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The Interplay of Emotional Instability and Socio-Environmental Aspects of Schools during Adolescence

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Abstract: According to Bronfenbrenner's socio-ecological model, school is an essential microsystem of the developing child. Schools provide important developmental contexts for children and adolescents, as they constitute environments that might either foster or evoke students' emotional instability. In particular, less is known about the precise and dynamic interplay of students' socio-environmental aspects in school (i.e., sense of school belonging, social relationships with teachers and peers) and emotional instability (i.e., depressive symptoms, perceived stress, feelings of loneliness) during adolescence. To close this gap, this study examined within- and over-time cross-lagged associations based on data from a quantitative questionnaire-based survey of adolescent students (T1: N= 1088; Mage = 13.70, SD = 0.53) from 23 secondary schools in Brandenburg, Germany. Results of latent cross-lagged panel design supports the mutual relations for within-time associations, which is in line with Bronfenbrenner's model. However, only the over-time association between school belonging and teacher-student relationship was found to be reciprocal.

Keywords: *Depressive symptoms, perceived stress, school belonging, loneliness, teacher-student and student-student-relationship.*

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Introduction

Schools provide one of the most important developmental contexts for children and adolescents, as their environment not only influences students' academic but also their socio-emotional and behavioral development (Hanish et al., 2016; Pittman & Richmond, 2007). In detail, schools can be seen as one of the most important microsystem of the developing child (Bronfenbrenner, 1975, 1979, 1989; Bronfenbrenner & Ceci, 1994) and as a social institution that creates an environment, which can either evoke or alleviate perceived stress during adolescence by either increasing individual's perception of perceived stress or by helping students reduce stress by fostering their coping resources (Chahal & Ewen, 2014). In addition, during the school transition from elementary to middle and then to high school, students must readapt to different classroom contexts, a process that is characterized by (social) stress and occurs during a time generally characterized by low emotional stability (Hanish et al., 2016). In sum, less is known about the precise and dynamic interplay of students' socio-environmental aspects in school (i.e., sense of school belonging, social relationships with teachers and peers) and emotional instability (i.e., depressive symptoms, perceived stress, feelings of loneliness). Therefore, this study aims to shed light on this essential and dynamic interplay between emotional stability and socio-environmental aspects during adolescence.

Following Bronfenbrenner's bio-socio-ecological model (Bronfenbrenner, 1975, 1979, 1989; Bronfenbrenner & Ceci, 1994), the developing child participates in many different microsystems (i.e., family, school, relationships with peers and teachers) in its proximal environment, which in sum constitute a child's mesosystem (Bronfenbrenner & Morris, 1998). This microsystem and its reciprocal interaction (mesosystem) is an essential (positive and/or negative) factor for a child's development. Particularly, in adolescence the school context is one of the most important socio-environmental factor, as students spend an enormous amount of time in school. Accordingly, school does not only build an educational area, but rather an important influence factor on student's development (Harter, 1996; Wigfield & Eccles, 2001).

"This gives a responsibility for development of resilience to the community, and encompasses also the school system as one of the most important systems for children and young people. Environmental and social contexts of a young person make it possible to work simultaneously on reducing risk factors and promoting protective factors" (Kiswarday, 2012, p. 94).

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Adolescence and emotional instability

Adolescence is a key developmental period, which involves biological, psychological and social changes, including challenging academics, extracurricular activities, challenging relationships, emotional sensitivity and shifting self-concepts (Moksnes, Bradley Eilersten, & Lazarewicz, 2016; Williams, Turner-Henson, Davis, & Soistmann, 2017). Specifically, adolescents experience a broader range of emotions with much stronger intensity and mood states than adults (Van Roekel et al., 2015), a phenomenon that is associated with socio-emotional development and changing relationships (Engels et al., 2016). In other words, the risk for emotional instability increases enormously with the onset of puberty, which is in line with research that found the greatest emotional instability to manifest itself between childhood and early adolescence (Larson, Moneta, Richards, & Wilson, 2002).

Depressive symptoms and major depressive disorder (MDD), with a prevalence ranging from 1-27% during adolescence (Maurizi et al., 2013), are associated with higher risks of developing emotional instabilities, such as depressive disorders in adulthood, a thirty-fold increased risk of committing suicide (Horowitz & Garber, 2006; Werner-Seidler, Perry, Calear, Newby, & Christensen, 2017; Williams et al., 2017), flawed social relationships, deviant behavior, and scholastic difficulties (Lombas et al., 2014; Williams et al., 2017). Therefore, MDD and depressive symptoms can be seen as significant individual and public health concerns affecting students' daily lives (i.e., in the school context) (Horowitz & Garber, 2006; Williams et al., 2017). MDD and/or depressive symptoms are positively associated with perceived stress, which can be perceived individually (e.g., increased perception of stressful life events, fights with friends, feeling excluded by peers) or cumulatively by being exposed to different types of stressful events (e.g., lost friendships or rejection) during a specific time period (Agoston & Rudolph, 2016; Moksnes, Bradley Eilersten, & Lazarewicz, 2016; Van Roekel et al., 2015). These empirical findings highlight the positive relationship between (chronic) life stress and depressive symptoms (see Lombas et al., 2014), thereby the association between perceived stress and depressive symptoms is understood to be bidirectional, as depressive symptoms can also foster perceived stress (Hankin & Abramson, 2001).

In addition, the feeling of loneliness, is defined as an unpleasant state that emerge due to a discrepancy between interpersonal relationships people want to have and those they perceive (Qualter et al., 2013; Vanhalst, Goossens, Luyckx, Scholte, & Engels, 2013; Vanhalst, Luyckx, & Goossens, 2014; Van Roekel et al., 2015) and affects an individual's emotional state negatively: It has been found to be associated with poor social, behavioral, and health outcomes from childhood to adulthood (Qualter et al., 2013; Vanhalst, Luyckx, & Goossens, 2014; Woodhouse, Dykas, & Cassidy, 2012). Studies have also found that the chronic experience of loneliness causes psychological and physiological strains (stress), which in turn increases students' risk of emotional disorders later in life (see Qualter et al., 2013). Hence, not only is loneliness associated with psychological and physiological stress, but it also contributes to a higher perception of stress in everyday life. This in turn might lead to depressive symptoms and a broad range of other somatic and psychological disorders and symptoms (see Qualter et al., 2013). Moreover, studies have found loneliness and a high level of depressive symptoms to be related with a decrease in grades and achievement in school (see Maurizi et al., 2013). In sum, existing research has shown that the above-mentioned aspects of emotional instability (i.e., depressive symptoms, perceived stress and loneliness) are positively, concurrently and longitudinally associated, indicating bidirectional relations.

The interplay between emotional instability and socio-environmental aspects in school

Considering that a child's emotional instability might be a result of reciprocal relations between different microsystems (Bronfenbrenner, 1979, 1989; Bronfenbrenner & Morris, 1998), which in sum constitutes a child's mesosystem, the role of socio-environmental aspects (i.e., school belonging, teacher-student relationship, student-student relationship) in school should be examined to identify these potential underlying bidirectional associations.

*School Belonging***.** School belonging can be defined as a feeling of connectedness to one's school or educational institution and, perhaps more importantly, a feeling of fitting in with other members of the same school (Pittman & Richmond, 2007). Researchers have found a positive sense of school belonging to be associated with better academic achievement, a better grade point average, lower rates of school drop-out and better socio-emotional and behavioral functioning (Pittman & Richmond, 2007). Specifically, school belonging was found to be associated with lower probability of MDD and/or depressive symptoms and loneliness (see Maurizi et al., 2013; Pittman & Richmond, 2007). Moreover, studies have shown that teacher support and students' engagement in class were positively associated with students' sense of (school) belonging, which in turn was related with scholastic commitment and achievement. In contrast, lower levels of teacher support were found to be associated with greater odds of depressive symptoms among students (see Maurizi, et al., 2013).

*Relationships with Teachers***.** The quality of the teacher-student relationships (TSR) is essential for developmental outcomes. A negative TSR is characterized by higher levels of teacher-student conflicts and a lack of emotional security, which was found to be associated with students' academic, socio-emotional and behavioral difficulties (see Engels et al., 2016). In turn, a positive and supportive TSR is characterized by warmth, sensitive and responsive interactions. It contributes to students' academic, socio-emotional and behavioral development and well-being (Baker, Grant, & Morlock, 2008; De Laet et al., 2016; Engels et al., 2016; Maurizi, Grogan-Kaylor, Granillo, & Delva, 2013). This

relationship was found to be bidirectional such that students' well-being also contributes to a positive TSR (De Laet et al., 2016). Following this, adolescents perceiving a positive TSR experience less emotional instability, have more resources for their learning activities (Baker, Grant, & Morlock, 2008) and may experience a higher level of belonging to their immediate educational context (Engels et al., 2016).

Relationships with Peers. During adolescence, particularly during the transition from early to middle adolescence, individuals typically seek greater independence from their parents, while peers and teachers become more essential (Persike & Seiffge-Krenke, 2014; Raufelder, 2007; Teppers, et al., 2013; Van Roekel, 2015; Wentzel & Muenks, 2016). However, negative peer relationships can be a greater risk of an unhealthy development (Reynolds & Crea, 2015): Research has shown that peer rejection was linked to loneliness, perceived stress and depressive symptoms (see Williams et al., 2017; Woodhouse, Dykas, & Cassidy, 2012) and a stronger desire to avoid school (i.e., low sense of school belonging) (Wentzel & Muenks, 2016). For decades, research has exclusively focused on individual risk factors to explain adolescents' MDD and depressive symptoms, yet recent studies suggest that peer groups and socio-environmental networks play an important role for explaining MDD and depressive symptoms in adolescence and adulthood (Reynolds & Crea, 2015), as strong peer support was found to be associated with reduced depressive symptoms (see Maurizi et al., 2013).

Moreover, studies have found that children who experience consistently low levels of loneliness showed the highest levels of positive peer interactions compared to children experiencing increasing levels of loneliness (see Vanhalst et al., 2013). As relationships during adolescence undergo lasting changes, individuals are said to experience less loneliness from middle to late adolescence (Vanhalst et al., 2013). This is in line with studies, which found that loneliness was relatively stable and reached its' peak at the age of 13, but then decreases (see Qualter et al., 2013). However, since not all individuals are able to establish and experience positive peer and/or teacher relationships and intimacy, adolescent students might differ in their development and perception of loneliness (Vanhalst et al., 2013).

When, in addition to loneliness, students also perceive rejection by their peers, they report a high amount of perceived stress (Persike & Seiffge-Krenke, 2014; Williams et al., 2017). Accordingly, studies have shown over half of adolescents to report peer rejection as the major stressor related to peer-context, highlighting negative outcomes of peer-relationships (see Persike & Seiffge-Krenke, 2014). In turn, students perceiving emotional support from their peers tend to report a positive student-student relationship (SSR), feel less lonely, emotionally distressed and/or show less depressive symptoms (see Wentzel & Muenks, 2016). In addition, positive friendships with peers can serve as a haven from perceived daily stress and as a protective factor for students' emotional instability in school and/or the family home (Persike & Seiffge-Krenke, 2014).

In sum, existing research provides evidence that aspects of emotional instability (i.e., depressive symptoms, perceived stress and loneliness) are associated with socio-environmental aspects in school context, such as the quality of TSR, SSR and students' sense of belonging. The above mentioned empirical results highlight the importance of intervention- and prevention programs in school, which a) focus on socio-emotional level (i.e., school environment) by creating a safe, supportive environment, which is characterized by a positive relationship between teachers and students, as well as students and students, and b) focus on individual level and students' emotional functioning (e.g., emotional functioning coaching) (Olsson et al., 2003).

However, less is known whether these associations are reciprocally related within and over-time. To fill this research gap, the current study was conceptualized including both aspects of emotional instability and aspects of socio-environment during adolescence.

Current Study

Based on the above-mentioned research and according to Bronfenbrenner's socio-ecological model (Bronfenbrenner, 1975, 1979, 1989; Bronfenbrenner & Ceci, 1994) this study aims to shed light on the precise dynamic interplay of aspects of emotional instability (i.e., depressive symptoms, perceived stress, loneliness) and socio-environmental aspects of school (i.e., school belonging, TSR, SSR) from early to middle adolescence. Particularly, the question arises whether the variables of interest are reciprocally associated concurrently and longitudinally. In detail, the following hypotheses were tested:

Depressive symptoms in early adolescence are positively, concurrently and longitudinally associated with other aspects of emotional instability (i.e., perceived stress and loneliness) and negatively associated with socio-environmental aspects of school (i.e., sense of school belonging, TSR and SSR) in middle adolescence.

Perceived stress in early adolescence is positively, concurrently and longitudinally associated with other aspects of emotional instability (i.e., depressive symptoms and loneliness) and negatively associated with socio-environmental aspects of school (i.e., sense of school belonging, TSR and SSR) in middle adolescence.

Loneliness in early adolescence is positively, concurrently and longitudinally associated with other aspects of emotional instability (i.e., depressive symptoms and perceived stress) and negatively associated with socio-environmental aspects of school (i.e., sense of school belonging, TSR and SSR) in middle adolescence.

The sense of belonging in early adolescence is positively, concurrently and longitudinally associated with other socio-environmental aspects of school (i.e., TSR and SSR) and negatively associated with aspects of emotional instability (i.e., depressive symptoms, perceived stress and loneliness) in middle adolescence.

TSR in early adolescence is positively, concurrently and longitudinally associated with other socio-environmental aspects of school (i.e., sense of school belonging and SSR) and negatively associated with aspects of emotional instability (i.e., depressive symptoms, perceived stress and loneliness) in middle adolescence.

SSR in early adolescence is positively, concurrently and longitudinally associated with other socio-environmental aspects of school (i.e., sense of school belonging and TSR) and negatively associated with aspects of emotional instability (i.e., depressive symptoms, perceived stress and loneliness) in middle adolescence.

To consider the stability of each construct, direct effects of each variable between T1 and T2 were additionally included.

Method

Sample and Procedure

The present study is based on data retrieved through a large longitudinal, quantitative questionnaire survey, examining Socio-Emotional Learning Factors (SELF-Project) of students from 23 randomly selected secondary schools in Brandenburg, Germany. Five schools were located in the largest cities (Frankfurt (Oder), Potsdam, Cottbus, Prenzlau, Brandenburg), whereas 18 schools were located in rural areas in the federal state of Brandenburg. Assessments were administrated in 2011 (T1) and 1.5 years later (T2) with the same participants. The first measurement time (T1) included students in their early adolescence (N= 1088; M_{age} = 13.70, SD = 0.53; 53,9% girls); the same students we re-examined once they entered middle adolescence at the second measurement time (T2) (M_{age} = 15.32, SD = .49; 55% girls). The drop-out rate between T1 and T2 was 22.23%. Initially, the government's Department of Education, Youth and Sport for Brandenburg and the participating schools gave their formal approval to conduct the study. Data were collected by two trained research assistants who also gave detailed instructions on how to complete the questionnaires using Likert scales. In an attempt to reduce the risk of students responding with what they held to be socially desirable responses, all participants were informed that researchers were only interested in their personal thoughts and emotions and that there were neither right, nor wrong answers. Prior to the assessments, parents and students were asked for their permission to participate and were thoroughly informed about the voluntary nature of their participation. The survey itself was pseudo-anonymous at T1 and fully anonymous at T2. The students completed the paper-pencil questionnaires in the classroom and were asked to sit separately. Hence, ethic background data were not collected as the percentage of ethnic minorities in the federal state of Brandenburg is low (2.6%). Moreover, socio-economical aspects were not considered due to German law, which does not allow to provide personal information about third persons (i.e., parents). The research was conducted in compliance with APA ethical standards.

Measures

The following measures used in the survey are all well-established, validated instruments for German adolescent students.

Depressive Symptoms. Depressive Symptoms were measured using the German version of the Personal Health Questionnaire Depression Scale (PHQ-8) by Gräfe, Zipfel, Herzog and Löwe (2004). It showed a satisfactory Cronbach's alpha reliability of .81 at T1 and .82 at T2. This scale includes eight items addressing students' feelings of worry and/or sadness over the past 14 days. Students had to rate the questions on a five-point Likert scale ranging from one (not at all) to five (almost every day).

Perceived Stress. Perceived stress was measured using the German version of the Perceived Stress Scale by Cohen, Kamarck and Mermelstein (1983), which showed a good Cronbach's alpha reliability coefficient of .78 at T1 and .80 at T2. The Perceived Stress Scale includes nine items which interrogate students about feeling nervous and/or overwhelmed by situations or the perceived ability to cope with difficult situations over the past month. Students had to rate each of the nine questions on a five-point Likert scale ranging from one (never) to five (very often).

Loneliness. Loneliness was measured using the German version of the UCLA Loneliness Scale by Schwab (1997), which showed a good Cronbach's alpha reliability coefficient of .83 at T1 and .90 at T2. This scale includes ten items asking students about their perceived loneliness (e.g., feeling unhappy because nobody talked to them or because they had to do many things by their own). Students were asked to rate these statements from one (never) to four (often).

Belonging. This variable originates from the Program for International Student Assessment (PISA) of the Organization for Economic Cooperation and Development (OECD) (Kunter et al., 2002). The scale revealed a Cronbach's alpha reliability coefficient of .78 at T1 and .80 at T2. This scale includes eight items which interrogate students about their experiences of social exclusion in and their sense of belonging to school. Students were asked to rate the statements from one (strongly disagree) to four (strongly agree).

TSR. This variable originates from the Program for International Student Assessment (PISA) of the Organization for Economic Cooperation and Development (OECD) (Kunter et al., 2002). It was measured using five items and showed a good reliability of α= .78 at T1 and .76 at T2. The items were introduced as follows: "Please think of the teachers in your school. How much do you agree with the following statements"? Statements included: "Most teachers think it is important that their students feel good", and "Most of the teachers are interested in what I have to say". Students were asked to rate these statements from one (strongly disagree) to four (strongly agree).

SSR. This variable also originates from the Program for International Student Assessment (PISA) of the Organization for Economic Cooperation and Development (OECD) (Kunter et al., 2002). It includes six items and revealed a satisfactory Cronbach's alpha of .69 at T1 and .70 at T2. This scale specifically focuses on the classroom context and addresses students' perceptions of their relationships with other students (e.g., jealousy if someone gets a good grade). Students were asked to rate these statements from 1 (strongly disagree) to 4 (strongly agree).

Statistical Analyses

The longitudinal association between perceived stress, depressive symptoms, belonging, loneliness, TSR and SSR from early to middle adolescence were examined using a latent cross-lagged SEM research design in Mplus 7.2 (Muthén & Muthén, 1998-2012). Initially, confirmatory factor analyses (CFA) were run in Mplus in order to test measurement invariance. In preparation for the CFA, parcels were randomly built to reduce the number of items and thus create more stable results by preventing potential doubtful correlations and shared variance (Little, Cunningham, Shahar, & Widaman, 2002; Little, Rhemtulla, Gibson, & Schoemann, 2013; Marsh, Hau, Balla, & Grayson, 1998; Nasser F., & Wisenbaker, 2003; Prats, 1990; Sterba & Rights, 2017). In detail, the eight items measuring depressive symptoms were transformed into two parcels consisting of four items each (DepP1T1 and DepP2T1 for T1 and DepP1T2, DepP2T2 for T2). The nine items of the Perceived Stress Scale were randomly transformed into two parcels consisting of five and four items each (STP1T1, STP2T1 for T1 and STP1T2, STP2T2 for T2). The ten items on the loneliness scale were transformed into two parcels with five items each (LOP1T1, LOP2T1 for T1 and LOP1T2, LOP2T2 for T2). The eight items subsumed in the belonging scale were also transformed into two parcels consisting of four items each (BELP1T1, BELP2T1 for T1 and BELP1T2, BELP2T2 for T2. In addition, the five items of TSR were transformed into two parcels consisting of three and two items (LVP1T1, LVP2T1 for T1 and LVP1T2, LVP2T2 for T2). Finally, the six items of SSR were also randomly split into two parcels with three items each (SVP1T1, SVP2T1 for T1 and SVP1T2, SVP1T2 for T2).

To evaluate the model fit the following fit indices were used: chi-square likelihood ratio statistic, root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker–Lewis fit index (TLI), and the standardized root mean square residual (SRMSR). Adequate model fit is indicated by CFI and TLI values ≥ 0.90, and RMSEA and SRMR values of ≤ 0.08, whereas a good model fit is indicated by CFI and TLI values ≥ 0.95 and RMSEA values ≤ 0.06 (Hu & Bentler, 1999; Kline, 2005). Due to the large sample size, the chi-square value did become significant and therefore cannot be interpreted adequately.

As the data of the study were nested (1088 students in 71 classrooms at T1, and 845 students in 67 classrooms at T2), cross-lagged SEM was conducted using the type-is-complex approach established by Asparouhov (2005) for complex survey data (Asparouhov & Muthén, 2006). This approach corrects the standard error biases created by the nested nature of the data (i.e., students in classes) (MacKinnon, 2008). In order to test whether the missing values are completely at random, Little's missing completely at random (MCAR) test was estimated (Little, 1988). As the results for the final model were not found to be significant, the hypothesis could not be rejected, meaning that missing values in this study were completely at random. For this reason, the randomly missing data values were handled using full-information maximum likelihood estimation (FIML) in Mplus 7.2. All assumptions for FIML were tested and confirmed.

Results

Descriptive Statistics and Intercorrelations

The following table (see Table 1) shows the intercorrelations between the variables of interest, as well as their means (M), range, standard deviation (SD), kurtosis with standard deviation and their skewness and standard deviation values.

Table 1. Intercorrelations between Depressive Symptoms, Perceived Stress, Loneliness, Belonging, Student-Student-Relationship and Teacher-Student-Relationship in T1 and T2, as well as their Range, Means, Standard Deviations, Kurtosis and Skewness values

	2	3	4	5	6	7	8	9	10	11	12	Range	M	SD	Kurtosis (SE)	Skewness (SE)
1. DEPT1	.43**	.60**	.40**	.42**	.19**	-.37**	-.18*	-.26**	-.16**	-.72**	-.17**	1-5	2.59	.61	-.10 (.15)	.62 (.08)
2. DEPT2	-	.36**	.67**	.27**	.46**	-.20**	-.31**	-.11**	-.18**	-.17**	-.25**	1-5	2.59	.76	-.26 (.17)	.48 (.09)
3. StressT1		-	.40**	.43**	.21**	-.17**	-.28**	-.24**	-.16**	-.28**	-.17**	1-5	2.75	.56	.33 (.15)	.31 (.08)
4. StressT2			-	.27**	.45**	-.16**	-.28**	-.16**	-.22	-.15**	-.22**	1-5	2.81	.61	.13 (.17)	.17 (.08)
5. LONT1				-	.42**	-.52**	-.31**	-.28**	-.15**	-.13**	-.57	1-4	2.15	.54	.02 (.15)	.49 (.08)
6. LONT2					-	-.52**	-.35**	-.18**	-.32**	-.11**	-.14**	1-4	2.09	.65	-.56 (.18)	.23 (.09)
7. BELT1						-	.47**	.35**	.16**	.33**	.23**	1-4	3.72	.52	1.3 (.15)	-.88 (.08)
8. BELT2							-	.23**	.27**	.26**	.32**	1-4	3.01	.53	-.04 (.17)	-.51 (.09)
9. SSRT1								-	.40**	.19**	.17**	1-4	2.65	.53	.18 (.15)	-.23 (.08)
10.SSRT2									-	.16**	.12**	1-4	2.61	.54	.10 (.18)	-.06 (.09)
11.TSRT1										-	.44**	1-4	2.85	.50	.73 (.15)	-.27 (.08)
12.TSRT2											-	1-4	2.79	.49	.95 (.18)	-.40 (.09)

Note. Dep= Depressive Symptoms; Stress= Perceived Stress; LO= Loneliness; BEL= Belonging; SSR= Student-Student-Relationship; TSR= Teacher-Student-Relationship; T1= Time 1 (2011), T2= Time 2 (2013); ** $p < .001$

Before conducting the cross-lagged SEM, confirmatory factor analyses (CFA) were run to prove measurement invariance (see Table 2), supporting the assumption that the constructs remained stable over time and therefore, favoring the use of a cross-lagged SEM design (Geiser, 2010). The CFA of strong measurement invariance over time showed a good model fit ($\chi 2_{(186)} = 374.93$, $p < .001$; *CFI*=.98, *TLI*=.97, *RMSEA*=.03 (.03–.04); *SRMR*=.02).

Table 2. Model fit indices of the stepwise CFA procedure to proof measurement invariance over time

Step	$\Delta\chi^2$	p	Δdf	df	χ^2	p	CFI	TLI	RMSEA	90% CI	SRMR
Model 0				186	374.93	<.001	.98	.97	.031	.026-.035	.022
Model 1	8.95	.18	6	192	384.18	<.001	.98	.97	.030	.026-.035	.024
Model 2	9.33	.16	6	198	392.67	<.001	.98	.97	.030	.026-.034	.038

Note. Model 0 = configural measurement invariance; Model 1 = weak measurement invariance; Model 2 = strong measurement invariance

Cross-Lagged SEM

The Cross-Lagged-SEM includes over-time associations (direct and cross-lagged paths) between each variable from T1 to T2, as well as within-time associations between all variables at T1 and all variables at T2. The final Cross-Lagged-SEM showed a good fit (χ^2 $_{(198)}$ =392.67, p <.001, *CFI*=.98, *TLI*=.97, *RMSEA*=.03 (.03–.04), *SRMR*=.04).

Within-time associations. The within-time associations between all variables of emotional instability are positive and significant. In detail, the association between depressive symptoms and loneliness (T1: r= .18/.53; p < .001; T2: r=.17/.53; p <.001) and between depressive symptoms and perceived stress (T1: r= .25/.76; p < .001; T2: r= .20/.72; p < .001), as well as the within-time associations between perceived stress and loneliness (T1: r= .12/.51; p < .00; T2: r= .11/.50; p < .001) are positive and highly significant. In contrast, all within-time associations between the socio-environmental factors are positive and significant: In detail, the associations between belonging and SSR (T1: r= .11/.46; p < .001; T2: r= .05/.30; p < .001) and teacher-student relationship TSR (T1: r= .18/.41; p < .001; T2: r= .04/.33; p < .001) are positive and significant, whereas the association between SSR and TSR is only positive and significant during early adolescence (T1: r= .06/.28; p < .001).

Last but not least, all associations between emotional instabilities and socio-environmental factors are negatively and significantly associated: The within-time associations between depressive symptoms and belonging (T1: r= –.16/–.48; p < .001; T2: r= –.08/–.34; p < .001), between depressive symptoms and SSR (T1: r= –.12/–.33; p < .001; T2: r= –.06/–.19; p < .001) and between depressive symptoms and TSR (T1: r= –.11/–.37; p < .001; T2: r= –.06/–.27; p < .001), as well as the associations between belonging and loneliness (T1: r= –.16/–.64; p < .001; T2: r= –.10/–.51; p < .001) and between belonging and perceived stress (T1: r= –.10/–.41; p < .001; T2: r= –.05/–.30; p < .001), but also the relations between perceived stress and SSR (T1: r= –.08/–.31; p < .001; T2: r= –.04/–.21; p < .001) and between perceived stress and TSR (T1: r= –.07/–.36; p < .001; T2: r= –.04/–.24; p < .001), and the association between loneliness and SSR (T1: r= –.10/–.38; p < .001; T2: r= –.08/–.38; p < .001) and between loneliness and TSR (T1: r= –.04/–.36; p < .05; T2: r= –.03/–.19; p < .001) are negatively associated.

Over-time associations: Direct effects. As Figure 1 shows, depressive symptoms in early adolescence and middle adolescence (B= .53, SE= .08, β= .49; p <.001), belonging during early and middle adolescence (B= .38, SE= .08, β =.39; p <.001), perceived stress in early and middle adolescence (B= .26, SE= .08, β =.24; p <.05), loneliness in early and middle adolescence (B= .53, SE= .08, β =.45; p <.001), SSR in early and middle adolescence (B= .55, SE= .08, β =.55; p <.001) and TSR in early and middle adolescence (B= .52, SE= .07, β =.52; p <.001) are all positively associated, which indicates the stability of each construct over time.

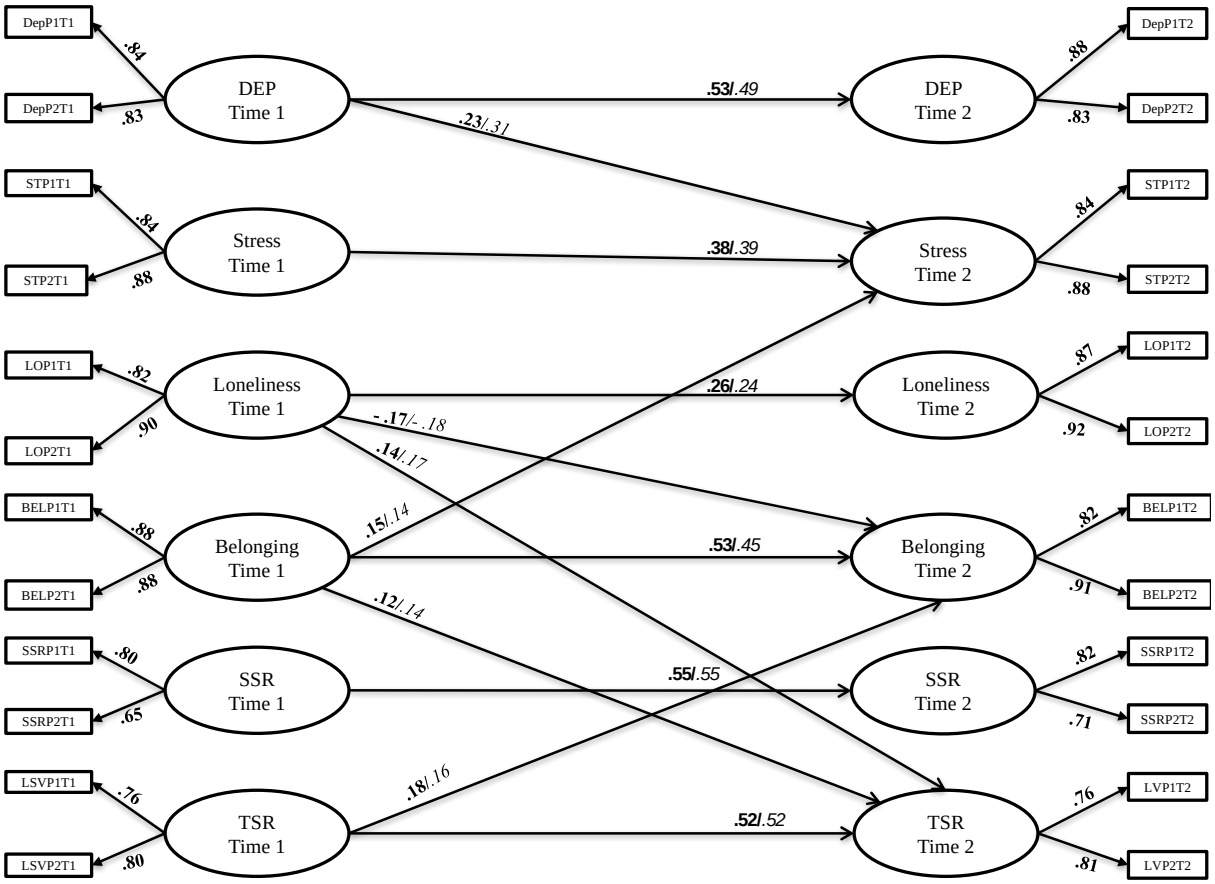

*Figure 1. Cross-Lagged-SEM of Depressive Symptoms (DEP), Perceived Stress (Stress), Loneliness, Belonging, Student-Student-Relationship (SSR) and Teacher-Student-Relationship (TSR) T1= first measurement point; T2= second measurement point (1.5 years later). Significant effects shown as unstandardized coefficients (B), standardized coefficients (β) are shown in italics; bold pathways are significant at *p < .05; non-significant effects are not shown in the figure for clarity reasons; The covariances of constructs during T1 and T2 are also not reflected in the figure for clarity reasons and will be reported separately.*

Over-time associations: Cross-Lagged-Effects. In sum, six cross-lagged effects are found to be significant. First, depressive symptoms in early adolescence are positively associated with perceived stress in middle adolescence (*B*= .23, *SE*= .06, β = .31; *p* <.001). Second, school belonging in early adolescence is positively associated with both perceived stress (*B*= .15, *SE*= .08, β = .14; *p* <.05) and TSR (*B*= .12, *SE*= .06, β = .14; *p* <.05) in middle adolescence. Third, loneliness in early adolescence is positively associated with TSR (*B*= .14, *SE*= .05, β = .17; *p* <.05) and negatively associated with belonging (*B*= –.17, *SE*= .07, β = –.18; *p* <.05) in middle adolescence. Finally, TSR in early adolescence is positively associated with school belonging (*B*= .18, *SE*= .06, β = .16; *p* <.05) in middle adolescence.

Discussion

According to Bronfenbrenner's socio-ecological model (Bronfenbrenner, 1975, 1979, 1989; Bronfenbrenner & Ceci, 1994), this study aimed to examine the precise microsystems-interplay of socio-environmental aspects of school (i.e., students' sense of school belonging, social relationships with teachers and peers) and aspects of emotional instability (i.e., depressive symptoms, perceived stress, feelings of loneliness) from early to middle adolescence using cross-lagged SEM.

The results support hypothesis I partly: Within time, all relationships between depressive symptoms and the other aspects of emotional instability were found to be significant. In detail, a bidirectional relationship between depressive symptoms and perceived stress (Hankin & Abramson, 2001; Lombas et al., 2014) as well as between depressive symptoms and loneliness (see Quarter et al., 2013) was found. In addition, the cross-lagged association between depressive symptoms in early adolescence and perceived stress in middle adolescence was found to be positive. Put simply: Students with stronger depressive symptoms in early adolescence experience higher levels of perceived stress in middle adolescence. This is in line with studies on adolescents (Compas, Howell, Phares, Williams, & Giunta, 1989; Windle, 1992), showing that depressive symptoms – amongst other variables – increase the overall number of negative and stressful events experienced at a later time in life (Cohen, Burt, & Bjorck 1987; Compas, Howell, Phares, Williams, & Giunta, 1989; Hankin & Abramson, 2001; Moksnes, Bradley Eilersten, & Lazarewicz, 2016; Windle, 1992). Nevertheless, this finding stands in contrast to research postulating a bidirectional relationship between depressive symptoms and perceived stress over time (see, e.g., Hankin & Abramson, 2001), as no significant cross-lagged effect was identified from perceived stress on depressive symptoms. However, strong significant associations between these variables were found in the within-time associations at T1 and T2. Furthermore, the cross-sectional associations between depressive symptoms and all socio-environmental factors (i.e., school belonging, SSR, and TSR) were found to be negatively significant. Overall, this is in line with results postulating a dynamic and mutual relationship of emotional instability and socio-environmental factors (Maurizi et al., 2013; Wentzel & Muenks, 2016). However, and against the hypothesis I, no cross-lagged paths between depressive symptoms and socio-environmental aspects were found to be significant over time.

The current results support hypothesis II partly, such as perceived stress was found to be positively related with other aspect of emotional instability as well as negatively related with all socio-environmental aspects in school context, but only concurrently and not longitudinally. In other words, perceived stress is not associated with any of the other variables over time. This contradicts current research postulating that the relationship between perceived stress and depressive symptoms is bidirectional (Hankin & Abramson, 2001). A possible explanation might be the long period of time between T1 and T2 in the current study (1.5 years), as no chronical stress could have been measured. Future studies might follow a research design with more measurement points within one school year, which allows the identification of chronical vs. acute stress.

Hypothesis III could only be partly confirmed. Concurrently, loneliness was positively related to the other aspects of emotional instability as well as negatively related to all three socio-environmental aspects in school context. As the cross-lagged association between students' loneliness in early adolescence and students' school belonging in middle adolescence was found to be negatively, this finding supports results showing school belonging to be associated with reduced feelings of loneliness (see Maurizi et al., 2013; Pittman & Richmond, 2007). Particularly, the results highlight the unidirectional nature of this association, such that loneliness negatively predicts school belonging but not vice versa. Furthermore, as loneliness in early adolescence was positively associated with TSR in middle adolescence, it can be interpreted that students with poor or lacking relationships with peers in early adolescence, might turn to relationships with adults (other than parents) over time to gain support.

The current results support hypothesis IV partly. Concurrently, belonging was found to be positively related to all other socio-environmental aspects in school context, as well as negatively related to all aspects of emotional instability. In turn, the cross-lagged association between students' school belonging in early adolescence and their level of perceived stress in middle adolescence was positive, which might be surprising as this association was found to be negatively related in the within-time associations. A possible explanation for this phenomenon might be that with a higher sense of belonging students' involvement in school might increase as they are more likely to participate in more activities and therefore spend more time in school, as well as attribute more meaning to the relationships and experiences formed within it, which in turn increases the level of perceived stress over time. Furthermore, a cross-lagged path between belonging and TSR was found to be positively significant, which was also found to be significant in the other direction (from TSR to belonging) supporting hypothesis V partly.

TSR was also positively related to all other socio-environmental aspects in school context, as well as negatively related to all aspects of emotional instability within time. Furthermore, as mentioned-above, a cross-lagged path between TSR and belonging was found to be significant. This finding is in line with research highlighting that teacher's support and their involvement in class-contexts are positively associated with adolescents' feeling of belonging (see Maurizi et al., 2013), as well as with research, which found that a positive TSR is associated with a higher level of school belonging (Uslu & Gizir, 2017).

Finally, hypothesis VI could also be supported partly, as no significant cross-lagged paths could have been found over time. However, SSR was positively related to all other socio-environmental aspects in school context at T1, as well as negatively related to all aspects of emotional instability at T1 and T2. At T2, the relationship between TSR and SSR was no longer significant. This might be due to the fact that during adolescence students tend to closer distinguish between relationships with peers and teachers (Engels et al., 2016).

Overall, although not all cross-lagged-effects from early to middle adolescence were found to be significant, all variables (except SSR and TSR during T2) were significantly associated within time (both at T1 and T2). In sum, only three of the six identified cross-lagged effects operated between variables of emotional instability and socio-environmental school factors (i.e., school belonging was associated with perceived stress; loneliness with school belonging and TSR) supporting Bronfenbrenner's socio-ecological model (Bronfenbrenner, 1975, 1979, 1989; Bronfenbrenner & Ceci, 1994), whereas the other three cross-lagged effects were identified between different variables of emotional instability (depressive symptoms was found to be associated perceived stress) or between variables of socio-environmental school factors (school belonging was associated with TSR and vice versa). The results suggest that prevention and intervention strategies should be implemented very early in students' lives (e.g., late childhood) to protect adolescents from developing alarming indicators of chronical emotional instability (i.e., depressive symptoms, perceived stress, loneliness).

Practical Implications

There are different options on different levels for intervening or maintaining students' emotional stability: Interventions on socio-environmental level (i.e., school environment) and interventions on individual level (Olsson et al., 2003). First, interventions focusing on students' immediate socio-environment can foster students' emotional stability by establishing a safe environment, acting against adversity actively and by creating a school environment defined by supportive peer experiences, positive teacher influences and opportunities for (academic) success (Olsson, et al., 2003). Second, interventions on students' individual level might focus on emotional functioning deficits (e.g., by emotional-functioning-couching) in elementary school to foster a positive development and reduce negative socio-emotional and behavioral outcomes (i.e., emotional instability) like MDD, depressive symptoms, deviant behavior, aggression or perceived stress after experiencing peer-related stress (Agoston & Rudolph, 2016). Another possibility on individual level is to target shy people and their potential feelings of loneliness, as this might be a more evident and effective target than social relationships (Woodhouse, Dykas, & Cassidy, 2012).

But as social relationships play an important role in adolescence (Raufelder, 2007), interventions giving attention to social relationships may be more attractive (Maurizi et al., 2013). In addition, increasing cohesiveness and decreasing conflict in class contexts (i.e., focusing on child and teacher relationships and positive classroom climate), may influence students' socio-emotional development and foster positive adaption and emotional stability (Baker, Grant, & Morlock, 2008). Moreover, intervention and/or prevention strategies should focus on fostering students' awareness of their own personal conduct and healthy coping skills and resources as well as situations and interactions in the classroom in general (Olsson et al., 2003). Regarding intervention programs focusing on emotional instability, externally-sourced programs were found to be more effective than those delivered by school staff (Werner-Seidler, et al., 2017). Nevertheless, aside from all these options for intervening and/or preventing students' emotional instability, teachers should still be aware of students' inter-and intra-individual differences and the group dynamics that operate within their classroom (Engels et al., 2016), as well as their own potential to support students' sense of school belonging and well-being.

Strength, Limitations and Future Directions

Based on data from a large sample of German secondary school students, the present study explored as one of the first within and over-time as well as cross-lagged-associations between aspects of emotional instability (i.e., depressive symptoms, perceived stress, and loneliness) and socio-environmental aspects of school (i.e., school belonging, TSR and SSR) from early to middle adolescence according to Bronfenbrenner's socio-ecological model (Bronfenbrenner, 1975, 1979, 1989; Bronfenbrenner & Ceci, 1994). However, when interpreting the results of this study, some limitations should be considered: First, research found that loneliness is associated with peer rejection and lonely students are generally not liked by peers (Qualter et al., 2013). This study did not question why or when students felt lonely. In line with this, perceived loneliness might occur due to perceived social isolation or objective social isolation (i.e., students have no desire/necessity to build peer relationships) or passively (i.e., students perceive loneliness due to peer-rejection). Moreover, there is an overlap between loneliness and depressive symptoms, as loneliness might in itself be an indicator of depressive symptoms. Future studies are necessary to refine these aspects of loneliness and their associations with traits of emotional instability and socio-environmental aspects of classroom context. However, the associations of these two constructs do not indicate a statistical overlap.

Second it has to be mentioned that current studies have shown some weakness regarding the method used in this study. Hamaker, Kuiper and Grasman (2015) for example have shown that autoregressive associations are not measured adequately if the construct-stability is "trait-like" or time-invariant. This might lead to inadequate conclusions about existing causal associations, their strength or their sign. Therefore, future studies, which include an appropriate quantity of measurement points (more than two), should use alternative methods like the random intercepts cross-lagged panel Model (RI-CLPM; Hamaker, Kuiper & Grasman, 2015) or the autoregressive latent trajectory Model with structured residuals (ALT-SR; Berry & Willoughby, 2016).

Third, the measure of TSR and SSR are more general in nature. Instruments that include more detailed questions about the hours spent with peers and teachers (also outside the school context), the quality of TSR and SSR and the reasons why those social relationships are defined as good and/or bad, would have offered a better insight into the associations studied. Future studies are warranted that focus more strongly on the quality of these relationships. In addition, a refinement of depressive symptoms (e.g., internal and behavioral aspects of depressive symptoms) and perceived stress (e.g., social, scholastic, parental stress) are necessary to gain a more profound insight into the origins and associations between these two constructs.

One may criticize the use of the self-report-data in this study (as no medical diagnosis of depressive symptoms could be generated). However, self-report data were appropriate for the current study as: (a) students' perception of socio-environmental aspects in school (i.e., school belonging, TSR, SSR) were in focus, and (b) internal states (i.e., depressive symptoms, perceived stress and loneliness) were explored. Nevertheless, future studies might consider mixed-method-designs (i.e., quantitative and qualitative design) and/or case-vignettes to get more detailed results.

In sum, the results of this study have some important implications for prevention and interventions strategies, as outlined earlier. Moreover, this study sheds a brighter light onto important within- and over-time associations between students' emotional instability (i.e., depressive symptoms, perceived stress, loneliness) and socio-environmental aspects (i.e., school belonging, TSR and SSR) in the transition from early to middle adolescence.

References

Agoston, A. M., & Rudolph, K. D. (2016). Interactive contributions of cumulative peer stress and executive function deficits to depression in early adolescence. *The Journal of Early Adolescence*, *36*(8), 1070–1094. doi: 10.1177/0272431615593176

Asparouhov, T. (2005). Sampling weights in latent variable modeling. *Structural Equation Modeling*, *12*(3), 411–434. doi: 10.1207/s15328007sem1203_4

Asparouhov, T., & Muthén, B. (2006). Item response mixture modeling: Application to tobacco dependence criteria. *Addictive Behaviors, 31*(6), 1050–1066. doi: 10.1016/j.addbeh.2006.03.026

Baker, J. A., Grant, S., & Morlock, L. (2008). The teacher-student relationship as a developmental context for children with internalizing or externalizing behavior problems. *School Psychology Quarterly*, *23*(1), 3–15. doi: 10.1037/1045-3830.23.1.3

Berry, D., & Willoughby, M. T. (2016). On the practical interpretability of cross-lagged panel models: Rethinking a developmental workhorse*. Child Development*, *88*(4), 1186–1206. doi: 10.1111/cdev.12660

Bronfenbrenner, U. (1975). Reality and research in the ecology of human development. *Proc.Am. Philos. Soc.* 119, 439–469.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.

Bronfenbrenner, U. (1989). Ecological systems theory. In R. Vasta (Ed.). *Six theories of child development: Revised formulations and current issues* (pp. 187–250). Greenwich, CT: JAI Press.

Bronfenbrenner, U., & Ceci, S. J. (1994). Nature-nurture reconceptualized in developmental perspective: a bioecological model. *Psychological Review, 101*, 568–586. doi: 10.1037/0033-295X.101.4.568

Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes, In W. Damon & R.M. Lerner (Eds.), *Handbook of Child Psychology: Theoretical Models of Human Development* (pp. 993–1028). New York, NY: Wiley.

Chahal, J. K., & Ewen, H. (2014). Social integration, social relationships, and stress. *The Wiley Blackwell Encyclopedia of Health, Illness, Behavior, and Society,* 1–5. doi: 10.1002/9781118410868.wbehibs383

Cohen, L. H., Burt, C. E., & Bjorck, J. P. (1987). Life stress and adjustment: Effects of life events experienced by young adolescents and their parents. *Developmental Psychology*, *23*(4), 583–592. doi: 10.1037/0012-1649.23.4.583

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 385–396. doi: 10.2307/2136404

Compas, B. E., Howell, D. C., Phares, V., Williams, R. A., & Giunta, C. T. (1989). Risk factors for emotional/behavioral problems in young adolescents: A prospective analysis of adolescent and parental stress and symptoms. *Journal of Consulting and Clinical Psychology*, *57*(6), 732–740.

De Laet, S., Colpin, H., Van Leeuwen, K., Van den Noortgate, W., Claes, S., Janssens, A., Goossens, L., & Verschueren, K. (2016). Transactional links between teacher–student relationships and adolescent rule-breaking behavior and behavioral school engagement: Moderating role of a dopaminergic genetic profile score. *Journal of Youth and Adolescence*, *45*(6), 1226–1244. doi: 10.1007/s10964-016-0466-6

Engels, M. C., Colpin, H., Van Leeuwen, K., Bijttebier, P., Van Den Noortgate, W., Claes, S., Goossens, L., & Verschueren, K. (2016). Behavioral engagement, peer status, and teacher–student relationships in adolescence: A longitudinal study on reciprocal influences. *Journal of Youth and Adolescence*, *45*(6), 1192–1207. doi: 10.1007/s10964-016-0414-5

Geiser, C. (2010). *Datenanalyse mit Mplus. Eine anwendungsorientierte Einführung [Data-analysis with Mplus. A practical introduction]*. Wiesbaden, Germany: VS.

Gräfe, K., Zipfel, S., Herzog, W., & Löwe, B. (2004). Screening psychischer Störungen mit dem "Gesundheitsfragebogen für Patienten (PHQ-D)". Ergebnisse der deutschen Validierungsstudie [Screening of psychological disorders with the PHQ-D. Results of the German Validation study]. *Diagnostica*, *50*(4), 171–181. doi: 10.1026/0012-1924.50.4.171

Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. P. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, *20*(1), 102–116. doi: 10.1037/a0038889

Hanish, L. D., Martin, C., L., Miller, C. F., Fabes, R. A., DeLay, D., & Updegraff, K., A. (2016). Social harmony in schools: A framework for understanding peer experiences and their effects. In Wenzel, K., R. & Ramani, G., B. (Eds.) *Handbook of social influences in school contexts. Social-emotional, motivation, and cognitive outcomes* (pp. 48–62). New York, NY: Routledge.

Hankin, B. L., & Abramson, L. Y. (2001). Development of gender differences in depression: An laborated cognitive vulnerability–transactional stress theory. *Psychological Bulletin*, *127*(6), 773–796. doi: 10.1037/0033-2909.127.6.773

Harter, S. (1996). Teacher and classmate influences on scholastic motivation, self-esteem, and level of voice in adolescence. In J. Juvonen & K.R. Wentzel (eds.), *Social Motivation – Understanding Children's School Adjustment* (pp. 11–42). New York, NY: Cambridge University Press.

Horowitz, J. L., & Garber, J. (2006). The prevention of depressive symptoms in children and adolescents: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, *74*(3), 401–415. doi: 10.1037/0022-006X.74.3.401

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: onventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. doi: 10.1080/10705519909540118

Kiswarday, V. (2012). Empowering resilience within the school context. *Methodological Horizons*, *7*(14), 93–103.

Kline, R. B. (2005). *Principles and Practice of Structural Equation Modeling*. New York, NY: The Guilford Press.

Kunter, M., Schümer, G., Artelt, C., Baumert, J., Klieme, E., Neubrand, M., Prenzel, M., Schiefele, U., Schneider, W., Stanat, P., Tillmann, K.-J., Weiß, M. (2002). *Dokumentation der Erhebungsinstrumente (Vol. 72) [Documentation of the measures*]. Berlin, Germany: Max-Planck-Institut für Bildungsforschung.

Larson, R. W., Moneta, G., Richards, M. H., & Wilson, S. (2002). Continuity, stability, and change in daily emotional experience across adolescence. *Child Development*, *73*(4), 1151–1165. doi: 10.1111/1467-8624.00464

Little, R. J. A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, *83*, 1198–1202.

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9(*2), 151–173. doi: 10.1207/S15328007SEM0902_1

Little, T. D., Rhemtulla, M., Gibson, K., & Schoemann, A. M. (2013). Why the items versus parcels controversy needn't be one. *Psychological Methods*, *18*(3), 285– 300. doi: 10.1037/a0033266.

Lombas, A. S., Martín-Albo, J., Valdivia-Salas, S., & Jiménez, T. I. (2014). The relationship between perceived emotional intelligence and depressive symptomatology: The mediating role of perceived stress. *Journal of Adolescence*, *37*(7), 1069–1076. doi: 10.1016/j.adolescence.2014.07.016

MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis*. Mahwah, NJ: Erlbaum.

Marsh, H. W., Hau, K. T., Balla, J. R., & Grayson, D. (1998). Is more ever too much? The number of indicators per factor in confirmatory factor analysis. *Multivariate Behavioral Research*, *33*(2), 181–220. doi: 10.1207/s15327906mbr3302_1

Maurizi, L. K., Grogan-Kaylor, A., Granillo, M. T., & Delva, J. (2013). The role of social relationships in the association between adolescents' depressive symptoms and academic achievement. *Children and Youth Services Review*, *35*(4), 618–625. doi: doi.org/10.1016/j.childyouth.2013.01.006

Moksnes, U. K., Bradley Eilertsen, M. E., & Lazarewicz, M. (2016). The association between stress, self-esteem and depressive symptoms in adolescents. *Scandinavian Journal of Psychology*, *57*(1), 22–29. doi: 10.1111/sjop.12269

Muthén, L. K., & Muthén, B. O. (1998–2012). *Mplus user's guide* (7th ed.). Los Angeles, CA.

Muthén & Muthén. Nasser F., & Wisenbaker J. (2003). A Monte Carlo study investigating the impact of item parceling on measures of fit in confirmatory factor analysis. *Educational and Psychological Measurement, 63*, 729–757. doi: 10.1177/0013164403258228

Olsson, C. A., Bond, L., Burns, J. M., Vella-Brodrick, D. A., & Sawyer, S. M. (2003). Adolescent resilience: A concept analysis. *Journal of Adolescence*, *26*(1), 1–11. doi: 10.1016/S0140-1971(02)00118-5

Persike, M., & Seiffge-Krenke, I. (2014). Is stress perceived differently in relationships with parents and peers? Inter-and intra-regional comparisons on adolescents from 21 nations. *Journal of Adolescence*, *37*(4), 493–504. doi: 10.1016/j.adolescence.2013.09.007

Pittman, L. D., & Richmond, A. (2007). Academic and psychological functioning in late adolescence: The importance of school belonging. *The Journal of Experimental Education*, *75*(4), 270–290. doi: 10.3200/JEXE.75.4.270-292

Prats D. C. (1990). *The effects of forming miniscales on the construct validity of the test anxiety inventory.* Paper presented at the National Council of Measurement of Education, Boston.

Qualter, P., Brown, S. L., Rotenberg, K. J., Vanhalst, J., Harris, R. A., Goossens, L., Bangee,

M., & Munn, P. (2013). Trajectories of loneliness during childhood and adolescence: Predictors and health outcomes. *Journal of Adolescence*, *36*(6), 1283–1293. doi: 10.1016/j.adolescence.2013.01.005

Raufelder, D. (2007). *Von Machtspielen zu Sympathiegesten. Das Verhältnis von Lehrern und Schülern im Bildungsprozess [From Powergames to gestures of sympathy. The Relationship of teachers and students in the process of education]*. Marburg, Germany: Tectum.

Reynolds, A. D., & Crea, T. M. (2015). Peer influence processes for youth delinquency and depression. *Journal of Adolescence*, *43*, 83–95. doi: 10.1016/j.adolescence.2015.05.013

Schwab, R. (1997). *Einsamkeit. Grundlagen für die klinisch-psychologische Diagnostik und Intervention [Loneliness. Basics for clinical-psychological diagnostic and intervention].* Bern, Switzerland: Hans Huber.

Seiffge-Krenke, I., Aunola, K., & Nurmi, J. E. (2009). Changes in stress perception and coping during adolescence: The role of situational and personal factors. *Child Development*, *80*(1), 259–279. doi: 10.1111/j.1467-8624.2008.01258.x.

Sterba, S. K., & Rights, J. D. (2017). Effects of parceling on model selection: Parcel-allocation variability in model ranking. *Psychological Methods, 22*(1), 47-68. doi: 10.1037/met0000067.

Teppers, E., Klimstra, T. A., Damme, C. V., Luyckx, K., Vanhalst, J., & Goossens, L. (2013). Personality traits, loneliness, and attitudes toward aloneness in adolescence. *Journal of Social and Personal Relationships*, *30*(8), 1045–1063. doi: 10.1177/0265407513481445

Uslu, F., & Gizir, S. (2017). School belonging of adolescents: The role of teacher–student relationships, peer relationships and family involvement. *Educational Sciences: Theory & Practice*, *17*, 63–82. doi: 10.12738/estp.2017.1.0104

Vanhalst, J., Goossens, L., Luyckx, K., Scholte, R. H., & Engels, R. C. (2013). The development of loneliness from mid-to late adolescence: Trajectory classes, personality traits, and psychosocial functioning. *Journal of Adolescence*, *36*(6), 1305–1312. doi: 10.1016/j.adolescence.2012.04.002

Vanhalst, J., Luyckx, K., & Goossens, L. (2014). Experiencing loneliness in adolescence: A matter of individual characteristics, negative peer experiences, or both?. *Social Development*, *23*, 100–118. doi: 10.1111/sode.12019

Van Roekel, E., Ha, T., Verhagen, M., Kuntsche, E., Scholte, R. H., & Engels, R. C. (2015). Social stress in early adolescents' daily lives: Associations with affect and loneliness. *Journal of Adolescence*, *45*, 274–283. doi: 10.1016/j.adolescence.2015.10.012

Wentzel, K. R., & Muenks, K. (2016). Peer influence on students' motivation, academic achievement and social behavior. In: Wentzel, K. R. & Ramani G. B. (Eds.), *Handbook of Social Influences in School Contexts: Social-Emotional, Motivation, and Cognitive Outcomes* (pp. 13–30). New York, NY: Routledge.

Werner-Seidler, A., Perry, Y., Calear, A. L., Newby, J. M., & Christensen, H. (2017). School-based depression and anxiety prevention programs for young people: A systematic review and meta-analysis. *Clinical Psychology Review*, *51*, 30–47. doi: 10.1016/j.cpr.2016.10.005

Wigfield, A., & Eccles, J. S. (Eds.) (2001). *Development of achievement motivation*. San Diego, CA: Academic Press.

Williams, S. G., Turner-Henson, A., Davis, S., & Soistmann, H. C. (2017). Relationships among perceived stress, bullying, cortisol, and depressive symptoms in ninth-grade adolescents: A pilot study. *Biological Research For Nursing*, *19*(1), 65–70. doi: 10.1177/1099800416656396

Windle, M. (1992). A longitudinal study of stress buffering for adolescent problem behaviors. *Developmental Psychology*, *28*(3), 522–530. doi: 10.1037/0022-006X.57.6.732

Woodhouse, S. S., Dykas, M. J., & Cassidy, J. (2012). Loneliness and peer relations in adolescence. *Social Development*, *21*(2), 273–293. doi: 10.1111/j.1467-9507.2011.00611.x