

Natalie Fischer & Désirée Theis

## **Quality of extracurricular activities – Considering developmental changes in the impact on school attachment and achievement**

### **Abstract**

*According to the stage-environment fit approach, the development of motivation is influenced by the fit between learning context and basic needs (i.e., the needs for autonomy, competence, and social relatedness). It is supposed that school-based extracurricular activities are especially suitable for fostering motivation and, thus, achievement by providing developmentally appropriate learning contexts. Until now, the influence of need fulfillment in extracurricular activities on school attachment and achievement has not been investigated. The aim of this study is to examine these relationships in German all-day schools and to explore the specific impact of each need across age. The longitudinal research sample consists of more than 3,000 students in Grades 5, 7 and 9. The students' perceptions of autonomy, competence (challenge) and social relatedness (student-staff-relationship) are analyzed as predictors of school attachment and achievement (i.e., grades). A conditional growth curve model reveals that the three quality features influence school attachment across age, but barely relate to achievement. Student-staff-relationship proves to be the most influential predictor in all age groups. However, the development of school attachment significantly influences achievement. Thus, promoting school attachment by means of high quality extracurricular activities should lead to the positive development of academic achievement.*

### **Keywords**

*Stage-environment fit; Extracurricular activities; Basic needs; School attachment*

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## Qualität außerunterrichtlicher Angebote – Wie beeinflusst sie Schulbindung und -leistung im Verlauf der Sekundarstufe I?

### Zusammenfassung

*Nach dem Stage-Environment-Fit-Ansatz wird die Entwicklung schulischer Motivation durch die Passung zwischen der Lernumgebung und den Grundbedürfnissen des Lernenden beeinflusst. Es wird angenommen, dass in außerunterrichtlichen Angeboten der Ganztagschule die Berücksichtigung dieser Bedürfnisse leichter möglich ist als im Unterricht. Zusammenhänge zwischen dem Erleben von Autonomie, Kompetenz und sozialer Unterstützung in Ganztagsangeboten einerseits und Schulbindung und -leistung andererseits sind bisher selten untersucht. Der vorliegende Artikel untersucht diese Beziehungen in der Sekundarstufe I. Zudem wird analysiert, ob sich die relative Bedeutung der einzelnen Bedürfnisse mit dem Alter ändert. Über 3000 Schülerinnen und Schüler wurden in den Jahrgangsstufen 5, 7 und 9 befragt. Anhand von Wachstumskurvenmodellen kann gezeigt werden, dass die untersuchten Merkmale zwar die Schulbindung beeinflussen, aber kaum direkt mit den Noten zusammenhängen. Soziale Unterstützung ist dabei in allen Altersgruppen der wichtigste Prädiktor. Die Entwicklung der Schulbindung beeinflusst die Leistungsentwicklung signifikant. Somit sollte die Förderung der Schulbindung über Ganztagsangebote, die die Grundbedürfnisse von Lernenden ansprechen, auch positive Konsequenzen in Bezug auf die Schulleistungen haben.*

### Schlagworte

*Ganztagschule; Außerunterrichtliche Angebote; Qualität; Schulbindung*

## 1. Introduction

In Germany, “schooling” is traditionally associated with an academic curriculum taught between about eight o’clock in the morning and – at least in primary school – noon or one o’clock in the afternoon. The introduction of “all-day schools” (i.e., extended school days) has been a major topic in recent educational debates. Between 2003 and 2009, converting and equipping schools to the all-day format has been financially supported by the investment program “Future of Education and Care” [Zukunft Bildung und Betreuung]. During this period the number of all-day schools in Germany has nearly doubled (KMK, 2011). The “Study on the development of all-day schools” (StEG) [Studie zur Entwicklung von Ganztagsschulen] was designed to evaluate the effects of this investment program. The analyses in this paper are based on data from StEG.

While all-day schools differ considerably with respect to organization and conceptual base, they all have in common that extracurricular activities are provid-

ed as well as regular lessons. These extracurricular activities are comparable to after-school programs in the United States, defined as “organized group activities that occur on a regular basis, typically 4 or 5 days a week” (Vandell, Pierce, & Dadisman, 2005, p. 51) and are typically housed in schools (Kleiner, Nolin, & Chapman, 2004).

Results of United States studies and meta-analyses indicate that extracurricular activities positively influence the development of social, physical and intellectual skills (Durlak, Weissberg, & Pachan, 2010; Eccles & Barber, 1999) as well as academic performance, measured by grades (Eccles, Barber, Stone, & Hunt, 2003; Feldman & Matjasko, 2005) and achievement tests (Lauer et al., 2006). It is often assumed that these effects are due to an improvement in students’ connections to school (i.e., school commitment, school attachment) (Barber, Stone, & Eccles, 2010; Marsh, 1992; Mahoney, Larson, Eccles, & Lord, 2005). However, so far, research investigating school attachment as outcome or mediation variable with respect to school grades is rare. Thus, one aim of this study is to analyze the development of academic achievement (grades) in dependence of school attachment. Another research gap is closed by also considering quality of extracurricular activities.

Recent studies on the effectiveness of after-school programs focus on either process-quality (as Miller & Truong, 2009) or quantity of participation, also referred to as “dosage” (as Vandell, Reisner, & Pierce, 2007). It is assumed that these factors are crucial to the achievement of positive effects from extracurricular participation. Former analyses of data from StEG support this assumption (Fischer, Kuhn, & Klieme, 2009; Fischer, Brümmer, & Kuhn, 2011; Kuhn & Fischer, 2011a). Up to now it is not known how specific quality features influence students across developmental trajectories. Therefore, this paper investigates age-differences in the effects of student perceived *quality* of extracurricular activities on academic performance and school attachment.

By gaining proper knowledge about quality features of extracurricular activities and their relevance across developmental stages, this study can help to create effective and beneficial extracurricular settings at school for each age group.

## **2. Theoretical background and empirical results**

### **2.1 Effects of extracurricular activities on school attachment and academic performance**

The number of studies concerning the effects of participation in extracurricular activities on cognitive and non-cognitive outcomes recently has increased considerably (see, for example, Eccles et al., 2003; Feldman & Matjasko, 2005). When analysing the effects on academic performance, most studies focus on grades (Grade Point Average (GPA)) or college completion. In a summary of pertinent studies,

Feldman and Matjasko (2005) reported a positive correlation between extracurricular participation and school performance. Eccles and Barber (1999) found that GPAs of students who participated in extracurricular activities in Grade 10 developed more positively than GPAs of their peers, even when controlling for sex, ethnicity and social background (see also Eccles et al., 2003). They assumed that extracurricular participation promotes the development of social, physical and intellectual skills and that these effects do not rely on a specific type of program. Results of meta-analyses generally support this notion (for example, Durlak et al., 2010).

Although mostly grades and college completion were investigated as dependent variables, academic competencies assessed by standardized tests also can be influenced by participation in extracurricular activities. In an overview of the effects of “Out of School-Time Programs”, Lauer et al. (2006) reported the occurrence of small but significant effects on reading and mathematics competencies independent of the type of program evaluated. Programs especially designed to enhance these competencies showed larger effects. These findings indicate that effects on academic achievement (grades) may partly rely on changes in academic competencies. However, motivational and social student characteristics also influence school grades (Robbins et al., 2004). Research and assumptions on these effects will be described below. In the present paper school attachment is analysed as a predictor of grades in German all-day schools.

## **2.2 Indirect effects of extracurricular activities on school performance**

Even though school grades correlate only moderately with standardized tests of competencies (Ingenkamp, 1967; Rakoczy, Klieme, Bürgermeister, & Harks, 2008), they are important prerequisites for a successful transition to adulthood. They reflect classroom processes, teacher personality and school performance as seen and evaluated by teachers (Ingenkamp, 1967; Rakoczy et al., 2008). Not only domain-specific achievement, but also social and motivational factors are evaluated (Lehmann, Peek, & Gänsfuß, 1997; Klieme, 2003; Rakoczy et al., 2008). This leads to the assumption that changing grades by affecting social behavior or school attachment may be a powerful capability of all-day schools.

Experimental studies often fail to show after-school programs having favorable results on academic competencies measured by standardized tests. However, Zief, Lauver, and Maynard (2006) suggest that after-school programs may change student behavior and social and emotional outcomes after all, which in turn may lead to the achievement of better grades.<sup>1</sup> Similarly, in their expectancy-value model Wigfield and Eccles (2000) include motivational variables as prerequisites of academic achievement. Results from StEG showed that extracurricular participation

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<sup>1</sup> For another viewpoint see the study of Lauer et al. (2006), cited above.

can favorably influence the development of students' social behavior in the classroom (Fischer, Kuhn, & Züchner, 2011) which in turn is connected to the achievement of better school grades (Kuhn & Fischer, 2011b). Vandell et al. (2005) propose a "cascade of effects in which programs first impact school attendance, work-habits and teacher-child-relationships which then affect academic performance and achievement" (p. 59). This assumption implies that participation in extracurricular activities affects school commitment and attachment. School attachment is described as the affective bonds between students and their schools (Hirschi, 1969). The connections students feel to their schools are influenced strongly by social relationships at school (Klem & Connell, 2004) and have been linked to a variety of outcomes both in, and outside of school (Anderman, 2002; Eisle, Zand, & Thomson, 2009; Finn & Rock, 1997; Klem & Connell, 2004).

Many researchers assume that extracurricular participation affects school commitment and attachment, although a minority of them conducted empirical tests on these variables. For example, Barber et al. (2010) consider extracurricular activities to be settings for providing opportunities to enhance identification with the values and goals of the school (i.e., school belonging, school attachment). Thus, these activities should promote the improvement of academic performance. In addition, Mahoney, Larson, Eccles, and Lord (2005) argue that extracurricular participation leads to improved school achievement, because it facilitates stronger emotional and social connections to one's school (cf. Marsh, 1992). Based on StEG data, Fischer and Brümmer (2012) investigated these indirect effects of participation in extracurricular activities on school attachment and academic performance in German "open all-day schools" where participation in extracurricular activities is voluntary. Their results lead to the assumption that long-term provision of extracurricular activities at school can enhance school attachment which in turn leads to the positive development of academic performance. However, other analyses of StEG-data showed that effects on motivation and school attachment are dependent on the student perceived process-quality of extracurricular activities (Fischer, Brümmer, & Kuhn, 2011). Thus, certain program features seem to be crucial for program effects to be achieved. In the next paragraph a framework for analyzing the relationship between quality features of extracurricular activities and the development of school attachment will be proposed.

### **2.3 Quality of extracurricular activities and the development of school attachment**

Although Eccles and Templeton (2002) point out that many studies link participation in specific activities to specified student outcomes without considering program features, the number of recent studies assessing the quality of the activities is increasing. For example, Miller and Truong (2009) developed a theory of change which includes Eccles and Gootman's (2002) features of effective programs as predictors of increased school engagement and achievement (see also Mahoney et al.,

2005). In a meta-analysis, Durlak et al. (2010) consider structure, challenge and the provision of positive interactions with peers and adults to be important features of quality (see also Barber, Stone, Hunt, & Eccles, 2005; Mahoney & Stattin, 2000; Vandell et al., 2007). In extracurricular contexts, structure generally refers to regularity and adult supervision, both of which are not given in unstructured leisure activities (cf. Mahoney & Stattin, 2000). As in German all-day schools activities are supervised by adult staff and occur on a regular base, “structure” can be considered as given.

Based on Hunt’s (1975) person-environment fit theory, Eccles et al. (1993) conceptualize school attachment as dependent on the match between developmental stage and the social environment (stage-environment fit). Fit between the environment and a student’s basic needs (Deci & Ryan, 1985) has to be achieved to foster positive motivational and emotional development. Deci and Ryan (1985; Ryan & Deci, 2000) suggest that motivation is a dynamic process driven by three basic human needs – autonomy, social relatedness and competence. The stage-environment fit approach suggests that the decrease in school motivation and attachment often found in middle school students may have its origins in a changed school organization that is not likely to meet students’ developmental needs for social relatedness and autonomy (see also Anderman & Anderman, 1999; Jacobs & Eccles, 2000). Whereas older students’ needs for autonomy increase (Eccles & Roeser, 2009), curriculum requirements lead to more control and less time for social relationships (Urdan & Midgley, 2003). Fischer, Radisch, and Stecher (2009) suppose that school-based extracurricular activities have the potential to be more responsive to students’ needs and individual learning processes than classroom instruction because they do not rely on a given curriculum (see also Eccles & Templeton, 2002). Similarly, Barber et al. (2005) consider extracurricular activities to be settings that provide special opportunities to enhance identification with the values and goals of the school. They assume that participating in organized leisure activities is a way for adolescents to meet their needs for *social relatedness*. In addition, Vandell et al. (2005) report that the relationship between children and after-school program staff exerts a strong influence on developmental outcomes (see also Mahoney, Schweder, & Stattin, 2002). Larson (2000) argues that the effects of structured activities are triggered by social processes in peer groups (cf. Eccles & Barber, 1999) because adolescents may experience more *autonomy* in these activities than in the classroom. Most of the researchers in this field have investigated supportiveness of relationships, structure, and opportunities for skill-building that extracurricular activities provide as features of quality (Miller & Truong, 2009; Mahoney et al., 2005). Opportunities for skill building relate to the “challenge” students experience and to the need to feel *competent*.

### 3. Research questions and hypotheses

Although relationships between school attachment and achievement are frequently proposed, empirical studies that highlight the development of both variables simultaneously are rare. This research aims to reply to the question: Does the development of school attachment influence the development of academic achievement?

Moreover, previous research on extracurricular participation is expanded by adding a stage-environment fit perspective. The approach suggests developmental differences in the impact of quality features. Eccles and Roeser (2009) point out that “older students desire more opportunities for autonomy and less adult-controlled structure” (p. 408). In the present study students’ perceptions of autonomy, competence (challenge) and social relatedness (student-staff-relationship) are analyzed as predictors of school attachment and achievement on every measurement point. Two research questions will be investigated:

- Does the quality of extracurricular activities have an impact on school attachment and achievement?
- Does the influence of student-perceived autonomy in the activities regarding the development of school attachment and achievement increase with age?

The theoretical background and the empirical results described above lead to the following research hypotheses. *Hypothesis 1:* The development of school attachment directly affects the development of academic achievement. *Hypothesis 2:* Perceived autonomy, challenge and student-staff-relationship (i.e., quality features) in extracurricular activities have an influence on the level of school attachment and the average grades of students in Grades 5, 7 and 9. *Hypothesis 3:* Quality features of extracurricular activities have a higher impact on school attachment than on school achievement. *Hypothesis 4:* The influence of perceived autonomy on school attachment and grades increases with age.

## 4. Method

### 4.1 Sample

The analyses in this paper are based on data from StEG, a longitudinal, multi-perspective and multi-criterial study. The school sample was representative for German all-day schools in 2005. As mentioned above until 2009 the number of all-day schools in Germany has nearly doubled (KMK, 2011). Thus, schools converted to the all-day format at the beginning of the investment program are overrepresented in the sample.

The target groups (i.e., the principals, teachers, other pedagogical staff at the schools, parents and students) filled in questionnaires at three measurement points (= waves) in the years 2005, 2007 and 2009. The longitudinal subsample



was made up exclusively of students who filled in questionnaires as fifth graders in 2005 and participated in at least one later wave of StEG.

In this research, we focused on students who participated in extracurricular activities at a minimum of two measurement times ( $N = 3,163$  students from 98 schools). This sample was selected because regular continuing participation dosage is linked to positive outcomes. This was shown by US-studies (Vandell et al., 2007; Simpkins, Little, & Weiss, 2004) as well as by former results of StEG (Fischer, Kuhn, & Klieme, 2009). Of the students, 615 (19.4 %) went to Gymnasiums, the highest track schools in Germany. At the first measurement point the average age of the sample was 11 years. Females made up 48.3 % of the sample ( $n = 1,529$ ) and 23.8 % of the participants had an immigrant background, meaning that at least one parent or the student himself/herself was born outside Germany ( $n = 753$ ). Values are comparable to the entire longitudinal subsample (47.6 % female, 21.9 % highest track, 25.5 % immigrant background; cf. Furthmüller, Neumann, Quellenberg, Steiner, & Züchner, 2011). On average, the students' families had a value of 45.1 (range 16 to 90,  $SD = 16.5$ ) as their highest level of occupational status on the international socioeconomic scale (SES) (HISEI; Ganzeboom & Treiman, 1996). The index is based on the mother's or the father's occupation, whichever is the higher. The HISEI-scale ranges from 16 to 90, with 16 being an unskilled worker and 90 being a courtroom judge. The average in this sample corresponds approximately to the HISEI in the German PISA 2009 sample (Klieme et al., 2010). There are different types of all-day schools in Germany: in some, extracurricular participation is mandatory and students are required to stay in school for extended hours at least three days a week (= compulsory schools); in others, participation in extracurricular activities is voluntary (= open all-day schools). In this research sample, 1,059 (33.5 %) students attended "open all-day schools".

## 4.2 Measures

In this section, measures from StEG that were used in the present research are described. All scales were tested for strong measurement invariance using three-wave-confirmatory factor analyses in the whole longitudinal sample. For the present subsample strong measurement invariance for the outcome school attachment is also given. As criterion we used CFI-differences between more or less restricted models. According to Cheung and Rensvold (2002) CFI changes should not exceed .01. As we find equal factor loadings and intercepts over time it is possible to interpret the differences found in the analyses (Meredith, 1993).



### 4.2.1 Dependent variables

*School attachment* and *average grades* were investigated as dependent variables. School attachment as a dimension of school bonding refers to the student's feelings about the school itself (Freidenfelt Liljeberg, Eklund, Väfors Fritz, & af Klinteberg, 2011). School attachment was measured by three items (based on Floerecke & Holtappels, 2004): "I like going to this school", "I'd never want to leave this school", and "I do not feel comfortable at this school". The last item score was reversed. All items were scored on a Likert-scale ranging from 1 (absolutely untrue) to 4 (absolutely true). Thus, high scores on the scale indicate a high rate of school attachment. The internal consistency (Cronbach's alpha) of the scale ranged from .71 (wave 1) to .81 (wave 3) for the subsample across the three waves of StEG.

Because empirical results imply that report card grades are a valid indicator of achievement in school and because student' self-reports are highly correlated with those of their teachers (Dickhäuser & Plenter, 2005), students were asked to submit their grades from their latest report cards. For each measurement point the grades from the latest report card for German, mathematics and a first foreign language (usually English) were combined to an arithmetic mean. In Germany, grades range from 6 for the lowest to 1 for the highest. For the analyses grades were re-coded. Thus, low numbers indicate low achievement and high numbers indicate high achievement. Table 1 shows the descriptive statistics of grades and school attachment. On average the students' grades as well as their school attachment decrease over the three measurement points.

Table 1: Descriptive statistics of the dependent variables

	<i>n</i>	<i>M</i>	<i>SD</i>
Grades wave 1 <sup>a</sup>	2,707	4.29	.737
Grades wave 2 <sup>a</sup>	2,871	4.05	.729
Grades wave 3 <sup>a</sup>	2,800	3.96	.758
School attachment wave 1 <sup>b</sup>	2,789	3.24	.749
School attachment wave 2 <sup>b</sup>	2,987	3.00	.788
School attachment wave 3 <sup>b</sup>	2,796	2.82	.831

Note. *n* = sample size. *M* = mean. *SD* = standard deviation.

<sup>a</sup>Grades recoded. Range Grades: 1 (lowest) to 6 (highest). <sup>b</sup>Range School attachment: 1 (lowest) to 4 (highest).

### 4.2.2 Time variant predictors

As described above, duration is an important factor in the effectiveness of participation in extracurricular activities. Thus, the present research is focused on students participating in extracurricular activities during at least two waves of StEG. The students rated process-quality of the activities they participated in at each measurement point. *Challenge*, *student-staff-relationship* and *autonomy* were as-

essed. These variables were assumed to indicate the process-quality of extracurricular activities. All items were rated on a four-point Likert-scale ranging from 1 (absolutely untrue) to 4 (absolutely true). Table 2 shows the scales, items and reliabilities.

**Table 2: Independent variables: Scales, items and internal consistency (Cronbach's alpha)**

Student-staff-relationship	Challenge	Autonomy
"Students and staff are generally on good terms."	"All students are to work actively on a task."	"We are frequently asked for our opinions when there is something to be planned or decided."
"Most staff members care about the students feeling comfortable."	"We frequently get exciting problems to solve in groups or alone."	"Frequently we can participate in decisions about our activities."
"Generally, staff members are interested in students' opinions."	"Visible results or products are expected from participation in the activities."	
"Additional help is provided by the staff, if a student needs it."	"Clear instructions are provided concerning strategies to achieve the required results."	
"Staff members deal with students fairly."	"Prior knowledge of students is taken into consideration."	
Reliabilities (Cronbach's alpha) W1/W2/W3		
.768/.831/.881	.703/.731/.769	.707/.700/.714

*Note.* Source: STEG 2005–2009, student questionnaire, longitudinal cohort, panel, students participating in extracurricular activities in two or three waves of STEG.

Table 3 shows the descriptive statistics of the time variant predictors. All in all students rate quality of activities rather positively, quality ratings decline, however, as students get older.

**Table 3: Descriptive statistics of the time variant predictors**

	<i>n</i>	<i>M</i>	<i>SD</i>
S.-S.-Rel. wave 1 <sup>a</sup>	2,304	3.34	.597
S.-S.-Rel. wave 2 <sup>a</sup>	2,309	3.12	.665
S.-S.-Rel. wave 3 <sup>a</sup>	1,659	3.07	.705
Autonomy wave 1	2,289	2.91	.899
Autonomy wave 2	2,289	2.72	.870
Autonomy wave 3	1,636	2.64	.852
Challenge wave 1	2,316	3.15	.603
Challenge wave 2	2,292	2.87	.630
Challenge wave 3	1,636	2.75	.597

*Note.* *n* = sample size. *M* = mean. *SD* = standard deviation. All variables range from 1 (lowest) to 4 (highest).

<sup>a</sup>S.-S.-Rel. = student-staff-relationship.

#### 4.2.3 Time invariant predictors (control variables)

To capture possible unobserved heterogeneity, a set of control variables was introduced. *Sex* was controlled for, because girls tend to have higher grades in German whereas boys score higher in mathematics (Kuhl & Hannover, 2012). Based on low grades German students can be obliged to repeat a school year. As this is confounded with school performance, *class repetition* in secondary school was also controlled for. The German school system consists of either a two- or a three-tiered structure. Tracking is based on students' performance in primary school. Passing final examinations in the highest track would entitle students to apply to university. As the range of grades is the same in all school tracks, grades are not comparable across tracks (Trautwein, Lüdtke, Becker, Neumann, & Nagy, 2008). Thus, *school track* (highest track (Gymnasium) vs. other tracks) was also included in the analyses. Intelligence is correlated with school grades (Steinmayr & Meißner, 2013). Therefore, the results of the *verbal subtest* of a cognitive ability test (Kognitiver Fähigkeitstest, KFT 4–12; Heller & Perleth, 2000) were included in the analyses.

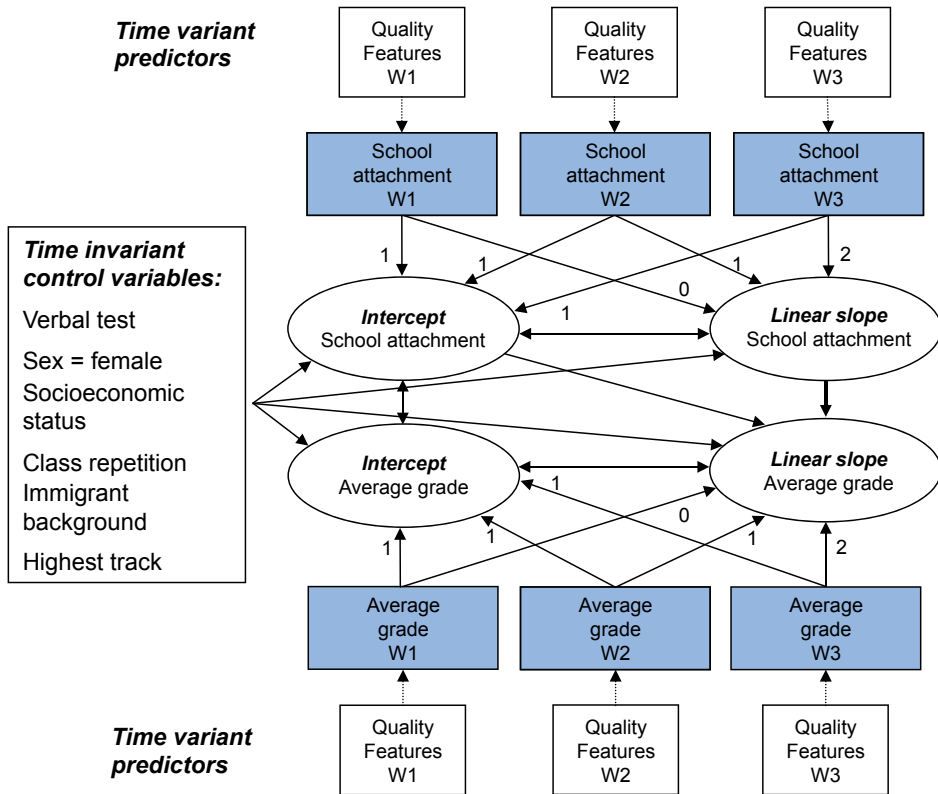
*SES* and *immigrant background* were controlled for because in Germany school performance and enrollment to the academic track highly depend on family background (Maaz, Trautwein, Lüdtke, & Baumert, 2008). Thus, PISA 2009 revealed, that the impact of family background on the performance of German adolescents was above the OECD average (OECD, 2010). SES was assessed using the highest international socioeconomic index of occupational status in the family (HISEI; Ganzeboom & Treiman, 1996, see Section 3.1). The occupational status was based on answers of students and their parents. The sample was grouped into quartiles and the highest and lowest quartiles were used as dummies in the analyses (with the middle quartiles being the reference group). Immigrant background in this study is a dummy-variable, indicating that either the student or one of his parents was born abroad.

### 4.3 Statistical analyses

The development of school attachment and academic achievement were modelled as two separate latent growth curves. Both were led back to two latent factors: intercept and linear slope. Time code was the wave number. Latent growth curve models allow development to be described and explained over time for individuals as well as for groups. Analyzing growth by structural equation models allows the fit between model and data to be tested (Bollen & Curran, 2006; Duncan, Duncan, & Strycker, 2006). An unconditional growth curve model was administered to both of the outcomes to test the fit of the linear approach.

A complex model containing two growth curves was applied to test the hypothesized relationships (see Section 2 for the hypotheses and Figure 1 for the model). The conditional growth-curve model for school attachment contains control variables as time-invariant and quality measures as time-variant predictors. For the in-

Figure 1: Complex model with two conditional growth-curves based on scales (= arithmetic means) of the outcomes<sup>2</sup>



intercept of the average grades, the same model was applied. In accordance with the hypothesis that changes in school attachment predict changes in academic achievement, the linear slope of the grades is predicted as well by intercept and linear slope of school attachment.

For the latent growth curve analyses, Mplus 5.21 was used. Full Information Maximum Likelihood (FIML) was applied to deal with missing values on the parameter level. Missing value analyses in the StEG-longitudinal sample showed that students with higher SES and students that never repeated a class were slightly overrepresented in the sample (see Furthmüller et al., 2011 for an extended discussion about missing value analyses in StEG). Both variables were included as control variables in the analyses. The MLR-estimator was chosen to deal with non-normality and non-independence of observations. Standard errors were corrected using TYPE = COMPLEX, which is a function of Mplus that takes into account the clustered data structure.

<sup>2</sup> Testing a model with a latent variable approach and the assumption of strong measurement invariance over time for school attachment led to very similar results and an acceptable fit.

## 5. Results

### 5.1 Development of school attachment and grades

Table 4 shows two unconditional growth models resulting in a good fit for school attachment and an acceptable fit for average grades (grades), supporting the assumption of linear development. As the mean intercept of school attachment is high, it can be assumed that the students in the sample were very much connected to their schools in Grade 5 – the negative slope indicates a decline in school attachment. The negative slope in average grades points to a decline as well – grades get worse with age. This development primarily occurs between Grades 5 and 7 (see Table 1). Declining school attachment and achievement throughout adolescence are common findings in developmental research. Significant variances of intercept and slope show that this development is varying among individuals in the StEG sample. Thus, including predictors may be useful to explain this variance.

Table 4: Unconditional growth curve models

	School attachment <i>b</i> ( <i>SE</i> )	Grades <sup>a</sup> <i>b</i> ( <i>SE</i> )
Mean intercept	3.227 (.028)**	4.286 (.029)**
Mean slope	-.214 (.013)**	-.177 (.012)**
Variance intercept	.305 (.024)**	.385 (.022)**
Variance slope	.093 (.011)**	.058 (.010)**
Covariance int/slop	-.070 (.014)**	-.067 (.012)**
Chi <sup>2</sup> /CFI/RMSEA	1.479/1.00/.012	19.050*/.986/.076

Note. Source: StEG 2005–2009, student questionnaire, longitudinal cohort, panel, students participating in extracurricular activities in two or three waves of StEG.

<sup>a</sup>Grades recoded (1 = lowest; 6 = highest).

\* $p < .05$ . \*\* $p < .01$ .

### 5.2 Results of the conditional growth curve model

Tables 5 to 8 contain results from *one* growth-curve model only (see Figure 1). The results are described separately for time-invariant control variables and time-variant predictors and for both independent variables. Fit statistics refer to the model as a whole. Values show that the model fits the data well ( $N = 3163$ ,  $\text{Chi}^2 = 194.67^*$ ,  $\text{df} = 58$ ,  $\text{CFI} = .97$ ,  $\text{RMSEA} = .03$ ). We found a significant influence of the development (slope) of school attachment on the development (slope) of grades achieved. The significant standardized beta-coefficient of .21 ( $SE: .05$ ;  $p < .01$ ) indicates that increasing school attachment leads to the achievement of better grades (Hypothesis 1).

Table 5 shows the variance components of the conditional model. Compared to the unconditional models (Table 4) the conditional model explains considerable amounts of variance except for the slope of grades.

Table 5: Variance components of the conditional growth curve model (Figure 1)

	School attachment <i>b</i> ( <i>SE</i> )	Grades <sup>a</sup> <i>b</i> ( <i>SE</i> )
Variance intercept	.214 (.021)**	.263 (.019)**
Variance slope	.076 (.009)**	.057 (.001)**

Note. Source: StEG 2005–2009, student questionnaire, longitudinal cohort, panel, students participating in extracurricular activities in two or three waves of StEG.

<sup>a</sup>Grades recoded (1 = lowest; 6 = highest).

\*\**p* < .01.

### 5.2.1 Time-invariant control variables

Tables 6 and 7 show the coefficients for the control variables. Concerning school attachment (Table 6), most of the control variables do not influence intercept and/or slope. Attending Gymnasium, the highest track schools, related particularly positively to initial school attachment in Grade 5 (intercept) but related negatively to attachment development (slope). As to achievement of good grades (Table 7), girls and students with high SES achieved better grades, whereas students with low SES, immigrant backgrounds and class repeaters were connected with poorer levels of achievement. Influence of the control variables on the development of grades (slope) was found to be negligible. This also holds true for the significant, but rather small counter-intuitive negative effect of higher results in the verbal test on the slope of grades (Table 7). A model without time-variant predictors produced similar results.

Table 6: Effects of control variables on school attachment

	Intercept <i>b</i> ( <i>SE</i> )	Linear slope <i>b</i> ( <i>SE</i> )
Female (dummy)	.040 (.027)	-.020 (.019)
SES high (dummy)	.042 (.033)	.022 (.022)
SES low (dummy)	-.063 (.034)	.003 (.026)
Immigrant background (dummy)	.021 (.033)	.001 (.023)
Verbal test	.009 (.003)**	-.001 (.002)
Class repetition	-.043 (.041)	-.001 (.029)
Highest track (Gymnasium dummy)	.374 (.042)**	-.119 (.032)**

Note. Source: StEG 2005–2009, student questionnaire, longitudinal cohort, panel, students participating in extracurricular activities in two or three waves of StEG.

\*\**p* < .01.

Table 7: Effects of control variables on school grades

	Intercept <i>b</i> ( <i>SE</i> )	Linear slope <i>b</i> ( <i>SE</i> )
Female (dummy)	.157 (.026)**	.018 (.017)
SES high (dummy)	.101 (.033)**	.050 (.021)*
SES low (dummy)	-.067 (.032)*	.025 (.021)
Immigrant background (dummy)	-.118* (.035)*	.030 (.019)
Verbal test	.051 (.004)**	-.007 (.002)**
Class repetition	-.329 (.040)**	.028 (.033)
Highest track (Gymnasium dummy)	.028 (.058)	.050 (.027)

Note. Source: StEG 2005–2009, student questionnaire, longitudinal cohort, panel, students participating in extracurricular activities in two or three waves of StEG. Grades recoded (1 = lowest; 6 = highest).

\* $p < .05$ . \*\* $p < .01$ .

## 5.2.2 Time variant predictors

Table 8 shows the influences of the three quality features on school attachment and grades for each wave.

Table 8: Effects of the time-variant predictors

	Autonomy $\beta$ ( <i>SE</i> )	Challenge $\beta$ ( <i>SE</i> )	Student-Staff- Relationship $\beta$ ( <i>SE</i> )
School attachment			
W1 (Grade 5)	.038 (.024)	.099 (.025)**	.216 (.026)**
W2 (Grade 7)	.076 (.023)**	.109 (.026)**	.201 (.022)**
W3 (Grade 9)	.055 (.027)*	.128 (.035)**	.241 (.039)**
School grades <sup>a</sup>			
W1 (Grade 5)	-.019 (.022)	.038 (.024)	.018 (.022)
W2 (Grade 7)	-.017 (.021)	.029 (.021)	.010 (.026)
W3 (Grade 9)	-.018 (.028)	.056 (.031)	.067 (.030)*

Note. Source: StEG 2005–2009, student questionnaire, longitudinal cohort, panel, students participating in extracurricular activities in two or three waves of StEG. Fully standardized results (STDXY).

<sup>a</sup>Grades recoded (1 = lowest; 6 = highest).

\* $p < .05$ . \*\* $p < .01$ .

The model resulted in nearly all the time-variant predictors having significant effects on school attachment. Only the influence of perceived autonomy in Grade 5 did not relate significantly to attachment. In all three waves, student-staff-relationship had the highest influence on school attachment, followed by challenge. For school achievement there was only one significant predictor: student-staff-relationship had a significant influence in wave 3. Thus, Hypothesis 2 is confirmed for



school attachment but not for achievement. Furthermore, the influence of the quality features on school attachment is higher than it is on achievement (Hypothesis 3).

Hypothesis 4 is based on the assumption that older students have a greater need for autonomy. An increasing influence of autonomy on school attachment was expected. The beta-coefficients show this predictor not to be significant in Grade 5. Although it gains influence in Grade 7, there is no further increase after that. However, even the difference between the coefficients in waves 1 and 2 is not significant in a Wald-Test.

Since the model resulted in direct positive effects of quality features in extracurricular activities on school attachment as well as a direct positive effect of the development of school attachment on the achievement of better grades, one can assume that quality features influence school grades via attachment. However, indirect influences of the quality of activities on the achievement of better grades via school attachment cannot be tested within this model.

## 6. Discussion

The effects of extracurricular participation on school motivation and performance are complex. To our knowledge this study is the first one investigating the effect of school attachment combined with quality features of extracurricular activities on the development of academic achievement. The relationship between these variables is highlighted by using a stage-environment fit approach. As children progress through middle school their school attachment declines. It is proposed that school attachment relies on a sufficient fit between teaching practices and students' developmental needs. Participation in extracurricular activities at school could protect adolescents against negative developments by providing more opportunities to make decisions and choices (autonomy) and to connect to other persons (relatedness). Also, the need to feel competent should be addressed in the activities by offering a challenging environment.

The data of this research show that in Grades 5, 7 and 9 these three quality features have an effect on school attachment but barely affect academic achievement at all. However, based on a two-curve conditional growth model, it was found that the development of school attachment significantly influences the achievement of better grades, although this relationship does not account for a vast degree of the variance. Supporting the development of school attachment by means of extracurricular activities should accordingly lead to a positive development of grades as well. School attachment, however, is associated with social and emotional adjustment in school (e.g., Hill & Werner, 2006). Promoting school attachment on its own may therefore be a valuable feature of extracurricular activities at school. This paper provides insight into how activities can foster school attachment by addressing students' developmental needs.

Stage-environment fit hypothesis suggests an increase in the impact of feeling autonomous on school attachment and grades. However, in this research only a slight and insignificant increase was found concerning school attachment between Grades 5 and 7. Also, challenge and student-staff-relationship seem to have more influence on school attachment than autonomy. The findings especially underline the importance of maintaining a positive student-staff-relationship throughout adolescence. This quality feature is significant with respect to the achievement of better grades among Grade 9 students and was the most influential predictor of school attachment in all three waves of StEG. This is consistent with new findings from the Youth Activity Participation Study of Western Australia (YAPS) which emphasize the importance of a positive adult leader of extracurricular activities on students' school attachment and self-concept (Barber & Blomfield, 2011).

Our results further clarify the relationship between student-perceived quality of extracurricular activities participated in at school and school attachment. However, certain limitations have to be considered. The results of our study suggest that high quality activities can improve academic achievement by influencing school attachment. Yet, focussing the different impacts of quality features across age, this mediation hypothesis could not be tested in this paper. Moreover, no differences in the impact of perceived autonomy on school attachment across age were found. Perhaps the two items on the autonomy scale of the activities do not represent autonomy as actually conceptualized by Deci & Ryan (1985). The need for autonomy relates to self-determined behaviour and while it can be fulfilled by choice, it also can be influenced by linking lessons to students' everyday lives which was not assessed. Perhaps this aspect would differentiate better between age groups.

In this research student-perceived quality had an impact on school attachment but other, perhaps more "objective", quality indicators were not included. Further analyses of StEG results could focus on data concerning staff or aggregated student ratings to obtain other quality indicators. However, some approaches on motivation development (for example, Wigfield and Eccles' (2000) expectancy-value theory) emphasize the importance of students' individual perceptions for the development of motivation. The results support the assumption of student perceived learning environment influencing school attachment.

Some studies particularly highlight the importance of the *type* of activity for the achievement of specific effects (Barber & Blomfield, 2011; Eccles & Barber, 1999; Eccles et al., 2003). Participation profiles were not included in this analysis. It may be considered plausible that activities provide different effects depending on subject matter *and* process-quality. In StEG, each student provided a broad rating of all activities. In the context of the present study differences in the impact of certain quality features by type of activity could not be analyzed. Future research on the direct and indirect effects of extracurricular participation on school performance should focus on specific programs designed to improve skills and competencies (cf. Lauer et al., 2006), thus, facilitating the distinction of particular effects of quality features on academic versus non-academic competencies.

To summarize, the research presented in this paper contributes significantly to science as well as to practice and teacher training by underlining the importance of positive relationships among students and their adult leaders as well as challenging learning environments in extracurricular activities. Providing social support and challenge in the activities, fosters students' bonds to school across age. Thus, the well-being as well as the academic achievement of students increases.

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