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School experiences in relation to emotional and conduct problems in adolescence: a 3-year follow up study

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Abstract

Background: Mental health in adolescents has become a major public health issue. This study examined school experiences in relation to mental health (emotional problems and conduct problems) from early to middle adolescence.

Methods: This longitudinal 3-year follow up study used data from the Swedish *Study of Health in School Children in Umeå* (SISU). Analyses were conducted in 1,379 participants that were attending grade six in 2003 or 2006 (age 12 years). *KIDSCREEN-52* was used to assess school experiences and the *Strengths and Difficulties Questionnaire* for emotional and conduct problems. Statistical analyses included repeated measures ANOVA and multiple linear regressions.

Results: Positive school experiences decreased while emotional and conduct problem scores increased from grade six to nine. Positive school experiences were negatively associated with emotional and conduct problem scores and contributed to the explanation of mental health scores in middle adolescence after controlling for background factors. When baseline mental health problem scores were taken into account the association with early school experiences disappeared (except for conduct problems in boys). However, incorporating concurrent school experiences in the analysis increased the levels of explanation for emotional and conduct problem scores further.

Conclusions: The results of this study confirm that school experiences are linked to emotional and conduct problems. That link may be stronger for conduct problems. In addition, the association of school experiences in early adolescence with later mental health may be overridden by concurrent school experiences in middle adolescence.

Keywords: school, emotional problems, conduct problems, adolescence.

Introduction

Mental ill health in young people is a global public health challenge.¹ Increasing trends of mental health problems in the adolescent general population have been reported in different European countries since the 1980s and collecting evidence on cohort changes in emotional and conduct problems is considered a priority.² Furthermore, identifying protective factors for emotional and conduct problems in adolescence is greatly important, since the beginning of mental health disorders can often be traced back to adolescence and when disorders appear at this stage they tend to persist into adulthood.¹

Emotional and conduct problems tend to increase in adolescence compared to the childhood years, but they follow different trajectories: emotional problems significantly increase throughout adolescence, especially in girls, whereas conduct problems slightly decrease in boys while they increase in girls.³ This results in a higher prevalence of emotional problems in girls and of conduct problems in boys.

The school environment has been recognized as an important determinant of adolescent mental health.⁴ School connectedness, broadly defined as encompassing students' perceptions of the school environment and their relationships with teachers, peers and others at school, has been emphasized as an important protective factor which helps prevent emotional and conduct problems in adolescence.^{5,6}

However, some aspects of the relationship between school connectedness and mental health in adolescence deserve further examination. First, the direction of the associations between these variables is not completely clear; the majority of research has been cross-sectional and existing longitudinal studies provide mixed findings.^{5,6} Secondly, the period from early to middle adolescence is of special interest, since developmental changes tend to coincide with an important school transition during those years. In Sweden, most children change schools between grade six and seven. Thirdly, based on the above mentioned different developmental profiles for emotional and

conduct problems and existing gender differences, it is important to analyze the links of school connectedness with emotional problems and conduct problems separately and for both boys and girls specifically.

Accordingly, the aims of this study were: (1) To examine the changes in school experiences and mental health (emotional problems and conduct problems) from early adolescence to middle adolescence in boys and girls; and (2) to analyse to what extent school experiences in these years can explain boys' and girls' mental health in middle adolescence.

Methods

Procedure and study population

Data for the present study comes from the *Study of Health in School Children in Umeå* (SISU). SISU is a longitudinal study that follows two cohorts of children in the city of Umeå, a municipality of slightly more than 100,000 inhabitants, situated in the north of Sweden.

For the purpose of this paper, the study population included all students attending grade six in years 2003 and 2006 (time 1, approximately 12 years of age). These students were followed up three years later when the great majority attended grade nine (time 2, approximately 15 years of age) - a small proportion attended grade eight or ten at time 2 but they will be referred to as grade nine from this point onwards.

In total, 1691 adolescents, 882 in year 2003 and 809 in year 2006, were invited to the study. Of those, 1,647 (97.4%) participated at time 1 and 1,586 (93.8%) were followed up at time 2. The current study included the 1,379 participants (81.6%) with complete answers in the variables of interest in this study, 706 (80%) from the 2003 cohort and 673 (83.2%) from the 2006 cohort. This sample comprised 685 adolescent boys (49.7%) and 694 girls (50.3%) with an average age of 12.5 years ($SD=0.33$) at time 1. The majority were born in Sweden (94.7%), belonged to two-parent families (69.3%) and had at least one parent who had completed college or university education (68.8%) at time 1. External missing distribution by cohort and sex was as follows: 60% of external missing were from the 2003 cohort and 40% from the 2006 cohort, 57.1% were girls and 42.9% were boys. Among the externally missed who also provided information about migrant status, family structure and parental education, 89.4% were born in Sweden, 42.5% lived in 2-parent families and 61.0% had at least one parent with a college/university degree. Regarding internal missing, drop-out analyses revealed that participants who had internal missing values on any of the study measures were comparable to those without missing, in terms of mean scores of school experience and emotional and conduct problems or in terms of correlations between school experiences and

emotional and conduct problem scores. This applies to the cross-sectional correlations in grades six and nine as well as the longitudinal correlations between school experiences in grade six and emotional and conduct problem scores in grade nine.

Measures

The self-reported *Strength and Difficulties Questionnaire-SDQ*^{7,8} was used in grades six and nine for the assessment of the dependent variables: emotional problems (somatic complaints, worries, unhappiness, nervousness and lack of confidence, and fears) and conduct problems (tantrums, disobedience, fighting, lying and stealing). Each scale consists of five items of which responses are summed to obtain a total score ranging from 0 to 10. When necessary, responses are reverse-coded so that higher scores indicate a higher presence of emotional or conduct problems. The SDQ has shown acceptable reliability and validity for the assessment of mental health in adolescent samples,⁸ including Sweden.⁹ Upon visual inspection of histograms, both scales showed signs of a normal distribution somewhat truncated at the lowest values. Skewness was acceptable (0.59 for girls' emotional problems, 1.31 for boys' emotional problems, 1.28 for girls' conduct problems, and 1.02 for boys' conduct problems).

School experience in grade six and nine, which were our independent variables, were assessed through the six-item school environment scale from the *KIDSCREEN-52* questionnaire.¹⁰ This scale captures general feelings towards school and relationships with teachers, as well as whether children do well and are able to pay attention in school. Following the instrument handbook, T scores were calculated for this scale, in which higher values indicate more positive school experiences. The *KIDSCREEN-52* school environment subscale has demonstrated acceptable psychometric properties in a number of European countries, including Sweden.¹⁰

Background information comprised sex, migrant status and family structure, obtained from the children, as well as parental education reported by the parents.

Statistical analyses

Repeated measures ANOVA was used to examine changes in school experiences, emotional problem and conduct problem scores from grade six to grade nine in boys and girls. Afterwards, multiple linear regressions were used to examine the longitudinal relation between school experiences in grade six and emotional or conduct problem scores in grade nine. First, a crude model was calculated with school experiences in grade six as the only predictor. In model 2, we also included cohort (2003-2006 vs 2006-2009) and the background factors: migrant status (born in Sweden vs. elsewhere), family structure (two-parent family vs. other), and parental education (at least one parent with university degree vs. other). Next, outcome at baseline and concurrent school experiences were entered in models 3 and 4, respectively. The full model was tested in boys and girls separately. Potential differences in students who continued their studies in the same school over time and in those who changed schools between grade six and grade nine were examined in sensitivity analyses.

Additional analyses using logistic regression on dichotomized versions of the SDQ subscales resulted in essentially the same conclusions, though lower statistical power, supporting the use of continuous variables. Since the data was hierarchical (students clustered within school classes and schools), multilevel linear regression was also performed as complementary analyses. However, this analysis did not change any inferences (coefficients and standard errors were basically the same). This was expected since the sampling was not clustered (all students in Umeå were sampled). Thus only the results from the single-level linear regression analyses are reported.

The significance ($p < .05$) and effect size of the included predictors was examined, with rs^2 values for effect size being interpreted as follows: negligible (below .010), medium (around .060) and large (around .150).¹¹ Multicollinearity tests were also performed for all the variables included in the multiple linear regression models.

Except for the complementary multilevel and logistic regression analyses, for which we used Stata 13, all analyses were conducted using IBM SPSS version 22.

Ethics

Ethical approval was obtained from the Research Ethics Committee of the Medical Faculty at Umeå University, Sweden, Dnr 03-352 (05-152).

Results

Changes in school experiences and mental health from grade six to grade nine

The repeated measures ANOVA showed significant changes from grades six to nine, with a noticeable effect size in all examined variables (Table I). Positive school experiences significantly decreased over time ($p < .001$, partial $\eta^2 = .23$) while scores in emotional problems ($p < .001$, partial $\eta^2 = .10$) and conduct problems ($p < .001$, partial $\eta^2 = .06$) significantly increased.

The interaction sex x time was significant for emotional problem scores ($p < .001$, partial $\eta^2 = .03$), with the increase from grade six to grade nine being slightly more accentuated in girls. The differences between sexes were small in grade six ($p < .001$, partial $\eta^2 = .040$) and medium to large in grade nine ($p < .001$, partial $\eta^2 = .134$). Changes in conduct problem scores and school experiences were not significantly different in boys and girls as shown by non-significant or negligible interaction effects. Still, a small effect size difference in conduct problem scores between boys and girls existed in grade nine ($p < .001$, partial $\eta^2 = .011$), where boys showed slightly higher scores in conduct problems.

- Table I -

All bivariate correlations between scores in school experiences, emotional problems and conduct problems were significant ($p < .001$) both concurrently in grade six and in grade nine and longitudinally from grade six to grade nine (see supplementary material).

School experiences in grade six and emotional problems in grade nine

As shown in table II, more positive school experiences in grade six were significantly associated with lower emotional problem scores in grade nine for both boys and girls. This was seen in the crude model (model 1) and in the model controlling for background factors (model 2). However, when controlling for emotional problem scores at baseline (model 3), school experiences in grade six were no longer significantly associated with later emotional problem scores in girls, and the size of this

association became negligible in boys. Incorporating school experiences in grade nine to the previous model significantly increased the level of explained variance in emotional problem scores in grade nine (model 4). In this final model, emotional problem scores in grade six, and school experiences in grade nine had very similar effect sizes and explained 18.2% of the variability in emotional problem scores for boys. In girls, the level of explained variance in model 4 was 25.4% with higher emotional problem scores in grade nine being associated with higher emotional problem scores in grade six and less positive school experiences in grade nine, with their effect sizes being very similar too. In addition, belonging to the 2006-2009 cohort was significantly associated with higher emotional problem scores in girls but not in boys.

Multicollinearity statistics were examined for all variables in each on the models and no indication of multicollinearity problems was found (highest VIF = 1.31).

- Table II –

School experiences in grade six and conduct problems in grade nine

As shown in table III, more positive school experiences in grade six were significantly associated with lower scores in conduct problems in grade nine for both boys and girls. This was seen in the crude model and when controlling for background factors. In boys, school experiences in grade six maintained a significant association with conduct problem scores in grade nine when conduct problem scores at baseline were controlled for (model 3). In girls, however, only conduct problem scores at baseline and family structure were significantly associated with later conduct problem scores. The incorporation of school experiences (model 4) led to a significant increase in the level of explained variance in conduct problem scores for both boys and girls. In both sexes, only conduct problem scores in grade six and school experiences in grade nine showed significant associations with noticeable effect sizes in the final model, with the magnitude of the effect size being higher for school experiences in grade nine than for conduct problems in grade six. The total levels of explained variance in that final model were 25% in boys and 26.9% in girls.

Multicollinearity statistics were examined for all variables in each of the models and no indication of multicollinearity problems was found (highest VIF = 1.38).

- Table III -

Sensitivity analyses

Sensitivity analyses were conducted to explore potential differences between students who continued their studies in the same school (36.1%) and those who changed schools between grade six and grade nine by incorporating change of school as an additional dummy variable in the models. Since this showed no significant effect in the models, this factor was not included in the final analyses.

Discussion

This study examined school experiences along with emotional and conduct problems from early to middle adolescence. During that period, we found changes in both school experiences and mental health problems. Specifically, emotional and conduct problems increased in boys and girls, with the increase in emotional problems being greater in girls, which is consistent with the literature.³ As for school experiences, they tended to become less positive in middle adolescence compared to early adolescence for both boys and girls. Previous research has found that global school connectedness and positive relationships with teachers tend to decrease as adolescents progress through the educational system.^{12,13} This has been partly attributed to a mismatch between the school environment and adolescents' needs of self-determination and increased autonomy.¹⁴ In addition, during the period we examined, a school transition takes place for these students, including having more teachers, and less contacts with a specific teacher, more moving between classrooms and greater academic responsibilities and challenges. Previous studies suggest that school connectedness tends to decrease after school transitions,¹⁵ which may have also contributed to aforementioned changes in school experiences.

Positive school experiences were negatively associated with both emotional and conduct problems, concurrently as well as prospectively. School experiences in early adolescence contributed significantly to the explanation of mental health in middle adolescence after controlling for background factors, but when baseline mental health problems were taken into account the association with school experiences disappeared. This does not allow for us to know whether, or to what extent, early emotional or conduct problems are confounders or mediators, that is, whether early school experiences lead to early emotional or conduct problems which then persisted across time to later emotional and conduct problems (mediator) or whether early school experiences were unrelated to later emotional and conduct problems but appeared to be related because they co-occurred with *early* emotional or conduct problems (confounder). There was an exception to this

pattern for conduct problems in boys, for whom school experiences in early adolescence still showed a small link with conduct problems in middle adolescence after taking into account conduct problems in early adolescence. Since the follow up was three years later and we found that continuity in school experiences was modest, we also examined the extent to which school experiences in middle adolescence contributed to the explanation of concurrent emotional and conduct problems in boys and girls after accounting for previous mental health problems and previous school experiences. We found medium to large effect size associations for both boys and girls in emotional and conduct problems respectively.

Other studies have reported a prospective effect of school experiences on emotional and conduct problems, suggesting that school experiences may precede these problems.^{6,16} The study by Loukas et al.⁵ concluded that there was a bidirectional association where school experiences were prospectively associated with conduct problems, but initial level of conduct problems also influenced school experiences one year later. Our present study has different characteristics, since it combines a longer follow up (3 years) with measurement points taking place before and after the school transition. In this regard, the fact that we did not find a clear prospective association may suggest that the effect of school experiences in early adolescence is not so long-lived that it can still be seen in middle adolescence. Here, new school experiences seem to have the potential to override previous ones, as also noted by Waenerlund et al.¹⁶ This may be especially the case after a school transition. Our findings would also be consistent with bidirectional patterns as the ones described in previous research.^{5,15}

In addition, our study also hints at potential differences in the role of school experiences for emotional and conduct problems, with possibly stronger links to conduct problems. This deserves further examination in future studies. Specifically, school experiences in middle adolescence showed a similar effect size to that of emotional problems in early adolescence for the explanation of emotional problems in middle adolescence. In contrast, school experiences in middle adolescence

showed a large effect size (notably larger than the small effect of conduct problems in early adolescence) in the analyses for conduct problems in middle adolescence. Furthermore, as previously mentioned, in the case of boys, school experiences in early adolescence had a small effect in conduct problems three years later even after controlling for conduct problems at baseline, and it was new school experiences in middle adolescence that made the role of those in early adolescence non-significant.

Finally, although not part of the main aims of this study, we found a cohort difference in girls only, suggesting that emotional problems are higher in girls from the 2006-2009 cohort compared to the 2003-2006 cohort, which can be informative for the growing body of literature describing trends in mental health problems in the adolescent population.²

This study has some limitations. Both school experiences and mental health were self-reported, which may result in shared method variance and could be viewed as a source of bias. However, the incorporation of the expectations, cognitions, and the subjective perspective of the participant has also been considered advantageous when studies are aimed at understanding adolescent health and wellbeing, for which the adolescents themselves are the best informants.¹⁷ In addition, students with emotional problems may be more likely to report negative life experiences, including school experiences, although the size of the correlations did not seem to support this claim. Second, although Umeå is overall comparable to other regions in Sweden, e.g. with regard to children's academic achievement, families' disposable incomes and family structures,¹⁸ the generalizability of these results to Sweden in general and to other countries needs to be further examined. Finally, examining some of the aspects within our school experience measure separately may contribute to a better understanding of the links between school connectedness and mental health in adolescence, since for instance relationships with teachers and general feelings towards school have shown different effects on other adolescent outcomes.¹⁹

Despite these limitations, this study provides additional valuable information on the links between school experiences and mental health in adolescence during a transition period of great interest from both an educational and developmental point of view. Furthermore, the longitudinal population-based approach including repeated measures of predictor and outcomes variables, and the use of well-known and valid measures of school experiences as well as emotional and conduct problems strengthen the reliability of the findings.

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Conflict of interest: None declared.

Key points

- The study confirms that school experiences are closely linked to emotional and conduct problems, with mental health problem scores in early adolescence and school experiences, especially those in middle adolescence, showing an important role for middle adolescents' mental health.
- School experiences seem to be more closely linked to conduct problem than to emotional problem scores.
- This study also suggests that the links between school experiences in early adolescence and middle adolescent mental health are likely to be overridden by school experiences in middle adolescence.
- Therefore, our findings indicate that interventions to improve school experiences as a way to foster adolescents' mental health may be important throughout the adolescent years.

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Table I. Descriptive statistics for school experiences, emotional problems and conduct problems in grade six and grade nine.

| | | All (n= 1379) | Boys (n= 685) | Girls (n=694) |
|--------------------|------------|---------------|---------------|---------------|
| School experiences | T1: M (SD) | 55.13 (9.16) | 54.78(9.56) | 55.47(8.73) |
| | T2: M (SD) | 49.36 (8.87) | 50.01(9.19) | 48.73(8.50) |
| Emotional problems | T1: M (SD) | 1.83(1.86) | 1.46(1.64) | 2.20(1.99) |
| | T2: M (SD) | 2.59(2.17) | 1.79(1.76) | 3.38(2.25) |
| Conduct problems | T1: M (SD) | 1.55(1.32) | 1.64(1.44) | 1.46(1.18) |
| | T2: M (SD) | 2.02(1.66) | 2.19(1.76) | 1.84(1.55) |

T1= grade six; T2=grade nine

Table II. Emotional problems in grade nine in relation to school experiences in grade six for boys and girls (n= 1379)

| BOYS (n = 685) | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|--|---------------------------|---------------------|---------------------------|-----------------|--------------------------|---------------------|---------------------------|---------------------|
| | B(SE) | rs ² | B(SE) | rs ² | B(SE) | rs ² | B(SE) | rs ² |
| Constant | 3.61(.39) ^{***} | | 3.47(.40) ^{***} | | 2.08(.42) ^{***} | | 3.82(.47) ^{***} | |
| School experiences T1 | -0.03(.01) ^{***} | .033 | -0.03(.01) ^{***} | .031 | -0.02(.01) [*] | .007 | 0.00(.01) | - |
| Cohort (ref: 2003-2006, n = 379) | | | 0.04(.14) | - | 0.07(.13) | - | 0.02(.13) | - |
| Migrant status (ref: born Sweden, n = 642) | | | -0.22(.28) | - | -0.29(.26) | - | -0.30(.25) | - |
| Family Structure (ref: two-parent family, n = 485) | | | 0.13(.15) | - | 0.05(.14) | - | 0.04(.14) | - |
| Parent education (ref: no parent with university degree, n = 205) | | | 0.12(.15) | - | 0.11(.14) | - | 0.13(.13) | - |
| Emotional problems T1 | | | | | 0.33(.04) ^{***} | .084 | 0.30(.04) ^{***} | .068 |
| School experiences T2 | | | | | | | -0.05(.01) ^{***} | .062 |
| Model R ² | | .033 | | .036 | | .120 | | .182 |
| ΔR^2 | | .033 ^{***} | | .003 | | .084 ^{***} | | .062 ^{***} |

| GIRLS (n = 694) | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|--|---------------------------|---------------------|---------------------------|--------------------|--------------------------|---------------------|---------------------------|---------------------|
| | B(SE) | rs ² | B(SE) | rs ² | B(SE) | rs ² | B(SE) | rs ² |
| Constant | 5.39(.55) ^{***} | | 5.41(.56) ^{***} | | 2.46(.62) ^{***} | | 5.39(.65) ^{***} | |
| School experiences T1 | -0.04(.01) ^{***} | .020 | -0.04(.01) ^{***} | .024 | -0.01(.01) | - | 0.02(.01) [*] | .005 |
| Cohort (ref: 2003-2006, n = 327) | | | 0.58(.17) ^{**} | .016 | 0.55(.16) ^{**} | .014 | 0.50(.15) ^{**} | .012 |
| Migrant status (ref: born Sweden, n = 664) | | | -0.49(.42) | - | -0.38(.39) | - | -0.33(.37) | - |
| Family Structure (ref: two-parent family, n = 470) | | | 0.25(.18) | - | 0.22(.17) | - | 0.10 (.16) | - |
| Parent education (ref: no parent with university degree, n = 225) | | | -0.20(.18) | - | -0.07(.17) | - | 0.01(.16) | - |
| Emotional problems T1 | | | | | 0.41(.04) ^{***} | .110 | 0.40(.04) ^{***} | .107 |
| School experiences T2 | | | | | | | -0.09(.01) ^{***} | .103 |
| Model R ² | | .020 | | .040 | | .151 | | .254 |
| ΔR^2 | | .020 ^{***} | | .020 ^{**} | | .110 ^{***} | | .103 ^{***} |

*** $p < .001$; ** $p < .01$; * $p < .05$ T1=grade six; T2=grade nine. Squared semipartial correlation (rs^2) provides an estimation of the magnitude of the association for significant p values, with values being interpreted as follows: negligible (below .010), medium (around .06) and large (around .14).

Table III. Conduct problems in grade nine in relation to school experiences in grade six for boys and girls (n= 1379)

| BOYS (n = 685) | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|--|---------------------------|------------------------|---------------------------|------------------------|--------------------------|------------------------|---------------------------|------------------------|
| | <i>B</i> (SE) | <i>rs</i> ² | <i>B</i> (SE) | <i>rs</i> ² | <i>B</i> (SE) | <i>rs</i> ² | <i>B</i> (SE) | <i>rs</i> ² |
| Constant | 4.55(.38) ^{***} | | 4.62(.40) ^{***} | | 3.06(.45) ^{***} | | 5.58(.48) ^{***} | |
| School experiences T1 | -0.04(.01) ^{***} | .055 | -0.05(.01) ^{***} | .056 | -0.03(.01) ^{**} | .015 | -0.00(.01) | - |
| Cohort (ref: 2003-2006, n = 379) | | | 0.17(.14) | - | 0.16(.13) | - | 0.09(.12) | - |
| Migrant status (ref: born Sweden, n = 642) | | | 0.19(.27) | - | 0.10(.26) | - | 0.08(.24) | - |
| Family Structure (ref: two-parent family, n = 485) | | | 0.08(.15) | - | 0.07(.14) | - | 0.05(.13) | - |
| Parent education (ref: no university degree, n = 205) | | | -0.14(.14) | - | -0.16(.14) | - | -0.14(.13) | - |
| Conduct problems T1 | | | | | 0.32(.05) ^{***} | .056 | 0.29(.05) ^{***} | .045 |
| School experiences T2 | | | | | | | -0.08(.01) ^{***} | .135 |
| Model <i>R</i> ² | | .055 | | .059 | | .115 | | .250 |
| ΔR^2 | | .055 ^{***} | | .005 | | .056 ^{***} | | .135 ^{***} |

| GIRLS (n=694) | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|--|---------------|-----------------|---------------|-----------------|--------------|-----------------|---------------|-----------------|
| | B(SE) | rs ² | B(SE) | rs ² | B(SE) | rs ² | B(SE) | rs ² |
| Constant | 3.59(.37)*** | | 3.43(.38)*** | | 1.94(.43)*** | | 4.78(.46)*** | |
| School experiences T1 | -0.03(.01)*** | .032 | -0.03(.01)*** | .029 | -0.01(.01) | - | 0.01(.01) | - |
| Cohort (ref: 2003-2006, n = 327) | | | 0.06(.12) | - | 0.03(.11) | - | -0.01(.10) | - |
| Migrant status (ref: born Sweden, n = 664) | | | 0.20(.28) | - | 0.23(.28) | - | 0.27(.25) | - |
| Family Structure (ref: two-parent family, n = 470) | | | 0.41(.12)** | .015 | 0.33(.12)** | .010 | 0.25(.11)* | .005 |
| Parent education (ref: no university degree, n = 225) | | | -0.11(.12) | - | -0.03(.12) | - | 0.02(.11) | - |
| Conduct problems T1 | | | | | 0.35(.05)*** | .061 | 0.27(.05)*** | .034 |
| School experiences T2 | | | | | | | -0.08(.01)*** | .158 |
| Model R ² | | .032 | | .049 | | .110 | | .269 |
| ΔR ² | | .032*** | | .018* | | .060*** | | .159*** |

*** $p < .001$; ** $p < .01$; * $p < .05$ T1=grade six; T2=grade nine. Squared semipartial correlation (rs^2) provides an estimation of the magnitude of the association for significant p values, with values being interpreted as follows: negligible (below .010), medium (around .06) and large (around .14).

Supplementary material: Pearson r correlations for concurrent and longitudinal associations among independent and dependent variables

| BOYS (n= 685) | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------------|---------|---------|---------|---------|---------|---------|
| 1. School experiences T1 | - | -.311** | -.402** | .351** | -.181** | -.234** |
| 2. Emotional problems T1 | -.311** | - | .324** | -.205** | .332** | .098* |
| 3. Conduct problems T1 | -.402** | .324** | - | -.196** | .133** | .312** |
| 4. School experiences T2 | .351** | -.205** | -.196** | - | -.325** | -.442** |
| 5. Emotional problems T2 | -.181** | .332** | .133** | -.325** | - | .287** |
| 6. Conduct problems T2 | -.234** | .098* | .312** | -.442** | .287** | - |
| GIRLS (n= 694) | 1 | 2 | 3 | 4 | 5 | 6 |
| 1. School experiences T1 | - | -.383** | -.368** | .310** | -.141** | -.178** |
| 2. Emotional problems T1 | -.383** | - | .351** | -.140** | .366** | .084* |
| 3. Conduct problems T1 | -.368** | .351** | - | -.255** | .162** | .307** |
| 4. School experiences T2 | .310** | -.140** | -.255** | - | -.363** | -.473** |
| 5. Emotional problems T2 | -.141** | .366** | .162** | -.363** | - | .263** |
| 6. Conduct problems T2 | -.178** | .084* | .307** | -.473** | .263** | - |

T1= grade six; T2= grade nine

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