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## Longitudinal examination of relationships between problem behaviors and academic achievement in young adolescents

Oksana Malinauskiene<sup>a</sup>\*, Rimantas Vosylis<sup>a</sup>, Rita Zukauskiene<sup>a</sup>

<sup>a</sup>*Mykolas Romeris University, Ateities str. 20, Vilnius, LT-08303, Lithuania*

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### Abstract

A substantial body of research has documented associations between a variety of problem behaviors and academic achievement measures. A systemic viewpoint posits that behavioral and academic problems exert reciprocal influences on one another, which, over time, can negatively affect the development of individuals and their environments. However, the results of these studies should be interpreted cautiously, given the considerable comorbidity of problem behaviors that often exists among school-age youth. Another limitation is that those associations mostly are documented in cross-sectional studies. This longitudinal study addressed the relationships between internalizing and externalizing self-reported problem behavior syndromes (withdrawal, somatic complaints, anxiety/depression, delinquent behavior, and aggressive behavior) and mean measures of academic achievement (overall, mean score of reading & spelling, and arithmetic performance). We found some interaction effects of problem behavior, gender and grade on academic achievement. First, we found a decrease of academic achievement through grades 6 to 8, among girls who exhibit less aggressiveness, while academic achievement among ones that are “more” aggressive stays the same across grades. Academic achievement among girls is pretty much the same across all grades, yet overall academic achievement is higher in non-delinquent group in all age groups. Secondly, in boys group there is a decrease of academic achievement through grades 6 to 8 among boys who show more aggressiveness, while academic achievement among boys who exhibit less aggressiveness stays the same across grades. The significant multivariate effect of “grade”, “gender” and delinquency interaction indicates that there is a decrease of academic achievement across grades in both boys group, yet the decrease among boys showing more delinquent behaviors is bigger than among the normal boys group.

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*Keywords:* academic achievement; problem behaviors; adolescence.

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### 1. Introduction

Learning and behavioral problems have been studied for the past several decades, but only relatively recently have they been investigated as developmental and enduring (e.g., Bergman, Magnusson, & El-Khoury, 2003; Forness, 2003). Numerous studies have established the relationship between early behavior problems and later behavior problems of adolescents (e.g., Bongers, Koot, van der Ende, & Verhulst, 2004; Conroy & Brown, 2004), and recent studies have demonstrated substantial stability in both Externalizing and Internalizing problem behaviors as rated by teachers for young students (Merydith, 2001) and for adolescents (Dekovic, Buist, & Reitz, 2004).

Low academic achievement might be a risk factor for behavioral problems; on the other hand it is thought that reciprocal relation between academic achievement and problem behaviors (Barriga et al., 2002). Results from study conducted by A. Q. Barriga et al. (2002) showed that there is no relation between social withdrawal, somatic complaints, aggressive and delinquent behaviors and academic achievement. Yet results from study conducted by F.

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\* Oksana Malinauskiene. Tel.: +370 5 2714 620; fax: +370 5 2714 711.

E-mail address: [oksana@mrni.eu](mailto:oksana@mrni.eu)

Yousefi et al. (2010) revealed that boys showing high emotional and behavioral difficulties had lower scores of academic achievement than those without difficulties, but girls with internalizing problems had bigger academic achievement than those without difficulties and on overall girls had higher academic achievement than boys. M. R. Linver et al. (2002) found that mean grades of mathematics tend to fall down across grades from 6th grade to 12th grade when children enter adolescence.

Research findings confirm that from 12 to 30 % of school aged children having emotional or behavioral difficulties also have difficulties with learning problems (Kessler et al., 1995; Weissberg, Caplan, & Harwood, 1991). Other research suggests that low academic achievement might be an outcome of weak adjustment to school environment. (Midgley and Urdan, 1995; Midgley et al., 1996; Nurmi et al., 1995), what can later lead to internalizing and externalizing behavior problems (Vazsonyi and Flannery, 1997).

Previous studies documented that emotional and behavioral problems limit students' academic potential throughout their educational careers. Early learning problems often lead to school failure in following years; e.g., children who are not behaviorally "ready" for school experience problems with teachers and peers at school entry, receive lower marks throughout their educational careers, and are less likely to graduate from high school (Farmer and Bierman, 2002). Thus, behavior problems during the early school years curtail educational attainment, adversely influencing long-term social and economic outcomes (McLeod and Kaiser, 2004). One-way in which behavior problems influence academic attainment is by impeding the acquisition of academic skills and the successful progression in school.

Among the emotional and behavioral problems associated with academic success, most research has focused on anxiety (Ashcraft, 2002) and aggression. The research on the affective contributors to achievement that does exist has largely been confined to the role of test anxiety on test performance. In general, it appears that worry interferes with the test performance of highly anxious students because it distracts attention from the task at hand. Research on emotions and cognitive processing suggests that youth who are struggling with depression or with other behavioral problems may also find it difficult to give full attention to their classroom activities (Roeser et al., 1998).

Depression, ADHD, and conduct disorder have all been associated with low academic aptitude in prior research (Hinshaw, 1992); academic aptitude is one determinant of school performance. Independent of aptitude, emotional and behavioral problems may affect academic performance through their associations with related academic skills such as work habits, concentration, and teacher expectations (Roeser et al., 1998). Poor work habits and trouble with concentration are defining features of attention deficit/hyperactivity disorder, one form of emotional and behavioral problems. Recently, G. Duncan et al. (2007) have documented the longitudinal association of children's attention problems at school entry with academic achievement at the end of primary school, based on data from six studies. In these studies, children's attention problems were correlated with externalizing and internalizing problems and all three types of problems predicted subsequent academic achievement. However, regression-adjusted estimates singled out attention as the only unique predictor, when the correlations among the three types of problems were taken into account (Duncan et al., 2007).

In S. Pečjak et al. (2009), study correlations between students' social behaviors and their academic achievement were higher in boys and higher between socially desired behavior and academic achievement compared to socially undesired behavior. In the category of desired behavior, self-management/compliance and academic behavior were significant predictors of male and female students' academic achievement. The strongest predictor of students' academic achievement was their academic behavior.

The difficulties that youth with emotional and behavioral problems have in school extend beyond their academic progress into other domains of school experience. Regardless of their academic skills, youth with emotional and behavioral problems may also experience negative relations with teachers that diminish their attachment to school and their motivation to succeed. Youth who fail to display their behaviors or who display other emotional problems receive negative feedback from teachers (Murray and Murray, 2004) which, in turn, discourages their achievement. They also experience high levels of rejection from peers and feel less attached to their schools (Patterson and Capaldi, 1990). These other school-related experiences of troubled youth are likely to be implicated in their disrupted educational attainment.

Gender as a predictor of academic achievement has been a controversial topic in the literature. Reports in the 1990s identified boys as recipients of more attention from teachers. Additionally, reports suggested that boys were more strongly encouraged than girls to pursue mathematics and science (AAUW, 1992). However, more recent studies have shown that girls perform better in school than boys in all major subjects (e.g. Wong et al., 2002) and that they graduate from high school with higher grade point averages than their male peers (Perkins, Kleiner, Roey, & Brown, 2004). Some of the offered explanations for this phenomenon covered boys' discipline problems and their

unwillingness to regularly complete their schoolwork (Connell, 1989; Mac An Ghail, 1994) and girls' faster adjustment and conformity to school routines (Gipps, 1996). One of the crucial determinants of boys' underachievement is their lower levels of school engagement (Clark & Trafford, 1995; Davies & Brember, 2001; Engels, Aelterman, Van Petegem, & Schepens, 2004; Lamb, 1997; Walsh, Hickey, & Duffy, 1999).

Prior cross-sectional research has shown that school engagement and behavior such as time spent on homework, attention in the classroom, and interest in learning tasks of girls are higher than those of boys. When these gender differences in school engagement are taken into account, the gender differences in achievement become smaller (Freudenthaler, Spinath, & Neubauer, 2008; Van de gaer, Pustjens, Van Damme, & De Munter, 2007; Stowe et al., 2000; Whitelaw, Milosevic, & Daniels, 2000).

In S. Pečjak et al. (2009) study academic behavior was the only subscale on which there were significant differences between primary and secondary school students, although girls scored higher again at both levels. Studies investigating gender differences in language achievement at different ages drive home to the point that girls achieve better than boys in language. However, only small to nonexistent gender differences exist during elementary school, whereas the gender differences are larger at the end of secondary school (Coley, 2003; Hill & Russell, 1999).

However, longitudinal evidence of gender differences in learning rates in language is still scarce. One of the few exceptions is V. L. Kiplinger's (2004) study, which investigated students' growth in reading and writing achievement from Grade 3 to Grade 10 and found that only at the high school level did girls progress at a significantly faster rate in reading.

This study addressed the relationships between internalizing and externalizing self-reported problem behavior syndromes (withdrawal, somatic complaints, anxiety/depression, delinquent behavior, and aggressive behavior) and mean measures of academic achievement (overall, reading & spelling, and arithmetic performance). Gender differences in longitudinal associations were also examined.

## **2. Method**

### *2.1. Participants*

The data is used from an ongoing longitudinal study on development of adjustment problems from childhood to adolescence. The longitudinal study program was initiated in 1996/1997 school year and continued up to 2010. The sample is school-based, with children from particular classes recruited to the study. Every year after the first measurement, the sample was approached again for a follow-up study. For current study, we used data from one (middle) cohort (N = 298). The sample comprised of 136 boys and 162 girls followed for three years (children were 12 years old during the first assessment) enrolled in secondary schools.

### *2.2. Procedure*

Each school was visited by research assistants each year. Parents were informed about the study by the letter. Parents were asked to contact the school or investigators if they did not want their children to participate. Questionnaires were administered by the researchers and several trained research assistants at the schools, after obtaining the consent of school authorities and parents. Questionnaires were completed in class during regular class hours. The questionnaire was administered in one class sessions and it took about 45 minutes to complete.

### *2.3. Measures*

Participants completed the Problem Items of the Youth Self-Report (YSR) (Achenbach, 1991). The YSR measures the respondent's perceptions of his or her own behavior in eight problem areas: Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior. In addition, three summary scales are calculated: Total Problems, Internalizing Behaviors (the sum of raw scores for the Withdrawn, Somatic Complaints, and Anxious/Depressed scales), and Externalizing Behaviors (the sum of raw scores for the Delinquent and Aggressive Behavior subscales).

The academic performance scale was used as self-reported measure of academic achievement

## **3. Results**

To analyze the academic achievement changes across grades 6, 7 and 8 and its dependency to gender, a MANOVA with repeated measurements was calculated. „Grade“ (3 levels) were used as within-subject factors, and „Gender“ (2 levels). Academic achievement was entered as dependent variable. The significant multivariate effect „Grade“ ( $F=26,03$ ,  $\text{Eta}^2 = 0,18$ ) indicates decrease of academic achievement from 6<sup>th</sup> to 8<sup>th</sup> grade. The significant multivariate effects of „gender“ ( $F=12,441$ ,  $\text{Eta}^2 = 0,04$ ) indicates significant difference between boys and girls academic achievement, girls scoring higher than boys across all three grades. No significant effect was found on grade and gender interaction ( $F=2,231$ ,  $\text{Eta}^2=0,007$ ).

Table 1. Results from MANOVA with repeated measures of academic achievement changes across grades 6, 7 and 8 and its dependency to gender, and gender and grade interaction

	Type III Sum of Squares	F	Sig. (p)	Partial Eta Square
Grade <sup>a</sup>	5,091	4,819	0,008	0,016
Gender <sup>b</sup>	89,902	12,441	<0,000	0,040
Grade * gender <sup>a</sup>	2,357	2,231	0,108	0,007

a- test of within subjects effects; b- test of between subjects effects

To analyze dependency of academic achievement to problem behaviors and its interaction with grades and gender we recoded problem behavior scale values into binary values to separate subjects with that shower high and normal levels of behavior. Recoding was based on tercils, subjects scoring in the highest one being assigned to “high problem behavior” group and rest of the subjects being assigned to “normal problem behavior” group. Girls and boys were recoded based on tercils calculated in their corresponding groups. Then we used MANOVA with repeated measures to conduct the analysis. Again “grade” (3 levels) were used as within-subjects factors, and “gender” (2 levels) and “problem behavior level” (2 levels) were used as between subject factors. Academic achievement was entered as dependant variable. We conducted a separate analysis with each of problem behavior scales.

There was no significant effect of anxiety / depression, social withdrawal and aggressiveness on academic achievement, but there was significant difference of academic achievement in high and low delinquency and somatic complaint groups (table 2), indicating that boys and girls showing higher delinquent behaviors and / or having more somatic complaints have a lower academic achievement than the rest.

We also didn't find any interaction of somatic complaints and gender effects on academic achievement (table 2). Yet there were some interaction effects of problem behavior, gender and grade on academic achievement (table 2). The significant multivariate effect of “Grade”, “gender” and aggressiveness interaction indicates that there is a decrease of academic achievement trough grades 6 to 8, among girls who exhibit less aggressiveness, while academic achievement among ones that are “more” aggressive stays the same across grades (figure 5). Meanwhile in boys group it's the other way around: there is a decrease of academic achievement trough grades 6 to 8 among boys who show more aggressiveness, while academic achievement among boys who exhibit less aggressiveness stays the same across grades. The significant multivariate effect of “grade”, “gender” and delinquency interaction indicates that there is a decrease of academic achievement across grades in both boys group, yet the decrease among boys showing more delinquent behaviors is bigger than among the normal boys group. Academic achievement among girls is pretty much the same across all grades, yet overall academic achievement is bigger in non-delinquent group in all age groups (figure 3). There were no interaction effects of any other problem behaviors, gender and grade.

Table 2. Results from MANOVA with repeated measures of academic achievement changes across grades 6, 7 and 8 and its dependency to gender, problem behavior, and gender and problem behavior interaction

	Type III Sum of Squares	F	Sig. (p)	Partial Eta Square
<i>Test of within subject factors (problem behavior effects on academic achievement)</i>				
Anxiety / depression	0,460	0,063	0,801	<0,00
Social withdrawal	18,721	2,618	0,107	0,009
Aggressiveness	6,760	0,934	0,335	0,003
Delinquency	52,502	7,415	<b>0,007</b>	0,025
Somatic complaints	32,0923	4,603	<b>0,033</b>	0,015
<i>Test of between subject factors (gender and problem behavior interaction effects on academic achievement)</i>				
Anxiety / depression * gender	9,320	1,287	0,258	0,004
Social withdrawal * gender	26,368	3,688	0,056	0,012
Aggressiveness * gender	4,146	0,934	0,450	0,002
Delinquency * gender	6,746	0,953	0,33	0,003
Somatic complaints * gender	5,126	0,717	0,33	0,015
<i>Test of between subject factors (grade, gender and problem behavior interaction effects on academic achievement)</i>				
Anxiety / depression * gender * grade	2,111	2,012	0,135	0,07
Social withdrawal * gender * grade	1,158	1,098	0,334	0,04
Aggressiveness * gender * grade	7,838	7,575	<b>0,001</b>	0,025
Delinquency * gender * grade	2,742	4,643	<b>0,032</b>	0,016
Somatic complaints * gender * grade	0,317	0,299	0,741	0,001

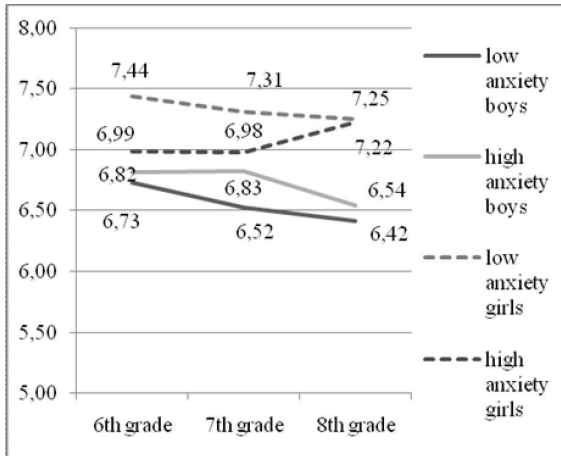


Fig. 1. Academic achievement among boys (continuous lines) and girls (dashed lines) with high and low anxiety, in grades 6, 7 and 8

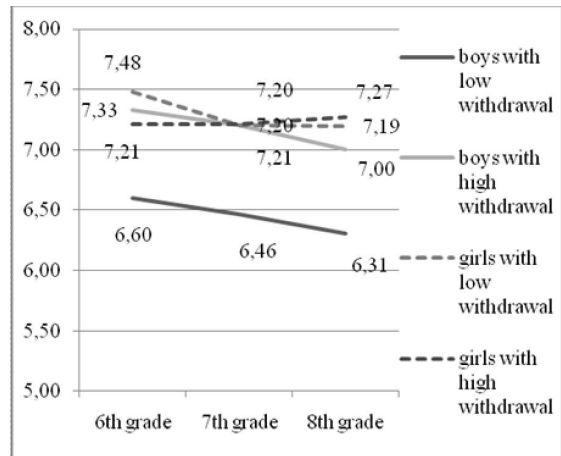


Fig. 2. Academic achievement among boys (continuous lines) and girls (dashed lines) with high and low withdrawal, in grades 6, 7 and 8

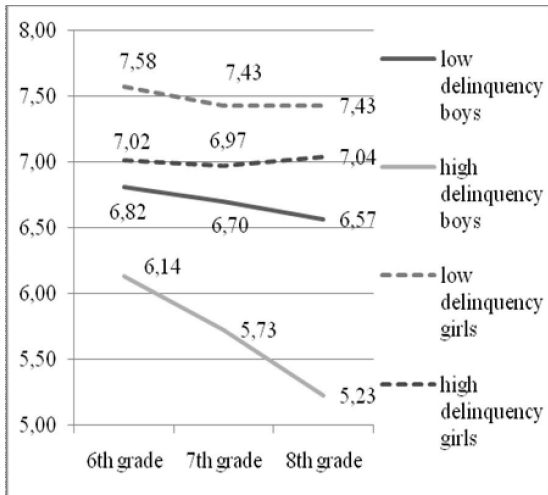


Fig. 3. Academic achievement among boys (continuous lines) and girls (dashed lines) with high and low delinquency, in grades 6, 7 and 8

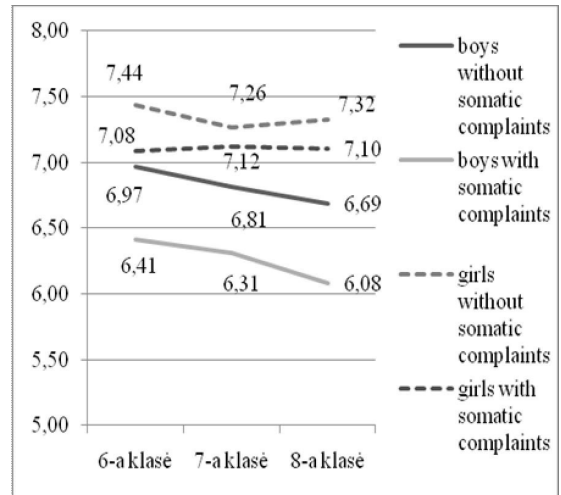


Fig. 4. Academic achievement among boys (continuous lines) and girls (dashed lines) with and without somatic complaints, in grades 6, 7 and 8

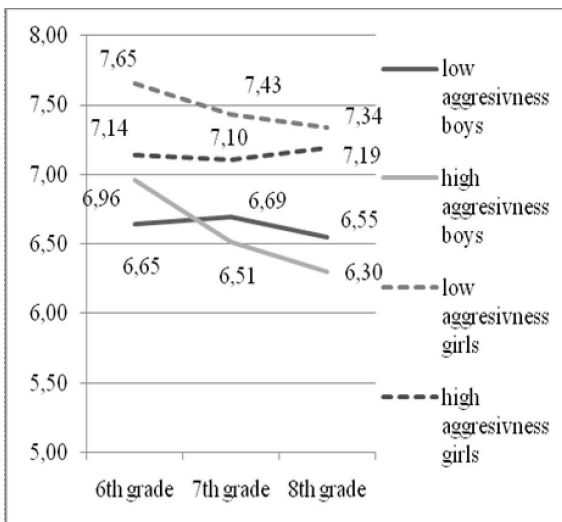


Fig. 5. Academic achievement among boys (continuous lines) and girls (dashed lines) with high and low aggressiveness, in grades 6, 7 and 8

## Discussion and conclusions

A clear understanding of the relationship between problem behaviors and academic achievement will help generate appropriate assessment, prevention, and intervention strategies for at-risk or troubled youth.

Results partly confirmed A. Q. Barriga et al. (2002) findings who didn't find the relation between social withdrawal, somatic complaints, aggressive and delinquent behaviors and academic achievement, as there was no significant effect of anxiety / depression, social withdrawal and aggressiveness on academic achievement in our sample.

However, after we divided participant to different groups in accordance to their delinquency and somatic complains groups, we found significant differences of academic achievement in high and low delinquency and somatic complaint groups, indicating that boys and girls showing higher delinquent behaviors and / or having more somatic complaints have a lower academic achievement than the rest.

We found some interaction effects of problem behavior, gender and grade on academic achievement. First of all, we found a decrease of academic achievement trough grades 6 to 8, among girls who exhibit less aggressiveness, while academic achievement among ones that are "more" aggressive stays the same across grades. Academic achievement among girls is pretty much the same across all grades, yet overall academic achievement is bigger in non-delinquent group in all age groups

Secondly, in boys group there is a decrease of academic achievement trough grades 6 to 8 among boys who show more aggressiveness, while academic achievement among boys who exhibit less aggressiveness stays the same across grades. The significant multivariate effect of "grade", "gender" and delinquency interaction indicates that there is a decrease of academic achievement across grades in both boys group, yet the decrease among boys showing more delinquent behaviors is bigger than among the normal boys group.

To conclude, our study confirms the link between emotional and behavioral problems and achievement, however there are interaction effects association of problem behavior, gender and grade on academic achievement.

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