolescents with behavioral problems (Owens, Shippee, & Hensel, 2008). These mixed results point to the importance of additional longitudinal studies to evaluate the relations between depressive symptoms and academic achievement in order to better understand the strength and direction of the relation between these constructs.

Teachers' and Peers' Behaviors, Academic Achievement, and Depressive Symptoms

The bio-ecological model states that the classroom represents the most immediate educational environment for the student, with the teacher and peers being among the main sources of social influence in adolescence (Bronfenbrenner & Morris, 2006). According to the learning environment theory, the classroom is a social and learning environment that may affect the students' learning and emotional experience throughout its characteristics—teachers' support (academic and emotional), mutual respect, and cooperative activities within the classroom (Fraser, 2012; Fraser & Kahle, 2007). Motivational theories (e.g., self-determination, Deci & Ryan, 2000; Ryan & Deci, 2017 and expectancy-value, Eccles et al., 1993; Wigfield et al., 2015) state that when adolescents fulfill their fundamental needs (e.g., relatedness) through interactions with their teachers and peers, their achievement and well-being (i.e., low emotional difficulties) are enhanced. Further, these theoretical models suggest that the way adolescents perceive their relationships with

teachers and peers has implications on their achievement and emotional experience (Fraser & Kahle, 2007; Ryan & Deci, 2017; Wigfield et al., 2015). However, there is no consensus in the literature regarding the importance of relationships with teachers and peers. Specifically, previous literature indicated either that the students become increasingly independent from their teachers and more focused on their peers as they grow older (e.g., Lynch & Cicchetti, 1997) or that supportive relationships with their teachers become more important for the adolescents' academic adjustment (i.e., achievement and engagement) as students grow older (see Roorda, Koomen, Spilt, & Oort, 2011, for a meta-analysis). Relying on these models, we focused on two characteristics of the classroom environment—teachers' and peers' behaviors.

Teachers' behaviors, students' academic achievement, and depressive symptoms. The self-determination (Deci & Ryan, 2000; Ryan & Deci, 2017) and expectancy–value (Eccles et al., 1993; Wigfield et al., 2015) models stipulate that adolescents who experience a greater quality of teachers' behaviors (i.e., caring, responsiveness, and respect toward students) within the classroom reach a higher level of academic performance (Eccles, 2007; Deci & Ryan, 2012; Wigfield et al., 2015). Similarly, the learning environment theory stipulates that the adolescents' perceptions of the teacher as caring for them, supporting their learning and well-being, and encouraging mutual respect are among the most important aspects of the classroom environment (Patrick, Ryan, & Kaplan, 2007; Ryan & Patrick, 2001). Thus, in this study the relationship with teachers was conceptualized as the adolescents' perception about emotional support (i.e., interested in them and caring about their learning) and equity (i.e., treating them equally by giving feedback and providing opportunities for learning; Aldridge & Fraser, 2000; Fraser, 2012).

Previous studies provide support for these ideas showing that teachers' autonomy-supportive behaviors (e.g., listening to students, encouraging effort from students, or being responsive to students' comments and questions) were related to adolescents' achievement and psychological well-being (see Ryan & Deci, 2017, for a review). A relative smaller number of studies focused on relatedness dimensions of teachers' behaviors and showed that adolescents who believe that their teachers are supportive, caring, helpful, respectful of students, and treat them equally when it comes to giving feedback and opportunities for learning are more

likely to have higher academic achievement (i.e., grades and grade point average) in both cross-sectional and longitudinal studies (e.g., Tas, 2016; see Roorda et al., 2011, for a meta-analysis).

Further, previous literature showed that adolescents who rate their teachers as supportive (e.g., emotionally) also reported a decreased level of their depressive symptoms (see Rueger, Malecki, Pyun, Aycock, & Coyle, 2016, for meta-analyses). However, there is evidence that emotional support from teachers and depressive symptoms are not related for a sample of older adolescents (e.g., Pittard, Pössel, & Smith, 2015). Further, there is little evidence showing that supportive relationships with teachers are linked with adolescents' depressive symptoms over time (e.g., Pössel et al., 2016; Pössel, Rudasill, Sawyer, Spence, & Bjerg, 2013).

Peers' behaviors, students' academic achievement, and depressive symptoms. The developmental models emphasize that during adolescence, peers become the primary source of support during periods of distress; the adolescents' susceptibility to peer influence increases, their peers serving a variety of functions, such as self-validation, guidance, or companionship (Harter, Stocker, & Robinson, 1996; Newman, Newman, Griffen, O'Connor, & Spas, 2007). In addition, these models state that individuals move into and through adolescence; they begin identifying with particular peer groups which may act as a normative context, structuring the kinds of values and norms to which one is exposed (Brown, 1990; Eccles & Roeser, 2009). Thus, peer groups can operate as normative contexts, which may affect the adolescents' academic behaviors and emotional functioning (Fredricks, 2014; Hamm, Hoffman, & Farmer, 2012). Further, theoretical models stipulate that students' perceptions of peers' help in classroom interactions, feel personally valued, and able to contribute through interactions with their peers are also important aspects of the classroom environment along with the teacher's academic and emotional support (Patrick et al., 2007; Ryan & Patrick, 2001). In this study, the relationship with peers was conceptualized as an adolescent's perception about cohesiveness (i.e., the extent to which the students in the class help and support each other) and cooperation (i.e., the extent to which the students cooperate rather than compete with one another in learning tasks) with their classmates (Aldridge & Fraser, 2000; Fraser, 2012).

Literature provides evidence for the relation between peers' behaviors and academic achievement, indicating that adolescents who report high

levels of cohesiveness and cooperation also have higher academic achievement (e.g., Gherasim, Butnaru, & Măirean, 2013; Wentzel, Battle, Russell, & Looney, 2010). To our knowledge, only one study explored the longitudinal relation between an adolescent's perception of relationships with their peers and their achievement, and the results showed that the adolescents who are socially connected with their peers and have positive relationships with their peers also report higher school adjustment over time, including lower rates of school dropout and higher achievement (Newman et al., 2007).

Previous literature investigating the relation between perception of relationships with peers and depressive symptoms reported mixed findings. Some studies found no link between adolescents' perceptions of emotional support received from peers and their depressive symptoms, whereas other studies reported strong inverse relations (e.g., Demaray, Malecki, Davidson, Hodgson, & Rebus, 2005; see Rueger et al., 2016, for a meta-analysis). Fewer longitudinal studies examined the relation between the quality of peers' behaviors and adolescents' depressive symptoms. The results indicated that adolescents reporting that peers fulfill their needs of support, information, and feedback also report lower levels of depressive symptoms over time (e.g., Newman et al., 2007; Pössel et al., 2018; Schwartz, Gorman, Duong, & Nakamoto, 2008; Stice, Ragan, & Randall, 2004). To our knowledge, none of these studies evaluated adolescents' perceived cohesiveness and cooperation with peers and their depressive symptoms over time.

Simultaneous impact of teachers' and peers' on students' achievement and depressive symptoms. Relatively little attention has been afforded in the literature to simultaneously investigate whether adolescents' perceptions of supportive relationships with both teachers and peers are differentially related to adolescents' academic achievement and well-being over time (Ryan & Deci, 2017). The existent studies reported mixed findings. One study reported that early adolescents' perception of supportive behaviors (e.g., feeling loved and receiving advice or information) from their peers rather than from their teachers predicted higher academic achievement and lower depressive symptoms over time (Rueger, Malecki, & Demaray, 2010). Another study found that early adolescents living in at-risk communities who perceived supportive and caring relationships with their parents showed decreasing depressive symptoms, whereas

the teachers' and peers' supportive and caring behaviors were not related to their internalizing problems (McMahon, Coker, & Parnes, 2013). Finally, three studies found that adolescents' perceptions of teachers as caring, helpful, and respectful of students and equally providing opportunities for students to learn, rather than the perception of their peers as caring, helpful, and giving advice or information, are related to their academic achievement (Gherasim et al., 2013) and depression over time (Colarossi & Eccles, 2003; Pössel et al., 2018) in samples of older adolescents. It is important to note that longitudinal studies are limited; little is known about how the earlier perception of teachers' and peers' behaviors is linked to later adolescent achievement and depressive symptoms.

Teachers' and Peers' Behaviors as Moderators

Theoretical models suggest that the relation between academic and emotional adjustment in adolescents could be better explained by characteristics of learning context (Lerner & Castellino, 2002). Thus, the learning environment (Patrick, Kaplan, & Ryan, 2011; Wolf & Fraser, 2008) and motivational (Deci & Ryan, 2012; Wigfield et al., 2015) theories stipulate that achievement and well-being (i.e., low emotional difficulties) are higher in classrooms in which the adolescents perceived positive interpersonal relationships from their teachers and peers.

However, little attention has been given to investigate whether these factors relate to the classroom environment may explain the strength of the relation between adolescent depressive symptoms and achievement. To our knowledge, only one study tested whether the children's friendships in the classroom peer group could explain the relation between adolescents' academic functioning and their depressive symptoms (Schwartz et al., 2008). The results indicated that poor academic functioning was related to symptoms of depression, only if children had a small number of friendships in the classroom. These findings provide some support for the moderating role of peers' behaviors on the relation between achievement and depressive symptoms, highlighting the complexity of the examined developmental processes.

Current Study

Previous literature indicated mixed findings regarding the relation between depressive symptoms and academic achievement, showing that depressive symptoms are temporally associated

with academic achievement (e.g., Hishinuma et al., 2012), either achievement is temporally linked to depressive symptoms (e.g., Grimm, 2007) or a bidirectional relation (e.g., Weidman et al., 2015). To advance the literature, the first goal of our study was to evaluate the bidirectional link between depressive symptoms and academic achievement in a sample of older adolescents. Based on theoretical models (e.g., competency-based model of depression, Cole, 1991; Cole et al., 2001; World Health Organization, 2001), we expected to find a negative relation between these two constructs (i.e., depressive symptoms and academic achievement).

Further, limited literature focused on the simultaneous examination of the adolescents' perceptions of their relationships with their teachers and peers within the same study; the reported results were contradictory. To add to the literature, this study aims to simultaneously investigate the relation between the perception of teachers' and peers' behaviors with adolescents' later academic and emotional difficulties over time, in order to understand the role of these important dimensions of the context of the classroom on adolescents' adjustment. Based on theoretical models (Fraser, 2012; Patrick et al., 2007) and previous empirical studies (e.g., Colarossi & Eccles, 2003; Gherasim et al., 2013; Pössel et al., 2018), we expected that greater teacher support/fairness and greater peer cooperation/cohesiveness would be related to higher achievement in older adolescents as well as lower depressive symptoms over time.

Furthermore, previous literature suggests that relationships with teachers and peers, as characteristics of a classroom environment, could explain the relation between adolescents' depressive symptoms and achievement (e.g., Lerner & Castellino, 2002; Patrick et al., 2011; Wigfield et al., 2015); however, the empirical evidence is very limited. To advance the literature, we expected that the strength of the relation between adolescents' depressive symptoms and their academic achievement could be explained by the adolescents' perception of the teachers' and peers' behaviors. Specifically, based on previous literature, indicating that adolescents who perceived their teachers as supportive, caring, and respectful of students and positive relationships with their peers also reported higher achievement and lower depressive symptoms over time (e.g., Newman et al., 2007; Pössel et al., 2016; Schwartz et al., 2008; Tas, 2016), we expected that the perception of supportive relationships with teachers and peers would be directly associated with higher academic achievement and

fewer depressive symptoms. However, we could not formulate specific hypotheses about the directionality of these relations, because of the mixed findings regarding the differential roles of the teacher and peer relationships for the adolescents' adjustment (Lynch & Cicchetti, 1997; Roorda et al., 2011).

Theoretical implications of this study will address the strength and direction of the longitudinal relation between depressive symptoms and academic achievement and whether there is a differential role of teachers' and peers' behaviors in the relation between depressive symptoms and achievement in a sample of adolescents. The study also has practical implications regarding what—depressive symptoms or academic achievement—the training programs should focus on, in order to decrease the development of further academic or emotional difficulties. In addition, these results will indicate whether the prevention or intervention activities need to be associated with the improvement of the relationships with their teachers, peers, or both, for adolescents with emotional or academic difficulties.

METHOD

Participants and Procedure

The participants were adolescents recruited from high schools from an urban area in the northeastern part of Romania. All the participants were Caucasian. This region where the study was conducted has very low ethnic diversity (Diaconu-Gherasim, Iacob, & Gavreliuc, 2017); therefore, only Romanian adolescents were included in the sample, without minorities. A sample of 302 Romanian high school students (60.10% girls) participated in the study at Time 1. The mean age was 17.35 years ($SD = 0.54$, range = 16–19 years). Of these students, only 239 of the participants (57.7% girls, $M_{age} = 17.38$, $SD = 0.55$, range = 16–19 years) were involved in the second measurement (Time 2). The attrition rate is 22% and can be explained by the fact that some of the participants could not be contacted for the second wave of the study, approximately one year after the first wave. They either missed the days of testing or enrolled in a different school; the other participants refused to participate in the second wave. Most of the adolescents reported biparental families (85.7%). The maternal education was distributed as follows: less than a high school degree (32.6%), a high school degree (44.8%), and a college degree (22.6%).

We sent invitations to eight theoretical high schools, and we received accepted answers from only four schools. We had the following percentage of the sample for each school: 17.2% from high school No. 1 ($n = 52$ adolescents); 31.1% from school No. 2 ($n = 94$ adolescents); 21.9% from school No. 3 ($n = 66$ adolescents); and 29.8% from school No. 4 ($n = 90$ adolescents). The classes have between 20 and 25 students; thus, only a small part of the class did not participate for each high school. Various reasons could explain nonparticipation, such as the adolescents' refusal to participate, missing the testing day, or not returning the questionnaire.

High school studies in Romania are four years in length, from the 9th to the 12th grades. Out of these four years, two are compulsory (the 9th and 10th years) and two are noncompulsory (the 11th and 12th years). In this study, we explored the academic and emotional difficulties in late adolescence, considering the limited previous literature that suggests a decrease in academic achievement and an increase in depressive symptoms, especially during the late adolescent period (Eccles & Roeser, 2009; Hankin, 2015; Yap et al., 2014). Given these considerations, the participants were initially recruited during the first semester of the 11th grade school year, and the assessments were conducted until the end of the first semester of the 12th grade.

All the participants were informed about the confidentiality and anonymity of their responses and that they could quit the session whenever they decided to do so. At the end of the first semester of the 11th grade (Time 1), the participants filled in scales measuring the depressive symptoms and perception of the teachers' and peers' behaviors. Their grades were also collected from the school registers. At the end of the first semester of the 12th grade, the participants completed the depressive symptom scale, and their average grades were acquired from official school records (Time 2). The scales for the present study were given to the students as a part of a larger testing study investigating adolescents' individual and contextual factors in relation to school functioning. During the time when the study was conducted, from Time 1 to Time 2, the students had the same teachers and peers. Research assistants collected the data during regular school days, in groups of about 20–25 students, and the participation was voluntary. Permission for the study was obtained from the students' parents as well as from the school authorities. The protocol for this study was approved by the

research ethical committee before beginning the study.

Measures

Depressive symptoms. The Beck Depression Inventory (BDI-II; Beck, Steer, Ball, & Ranieri, 1996) was used to measure depressive symptoms at Time 1 and Time 2, respectively. It is a widely used 21-item self-reporting inventory designed to assess the presence and severity of depressive symptoms (e.g., sadness, loss of pleasure, guilty feelings) over a two-week period. We omitted the suicide item from the assessment due to concerns regarding child and parent sensitivity (similar with Weidman et al., 2015). Each item consists of four statements graded in the order of increasing severity from 0 to 3 (e.g., 0—I do not feel sad; 1—I feel sad much of the time; 2—I am sad all the time; 3—I am sad or unhappy that I can't stand it). The participants selected one sentence from each group that best described themselves over the past two weeks. The total scores were computed, higher scores indicating more severe depressive symptoms. The alpha coefficients in this sample were .89 at Time 1 and .92 for Time 2, respectively.

The scale was translated from English into Romanian using the forward-backward translation design (Hambleton, Yu, & Slater, 1999). The two versions were equivalent regarding the conceptual meaning.

Academic achievement. We collected the adolescents' average grades from school registers, for each of eight subjects (Romanian, mathematics, physics, chemistry, biology, geography, history, and English) at the end of the first semester of the 11th grade (Time 1) and at the end of the first semester of the 12th grade (Time 2). A single score was obtained by averaging the grades for the eight subjects and was computed in each of the time moments. These are among the most important subjects from the core curriculum in Romanian high schools. In Romania, grades are coded from 1 to 10 (1 indicates the poorest achievement and 10 indicates outstanding achievement). The alpha coefficients in this sample were .77 at Time 1 and .76 for Time 2, respectively. Thus, the average grades were calculated for each adolescent for each time point.

Perception of teachers' and peers' behaviors. A short form of *What Is Happening in this Class?* (WIHIC; Aldridge & Fraser, 2000) validated for

Romanian adolescent samples by Gherasim et al. (2013) was used to assess the quality of teachers' (16 items) and peers' behaviors (16 items) at Time 1. The scales for the overall perception of quality of teachers' behaviors were teacher support (8 items, e.g., The teachers take a personal interest in me.) and equity (eight items, e.g., The teachers give as much attention to my questions as to other students' questions.). The scales measuring the peers' behaviors were cohesiveness (8 items, e.g., Members of the class are my friends.) and cooperation (eight items, e.g., I cooperate with other students when doing assignment work.). The items were evaluated on a 5-point Likert response format (from 1—*almost never* to 5—*almost always*). In order to verify the factorial validity of the scale, we tested two models: a four-factor model and a two-factor model. For the model fit, we applied the maximum-likelihood estimation and reported the following fit indexes: comparative fit index (CFI), the normative fit index (NFI), and the root mean square error of approximation (RMSEA).

The fit for the four-factor model is good (Hu & Bentler, 1999): $\chi^2(384) = 590.05$, $p < .001$; CFI = .93; RMSEA = .042, 95% CI [0.035–0.049]. The fit for the model with two factors, where teacher support and equity form a single factor, while student cooperation and cohesiveness form the other factor, also fit the data in a satisfactory degree: $\chi^2(382) = 495.50$, $p < .001$; CFI = .96; RMSEA = .031, 95% CI [0.023–0.039], being significantly superior to the four-factor model, $\Delta\chi^2 = 94.55$, $\Delta df = 2$, $p < .001$. Thus, in this present study we computed two separate scores for the quality of teachers' and peers' behaviors. The Cronbach alpha coefficients were .87 for the teachers' support/equity behavior subscales and .83 for peers' cooperation/cohesiveness behavior subscales, respectively. Higher scores indicated a greater quality of teachers' and peers' behaviors. The instrument demonstrated consistent correlations with various indexes of motivation (e.g., Gherasim et al., 2013).

RESULTS

Overview

First, we conducted the preliminary analyses to examine whether demographic variables are associated with achievement and depressive symptoms. A missing value analysis was performed using the SPSS 22 (MVA; Little & Rubin, 2014). Second, the associations among the main variables were

calculated. Third, to test the direct effects of depressive symptoms and the quality of teachers' and peers' behaviors on academic achievement and also to estimate the moderation, we used a structural equation model framework in the AMOS Graphics 22 (Arbuckle, 2011). The independent variables were standardized. For the evaluation of the overall model fit, four different fit indices were used: the chi-square statistic (χ^2), the NFI, the CFI, and the RMSEA. A RMSEA < 0.05 , $\chi^2/df < 3$, NFI and CFI > 0.90 indicates a very good model fit (Hu & Bentler, 1999). We accounted for missing data by means of applying the full information maximum-likelihood estimations (Newman, 2003). To examine the nature of the significant interaction term, we used Dawson's (2014) method based on graphically displaying the interaction.

Preliminary Analysis

The results from the missing value analysis revealed no systematic differences in any investigated main variables, age and gender, $\chi^2(9) = 13.09$, $p = .158$. Intraclass correlations were used to determine whether there is between-classroom variance in the academic achievement. The analyses indicated no significant between-classroom variability (ICC = 0.13, $p = .147$). The non-significant value of ICC of these variables suggests that data from all the classrooms could be combined for primary analyses.

Descriptive statistics for the main variables are presented in Table 1. The adolescents' ages did not correlate with academic achievement at Time 1 but was negatively related to academic achievement at Time 2. Moreover, age did not correlate either with depressive symptoms measured at Time 1 and 2 or with teachers' support/equity and peers' cooperation/cohesiveness behaviors measured at Time 1. Further, depressive symptoms at Time 1 did not correlate with academic achievement at Time 1 and was negatively related to academic achievement at Time 2. There were no significant differences between adolescents with biparental family status and those indicating a family with a single parent in depressive symptoms measured at Time 1, $t(300) = .76$, $p = .44$, and Time 2, $t(243) = 1.33$, $p = .18$, academic achievement at Time 1, $t(247) = -0.79$, $p = .42$ and Time 2, $t(237) = -0.97$, $p = .33$. Further, there were no significant maternal educational differences in academic achievement measured at Time 1, $F(2, 246) = 0.13$, $p = .87$ and at Time 2, $F(2, 236) = 1.37$, $p = .25$. However, there were significant gender differences in academic

TABLE 1
Means, Standard Deviations, and Minimum and Maximum Values of the Main Study Variables

Variables	Mean	SD	Minimum	Maximum
1. Depressive symptoms Time 1	8.84	8.21	0	60
2. Academic achievement Time 1	8.82	0.65	7.13	10.00
3. Teachers' support/equity Time 1	3.52	0.60	1.07	5.00
4. Peers' cooperation/cohesiveness Time 1	3.72	0.48	2.19	4.94
5. Depressive symptoms Time 2	9.89	9.62	0	60
6. Academic achievement Time 2	8.54	0.87	6.22	10.00

achievement at Time 1, $t(247) = -5.17, p < .001$ and Time 2, $t(237) = 4.25, p < .001$. Both at Time 1 and Time 2, the girls reported higher scores ($M = 8.99, SD = 0.61$; $M = 8.74, SD = 0.76$, respectively) compared to the boys ($M = 8.58, SD = 0.64$; $M = 8.26, SD = 0.92$, respectively). There were no significant gender differences in depressive symptoms measured at Time 1, $t(300) = -0.11, p = .91$ and Time 2, $t(243) = -0.11, p = .91$ or in teachers', $t(300) = -0.54, p = .58$ and peers' behavior, at Time 1, $t(300) = 0.22, p = .82$. These results are presented in Table 2.

Associations Among the Main Study Variables

As expected, academic achievement measured at Time 1 significantly positively correlated with academic achievement measured at Time 2, while depressive symptoms measured at Time 1 significantly positively correlated with depressive symptoms measured at Time 2. Adolescents' depressive symptoms measured at Time 1 significantly negatively correlated with academic achievement measured at Time 2. Moreover, achievement measured at Time 1 did not correlate with depressive symptoms measured at Time 1 and Time 2. The results are presented in Table 2.

To evaluate the direction of the relation between depressive symptoms and academic achievement over time, a cross-lagged analysis was conducted, including the adolescents' depressive symptoms and academic achievement measured at Time 1 and Time 2 (see Figure 1). The adolescents' gender and age were included as control variables because of the significant relations between age and the adolescents' achievement at Time 2 as well as the gender differences concerning academic achievement at Time 1 and Time 2. The model fit indices indicated a very good fit to the data, $\chi^2(8) = 7.18, p = .51$; NFI = 0.98, CFI = 1.00; RMSEA < 0.001 CI 95% [0.000; 0.061]. Specifically, depressive symptoms measured at Time 1 predicted a decrease in later achievement in Time 2 $b = -.006, p = .05$, whereas achievement measured at Time 1 did not predict changes in the depressive symptoms at Time 2 ($b = .008, p = .99$). Therefore, these results sustain the model where the depressive symptoms measured at Time 1 are the independent variable and academic achievement measured at Time 2 is the dependent variable.

Teachers' support/equity and peers' cooperation/cohesiveness behaviors (Time 1) did not significantly correlate with academic achievement over time (Time 2) (see Table 2).

TABLE 2
Zero Order Correlations for All the Study Variables

	1	2	3	4	5	6	7
1. Depressive symptoms Time 1							
2. Academic achievement Time 1	-.05						
3. Teachers' support/equity Time 1	-.13*	.08					
4. Peers' cooperation/cohesiveness Time 1	-.11*	-.09	.50**				
5. Depressive symptoms Time 2	.75**	-.02	-.11	-.14			
6. Academic achievement Time 2	-.12*	.89**	.03	-.06	-.11		
7. Gender	.006	.31**	.03	-.01	.007	.27**	
8. Ages	-.06	-.07	.002	-.05	-.006	-.14*	-.003

Note. $N = 302$.

* $p < .05$; ** $p < .001$.

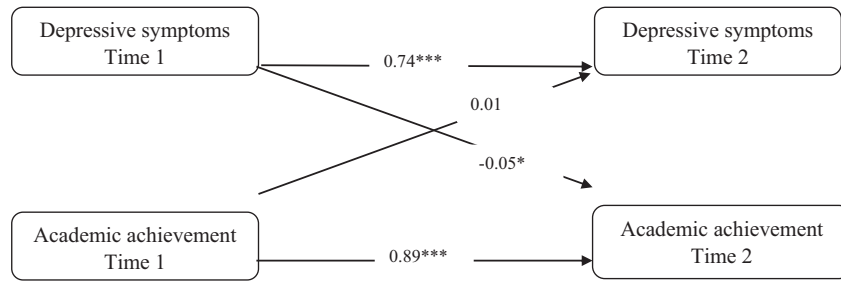


FIGURE 1 Longitudinal associations between adolescents' depressive symptoms and academic achievement. Standardized coefficients are reported.

Testing for Direct Effects and Moderation

Finally, we simultaneously tested the main effects of depressive symptoms and quality of teachers' and peers' behaviors on academic achievement, including the moderated role of the quality of teachers' and peers' behaviors on the relation between depressive symptoms and academic achievement using a structural equation model. The following variables were introduced into the model: depressive symptoms (Time 1), the teachers' support/equity, and peers' cooperation/cohesiveness behaviors (Time 1), as well as the two interaction terms of depressive symptoms and quality of teachers' and peers' behaviors as independent variables, in order to test the moderating effect on academic achievement over time (Time 2). The dependent variable was academic achievement measured at Time 2. Age and gender were entered as controlled variables, as well as academic achievement measured at Time 1. The fit for our

overall model is very good: $\chi^2(14) = 28.72, p = .01$; NFI = .96; CFI = .98; RMSEA = .05 (CI: 0.02, 0.09). The standardized path coefficients are presented in Figure 2. The model explained 13.2% of the variance in academic achievement at Time 2, above and beyond the variance explained by the participants' initial academic achievement at Time 1.

Depressive symptoms measured at Time 1 negatively predicted the academic achievement measured at Time 2 ($b = -.006, p = .03$). The teachers' support/fairness and peers' cooperation/cohesiveness behaviors did not directly predict academic achievement ($b = -.05, p = .21$; $b = .01, p = .79$, respectively). Further, our results showed that the adolescents' perception of their peers' cooperation/cohesiveness behaviors moderated the association between depressive symptoms measured at Time 1 and academic achievement measured at Time 2 ($b = .06, p = .03$). Higher levels of depressive symptoms were associated with greater academic

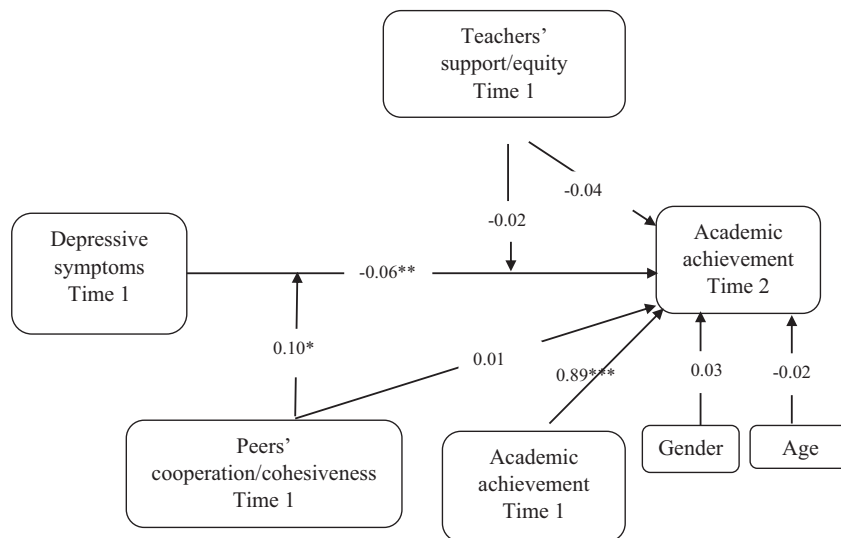


FIGURE 2 The structural equation model and path analysis of the relation between depressive symptoms and academic achievement, moderated by teachers' and peers' behavior. Standardized path coefficients reported. * $p < .05$; ** $p < .01$; *** $p < .001$.

achievement when the adolescents perceived high levels of cooperation/cohesiveness with their peers. However, when the level of depressive symptoms was low, high achievement was reported only when the adolescents perceived low levels of cooperation/cohesiveness with their peers (see Figure 3). The association between depressive symptoms measured at Time 1 and academic achievement measured at Time 2 was not moderated by teachers' support/fairness (see Figure 2).

DISCUSSIONS

This study investigated how depressive symptoms and academic achievement are related, using a longitudinal design. This study also advances the literature by investigating whether the adolescents' perceptions of teachers' and peers' behaviors may explain, as moderators, these relations in a sample of Romanian adolescents. Specifically, we explored the differential role of the teachers' and peers' behaviors on the strength of longitudinal associations between depressive symptoms and academic achievement.

Correlational analyses indicated that adolescents' depressive symptoms at Time 1 were negatively related to academic achievement over time. Similarly, the cross-lagged analyses showed a negatively significant association between depressive symptoms and later academic achievement, while the relation between academic achievement and later depressive symptoms measured over time was not significant. These findings are in line with one previous study reported on Western samples which investigated the direction of the relation between these constructs. They also showed that

the adolescents reporting high levels of depressive symptoms were more likely to have lower levels of academic achievement over time, the reverse relation between constructs being nonsignificant (Hishinuma et al., 2012). Thus, these findings provide empirical evidence that depressive symptoms affect the individuals' quality of learning (Gotlib & Joormann, 2010). Importantly, our study advances the previous limited literature by showing that adolescents' depressive symptoms are a key factor in setting their level of later achievement, rather than achievement emerging as an important predictor of later depressive symptoms on a sample of East European adolescents.

Despite the theoretical links between depressive symptoms and academic achievement, the investigations about classroom-related factors that could explain these associations are missing in the literature (see Schwartz et al., 2008, as an exception). In this study, we explored whether the perception of teachers' and peers' behaviors may explain the longitudinal relation between depressive symptoms and achievement. Initially, we examined how teacher supportive/equity behaviors and peers' cooperation/cohesiveness behaviors are related to adolescents' academic achievement. The results of a path analysis, including the adolescents' perceptions of teachers' and peers' behaviors simultaneously, and controlling for demographic and other variables (e.g., gender and academic achievement Time 1), indicate that teachers' supportive/equity and peers' cooperation/cohesiveness did not have a significant contribution to adolescents' later academic achievement. These findings complement those of limited previous studies, simultaneously evaluating the role of parents, teachers, and peers,

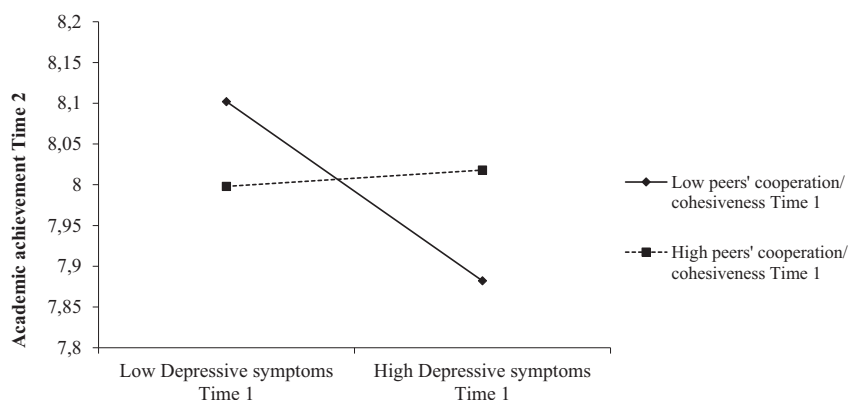


FIGURE 3 Academic achievement as a function of depressive symptoms and peers' cooperation/cohesiveness.

on adolescent adjustment, and showing that adolescents who perceived their parents, rather than their teachers or peers, caring for them, offering them advice or resources, also reported higher achievement and lower depressive symptoms on samples of early Western adolescents (e.g., McMahon et al., 2013; Pittard et al., 2015; Rueger et al., 2010). Thus, our study advances the literature showing similar findings on samples of older non-Western adolescents.

An important finding of our study is that adolescents' perception of peers' behaviors but not teachers' behaviors moderates the relations between their depressive symptoms and achievement, when controlling for the effects of perceptions of teachers' behaviors and other variables (e.g., gender or achievement at Time 1). Specifically, when adolescents experienced lower levels of depressive symptoms, the perception of a higher level of peers' cohesiveness/cooperation decreased their academic achievement. An inverse relation was obtained when adolescents experienced high levels of depressive symptoms; greater academic achievement was found when they perceived higher levels of peer cooperation/cohesiveness behavior. Overall, these findings are in line with previous developmental theories, indicating that adolescents' susceptibility to peer group influences increases, their peers being a source of adolescents' self-validation, guidance, or companionship which in turn may undetermined their learning and well-being (Fredricks, 2014; Hamm et al., 2012). Thus, our findings indicate that the quality of peers' behaviors (i.e., cooperative activities with peers, feeling loved, understood, and receiving information or support from their peers) have a protective effect for adolescents who experience high levels of depressive symptoms, increasing their level of achievement. On the contrary, perceiving greater peer cooperation/cohesiveness behavior did not have a protective effect for adolescents experiencing low levels of depressive symptoms, their achievement decreasing over time. An explanation for these unexpected findings could be higher levels of caring, and supportive and helpful behaviors in classroom activities and assignment work, which could decrease adolescents' effort and involvement in solving these activities independently with negative consequence over time. More importantly, to our knowledge, this study is the first providing evidence regarding the explanatory role of adolescents' perceptions of teachers' and peers' behaviors for the relation between depressive symptoms and achievement. These findings

are consistent with the previous literature suggesting the importance of peers' (emotional, informational, and behavioral) support above and beyond other sources' (e.g., teachers) support on children's emotional difficulties (e.g., depression) and school adjustment (e.g., school attitude and stress) (Demaray et al., 2005). Further, our results complement previous studies reported on Western children samples (Schwartz et al., 2008), suggesting that feeling supported by peers is particularly relevant for the relation between depressive symptoms and achievement.

The fact that only peers, but not teachers, explained the relation between depressive symptoms and achievement is in line with the idea that, during adolescence, students become increasingly independent from their teachers; their sense of belonging in their classrooms decreases, whereas they are more focused on their peers as they grow older (Buhrmester & Furman, 1987; Lynch & Cicchetti, 1997). This tendency could be explained by the fact that, although teachers represent an important source of support during adolescence, there is a developmental shift in the specific aspects of student-teacher relationships (Roorda et al., 2011). The professional roles of teachers change during adolescence, the teachers being more focused on the adolescents' school adjustment and consequently are more likely to use control and discipline and less emotional support in their relationships with their students. This could lead to less satisfaction with levels of teacher support among adolescents (Bergin & Bergin, 2009; Murray, 2009). In this context, the perception of teachers' support is not a protective factor for adolescents experiencing higher levels of depression, not increasing their level of achievement. For these adolescents, the relationships with their peers are more important, the peer group being the most important source of validation, guidance and assistance, companionship, and stimulation.

This study enhances the literature extending the knowledge, using a longitudinal approach, regarding the relation between depressive symptoms and achievement. The results bring evidence about the depressive symptoms to the academic achievements' relation in a sample of older adolescents. This confirms the theoretical model suggesting that depressive problems, which may cause poor academic functioning in adolescents (World Health Organization, 2001; see also Riglin et al., 2014). Thus, our findings extend to previous literature that focuses on the reverse relation—academic achievement and later depressive symptoms. Our

findings confirm the theoretical models (Fraser & Kahle, 2007; Ryan & Deci, 2017; Wigfield et al., 2015) stipulating that supportive relationships with teachers and peers are relevant for adolescents' depression and achievement. Further, we extended the previous literature by studying the simultaneous associations of both the teachers' and peers' behaviors with the adolescents' depressive symptoms and achievement. We also highlighted the differential role of teachers' and peers' behaviors in the relation between depressive symptoms and achievement. Moreover, our results contribute to the generalization of its theoretical assumptions in a less studied population of older adolescents from Eastern Europe. Future studies should focus on the role of other indices of well-being (e.g., anxiety or subjective well-being) and various aspects of academic achievement (e.g., self-reports of grades and performance on standardized tests). In addition, these studies should also consider the factors that may affect the strength of these relations.

Although this study enhances the literature, several limitations should be noted. First, all the data were collected via self-reported questionnaires. The adolescents' perceptions of other behaviors (teachers and peers) are based on self-reporting and are likely to be affected by a shared method variance in relation with depressive symptoms (which is assessed in the same way) but not with achievement (as the students were graded by their teachers). Future studies should rely on multiple informant approaches (e.g., peers and teachers) in order to validate the present findings. However, the reports of other informants could also be subject to different kinds of errors (e.g., social desirability bias; Tan & Hall, 2005). Future studies should also include the observation instrument as a more objective way of measuring teaching and peer behaviors (see Maulana & Helms-Lorenz, 2016), in order to better understand the complex nature of the classroom environment. Second, we relied on a longitudinal design with a one-year time interval between assessments. Future studies should use longer time intervals, with more time measurements and different time intervals between assessments; they may show the direction of the relation between depressive symptoms and academic achievement and whether the quality of teachers' and peers' behaviors is a protective factor that may reduce the impact of adolescents' internalizing problems on their achievement more accurately. Third, our study focused on a single dimension of achievement (i.e., the adolescents' grades), but other indicators of academic achievement based on

standardized measures (e.g., national tests) may also bring valuable information. Additionally, we investigated the teachers' supportive and fair behaviors, as well as peer cooperation and cohesiveness as explanatory factors. Other teachers' and peers' behaviors, such as academic pressure or involvement, could be responsible for the relations between depressive symptoms and achievement and, thus, might enhance the understanding of the relation between these variables. Fourth, the high attrition rate presented in this study could also limit the generalization of the findings. We did not have information, for example, whether the participants who left their studies are those with more severe depressive symptoms or with more school difficulties and disappointments concerning their peers' and teachers' behaviors. Moreover, previous studies documented regional differences between the northeastern region (i.e., Moldova) and other regions from Romania (e.g., Banat, the western region from Romania), concerning academic achievement and attitudes toward educational opportunities (e.g., Diaconu-Gherasim et al., 2017). Given these regional differences, the generalization of the current findings should be made with caution.

Our study has important practical implications. Our results suggest that depressive symptoms may lead to lower academic achievement later in life and thus highlight the importance of identifying adolescents with emotional difficulties. Training programs should focus on adolescents' depressive symptoms (along with cognitive and motivational trainings), in order to decrease the probability of developing academic difficulties. Further, it seems that the cooperation and cohesiveness of peer groups have a protective effect for adolescents who experience high levels of depressive symptoms, increasing their level of achievement. In light of these results, prevention or intervention activities need to be associated with improvement of the adolescents' relationships with their peers, especially for those with high levels of depressive symptoms. Thus, school counselors should constantly monitor those adolescents with depressive symptoms and consecutively encourage the adolescents' cohesiveness and cooperation with their peers within the classroom in order to improve their achievement. In addition, teachers should focus on encouraging adolescents, especially those with emotional difficulties, to get involved in group activities in order to facilitate cooperation and cohesiveness with their peers and to further improve their academic achievement.

In summary, the adolescents showing greater depressive symptoms later reported lower academic achievement. The current findings advance the literature showing that adolescents' depressive symptoms are related to their achievement over time and that peer supportive behaviors rather than the quality of the teacher's behavior moderate this link. Thus, adolescents with higher levels of depressive symptoms also reported high academic achievement, only when they reported higher levels of peer cooperation/cohesiveness behaviors. The field would benefit from longitudinal studies with more points of data measure to clarify potential bidirectional effects. In addition, future studies would evaluate other contextual factors that may moderate the relations between depressive symptoms and achievement in adolescence.

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