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## The Impact of Internalizing and Externalizing Behavior Problems and Other Empirically Relevant Factors on Stress Perception in Adolescent Peer Relations

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### Abstract

Stress perception in romantic and friendship peer relations constitutes a typical adolescent phenomenon observed across cultures. Although internalizing and externalizing problems are associated with social interaction difficulties with peers, different behavior problems have not yet been explicitly related to stress perception in peer relations. The current study addresses the question of whether internalizing, externalizing and comorbid problem behavior is associated with stress perception in peer relations. It secondly examines empirically relevant risk factors that might moderate this assumed association. Standardized instruments are applied to a sample of 1019 adolescents, including 678 with behavior problems according to an aggregated teacher-student-rating. MANCOVAs and MLRs reveal that type of behavior problem is an important variable to explain peer stress, but that socioeconomic status (e.g., parents' highest educational level, occupational status) explains more variance. Migration background proves to be a moderator, as well. The results are in accordance with current research on the high meaning of societal macro-level variables for the social and emotional development of youths.

Keywords: Internalizing Problems, Externalizing Problems, Stress Perception, Peer Relations.

### Die Einflüsse internalisierender und externalisierender Verhaltensprobleme sowie anderer empirisch relevanter Faktoren auf Stresserleben in jugendlichen Peerbeziehungen

#### Zusammenfassung

Stresserleben im Kontext romantischer und freundschaftlicher Peerbeziehungen stellt kulturübergreifend ein jugendtypisches Phänomen dar. Obwohl internalisierende und externalisierende Verhaltensprobleme oft mit sozialen Interaktionsproblemen in Peerbeziehungen einhergehen, wurde der Zusammenhang zwischen verschiedenen Verhaltensproblemen sowie Stresserleben in Peerbeziehungen noch nicht betrachtet. Die vorliegende Studie untersucht erstens die Fragestellung, ob internalisierende, externalisierende und komorbide Verhaltensprobleme mit dem Stresserleben in Peerbeziehungen assoziiert sind. Zweitens werden empirisch relevante Risikofaktoren in den Blick genommen, die den vermuteten Zusammenhang moderieren könnten. 1019 Jugendliche werden mit standardisierten Instrumenten untersucht, ein-

schließlich 678 mit Verhaltensproblemen gemäß aggregiertem Rating der Jugendlichen sowie deren Lehrkräfte. MANCOVAs und MLRs zeigen, dass die Art der Verhaltensprobleme eine relevante Größe zur Erklärung des Stresserlebens in Peerbeziehungen darstellt. Aspekte des sozio-ökonomischen Status (z. B. der höchste Bildungsabschluss sowie der Beschäftigungsstatus der Eltern) erklären jedoch am meisten Varianz. Auch das Vorliegen eines Migrationshintergrundes nimmt moderierenden Einfluss. Die Ergebnisse stehen im Einklang mit Befunden zum hohen Stellenwert von Variablen auf der gesellschaftlichen Makroebene für die soziale und emotionale Entwicklung von Jugendlichen.

Schlüsselwörter: Internalisierende Probleme; externalisierende Probleme; Stressverarbeitung; Peerbeziehungen.

## Theoretical background

### *Peer relations among adolescents with behavior problems*

Internalizing behavior problems comprise aspects of anxiety and depressive mood, and externalizing behavior problems include dissocial and hyperactive behavior (Linderkamp & Grünke, 2007). This study focuses on internalizing and hyperactive behavior problems. Considering research on peer relations, youths with internalizing and externalizing behavior problems are more likely to have difficulties in social interactions with peers than unobtrusive control groups, irrespective of how the terms *peer* or *peer relation* are operationalized. In this study, a peer is defined as an adolescent "belonging to the same societal group especially based on age, grade, or status" (Reitz, Zimmermann, Hutteman, Specht, & Neyer, 2014, S. 218). Peer definitions usually specifically refer to social relations being obtained in the school context because adolescents spend much of the day at school. Lauer and Renk (2013) developed a questionnaire that comprises case vignettes that describe unobtrusive behavior and different behavior problems. Youths reported more social rejection (high social distance, bullying, and ignorance) towards the problem behavior vignettes than the unobtrusive ones. Evans, Fite, Hendrickson, Rubens and Mages (2015) find a link between hyperactivity-impulsivity and peer re-

jection, which is moderated by effects of reactive aggression. Normand et al. (2011) point to evidence that adolescents with hyperactive and other AD(H)D-related symptoms report lower personal satisfaction in peer relationships.

### *The construct of stress perception in peer relations*

Stress perception in peer relations is defined on the basis of the transactional stress model by Lazarus and Folkman (1984). One aspect of the model contains cognitive primary appraisal processes (e.g., thoughts, ideas) that relate to questions of whether a situation is considered as personally relevant / irrelevant or threatening / harmless for a person's subjective well-being. It is necessary to differentiate romantic stress from friendship-related stress, as romantic relationships include greater intimacy and more sexual behavior components (Buhs, 2013). For brevity, friendship-related peer stress is here referred to as *peer stress* and stress perception related to romantic relationships as *romantic stress*. The aspects of peer and romantic stress constitute the construct of stress perception in peer relations in the current study.

Persike and Seiffge-Krenke (2016) conducted an international study with 4957 adolescents (aged 11-18 years) from 18 different European, American, South American and Asian countries, who were asked for their peer stress perception. Adolescents from all geographical regions and countries per-

ceived peer stress to a certain extent. This might be due to the dual psychological function of peer relations being both a source of affection and a way to develop autonomy for adolescents (Hodgins, Koestner & Duncan, 1996). Seiffge-Krenke et al. (2010) show that romantic stress is also observable in different cultural contexts (i.e., Mid-Europe, Northern Europe, Eastern Europe, Southern Europe, South Africa, South America, and the Middle East). Anderson, Sulk and Hyde (2015) conducted a prospective longitudinal study which demonstrates that depressive symptoms are associated with romantic stress. However, no study yet exists referring to the possible association between behavior problems and stress perception in peer relationships as operationalized by the transactional stress model (Lazarus & Folkman, 1984).

It can be assumed that internalizing, externalizing, and comorbid problems have an impact on primary appraisal processes in peer interactions due to different prevailing perception biases in the subgroups. A *positive self-perceptual bias* (Emeh & Mikami, 2014) could especially be found among youths with AD(H)D(-symptoms), which means that a considerable discrepancy exists between adolescents' self-perception and the perception of other informants (e.g., parents, teachers). Although having a low sociometric peer status, some adolescents with ADHD believe themselves to be relatively popular (McQuade et al., 2014) and thus do not necessarily report high stress levels. However, youths with internalizing problems tend to globally interpret situations as negative, even if the situations are neutral. They also predominantly remember negative events and sad feelings (*Sad bias*, Sylvester, Hudziak, Gaffrey, Barch & Luby, 2016). Anxious teenagers interpret ambiguous situations as potentially threatening (*Threat bias*, Sylvester et al., 2016). Youths with comorbidities generally experience the highest overall psychological distress in different areas of life (e.g., Rockhill et al., 2013). The potential connection between stress perception in peer relations and stress appraisal processes

is underlined by studies that explore ruminative self-focusses among youths with social anxiety (Norton & Abbott, 2016). Depressive youths tend to exhibit conversational self foci (Schwartz-Mette & Rose, 2016). Self-foci connected with catastrophizing thoughts (e.g., exaggerating negative consequences, Gellatly & Beck, 2016) appear to constitute a basis for high peer stress perception. Rumination requires the "ability" to focus on single aspects of a situation excessively, which seems to be particularly difficult for hyperactive adolescents. In addition, hyperactivity-impulsivity may serve to exacerbate inattentiveness over time (Greven, Asherson, Rijdsdijk & Plomin, 2011). This is a reason for assuming that hyperactive adolescents might perceive lower peer stress, as stress perception is operationalized as a cognitive process.

### ***Relevant factors to explain stress perception in peer relations***

Analyzing the association between behavior problems and stress perception in peer relations, age effects might be possible. The large amount of biological and normative developmental tasks in adolescence is often accompanied by an increasing stress perception, decreasing again at the end of puberty (Seiffge-Krenke, Aunola & Nurmi, 2009).

Socioeconomic status and migration background might exert an additional moderating impact on the link between behavior problems and stress perception in peer relations, because both variables are important to explain general stress level and peer relationships. Taking a family's net income as an indicator of socioeconomic status, a positive correlation with the number of friends can be identified (Hjalmarsson & Mood, 2015). Aspects of socioeconomic status ([neighbor] income, education, unemployment) are correlated with stress operationalized with repeated cortisone measurements. Variables indicating a high socioeconomic status of a family coincide with lower physiological

stress parameters (Vliegthart et al., 2016). A higher net income enables youths to spend free time with peers in their own room and to participate in more expensive activities, which might constitute factors that reduce stress. The potential relevance of socioeconomic status for the explanation of peer stress is underlined by studies that demonstrate that income inequality within neighborhoods is associated with emotional distress, especially among adolescents with low socioeconomic status (Vilhjalmsdottir, Gardarsdottir, Bernburg & Sigfusdottir, 2016).

Migration background is linked to lower socioeconomic status (Federal Agency for Civic Education, 2016). According to the Federal Statistical Office in Germany (Statistisches Bundesamt, 2016) people with a migrant background are immigrants entering Germany since 1950, their immediate descendants, and the foreign population living in Germany. In Germany, 16.4 million people, which comprises 20.3% of the total population, meet these criteria. Boda and Néray (2015) show that perceived ethnic background is especially important for social acceptance in a peer group. Perceiving peers as minorities due to how they appear is a risk factor for social rejection. Adolescents with a migration background often look different than the majority e.g., skin color or clothing style. Research on the link between stereotypes and social acceptance identifies the importance of physical features for peer acceptance. Moreover, adolescents that appear stereotypical of their racial group are more vulnerable to discriminatory treatment by outgroup members (Hebl, Williams, Sundermann & Davies, 2012). It could be relevant for peer stress perception that adolescents with a migrant background are often faced with the challenge of integrating two cultures personally and coping with acculturation stress (Kouider, Koglin & Petermann, 2015). Importantly, it has been found that identifying with the majority culture is a predictor of friendships between youths belonging to cultural minorities and the

majority (Munniksmas, Verkuyten, Flache, Stark & Veenstra, 2015). The development of a cultural identity is a process shaped by social experiences, conflicts, and sometimes being confronted with different value systems. These are some of the main reasons why a migration background might increase the probability of perceiving higher peer stress. It has also been reported that adolescents with a migrant background are more likely to develop internalizing problems (Kouider et al., 2015).

### ***Research objectives, questions, and hypotheses***

This explorative study aims to investigate the association between behavior problems and peer and romantic stress perception. It also attempts to identify factors (socioeconomic status, migration background) that might be relevant for stress perception in peer relations among youths with behavior problems. The main objective is to expand research perspectives on peer relationships of youths with behavior problems by linking different, but related, research fields (i.e., stress research, research on adolescent peer relations and behavior problems). This novel perspective is expected to broaden the understanding of behavior problems and relevant associated factors.

Although peer stress and romantic stress are parts of perceptual reality for many adolescents across cultures (Persike & Seiffge-Krenke, 2016; Seiffge-Krenke et al., 2010), internalizing, externalizing, and comorbid behavior problems have not yet been explicitly related to the construct of stress perception in peer relations in one common model. Different behavior problems promise to explain variance of the construct of stress perception in peer relations, because social information processes in youths with internalizing and externalizing problems differ. These differences might also influence their stress perception in peer interactions. Hyperactive adolescents with a prevailing *positive self-perceptual bias* (Emeh & Mikami,

2014) may feel less peer stress than youths with internalizing problems and a *sad* or *threat bias* (Sylvester et al., 2016). Youths with comorbid problems should have the highest stress perception in peer relations, because they are exposed to the largest number of risk factors (e. g., Rockhill et al., 2013). As socioeconomic status explains aspects of stress (Vilhjalmsdottir et al., 2016; Vliegenthart et al., 2016), it might moderate the link between behavior problems and stress perception in peer relationships. Moreover, low socioeconomic status is expected to coincide with high stress perception. Migration background might be a moderator, as well. Some adolescents with a migrant background are expected to perceive higher peer stress, which is implied by research on the impact of culture-related social stereotypes (e.g., Hebl et al., 2012) and cultural identity problems that might reinforce conflicts with peers (e.g., Kouider et al., 2015; Munniksma et al., 2015) and peer stress.

The current study is based on two main research questions: (1) Do internalizing and externalizing behavior problems in adolescence explain variance of stress perception in peer relations? and (2) Which empirically relevant risk factors moderate this assumed association? As there is not yet any comparable study, the hypotheses do not contain causal relations. The hypotheses of the current study are as follows: *Behavior problems (controls, internalizing, externalizing, comorbidity) have a significant impact on stress perception in peer relations (peer stress, romantic stress) (hypothesis 1). The association between behavior problems and stress perception in peer relations is moderated by socioeconomic status (hypothesis 2) and migration background (hypothesis 3).*

## Methods

The present study aims to constitute an explorative analysis of the impact of behavior problems on stress perception in peer relations by applying standardized measures

within a quantitative research design and a general linear model.

### Participants

Adolescents were recruited from public schools and advisory centers in Wuppertal, Remscheid and Solingen. Advisory centers are social institutions that provide counselling to adolescents. In addition, they are often financed by social welfare agencies. To be eligible, the youths cannot have a mental or physical handicap that impairs participation at assessments, e.g., psychosis. Inclusion criteria for the sample comprised scores in a diagnostic screening for internalizing and externalizing problems (*Strengths and Difficulties Questionnaire, SDQ, Goodman, 2001*) that exceeded (group with behavior problems) or did not reach the cut-off (controls). The adolescents were controlled for age, as puberty is linked with age-related developmental changes so that an irregular distribution of age would have distorted the data. A further inclusion criterion was the availability of class teachers willing to assess behavior problems. In order to reduce self-selection-biases (Kekkonen et al., 2015) and Rosenthal-effects (Rosenthal, 1984), a double-blind procedure was chosen and neither the investigator (psychologists and master-teacher-students at the University of Wuppertal) nor the participants knew to which subgroup (with or without behavior problems) the participants would be assigned. Youth advisory centers were also involved without explicitly asking for youths with behavior problems. Data were collected in small groups comprising four to five adolescents.

The total sample comprised 1019 adolescents aged  $M = 15.11$  ( $SD = 1.42$ ; range = 13-18), including 449 (47%) girls and 540 (53%) boys. 341 (33.5%) youths belonged to the controls, 154 (15.1%) had internalizing, 192 (18.8%) externalizing, and 332 (32.6%) comorbid internalizing and externalizing behavior problems. 88 (8.64%) adolescents attended a so-called *Förderschule* (school for

children with special needs). Most students had special needs in physical and motor development ( $N = 37$ , 32.05%), emotional and social development (17, 19.32%), learning (17 (19.32%), and hearing (2, 2.27%). 13 (14.77%) did not provide any information regarding their special needs. 187 (18.35%) youths of the total sample attended a *Hauptschule* (general secondary school), 171 (16.78%) a *Realschule*, 323 (31.7%) a *Gymnasium*, and 169 (16.58%) a *Gesamtschule* (comprehensive school). For 81 (7.95%) of youths, information on school type was not available or they chose the "Sundries" category. 378 (37.09%) adolescents had a low socioeconomic status, and 558 (55%) youths had a middle or high status. 83 adolescents (8.1%) did not provide sufficient information on socioeconomic factors. The sample included 296 youths with a migration background. The sample included 35 (11.82%) adolescents from Turkey, 27 (9.12%) from Poland, 18 (6.08%) from Iran, 15 (5.06%) from Italy, 8 (2.70%) from Kurdistan, 7 (2.36%) from Kazakhstan, 7 (2.36%) from Greece, 6 (2.02%) from Afghanistan, 5 (1.69%) from Chile, 4 (1.35%) each from Hungary, Ukraine, Albania and Sudan, 3 (1.01%) from Thailand, and 1 (0.34%) from Kosovo. The category "Kurdistan" was used, because further information on the adolescents' countries of origin was not available. The country of origin of the other 148 adolescents with a migrant background was Germany, as they were second-generation migrants. In addition, most of them had a Turkish or Polish migration background.

### **Measures and Operationalizations**

The dependent variables (peer stress, romantic stress) were operationalized by the *Problem Questionnaire (PQ)* by Seiffge-Krenke (1995), a self-rating scale which assesses stress perception of adolescents aged 12-19 according to the transactional stress model (Lazarus & Folkman, 1984). The *PQ* consists of 64 items, which can be subsumed

under a seven-factor structure (school, future, parents, [friendship] peer relations, free time, romantic stress, and self [identity aspects]). The subscales which represent friendship peer relations (peer stress) and romantic stress were chosen as stress indicators. The scale peer stress consists of nine items that contain certain aspects, such as having no friends or not feeling accepted by classmates. The scale romantic stress consists of eight items, for example referring to having no romantic partner and sexual conflicts. The items ranged from low (1) to full (5) agreement. Mean scores of each scale can be interpreted as a stress indicator in friendship or romantic relationships. The *PQ* was validated on a sample of  $N = 1028$  adolescents aged 12-19. Seiffge-Krenke (1995) found an explained variance of 69% for the seven-factor structure of the whole instrument (total stress level). The variance explained by the peer stress scale was 12%, and the scale romantic stress explained 7% variance. Cronbach's alphas of the subscales ranged between .70-.84.

Behavior problems were operationalized through the subscales hyperactivity (externalizing) and emotional problems (internalizing) of the teacher- and the self-assessment scale of the *Strengths and Difficulties Questionnaire (SDQ)* (Goodman, 2001). The *SDQ* is one of the most common screening instruments, which has already been validated in Germany and in numerous other countries. The four problem subscales of the *SDQ* consist of five items each. As the study involves a subclinical *ad hoc* sample, it was not possible to recruit a sufficient number of adolescents with subclinical dissocial behavior, which would have been necessary to aggregate the two scales (dissocial) problem behavior and hyperactivity to measure the externalizing dimension. Thus, in this study, externalizing behavior is equivalent to hyperactivity. For internalizing problems, the subscale emotional problems was employed, which refers to aspects of anxiety, psychosomatic symptoms (e.g., stomach pain), and depressive mood. Reviewing the teacher-

SDQ, Warnick, Bracken and Kasl (2008) point out that the instrument has been translated into more than 50 languages, being routinely used in Europe, Asia, Australia, and the U.S.A. Lohbeck, Schultheiß, Petermann and Petermann (2015) could replicate the original five-factor-structure for the *SDQ*-self-assessment-scale in a sample of 1501 youths aged 11-16. They found Cronbach's alpha coefficients ranging from .55-.77 for the subscales. Roy, Veenstra and Clench-Aas (2008) demonstrate that the *SDQ* can also be used for adolescents aged 10-19, although Goodman (2001) chose an age range from 3-16. Considering the subscales of the *SDQ*, in most studies the best reliability indices are reached for the subscales hyperactivity and emotional problems.

It is impossible to conceptualize behavior problems without considering the diagnostic information source, because teachers, youths, and parents often disagree regarding the extent of adolescents' behavior problems. On average, teachers', parents', peers', and adolescents' ratings of internalizing and externalizing problems only correlate moderately,  $r = .28$  (De Los Reyes et al., 2015). However, by operationalizing behavior problems by *SDQ*, high agreement with clinical diagnoses could be found in cases in which adolescents' behaviors were classified as problematic both in the self-assessment and the teacher-*SDQ*-version (Johnson, Hollis, Marlow, Simms & Wolke, 2013). In the present study, behavior problems are operationalized as internalizing and / or externalizing problems that reach the *SDQ*-cut-off both in the teacher and self-assessment version. Especially relating to internalizing problems, self-assessment adds important information, as teachers often do not recognize internalizing symptoms (Morey, Arora & Stark, 2015). For this reason, informant discrepancies have to be taken into account in statistical procedures.

Migration background is defined by the criteria of the Federal Statistical Office in Germany (Statistisches Bundesamt, 2016). More precisely, in this study, people with a

migration background are only those with migration experiences in the first- or second-generation. Socioeconomic status is operationalized as both the parents' current employment status (employed / unemployed, and in this context also the main source of income, e.g., social welfare) and the parents' highest level of educational attainment. Youths were classified as living in a family which tends to have a low status if: (1) at least one parent did not have any educational degree; (2) and / or was unemployed / received welfare; (3) and / or both parents' graduated from *Hauptschule*. In Germany, a *Hauptschule* is a secondary school predominantly attended by students with low socioeconomic status (Federal Agency for Civic Education, 2016).

### Data analysis

Before testing the hypotheses, missing data were imputed using the EM-Algorithm (Enders, 2003) for the *PQ*-data. The number of overall missing *PQ*-data was rather low (6.7%). Participants were eliminated from the sample as soon as any *SDQ*-item was missing, because a scale comprising five items might be unusable whenever an item has not been answered. As a consequence, the original sample size ( $N = 1096$ ) was reduced by approximately 7.02%.

Hypothesis 1 was tested with a MANCOVA with peer stress and romantic stress as dependent variables, behavior problems (controls, internalizing, externalizing, comorbidity) as an independent factor, and age integrated as a co-varying variable (MANCOVA1). Age is considered as a co-varying factor and a carrier variable (Baltes, Reese & Nesselroade, 1988), which means that it correlates with stress perception, but does not explain stress as a potential causal factor. Treating age as an independent variable would imply assumptions about a process over time (stress increases at the beginning and decreases at the end of puberty, Seiffge-Krenke, Aunola & Nurmi, 2009). As the

study is cross-sectional, we decided to model age as a co-varying variable.

Regarding the requirements of the MANCOVA, a normal distribution and homoscedasticity could be proven. As variant analysis is a robust statistical procedure (Sheehan-Holt, 1998), it was chosen for data analysis although the same cell sizes across groups could not be realized. As the extent of perceived behavior problems may differ depending on whose subjective perspective is taken into account (De Los Reyes et al., 2015), two multiple linear regressions were conducted with four predictors each (*SDQ*-teacher internalizing, *SDQ*-teacher externalizing, *SDQ*-student internalizing, *SDQ*-student externalizing) to determine the variance explained by each assessment. Whereas the MANCOVAs were based on the norm data of the *SDQ*, the regression analyses were performed with the raw data (sums of the subscales) in order to estimate to what extent the students' and the teachers' ratings each contributed to explain peer stress and romantic stress. The dependent variable of the first regression analysis was peer stress, and the one of the second regression was romantic stress. The regression analyses may be regarded as additional explorative analyses, especially taking into account the multi-informant approach to assess behavior problems. To eliminate multicollinearity between the predictors, a main component analysis with varimax rotation was conducted. The main component analysis was based on the raw data of the *SDQ* and the mean scores of the *PQ*-subscales peer stress and romantic stress, which were regarded as metric scales. This orthogonal rotation makes it possible to increase a factor's own proportion of variance, independent of the others (Bortz & Schuster, 2016). After these preliminary analyses, the conditions for regression analyses were fulfilled. The highest correlation emerged between the components "*SDQ*-adolescent internalizing" and "*SDQ*-teacher-internalizing" ( $r = .26, p < .001$ ), and the lowest correlation was found between the components "*SDQ*-adolescent ex-

ternalizing" and "*SDQ*-teacher externalizing" ( $r = .14, p < .001$ ). Hypotheses 2 and 3 were tested with MANCOVAs analogous to hypothesis 1. As opposed to MANCOVA1, the MANCOVAs included a further independent variable each, i.e., socioeconomic status (hypothesis 2, MANCOVA2) or migration background (hypothesis 3, MANCOVA3). Post-hoc *t*-tests with independent samples were performed to explore significant subgroup differences. The alpha error was controlled by Bonferroni procedure.

## Results

MANCOVA1 shows a significant main effect of behavior problems on peer stress ( $F_{3,1015} = 51.60, p < .001, \eta^2 = .14$ ) and romantic stress ( $F_{3,1015} = 36.23, p < .001, \eta^2 = .10$ ). The covariate age ( $\eta^2 < .01$ ) has a small effect in the multivariate model. MANCOVA2 yields both significant main effects for behavior problems (peer stress:  $F_{3,928} = 1.9, p < .001, \eta^2 = .12$ ; romantic stress:  $F_{3,928} = 12.11, p < .001, \eta^2 = .10$ ) and socioeconomic status (peer stress:  $F_{1,928} = 398.14, p < .001, \eta^2 = .17$ ; romantic stress:  $F_{3,928} = 116.72, p < .001, \eta^2 = .14$ ). A significant interaction emerges, as well (peer stress:  $F_{3,928} = 4.11, p < .001, \eta^2 = .06$ ; romantic stress:  $F_{3,928} = 3.78, p < .001, \eta^2 = .05$ ). Age has a significant, but small, impact on peer stress and romantic stress ( $\eta^2 < .01$ ). MANCOVA3 shows a significant main effect of behavior problems on peer stress ( $F_{3,1011} = 48.29, p < .001, \eta^2 = .12$ ) and romantic stress ( $F_{3,1011} = 31.75, p < .001, \eta^2 = .09$ ). Migration background has an impact on peer stress ( $F_{3,1011} = 29.56, p < .001, \eta^2 = .09$ ), while the main effect for romantic stress is not significant. A significant interaction on the peer stress scale emerges ( $F_{3,1011} = 15.45, p < .001, \eta^2 = .06$ ). The results of the regression analyses are shown in Table 1.

The regression analyses reveal that internalizing behavior problems, as subjectively perceived by youths, explain the most vari-

Table 1: Results of multiple linear regression analyses

| Predictors                            | <i>B</i> | <i>SE</i> | <i>b</i> | <i>R</i> <sup>2</sup> <sub>korr</sub> |
|---------------------------------------|----------|-----------|----------|---------------------------------------|
| 1. MLR (Outcome: Peer stress)         |          |           |          |                                       |
| Internalizing (teacher’s perspective) | .14      | .02       | .17**    | .26**                                 |
| Externalizing (teacher’s perspective) | .12      | .02       | .15**    |                                       |
| Internalizing (self-assessment)       | .27      | .03       | .33**    |                                       |
| Externalizing (self-assessment)       | .18      | .03       | .22**    |                                       |
| 2. MLR (Outcome: Romantic stress)     |          |           |          |                                       |
| Internalizing (teacher’s perspective) | .13      | .02       | .19**    | .23**                                 |
| Externalizing (teacher’s perspective) | .06      | .02       | .07*     |                                       |
| Internalizing (self-assessment)       | .26      | .03       | .35**    |                                       |
| Externalizing (self-assessment)       | .07      | .02       | .09*     |                                       |

Notes. \* = Significant at the 05-level after Bonferroni-correction; \*\* = Significant at the 01-level after Bonferroni-correction; *R*<sup>2</sup><sub>korr</sub> = corrected determination coefficient according to Nimon, Zientek and Thompson (2015); MLR = multiple linear regression

Table 2: Post hoc tests: Differences in friendship peer and romantic stress depending on behavior problems

| Subscales       | Subgroup 1    |               | Subgroup 2    |           | <i>df</i> | <i>t</i> | <i>p</i> | <i>d</i> |
|-----------------|---------------|---------------|---------------|-----------|-----------|----------|----------|----------|
|                 | <i>M</i>      | <i>SD</i>     | <i>M</i>      | <i>SD</i> |           |          |          |          |
| Peer stress     | Comorbid      |               | Internalizing |           | 484       | -1.18    | .047     | -        |
|                 | 2.5           | 0.94          | 2.38          | 0.85      |           |          |          |          |
|                 | Comorbid      |               | Externalizing |           | 522       | -6.2     | .000**   | -0.59    |
|                 | 2.5           | 0.94          | 1.99          | 0.77      |           |          |          |          |
|                 | Comorbid      |               | Control group |           | 533       | -11.63   | .000**   | -0.91    |
|                 | 2.5           | 0.94          | 1.79          | 0.56      |           |          |          |          |
|                 | Internalizing |               | Externalizing |           | 344       | 4.49     | .000**   | -0.48    |
|                 | 2.38          | 0.85          | 1.99          | 0.77      |           |          |          |          |
|                 | Internalizing |               | Control group |           | 493       | -9.20    | .000**   | -0.81    |
|                 | 2.38          | 0.85          | 1.79          | 0.56      |           |          |          |          |
| Externalizing   |               | Control group |               | 531       | -3.44     | .000**   | -0.29    |          |
| 1.99            | 0.77          | 1.79          | 0.56          |           |           |          |          |          |
| Romantic stress | Comorbid      |               | Internalizing |           | 484       | -1.6     | n.s.     | -        |
|                 | 2.1           | 0.55          | 2.0           | 0.74      |           |          |          |          |
|                 | Comorbid      |               | Externalizing |           | 522       | -5.15    | .000**   | -0.47    |
|                 | 2.1           | 0.55          | 1.8           | 0.71      |           |          |          |          |
|                 | Comorbid      |               | Control group |           | 671       | -10.37   | .000**   | -0.89    |
|                 | 2.1           | 0.55          | 1.6           | 0.57      |           |          |          |          |
|                 | Internalizing |               | Externalizing |           | 344       | 2.83     | .000*    | -0.27    |
|                 | 2.0           | 0.74          | 1.8           | 0.71      |           |          |          |          |
|                 | Internalizing |               | Control group |           | 493       | -6.64    | .000**   | -0.61    |
|                 | 2.0           | 0.74          | 1.6           | 0.57      |           |          |          |          |
| Externalizing   |               | Control group |               | 531       | -3.06     | .000*    | -0.31    |          |
| 1.8             | 0.71          | 1.6           | 0.57          |           |           |          |          |          |

Notes. \* = Significant at the 05-level after Bonferroni-correction; \*\* = Significant at the 01-level after Bonferroni-correction; n.s. = not significant

ance of peer stress and romantic stress. Externalizing predictors generally explain less variance in both models than the internalizing dimension. Table 2 presents the results of the post-hoc *t*-tests for MANCOVA1.

All youths with behavior problems have significantly higher peer stress and romantic stress than the controls. Youths with externalizing problems perceive lower peer stress than those with internalizing problem behavior. However, the difference among youths with internalizing and comorbid problems is not significant. Table 3 depicts the post-hoc tests for socioeconomic status.

Table 3 illustrates the importance of socioeconomic status for peer stress and ro-

mantic stress. The interaction between behavior problems and socioeconomic status is ordinal (Bortz & Schuster, 2016). Youths with low socioeconomic status experience perceive higher peer stress and romantic stress, irrespective of the subgroup to which they belong (behavior problems, controls). Table 4 shows the post-hoc tests for migration background.

A partially ordinal interaction on the scale peer stress emerges. In the subgroup of youths with externalizing, internalizing and comorbid problems, significant differences between youths with and without migration background are evident, whereas the controls do not differ depending on migration

Table 3: Post hoc tests: Differences in friendship peer and romantic stress depending on behavior problems and socioeconomic status

| Subscales       | Subgroup 1    |         | Subgroup 2 |      | df   | t      | p      | d    |
|-----------------|---------------|---------|------------|------|------|--------|--------|------|
|                 | M             | SD      | M          | SD   |      |        |        |      |
| Peer stress     | Control group |         |            |      | 293  | 5.89   | .000** | 1.09 |
|                 | High SES      |         | Low SES    |      |      |        |        |      |
|                 | 1.32          | 0.35    | 1.87       | 0.63 |      |        |        |      |
|                 | Internalizing |         |            |      | 145  | 4.02   | .000** | 0.51 |
|                 | High SES      |         | Low SES    |      |      |        |        |      |
|                 | 2.23          | 0.49    | 2.56       | 0.76 |      |        |        |      |
|                 | Externalizing |         |            |      | 166  | 3.87   | .000** | 0.63 |
|                 | High SES      |         | Low SES    |      |      |        |        |      |
|                 | 1.89          | 0.41    | 2.27       | 0.74 |      |        |        |      |
| Comorbid        |               |         |            | 324  | 6.69 | .000** | 0.77   |      |
| High SES        |               | Low SES |            |      |      |        |        |      |
| 2.21            | 0.53          | 2.82    | 0.98       |      |      |        |        |      |
| Romantic stress | Control group |         |            |      | 293  | 5.98   | .000** | 0.71 |
|                 | High SES      |         | Low SES    |      |      |        |        |      |
|                 | 1.40          | 0.50    | 1.82       | 0.66 |      |        |        |      |
|                 | Internalizing |         |            |      | 145  | 3.04   | .000*  | 0.28 |
|                 | High SES      |         | Low SES    |      |      |        |        |      |
|                 | 2.00          | 0.68    | 2.19       | 0.63 |      |        |        |      |
|                 | Externalizing |         |            |      | 166  | 3.10   | .000*  | 0.29 |
|                 | High SES      |         | Low SES    |      |      |        |        |      |
|                 | 1.73          | 0.87    | 1.94       | 0.54 |      |        |        |      |
| Comorbid        |               |         |            | 324  | 4.69 | .000** | 0.59   |      |
| High SES        |               | Low SES |            |      |      |        |        |      |
| 1.88            | 0.76          | 2.28    | 0.59       |      |      |        |        |      |

Notes. \* = Significant at the 05-level after Bonferroni-correction; \*\* = Significant at the 01-level after Bonferroni-correction; SES = socioeconomic status

Table 4: Post hoc tests: Differences in friendship peer and romantic stress depending on behavior problems and migration background

| Subscales       | Subgroup 1    |            | Subgroup 2 |      | df  | t    | p      | d     |
|-----------------|---------------|------------|------------|------|-----|------|--------|-------|
|                 | M             | SD         | M          | SD   |     |      |        |       |
| Peer stress     | Control group |            |            |      | 339 | 1.74 | n.s.   | -     |
|                 | With M.       |            | Without M. |      |     |      |        |       |
|                 | 1.62          | 0.77       | 1.53       | 0.57 |     |      |        |       |
|                 | Internalizing |            |            |      | 152 | 3.41 | .000** | -0.33 |
|                 | With M.       |            | Without M. |      |     |      |        |       |
|                 | 2.45          | 0.89       | 2.16       | 0.83 |     |      |        |       |
|                 | Externalizing |            |            |      | 190 | 2.94 | .000** | -0.35 |
|                 | With M.       |            | Without M. |      |     |      |        |       |
|                 | 2.06          | 0.63       | 1.81       | 0.81 |     |      |        |       |
|                 | Comorbid      |            |            |      | 330 | 5.03 | .000** | -0.49 |
| With M.         |               | Without M. |            |      |     |      |        |       |
| 2.79            | 0.63          | 2.29       | 0.81       |      |     |      |        |       |
| Romantic stress | Control group |            |            |      | 339 | 1.78 | n.s.   | -     |
|                 | With M.       |            | Without M. |      |     |      |        |       |
|                 | 1.62          | 0.60       | 1.48       | 0.39 |     |      |        |       |
|                 | Internalizing |            |            |      | 152 | 0.69 | n.s.   | -     |
|                 | With M.       |            | Without M. |      |     |      |        |       |
|                 | 2.00          | 0.77       | 1.92       | 0.62 |     |      |        |       |
|                 | Externalizing |            |            |      | 190 | 0.63 | n.s.   | -     |
|                 | With M.       |            | Without M. |      |     |      |        |       |
|                 | 1.84          | 0.75       | 1.73       | 0.60 |     |      |        |       |
|                 | Comorbid      |            |            |      | 330 | 0.39 | n.s.   | -     |
| With M.         |               | Without M. |            |      |     |      |        |       |
| 2.10            | 0.74          | 2.14       | 0.68       |      |     |      |        |       |

Notes. \*\* = Significant at the 01-level after Bonferroni-correction; M. = Migration background; n.s. = not significant

background. In addition, migration background exerts no impact on romantic stress.

## Discussion

The study provides empirical indications that internalizing and externalizing problem behavior explains considerable variance of stress perception in adolescent peer relations. Nevertheless, comorbid problem constellations cannot be identified by the variables peer stress and romantic stress. As behavior problems impart a significant effect on peer stress and romantic stress, hypothesis 1 may be confirmed. Since socioeco-

nomie status moderates the association between behavior problems and both peer stress and romantic stress, hypothesis 2 can also be confirmed. Migration background has an impact on peer stress, but does not influence romantic stress, which means that hypothesis 3 is rejected.

Behavior problems explain more variance of peer stress than romantic stress, which could be due to the sample composition of this study, i.e., many adolescents aged 14-15 have not yet had a romantic relationship (Heßling & Bode, 2015). As opposed to romantic partnerships, friendship relations are ever-present in many cultures and in almost all age groups (this also applies

to childhood, Way & Silverman, 2012), which could explain the effect of behavior problems on peer stress. As expected, adolescents with externalizing (hyperactive) problems feel lower friendship peer stress and romantic stress than adolescents with internalizing problems, which could be due to their tendency to perceive themselves as quite popular even if they are socially rejected (McQuade et al., 2014). It is surprising that youths with both internalizing and externalizing problems do not perceive more friendship peer stress and romantic stress than youths with internalizing problems, which contradicts current research findings about higher psychological impairments linked to comorbidity (e.g., Rockhill et al., 2013). This could be traced back to externalizing problems being defined as hyperactivity rather than the overall scope of externalizing problem behaviors. Yet, hyperactivity should also be linked to high stress perception (van der Meer et al., 2015) so that, in this study, youths with comorbid problems were also expected to be particularly impaired. Johnco, Salloum, Lewin, McBride and Storch (2015) compared the profile of children with a primary anxiety disorder or depression without comorbidity to those with different comorbidity profiles in a treatment-seeking sample. It was determined that anxiety severity and depressive symptomatology did not vary by comorbidity profile. This could indicate that internalizing problems might be so decisive for an adolescent's perceptual reality that peer stress and romantic stress are comparably high regardless of specific comorbidity profiles. This assumption is supported by research on perceptual biases showing that internalizing problems often coincide with globally negative views (e.g., Sylvester, 2016). The regression analyses in the current study underline the meaning of subjective perception of behavior problems for peer stress and romantic stress. Since cognitive processes are one of the most important aspects of behavior problems and disorders, the meaning of cognitive biases as trans-

agnostic factors has been explored (Gellatly & Beck, 2016).

The current study indicates that socioeconomic status and migration background are important factors to explain peer stress. As peer relations of adolescents are primarily embedded in the school context, socioeconomic status and migration background exert a major impact on social and educational outcomes (Federal Agency for Civic Education, 2016). Being operationalized through the parents' highest educational level and occupational status, socioeconomic status explains approximately 17% of variance (peer stress) in the current study. This result matches those of empirical studies indicating that socioeconomic factors affect peer relations (Hjalmarsson & Mood, 2015) and stress levels of adolescents (Vliegenthart et al., 2016).

The main effect of migration background on peer stress in this study ( $\eta^2 = .09$ ) can only be explained by significant subgroup-differences among migrants and non-migrants with behavior problems rather than differences in the control group. A large proportion of the sample were first-generation migrants from Turkey ( $N = 35$ ), 24 of which had behavior problems. The sample composition (a large number of migrants with behavior problems) may be the reason why no differences between migrant and non-migrant controls could be found. Turkish adolescents with behavior problems possibly perceive higher peer stress, because they are likely to be exposed to hostility-related prejudices. Degner, Wentura, Gniewosz and Noack (2007) use implicit measures and find negative prejudices towards Turkish adolescents in a sample of German adolescents. Yet, the largest proportion of migrants in the current study were second-generation migrants ( $N = 148$ ). As opposed to first-generation migrants, who often cope with stressors that are directly related to the immigration process, second-generation migrants are to a larger extent occupied with personally integrating two cultures (Kouider, Koglin & Petermann, 2015). Seeking one's identity

among a majority and a minority culture might coincide with more conflicts with peers, and thus increased peer stress. In addition to increasing stress due to developmental tasks during puberty (Seiffge-Krenke, 2009), they possibly perceive acculturation stress, which might also affect peer relations. The strongest peer stress in this study can be found among migrants with comorbid problems ( $d = -0.49$ ). The correlation between migration background and internalizing and externalizing behavior problems is empirically well proven (Bermejo, Mayninger, Kriston & Härter, 2010). The strong perceived peer stress among migrants with comorbid problems could be traced back to cumulated impairments associated with comorbidity. The descriptive data do not allow determination of whether factors associated with migration background primarily reinforce comorbid problems or whether comorbidity leads to greater vulnerability towards stressors connected with a migration background.

The results of this study may solely be interpreted as empirical indicators because the data basis does not allow causal conclusions concerning how behavior problems, socioeconomic status, and migration background are related. Causality could be tested in prospective longitudinal studies and path analytic models in future studies. In addition, since constructs of socioeconomic status and migration background might share common variance, the explained variance for peer stress and romantic stress should not be overrated. Including youths with subclinical problems might explain why most adolescents did not use extreme values in the *PQ*. The results may also not be generalized to clinical populations. The distribution of some variables in the current sample (especially school type) does not follow the proportions of the original total population. Further studies with systematic sample selection are necessary to replicate the results. This also refers to dissocial aspects of externalizing problems, which should be equally related to peer stress in future studies. Distinctions between anxiety and depressive

symptoms could be made to concretize the internalizing dimension. The age variable only took a small co-varying impact, which might be due to little age variance in the total sample ( $M = 15.11$ ;  $SD = 1.42$ ). The *PQ* has not been modified since 1995, even though it is a well validated instrument. Consequently, other aspects of peer relations (e.g., social relations in online networks) should also be examined to obtain a comprehensive understanding of the peer stress phenomenon. Further studies could place romantic stress and peer stress in the context of total stress perception to assess explained variance more accurately. The results of this study might have differed if other aspects of migration background had been controlled, e.g., migration motives, country of origin, multilingual or bilingual education, or the languages spoken by the adolescent. If socioeconomic status aspects were considered separately rather than as a dichotomous variable, the results could differ, as well (yet the sample characteristics did not allow that). Gender could have had an impact on the results (Persike & Seiffge-Krenke, 2016). Concerning data analysis, it has to be pointed out that in the regression analysis (peer stress:  $R^2_{korr} = .26$ ; romantic stress:  $R^2_{korr} = .23$ ) the influence of behavior problems on stress perception in peer relations appears to be larger than in the MANCOVAs (e.g., MANCOVA1, peer stress:  $\eta^2 = .14$ ; romantic stress:  $\eta^2 = .10$ ). The MANCOVAs were based on the norm data of the *SDQ*, and thus they should estimate effect sizes more accurately.

Overall, the study provides empirical indications that different individual behavior problems are associated with peer stress and romantic stress (effect sizes ranging from  $d = -0.29$ - $0.91$  on the friendship peer stress scale and  $d = -0.27$ - $0.89$  on the romantic stress scale). This association is moderated by socioeconomic status factors to a large extent. Linking research on stress, peer relations, and adolescent behavior problems can help to develop a focused line of research that could support the development of diag-

nostic tools or interventions for youths with behavior problems in future studies. The current study is able to provide indications that this approach could be worthwhile. Socioeconomic status, being even more important for peer stress than the individual kind of behavior problem, underlines the high importance of societal macro-level variables for the social, emotional, and academic development of adolescents (Lavrijsen & Nicaise, 2015; Moor et al., 2014). Increased peer stress among youths with low socioeconomic status points out the necessity of school and therapeutic interventions that go beyond disorder-specific perspectives and involve societal and social context variables to a greater extent.

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