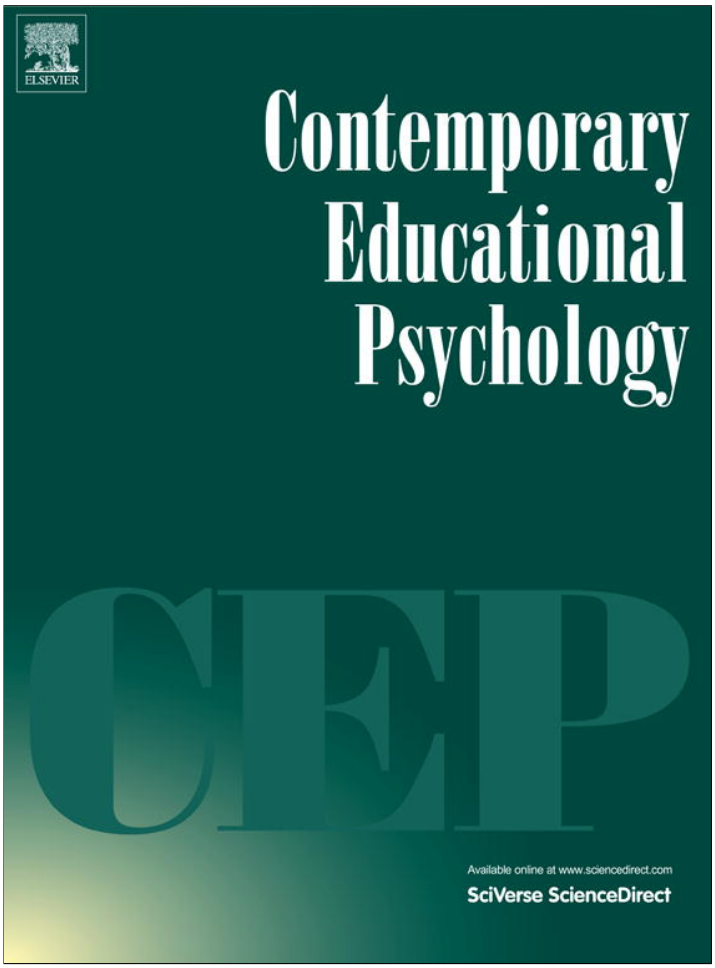

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Achievement goals and school achievement: The transition to different school tracks in secondary school

Isabell Paulick [a,*], Rainer Watermann [b], Matthias Nückles [c]

[a] Department of Psychology/Educational Psychology, Kiel University, Olshausenstraße 75, D-24118 Kiel, Germany
[b] Department of Education and Psychology, Freie Universität Berlin, Habelschwerdter Allee 45, D-14195 Berlin, Germany
[c] Department of Educational Science, University of Freiburg, Rempartstraße 11, D-79098 Freiburg, Germany

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ABSTRACT

During the transition from elementary school to secondary school, in Germany, students are assigned to different school tracks, academic or non-academic, that differ markedly in compositional and institutional characteristics, e.g., the level of cognitive activation and performance standards are higher in academic tracks than in non-academic tracks. Currently, there is a lack of research examining the changes in achievement goals (mastery-approach, performance-approach, and performance-avoidance goals) and in the association between achievement goals and school achievement during the transition to these different school tracks. There were 1646 students who participated in a large-scale, three-wave longitudinal study from Grade 4 to Grade 6. While results revealed only slight differences between the two school tracks, the three types of achievement goals declined over time. In elementary school mastery-approach goals were positively and performance-approach goals negatively associated with school grades. After the transition to secondary school mastery-approach goals predicted school grades positively, whereas performance-approach goals negatively influenced achievement (academic track). Overall, the results indicate that between-school-tracking plays a minor role for the development of achievement goals and the relation between goals and achievement.

1. Introduction

Achievement goals are regarded as important determinants of academic performance and have been widely studied in the educational psychology literature (Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). While the development of achievement goals has often been investigated during the transition from elementary to secondary school in the US, the transition into different school tracks in countries with a stratified school system has rarely been studied. The German school system differs from those in Anglo-Saxon countries as the majority of the students are assigned to different school tracks: non-academic and academic tracks. Each of these tracks differs markedly from the others in the ability level of the students and the learning environments of the classes. Accordingly, the primary purpose of the current study is to examine the changes in achievement goals and in the association between achievement goals and achievement before and after the transition to non-academic and academic school tracks in secondary school.

1.1. Achievement goals

Achievement goals are defined as cognitive representations of competence-relevant possibilities that guide behavior to a competence-related end state that the individual is committed to either approach or avoid (Elliot & Thrash, 2001; Hulleman et al., 2010). These goals are associated with behavioral and performance variability (McKinney, 2003). Achievement goals are conceptualized as dynamic and changing in relation to the context (Shim, Ryan, & Anderson, 2008).

They are divided into two types of goals that individuals pursue in task/learning contexts: *mastery* and *performance goals* (Ames & Ames, 1984). A mastery goal is the desire to acquire new skills, master new situations, and improve one's competence. Conversely, students with high performance goals seek to demonstrate or prove one's competence to others. Additionally, the distinction between approach and avoidance is made for both mastery and performance goals (Elliot, 1999; Elliot & McGregor, 2001). Mastery-approach goals are focused on attaining task-based or intrapersonal competence, whereas mastery-avoidance goals are focused on avoiding task-based or intrapersonal incompetence. However, there is little research on mastery-avoidance goals. Attaining normative competence, demonstrating high competence, and gaining positive judgments from others is part of performance-approach

* Corresponding author.
E-mail address: isabell.paulick@psychologie.uni-kiel.de (I. Paulick).

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goals, whereas avoiding normative incompetence and preventing negative judgments from others is part of performance-avoidance goals (Elliot, 1999).

1.2. The development of achievement goals

With respect to the development of achievement goals two strands of theory and research have to be taken into consideration. First, developmental psychologists (Dweck, 2000; Nicholls, 1984, 1990) have argued that students' mastery goals decrease and students' performance goals increase, primarily as a result of their cognitive development and their concept of ability that becomes increasingly differentiated. Thus, studies by Anderman and Anderman (1999) and Midgley, Anderman, and Hicks (1995) found a decrease in mastery and an increase in performance goals. Second, educational psychologists suggest that middle-level schools can be a major source of a general decline in motivation during early adolescence (Eccles, Lord, Roeser, Barber, & Jozefowicz, 1997; Juvonen, Le, Kaganoff, Augustine, & Constant, 2004). The changes in classroom organization, instruction, and climate variables could result in a developmental mismatch between early adolescent needs and classroom environment, which may cause a general decline in achievement goals as a motivational outcome (developmental stage-environment fit; Eccles et al., 1993). Studies by Bong (2009) and Shim et al. (2008) confirmed a general decline in all types of achievement goals. The results of some German studies also lend support to a general decline of achievement goals. Schwinger and Wild (2006) examined subject-specific achievement goal profiles in mathematics from Grade 3 to Grade 5. Their results could not confirm Nicholls' and Dwecks assumptions of a change from mastery to performance goals. Rather, they found a decline in all three types of achievement goals. Finsterwald (2006) also found a decline in all types of achievement goals during the transition from elementary school to secondary school. These results indicate that a decrease in students' achievement goals after transition to secondary school may be predominantly attributed to the transition itself with its concomitant changes in the learning environment rather than to the onset of puberty.

1.3. The relation between achievement goals and school achievement

A large body of research has investigated the relationship between achievement goals and school achievement. In general, these studies have shown, that mastery-approach goals support academic learning in an optimum manner (Elliot & Church, 1997; Lavasani, Weisani, & Ejei, 2011), whereas performance-avoidance goals are a negative predictor for school achievement (Elliot & Church, 1997; Elliot & McGregor, 1999). Performance-approach goals are leading to better academic performance only under certain circumstances, for example, when competitive conditions or social comparisons asking for a demonstration of one's competences (Middleton & Midgley, 1997). However, in their recent meta-analysis Hulleman et al. (2010) found, that the effect sizes were rather small.

With regard to younger learners some researchers have concluded that the association between achievement goals and achievement changes as students grow older and move through the educational system (Bong, 2009; Midgley, Kaplan, & Middleton, 2001; Shim et al., 2008). Mastery goals were more beneficial in the elementary school years (Pekrun, Elliot, & Maier, 2009); which finds expression in a positive relation with achievement outcomes, and became less beneficial at the secondary or college level, that is, there were small positive or no relations with achievement outcomes. Conversely, performance-approach goals were less advantageous for achievement in the early school years (e.g., Anderman & Anderman, 1999) and became more advantageous at the secondary or college level (Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997). In addition, Middleton, Kaplan, and Midgley (2004) concluded that performance-approach goals may be less beneficial or potentially harmful for school achievement in elementary, middle, and high schools as the context is less competitive at those levels compared to the context of college (Middleton & Midgley, 1997).

Bong (2009), in her study of 1196 Korean students from Grade 1 to Grade 9, found no relation between achievement goals and achievement in Grades 1 and 2 but small positive correlations for mastery goals and small negative correlations for performance-avoidance goals for the higher grades. With respect to performance-approach goals, there was a small positive relation to achievement starting in the upper elementary school (Grades 5 and 6) and the middle school (Grades 7–9). There was no significant correlation for the lower grades. Thus, performance-approach goals did not play a significant role in the early school years.

There are only a few German studies on the relation between achievement goals and school achievement in primary and secondary school. Paulick, Watermann, and Nückles (2011) found (in an extension of the TIMS-study 2007) in elementary school (Grade 4) a negative association between performance-approach goals and school achievement (test scores and school grades), but only a weak positive or no association between mastery-approach and performance-avoidance goals and school achievement. Spinath and Schöne (2003) found a positive correlation between mastery goals and school grades and low positive/negative correlations between performance-approach/performance-avoidance goals and school grades. In a longitudinal study with three measurement occasions Köller (1998) found higher learning rates – measured with standardized tests – for mastery-goal oriented students than for performance-goal oriented students (Grade 7). Because he used a person-centered approach (Mixed Rasch Model) the results of his study are not fully comparable with other studies that applied a variable-centered approach. Altogether, the majority of the studies support the view that performance goals are less beneficial in elementary school in relation to secondary school.

1.4. The German school system

As far as the transition from primary to secondary school is concerned, the German school system differs at least in two important ways from those in Anglo-Saxon countries. Firstly, in most German federal states, the transition to secondary school occurs after Grade 4. Secondly, students are assigned to different secondary school tracks. There is considerable variation across the German states in terms of the number and quality of these tracks (Baumert, Stanat, & Watermann, 2006), but the tracked system of Hauptschule (lower track), Realschule (middle track), and Gymnasium (upper track) is the best known. Hauptschule is the academically least demanding track; Realschule, the intermediate track; and Gymnasium, the college-bound or academic track. Hauptschule students graduate after Grade 9 or 10 and typically enter the dual system, which combines part-time education at vocational school with on-the-job-training. Realschule students graduate after Grade 10; most of them also enter the dual system, usually aspiring to more skilled occupations (e.g., trade, technical and administrative professions). Gymnasium students graduate after Grade 12 or 13. Passing the final examination (Abitur) is a prerequisite for university entrance. Besides Hauptschule, Realschule, and Gymnasium, some states offer multitrack and comprehensive schools.

In general, the allocation to different tracks is based on students' school performance and their parents' preferences. Elementary school teachers recommend students to different tracks according to their school grades and potential for academic success. Parents may intervene in the transition process by trying to

influence the teacher's recommendation or choosing to go against the recommendation and enrolling their child on another school type, but students must pass an examination or a probationary instruction in order to be accepted into a more demanding school type. Studies showed that the opportunities for access to the different school tracks vary between the different social classes. The opportunity for upper class students to attend the academic track (Gymnasium) is much larger than for lower class students, even after controlling for performance and cognitive abilities (Baumert & Schümer, 2001; Ditton, 2007; Maaz, Trautwein, Lüdtke, & Baumert, 2008).

Even though the tracks are comparable in quantitative terms, such as the number of lessons timetabled, they differ markedly in qualitative terms. Specifically, there are differences between non-academic and academic schools with respect to the compositional makeup, e.g., mean achievement and parental SES, and the institutional factors, such as lesson design, and teacher training.

On the one hand, the academic track provides qualitatively better conditions for academic learning because the learning group is positively selected in terms of social background and cognitive abilities (Trautwein, Lüdtke, Marsh, Köller, & Baumert, 2006) and the instruction is delivered at higher levels of cognitive activation (Kunter & Baumert, 2006). Accordingly, Maaz et al. (2008) showed that students' learning rates differ between the tracks favoring students from academic track. Effects of parental SES on learning rates as well as on motivational aspects within school tracks were rather small.

On the other hand, as a consequence of ability-grouping, performance standards are higher in the academic track than in non-academic tracks. To reach the performance level of the elementary school, students in the academic track have to exert greater effort and invest more than they did in elementary school. Thus, the learning environment of the academic track can be regarded as more competitive. Social upwards comparisons with other classmates might be conducted more often compared to the former learning environment in elementary school.

1.5. Research questions

Our main research question concerns what changes in achievement goals and their impact on learning we might find following the transition from elementary school to different school types.

1.6. Changes in achievement goals

Maehr and Midgley (1991) suggested that performance goals increase more in learning environments that focus on grades and performance than in learning environments that focus on learning. Compared to elementary school, secondary school is more focused on grades and competition; social comparison processes become more important. The meaning of the other classmates as a frame of reference increases, what should entail an increase in performance goals and a decrease in mastery goals after the transition to secondary school (see Dweck, 2000; Nicholls, 1984, 1990). Moreover, because of the higher performance standards — caused by the more demanding curriculum as well as the higher average class ability — and the more pronounced competitive conditions for good grades asking for a demonstration of one's competences, performance-approach goals are expected to become even more important when students transfer to the academic track instead of non-academic tracks.

However, one could also expect an overall decline in all three types of achievement goals in both tracks (academic and non-academic) because of a possible mismatch between the changing needs of the students and the changes in the secondary school learning environments (see Eccles et al., 1993). The overall motivation of students could decline during the transition to secondary school independent of the school track, because of significant differences between elementary and secondary school. Not only mastery goals, but also performance goals could be affected by these changes. However, as mentioned above the decline of performance goals should be smaller at the academic track because the learning environment at the academic track is assumed to be more competitive compared to non-academic tracks.

1.7. Impact of achievement goals on learning

Midgley et al. (2001) further suggested that the consequences of achievement goals may change as the context becomes more competitive. Mastery goals may become less beneficial (no relation to achievement), whereas performance-approach goals may become more beneficial (positive relation to academic achievement). Therefore, Midgley et al. (2001) referred to a study by Harackiewicz et al. (1997) in which a positive relation between performance-approach goals and the final grade in an introductory psychology class was found. They argued that college learning environments are often competitive and performance-oriented, which in turn leads to advantages of performance-approach goals in these settings. Generally, the learning environment of secondary schools can also be described as more performance-oriented and, in some cases, as more competitive compared with the learning environment of elementary schools. Thus, we could expect that performance-approach goals might be slightly more associated with school grades in secondary schools than in elementary schools. Again, performance goals should be more beneficial in the academic-track as compared to non-academic tracks.

Thus, our hypotheses and research questions are as follows:

1. How do achievement goals change after the transition from elementary to secondary school? Can we find an overall decline in all three types of achievement goals (Midgley et al., 2000)? Or do we find an increase of performance-approach goals according to Nicholls (1984) and Dweck (2000)?
2. Are there any differences between the non-academic and the academic track regarding the development of achievement goals? We hypothesize, that performance-approach goals will become more important in the academic track than in non-academic tracks.
3. How are achievement goals related to school achievement in elementary school and in secondary school? We expect a positive association between mastery-approach goals and school achievement, whereas performance-approach goals might be less beneficial in elementary school and negatively associated with school achievement, the same as performance-avoidance goals. After the transition to secondary school, we expect that mastery goals are still positively associated with school achievement. However, do performance-approach goals lose their detrimental effect and do they predict school achievement positively?
4. Are there any differences between the non-academic and the academic track regarding the impact of achievement goals on school achievement? We expect performance-approach goals to be stronger associated with school grades in the academic track in comparison to the non-academic tracks.

2. Method

The empirical basis for the present investigation was the Transition Study, a cooperative project of the Max-Planck-Institute for Human Development in Berlin, the Department of Education and Psychology at the Freie Universität Berlin, the University of Potsdam, the Institute for School Development Research at the

University of Dortmund, and the Institute for Educational Progress at the Humboldt University in Berlin. Germany's participation in the Trends in Mathematics and Science Study (TIMSS) 2007 of students at the end of the fourth grade (T1) has provided an ideal opportunity to extend scientific knowledge of how students and their parents cope with the process of transition. As such, two further waves of data collection were undertaken after the transition to secondary school — six months later to coincide with the fifth grade mid-term report card (T2, middle of Grade 5) and one year later to coincide with the final fifth grade report card (T3, beginning of Grade 6). The Transition Study was embedded within TIMSS 2007.

2.1. Participants

The sample of 1646 students comprised most of the classes participating in the TIMSS. The sample was clustered as follows: there were 928 students in Gymnasium (academic track); 436 in Realschule (middle track); 158 in Hauptschule (low track); and 124 in schools with combined non-academic educational programs or comprehensive schools. Due to our hypotheses we distinguished between Gymnasium (academic track) on the one side and Realschule, Hauptschule and other school types with combined non-academic educational programs or comprehensive schools (non-academic track) on the other side. Thus, we combined Realschule, Hauptschule and other non-academic schools to a single group for two reasons. First, because of different enrollment rates there is considerable variation between the German states in the meaning of these different non-academic tracks, e.g., with regard to the student composition (average ability, SES). Hauptschule in some German states is more or less comparable to Realschule in other German states. As we also know from German studies, school types with combined programs and comprehensive schools are more or less comparable to Hauptschule and Realschule (Köller, 2003). Second, in-depth examinations of our data confirmed ignorable differences between the different school types regarding the trajectories of achievement goals. In multi-group analyses we ran latent growth curve models where we fixed the factor loadings as well as the residuals across the groups. The fit statistics for all three models were excellent (mastery-approach goals: $\chi^2 = 13.94$, $df = 8$, RMSEA = .056, CFI = .977, TLI = .974; performance-approach goals: $\chi^2 = 10.41$, $df = 8$, RMSEA = .026, CFI = .991, TLI = .991; performance-avoidance goals: $\chi^2 = 9.27$, $df = 8$, $p < .01$, RMSEA = .023, CFI = .990, TLI = .992).

We included students that participated in Grade 4 and in at least one of the other two occasions. Of the sample, 49.4% were female, 87.4% of the children were born in Germany, and the mean age of the students at T1 was 10.4 years ($SD = 0.50$). Selectivity analyses revealed that the longitudinal sample was positively selected. Students whose parents selected the academic track (Gymnasium) were overrepresented in the longitudinal sample, while students with parents who selected the low track (Hauptschule) were underrepresented. Furthermore, students in the longitudinal sample had better school grades in Grade 4 (approximately half of a standard deviation), and the socio-economic status of the parents (Parents' Highest International Socioeconomic Index; HISEI) was half of a standard deviation higher on average. In an additional step, a series of two-factor analyses of variance with the school track decision of the parents and the participation in the longitudinal sample as factors, as well as school grades, test scores and social-economic position of the parents as criteria, were conducted. No interaction effect was found, that is, school track decision x participation in the longitudinal sample, indicating that there was a systematic drop-out, but this drop-out did not differ systematically between students based on different school track decisions.

2.2. Measures

2.2.1. Achievement goals

To measure students achievement goals we could not draw on an existing and validated questionnaire for a large-scale assessment in elementary school. Thus, we needed to compose an instrument, that was short enough to be used in the framework of a large-scale assessment and that shows adequate content validity, a reasonable factor structure, and construct validity. Therefore we applied a twofold strategy: One the hand we have chosen items from existing instruments (e.g., PALS), that would cover different components of achievement goals and we adapted them to German. On the other hand — where possible — we have chosen items from approved German instruments that have already been applied to students from elementary school. All items were phrased domain-general and scored on a 4-point Likert-type scale (1 = very true through 4 = not at all true). The preliminary instrument consisting of twelve items was tested in a field trial. After the elimination of two items the instrument showed an excellent factor structure and the scales were sufficiently reliable and valid. The theoretically assumed factorial structure was confirmed in a study with the same sample that was used in the present study (see Paulick et al., 2011).

Mastery-approach goal items (four items, $.73 < \alpha < .78$) stem from the revised version of the Patterns of Adaptive Learning Scales (PALS) (Midgley et al., 2000). The items focused on developing academic competence, for example, "It is important to me that I improve my skills.", and were translated into German. Following Hulleman et al. (2010), we identified three components of mastery-approach goals: mastering the requirements of the task (two items), improving one's competence, and fulfilling one's potential and learning to as great a degree as possible. Performance-approach goals were measured using four items ($.67 < \alpha < .88$) based on the German version of the Motivational Orientation Scales (MOS) (Köller & Baumert, 1998; original version by Nicholls, Patashnick, & Nolen, 1985). The items focused on demonstrating high academic competence relative to classmates, for example, "It is important to me that I know more than other students in my class". Following Hulleman et al. (2010), we identified two components of performance-approach goals: three normative items (trying to do better than others) and one appearance item (trying to look good to others). Performance-avoidance goals were assessed with two items that were based on items developed by Schwinger and Wild (2006). The items addressed the focus on avoiding the demonstration of incompetence (appearance component). For example, "It is important to me that others do not think I am stupid". Despite the small number of items the internal consistency was quite satisfactorily ($.62 < \alpha < .88$). All items were reverse coded so that high scores on the final scales indicated high levels of achievement goals (see Appendix for the item list).

2.2.2. Achievement

Student school grades from Grade 4 to Grade 5 were used as a measure of school achievement. In the middle of Grade 4 (assessed at the end of Grade 4 in retrospect) the grades in German, mathematics, foreign language, and social studies using the six-level grading system implemented throughout Germany were obtained by the teachers. At the beginning of Grade 6 students reported the grades they had in the middle und at the end of Grade 5 in German, mathematics, and foreign language. We reverse coded these grades, resulting in the following six rating levels: excellent (6), good (5), satisfactory (4), sufficient (3), poor (2), and very poor (1). We computed a GPA for three time points (middle of Grades 4 and 5, end of Grade 5) by taking the mean of the individual grades.

2.2.3. Basic cognitive abilities

We also assessed the basic cognitive abilities of students using a German test of figural cognitive abilities (KFT; Heller & Perleth, 2000), which is frequently administered in large-scale studies. The test was administered in two parallel versions (version A: α = .92, version B: α = .93). Students had to draw analogies between figures. A couple and the half of a second couple of figures were given. Students had to choose the missing part of the second figure answer (one out of five) that had the same connection to the missing part than figure one.

2.2.4. Socio-economic status (SES)

Socioeconomic status of the family was measured by the International Socioeconomic Index (ISEI) proposed by Ganzeboom, de Graaf, Treiman, and de Leeuw (1992) (see also Ganzeboom & Treiman, 1996). The highest value for mother or father was used.

2.3. Data Analysis

Analyses were conducted using the M*plus* 6.1 program (Muthén & Muthén, 1998–2010). Missing data (achievement goals: Grade 4: appr. 0.5%, Grade 5: 6.5%, Grade 6: 19.3%, GPA: Grade 4: 13.5%, middle Grade 5: 8.3%, end Grade 5: 23%) were multiple imputed with M*plus*. Multiple imputation is a procedure in which missing data are imputed based on the available information (Graham, Cumsille, & Elek-Fisk, 2003). Five complete data sets were created by filling in a random value for each missing data point. M*plus* combines the results for each data set into an average result. Schafer and Olsen (1998) showed that multiple imputation can be used even when the proportion of missing data is rather large. When 30% of the data is missing, an efficiency of 94% can be achieved with already five imputations. Other treatments for missing data (e.g., listwise deletion, mean imputation) can lead to a biased statistical inference (Little & Rubin, 2002).

In the first step, the invariance of the measurement model (factor loadings) across groups was tested by means of a confirmatory factor analysis (CFA). All correlations between the factors were estimated freely.

To analyze the changes in achievement goals, we used growth curve analytic techniques (Latent Growth Curve Models, LGCM; cf. Bollen & Curran, 2006; Duncan, Duncan, & Strycker, 2006; Meredith & Tisak, 1990) and compared the different models with each other. LGCM is a tool for analyzing longitudinal data that permits an analysis of change on a latent level whereby random measurement errors are considered. Thus, inter-individual differences of change and different forms of change over time can be taken into account. The slope factor indicates the rate of change per time unit. The interpretation of the slope factor depends on the presumed time function. In a linear growth curve model, a linear growth per time unit is expected. However, this time function is not adequate in every case. In cases, where the growth trend is not known, it can be appropriate to estimate a model with an unspecified growth trend (Meredith & Tisak, 1990) in which the time function is not fixed *a priori* but is estimated from the data. For each achievement goal, we specified different growth curve models, starting with a linear growth rate and followed by an unspecified (freed-loading LGCM) growth rate (Bollen & Curran, 2006, Chap. 4). In the freed-loading LGCM, we fixed the first loading in the slope factor to 0, the third loading to 1, and freely estimated the remaining second loading. The estimated value of the second factor loading indicates the amount of change occurring between measurement occasions one and two relative to the amount of change occurring between measurement occasions two and three. For example, a value of .25 means that the amount of change occurring between occasions one and two is 25%, whereas 75% of the amount of change occurs between occasions two and three. In addition, we imposed equality restrictions on the disturbance terms of the repeated measures. However, as the assumption of homoscedasticity was rejected by our data in most cases, we conducted our baseline models with time-invariant disturbance terms of the repeated measures. To test whether coefficients differed across the different school tracks, we ran multi-group models for academic and non-academic tracks. To consider the nested structure of the data, we used the command type = general complex. The analyses were computed with the MLR estimator (maximum likelihood estimation with robust standard errors). As the value of the chi-square statistic tends to increase along with the sample size, we considered approximate fit indices such as the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation index (RMSEA) for model evaluation. A very good

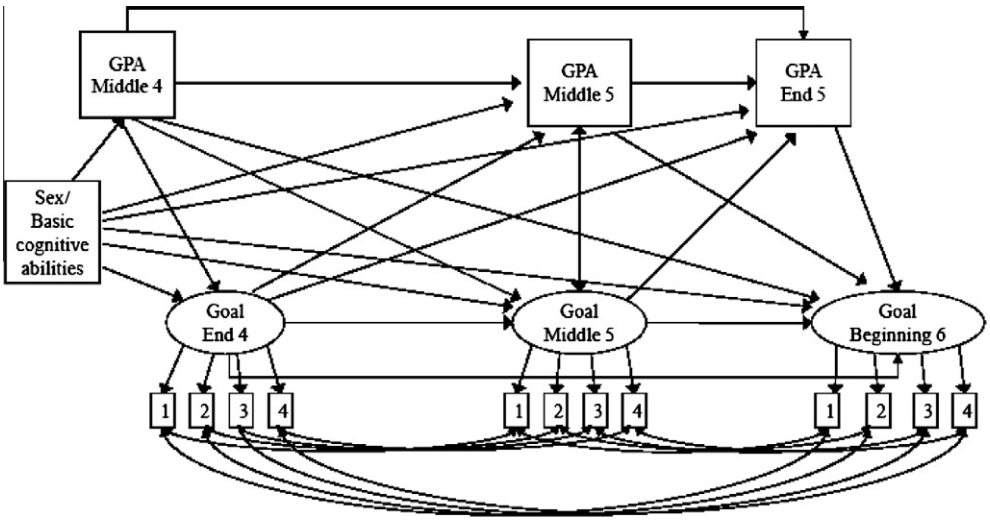

Fig. 1. A priori model of causal paths between GPAs (GPA) and achievement goals (goal). For clarity, only a general achievement goal factor was pictured (goal) rather than all three types of achievement goals (mastery-approach, performance-approach and performance-avoidance goals). Achievement goals were inferred from four indicators for mastery-approach/performance-approach goals and two indicators from performance-avoidance goals. The double arrow between GPA middle 5 and goal middle 5 represents the covariance between the residuals of GPA middle 5 and goal middle 5.

fit is indicated by a value greater than 0.95 for the CFI and TLI and by a value less than 0.06 for the RMSEA (Hu & Bentler, 1999; Yu, 2002).

To analyze the association between achievement goals and school achievement, we conducted cross-lagged panel models (Kenny, 1975). With regard to the time points T2 and T3, we used school-track centering for the GPA within the non-academic track to take into account the frame-of-reference effect on grading. Achievement goals were modeled as latent variables, constraining the factor loadings for each pair of repeated measures to be homogeneous over time. In addition, correlated errors have been specified for each pair of repeated measures (Marsh & Yeung, 1997). The model consisted of 36 path coefficients relating the 12 constructs (nine achievement goals and three GPAs), whereby 15 of these paths were of critical importance: the six paths leading from each achievement goal to the subsequent GPA and the nine paths leading from the GPA to the subsequent achievement goal (see Fig. 1 for a simplified model). To test whether path coefficients differ across the different school tracks, we ran multi-group models for academic and non-academic tracks. Five different cross-lagged panel models (CLPM) with different constraints were compared. All paths were estimated freely in model 1. In model 2, all autoregressive paths (stability coefficients between T1 and T2 and between T1 and T3) were constrained to be equal across academic and non-academic tracks. In model 3, all paths from previous GPAs to subsequent achievement goals, and in model 4, all paths from previous achievement goals to subsequent GPAs, were set equal across the different school tracks. In model 5, the paths from previous GPAs to subsequent achievement goals, and vice versa, were constrained to be equal across the school tracks. The model comparison was performed by using chi-square difference tests. In all models, we controlled for gender and basic cognitive abilities to ensure that the associations of interest between achievement goals and school achievement as well as differences between the school tracks would not be caused by students gender or basic cognitive ability level. Studies that included sex and cognitive ability in their analyses showed gender differences in the level of achievement goals. For example, girls preferred mastery goals stronger than boys (Hijzen, Boekaerts, & Vedder, 2006). Meece and Jones (1996) examined students achievement goals in science (Grade 5 and 6) and found that differences in self-reports of motivation were more related to students ability level than to gender. For achievement goals gender differences occurred only for low-ability students: Boys reported a stronger mastery orientation than did girls. There were no gender differences in students mastery orientation among average- and high-ability students.

3. Results

3.1. Descriptive statistics

Table 1 presents means, standard deviations, and internal consistency reliabilities for the three achievement goal scales and the GPAs from T1 to T3 for the academic and non-academic track. The mean level of all types of achievement goals declined from Grade 4 to Grade 6 in both tracks. However, there were some differences in the mean levels across the tracks. Mastery-approach goals differed only slightly across school tracks (Fig. 2), whereas the mean levels of performance-approach and performance-avoidance goals were higher for non-academic track students (see Figs. 3 and 4). We tested for the significance of the differences in the mean levels of the achievement goals between the school tracks by comparing two models. In model 1, we equated the means between the school tracks while in model 2, we freely estimated the means. Chi-square difference tests revealed significant mean level differences between the school tracks for mastery-approach goals in Grade 4, which was slightly higher for the academic track (results of the χ^2-difference tests: $\chi^2 = 6.55$, $df = 1$, $p < .01$); track difference was approximately .13 standard deviation. However, the tests did not reveal significant mean level differences for Grades 5 and 6 (Grade 5: $\chi^2_{Diff} = 1.11$, $df_{Diff} = 1$, $p > .05$; Grade 6: $\chi^2_{Diff} = 0.52$, $df_{Diff} = 1$, $p > .05$). With respect to both types of performance goals, the mean levels differed between the school tracks at all three time points (performance-approach goals Grade 4: $\chi^2_{Diff} = 45.60$, $df_{Diff} = 1$, $p < .001$; Grade 5: $\chi^2_{Diff} = 44.52$, $df_{Diff} = 1$, $p < .001$; Grade 6: $\chi^2_{Diff} = 36.86$, $df_{Diff} = 1$, $p < .001$; performance-avoidance goals Grade 4: $\chi^2_{Diff} = 20.19$, $df_{Diff} = 1$, $p < .001$; Grade 5: $\chi^2_{Diff} = 35.71$, $df_{Diff} = 1$, $p < .001$; Grade 6: $\chi^2_{Diff} = 31.53$, $df_{Diff} = 1$, $p < .001$), thus indicating lower means for students in the academic track. The means differed by about one third (performance-approach) and one fourth (performance-avoidance) of a standard deviation.

As a result of the different grading practices, school grades decreased in the academic track and increased in the non-academic track (see Fig. 5). We tested for differences in the GPAs mean levels between the school tracks. Chi-square difference tests revealed substantial and significant mean level differences between the

Table 1
Descriptive measures: Means (M), standard deviations (SD) and reliabilities (α) of achievement goals and GPAs in academic and non-academic tracks from T1 to T3.

Scales	Academic track			Non-academic track		
	M	*SD*	α	*M*	*SD*	α
MAP 4th	3.57	0.45	.74	3.51	0.49	.78
MAP 5th	3.46	0.46	.73	3.44	0.47	.74
MAP 6th	3.21	0.48	.73	3.21	0.49	.73
PAP 4th	2.42	0.87	.84	2.72	0.82	.88
PAP 5th	1.88	0.74	.87	2.14	0.79	.86
PAP 6th	1.71	0.65	.67	1.92	0.75	.88
PAV 4th	2.93	0.65	.77	3.08	0.66	.62
PAV 5th	2.50	0.76	.74	2.70	0.65	.75
PAV 6th	2.14	0.88	.84	2.36	0.74	.85
GPA Middle 4th grade	4.12	0.45	.68	3.20	0.63	.58
GPA Middle 5th grade	3.61	0.68	.75	3.29	0.61	.62
GPA End 5th grade	3.56	0.67	.75	3.28	0.61	.61

Note: M = mean. SD = standard deviation. MAP = mastery-approach goal. PAP = performance-approach goal. PAV = performance-avoidance goal.

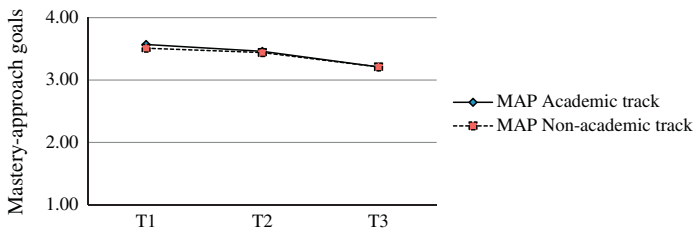

Fig. 2. Means of achievement goals from Grades 4 to 6 for academic and non-academic tracks. T1 = end of Grade 4. T2 = middle of Grade 5. T3 = beginning of Grade 6.

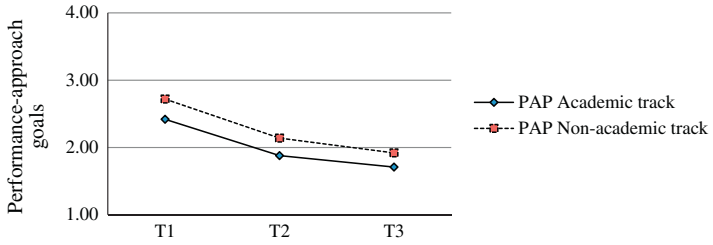

Fig. 3. Means of achievement goals from Grades 4 to 6 for academic and non-academic tracks. T1 = end of Grade 4. T2 = middle of Grade 5. T3 = beginning of Grade 6.

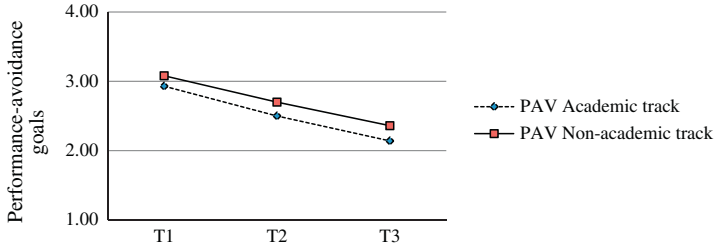

Fig. 4. Means of achievement goals from Grades 4 to 6 for academic and non-academic tracks. T1 = end of Grade 4. T2 = middle of Grade 5. T3 = beginning of Grade 6.

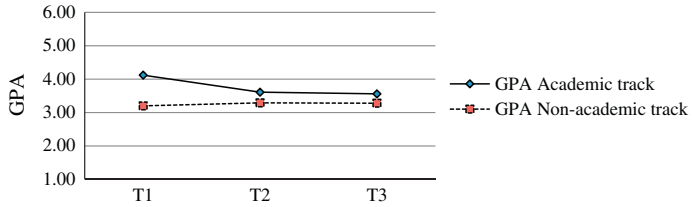

Fig. 5. Means of GPAs from Grades 4 to 6 for academic and non-academic tracks. T1 = middle of Grade 4. T2 = middle of Grade 5. T3 = end of Grade 5.

school tracks for GPAs in Grade 4 ($\chi^2_{Diff} = 675.47$, $df_{Diff} = 1$, $p < .001$), there was not a significant difference in Grades 5 and 6 (Grade 5: $\chi^2_{Diff} = 1.78$, $df_{Diff} = 1$, $p > .05$; Grade 6: $\chi^2_{Diff} = 2.64$, $df_{Diff} = 1$, $p > .05$). On average, the mean GPA in Grade 4 of students who were selected to the Gymnasium was approximately 1.5 standard deviations higher than that of their peers who were assigned to a non-academic track.

Table 2 presents correlation coefficients among the variables within each school track. Several findings are noteworthy. First, the positive correlation among mastery-approach and both types

Table 2
Zero-order correlations among achievement goals and grades.

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. MAP 4th	–	.37	.25	.37	.16	.09	.40	.18	.09	−.02	.02	.03
2. MAP 5th	.34	–	.49	.18	.17	.10	.16	.22	.06	.01	.05	.09
3. MAP 6th	.25	.29	–	.10	.15	.14	.10	.15	.11	.08	.10	.11
4. PAP 4th	.39	.22	.13	–	.51	.40	.81	.45	.37	−.17	−.18	−.15
5. PAP 5th	.11	.24	.17	.37	–	.61	.42	.76	.51	−.06	−.09	−.07
6. PAP 6th	−.00	.11	.22	.32	.55	–	.32	.45	.76	−.07	−.03	−.02
7. PAV 4th	.42	.21	.09	.81	.31	.22	–	.44	.34	−.11	−.13	−.11
8. PAV 5th	.10	.30	.16	.20	.76	.43	.27	–	.47	−.09	−.11	−.11
9. PAV 6th	.04	.14	.26	.29	.50	.78	.24	.46	–	−.07	−.06	−.05
10. GPA Middle 4th grade	.08	.02	.03	−.16	−.14	−.11	−.06	−.05	−.11	–	.51	.52
11. GPA Middle 5th grade	.06	.03	.00	−.11	−.08	−.12	−.03	−.05	−.12	.38	–	.85
12. GPA End 5th grade	.07	.09	.07	−.09	−.10	−.13	−.02	−.06	−.12	.40	.76	–

Note: Academic track students ($n = 928$) are shown above the diagonal. Non-academic track students ($n = 718$) are shown below the diagonal. MAP = mastery-approach goal. PAP = performance-approach goal. PAV = performance-avoidance goal. Coefficients greater than .09 in absolute value for academic track and .11 for non-academic track are statistically significant at $p < .01$.

Table 3
Multi-group latent growth curve models: Results from model comparisons.

Growth rate	χ^2	*df*	*p*-Value	CFI	TLI	RMSEA
MAP						
M1 (Linear)	50.26	5	<.001	.916	.899	.105
M2 (Unspecified)	5.09	4	.28	.998	.997	.016
ΔM1–M2	45.17	1	<.001			
PAP						
M1 (Linear)	134.16	5	<.001	.862	.835	.178
M2 (Unspecified)	18.97	4	<.001	.984	.976	.067
ΔM1–M2	115.19	1	<.001			
PAV						
M1 (Linear)	13.13	5	<.05	.987	.985	.044
M2 (Unspecified)	6.39	4	.17	.996	.994	.025
ΔM1–M2	6.73	1	<.001			
GPA						
M1 (Linear)	1588.93	5	<.001	.056	.132	.623
M2 (Unspecified)	12.16	4	<.05	.995	.993	.045
ΔM1–M2	1576.77	1	<.001			

Note: MAP = mastery-approach goal. PAP = performance-approach goal. PAV = performance-avoidance goal. CFI = comparative fit index, TLI = Tucker-Lewis index, RMSEA = root mean square error of approximation. Equated factor loadings and disturbance terms of repeated measures across groups.

of performance goals decreased significantly after the transition in both school tracks (from $r = .39$ down to $r = .22$ for performance-approach goals, $z = 6.82$; from $r = .42$ down to $r = .26$ for performance-avoidance goals, $z = 6.58$). Second, there were no or only very low correlations between achievement goals and GPAs ($.00 < r < -.18$). While the non-academic track student mastery-approach goals showed no significant correlation to GPAs ($.00 < r < .09$), there was a significant positive correlation for academic track students in Grade 6 ($r = .11$, $p < .01$). Performance-approach and performance-avoidance goals showed low negative correlations with GPAs in both tracks ($-.02 < r < -.18$). The correlations between performance-approach goals in Grade 4 and GPAs were significant and negative in both school tracks (academic track: $-.15 < r < -.18$, $p < .01$; non-academic track: $-.11 < r < -.16$, $p < .01$), whereas later correlations were significant only in non-academic tracks ($-.10 < r < -.14$, $p < .01$). Only performance-avoidance goals in Grade 6 were significantly negative related to GPAs in non-academic tracks ($-.11 < r < -.12$, $p < .01$), whereas in academic tracks, performance-avoidance goals in Grade 5 were also significantly negative correlated to GPAs ($-.11$, $p < .01$).

3.2. Growth curve models

To test the changes in achievement goals and GPA, we used multi-group growth curve analytic techniques and compared growth curve models with two different time functions, that is, linear vs. unspecified. For all three types of achievement goals and for GPAs, a model with an unspecified time function showed a significantly better model fit than a model with a linear time function (see Table 3). The slope factor of mastery-approach goals (T2: −.278) indicated that 27.8% of the change occurred during the first half of the school year in secondary school. With respect to both types of performance goals, the percentage of change during the first half of the school year in Grade 5 was much higher at 73.3% for performance-approach goals (slope factor T2: −.733) and 55.5% for performance-avoidance goals (slope factor T2: −.555). The results for student GPAs showed a change of 90.2% between T1 and T2 (slope factor T2: −.902).

In an additional step, we tested for differences in the trajectories (factor loadings, disturbance terms of repeated measures) across school tracks. For mastery-approach, performance-approach goals and GPAs, a model with equated factor loadings and disturbance terms across the school tracks but with differing disturbance terms of the repeated measures showed the best model fit (mastery-approach goals: $\chi^2 = 5.09$, $df = 4$, $p > .05$, RMSEA = .016, CFI = .998, TLI = .997; performance-approach goals: $\chi^2 = 18.97$, $df = 4$, $p < .001$, RMSEA = .067, CFI = .984, TLI = .976; GPA: $\chi^2 = 14.84$, $df = 4$, $p < .01$, RMSEA = .057, CFI = .994, TLI = .991). For performance-avoidance goals, a model with equated factor loadings and disturbance terms of the repeated measures and across the groups fit the data best ($\chi^2 = 8.71$ $df = 6$, $p > .05$, RMSEA = .022, CFI = .996, TLI = .996).

3.3. Cross-lagged panel models

The results of the CFAs revealed invariance of the measurement model across the groups. The model fit of a model with invariant factor loadings across groups was not significantly worse than a model with group-specific factor loadings (see Table 4).

Table 4
Goodness of fit of the cross-lagged panel models.

Model	Equality constraints across groups				Fit indices					
	FL	AR	GPA ON AG	AG ON GPA	χ^2	df	*p*	CFI	TLI	RMSEA
Confirmatory factor analysis (CFA)										
M1					1804,16	727	.000	.946	.936	.042
M2	x				1814,44	734	.000	.946	.936	.042
ΔM2–M1					10,27	7	.174			
Cross-lagged panel model (CLPM)										
M1	x				2544,96	980	.000	.933	.919	.044
M2	x	x			2586,71	992	.000	.932	.918	.044
M3	x	x	x		2604,01	1001	.000	.931	.918	.044
M4	x	x		x	2604,55	1007	.000	.931	.918	.044
M5	x	x	x	x	2621,59	1016	.000	.930	.920	.044
ΔM2–M1					41,75	1200	.000			
ΔM3–M2					17,30	900	.044			
ΔM4–M2					13,03	800	.111			
ΔM5–M2					34,88	2400	.070			
ΔM5–M1					76,63	3600	.000			
M6	x	x1	x2	x	2583,57	1012	.000	.932	.921	.043
ΔM6–M1					38,61	3200	.195			

Note: FL = factor loadings, AR = autoregressive coefficients, GPA = grade point average, AG = achievement goals, χ^2 = Chi-square, df = degrees of freedom, 1 = free estimation of autoregressive coefficients between grades, 2 = free estimation of GPA (T2) on PAP (T1).

Table 5
Parameters of the final two-group cross-lagged panel model.

Paths	Unstandardized estimates	SE
Stability		
MAP End 4 → MAP Middle 5	.43***	.035
MAP End 4 → MAP Beginning 6	.09*	.046
MAP Middle 5 → MAP Beginning 6	.59***	.054
PAP End 4 → PAP Middle 5	.39***	.026
PAP End 4 → PAP Beginning 6	.08***	.024
PAP Middle 5 → PAP Beginning 6	.50***	.031
PAV End 4 → PAV Middle 5	.48***	.044
PAV End 4 → PAV Beginning 6	.23***	.052
PAV Middle 5 → PAV Beginning 6	.56***	.046
GPA Middle 4 → GPA Middle 5	.67***/.39***	.061/.048
GPA Middle 4 → GPA End 5	.13***	.034
GPA Middle 5 → GPA End 5	.77***/.68***	.028/.035
From achievement goal to GPA		
MAP End 4 → GPA Middle 5	.14*	.063
MAP End 4 → GPA End5	−.02	.046
PAP End 4 → GPA Middle 5	−.10**/−.03	.032/.038
PAP End 4 → GPA End5	.02	.018
PAV End 4 → GPA Middle 5	.02	.054
PAV End 4 → GPA End5	.01	.035
MAP Middle 5 → GPA End 5	.12***	.034
PAP Middle 5 → GPA End 5	−.02	.020
PAV Middle 5 → GPA End 5	−.02	.030
From GPA to achievement goal		
GPA Middle 4 → MAP End 4	.06*	.026
GPA Middle 4 → PAP End 4	−.15***	.044
GPA Middle 4 → PAV End 4	.01	.033
GPA Middle 4 → MAP Middle 5	.00	.024
GPA Middle 4 → PAP Middle 5	−.01	.036
GPA Middle 4 → PAV Middle 5	−.01	.036
GPA Middle 4 → MAP Beginning 6	.03	.029
GPA Middle 4 → PAP Beginning 6	−.01	.038
GPA Middle 4 → PAV Beginning 6	.02	.047
GPA Middle 5 → MAP Beginning 6	−.03	.029
GPA Middle 5 → PAP Beginning 6	−.03	.041
GPA Middle 5 → PAV Beginning 6	−.05	.047
GPA End 5 → MAP Beginning 6	.03	.036
GPA End 5 → PAP Beginning 6	.03	.043
GPA End 5 → PAV Beginning 6	.00	.052

Note: MAP = mastery-approach goal. PAP = performance-approach goal. PAV = performance-avoidance goal. SE = standard error. The coefficient before the slash is for the academic track, behind the slash for the non-academic track.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

To analyze the association between achievement goals and school achievement, cross-lagged panel models were conducted. First analyses revealed that the socio-economic status was not or only slightly related to students achievement goals at the single school tracks. For this reason, we did not include SES in our models. However, we controlled for sex and cognitive ability at every occasion.

The results of the cross-lagged panel models and the model comparisons revealed that the model fit worsened when equality restrictions across groups were imposed on the autoregressive coefficients as well as on the coefficients from previous achievement goals to subsequent GPAs. Therefore, in an additional step, we tested for differences across the academic and the non-academic track by estimating paths freely, one at a time. A model where all but three paths were constrained to be equal across the school tracks fit the data best: the path between performance-approach goals in Grade 4 and GPA in the middle of Grade 5 and the paths between each GPA differed significantly across academic and non-academic tracks. The freely estimated paths between each GPA showed that the GPAs were less stable in non-academic tracks than in academic tracks.

Table 5 shows the results of the final CLPM while always controlling for the other achievement goals, gender, and basic cognitive abilities. GPA in the middle of Grade 4 predicted mastery-approach goals positively (.06, $p < .05$), and performance-approach goals were predicted negatively (−.15, $p < .001$) at the end of Grade 4. Performance-approach goals in Grade 4 negatively predicted achievement after the transition to the academic track in secondary school (−.10, $p < .01$). Furthermore, mastery-approach goals predicted later higher school achievement, both in the academic and the non-academic tracks (cross-lagged effects) (.14, $p < .05$ and .12, $p < .001$). Performance-avoidance goals did not predict achievement at any time point or for any school track.

The remaining path coefficients, those relating nonadjacent constructs (e.g., GPA in the middle of Grade 4 to achievement goal at the beginning of Grade 6), were non-significant.

4. Discussion

Our main goals in this study were to examine the changes in achievement goals and the relations between achievement goals and school achievement in two different school tracks (academic vs. non-academic) after the transition from primary to secondary school. Our central research questions and hypotheses were as follows. Can we find an overall decline in all three types of achievement goals or an increase in performance-approach goals? Are there any differences between the school tracks? How are achievement goals related to school achievement before and after the transition? We expected a positive relation between mastery-approach goals and school achievement before and after the transition. For performance-approach goals, a negative association with school achievement was expected in elementary school. Do performance-approach goals predict achievement positively after the transition? Are there any differences between the predictive patterns of achievement goals in the different school tracks?

Our results revealed an overall decline in all three types of achievement goals from Grade 4 to 6 in each school track. Hence, our findings are much in line with findings from other German studies (Finsterwald, 2006; Schwinger & Wild, 2006) and with studies in the US as well (Bong, 2009; Shim et al., 2008). Accordingly, from a developmental perspective our study does not lend support for the view that students' performance-approach goals increase during this developmental phase.

Since we were able to investigate transition effects after Grade 4 — when the transition is detached from the onset of puberty — our findings imply that a decrease in students' achievement goals after transition to secondary school may be predominantly associated with the transition itself and with the changes in the learning environment rather than with the onset of puberty. Moreover, performance goals, especially performance-approach goals, declined much more rapidly than mastery-approach goals during the first half of the school year in secondary school, three-fourths of the change in performance-approach and more than half of the change in performance-avoidance goals occurred. It might be very unlikely that general developmental processes are responsible for the strong decrease of both types of performance goals during the short period directly after the transition. Thus, on the basis of these findings we suggest that the transition to secondary school and the changes that come along with that transition impact especially on performance-approach and performance-avoidance goals.

Perhaps one of the most important findings is the absence of any consistent empirical support for a substantial difference between the different school tracks regarding the changes in

achievement goals. This is a noteworthy finding given the differences between the tracks considered in the present study. First, tracking was very explicit in our study, and students were well aware of the track to which they were selected. Second, track membership was based on prior achievement. Although research findings indicate that students from families with a high socioeconomic status are more likely to being placed at Gymnasium than their counterparts from a less favorable family background who perform just as well (Baumert & Schümer, 2001), prior achievement level remains the most important predictor of track membership (see also Fig. 5). Third, track membership has a direct impact on students' future educational and vocational outcomes. Fourth, the instruction is delivered at higher levels of cognitive activation at Gymnasium and the performance standards are lower in the non-academic school tracks. Despite these differences between both tracks, the shape of the achievement goals trajectories as well as the rate of change was rather similar across the tracks. This indicates that explicit between-school tracking plays a minor role in the development of achievement goals. This is even more noteworthy, considering that other psychosocial characteristics like academic self-concept and intrinsic motivation have shown to be strongly influenced by between-school tracking (Lucas, 1999; Trautwein et al., 2006).

Our third research question referred to the relation between achievement goals and school achievement in elementary school and secondary school. Similar to other studies with students at this age (e.g., Bong, 2009; Lau & Nie, 2008), we found relatively low correlations between achievement goals and school achievement in elementary school. The highest zero-order correlation we found did not exceed .18. Overall, our hypothesis that mastery-approach goals are positively associated with school achievement was confirmed by our study. On the one hand, results of the cross-lagged panel models suggested that there was a positive relation between mastery-approach goals and school achievement in elementary school. On the other hand, school achievement after the transition to secondary school was predicted by mastery-approach goals. Considering that in our cross-lagged panel analysis we were able to control for prior achievement, other types of achievement goals, gender, and basic cognitive abilities this is a quite noteworthy result. Again, differences between the school tracks in the predictive pattern of mastery-approach goals could not be found. Mastery-approach turned out to be beneficial for learning processes independent from different levels of cognitive activation and the intended curriculum in the classroom.

As expected, performance-approach goals were negatively related to school achievement in elementary school. This type of achievement goal has shown to be disadvantageous for the achievement of young students. In fact, after the transition to secondary school, school achievement was negatively predicted by performance-approach goals even if only at the academic track. The more performance-approach goal oriented the students were in elementary school, the worse their GPAs later on in secondary school. However, performance-approach goals lost their detrimental effect on learning afterwards. Hence, contrary to our expectations, performance-approach goals did not predict school grades positively after the transition to secondary school. As suggested by Middleton et al. (2004), we found that performance-approach goals had a negative effect on school achievement as early as elementary school or vice versa, that is, school achievement potentially negatively influenced the adoption of performance-approach goals. The direction of this relation is empirically rather unclear as we assessed the variables shortly after another. We can confirm, however, that performance-approach goals are negatively associated with academic achievement for young students (Midgley et al., 2001).

Moreover, our study has shown that grades did not predict subsequent achievement goals, which is also an important finding because some researchers have identified perceived competence as a probable precursor to goal adoption (Elliot & Church, 1997), even though perceived competence is not equivalent to grades. It was argued that students with high perceived competence would be likely to endorse approach goals, whereas students with low perceived competence would be likely to adopt avoidance goals. As grades are known to be the most important source for a student's perceived competence, our results do not support this argument with respect to the transition from primary to secondary school.

There are a few limitations worthy of consideration. First, we measured achievement goals only as domain-general, not as domain-specific, separately for each school subject. Current research is not clear on this issue. Some researchers are convinced that achievement goals are domain-general (e.g., Köller & Baumert, 1998; Nicholls, 1992), while others argue achievement goals are domain-specific (Middleton & Midgley, 1997; Miller, Behrens, Greene, & Newman, 1993; Wigfield & Eccles, 1992; Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991). Recent studies differentiated between mastery and performance goals and suggested that performance goals (performance-approach and performance-avoidance goals) are domain-general and mastery-approach goals are domain-specific (Bong, 2001; Sparfeldt, Buch, Wirthwein, & Rost, 2007). Since we did not assess achievement goals domain-specific, we cannot be certain that achievement goals do not differ among single school subjects.

Second, we only assessed grades as indicators of achievement. However, grades are considered less objective than standardized tests. Furthermore, there are differences in teachers' judgments about student academic achievement (grading) between elementary and secondary schools and between the school tracks that should not be neglected. The reference group plays an important role when students are graded (Südkamp & Möller, 2009), whereas standardized tests provide more objective information about student achievement. Especially the change of teachers between Grades 4 and 5 makes a comparison of student́s achievement even much more difficult.

Third, it was not possible to disentangle effects of psychosocial development from tracking effects, because the transition into different school tracks was confounded with the developmental phase that is assumed to be important for students' psychosocial development.

Finally, as Hulleman et al. (2010) showed, the association between achievement goals and school achievement is not independent from the measurement instruments that were used and the operationalization of the constructs. Results concerning the development of achievement goals are mixed up in the literature too, also depending on the measurement instruments that were used. As far as the development of achievement goals is concerned, our findings seem to be in line with the results of studies that used the revised version of the PALS (Patterns of Adaptive Learning Scales, Midgley et al., 2000). Thus, to ensure that our results are not specific to the measurement instrument used, studies are required, that systematically investigate the effects of different questionnaires.

Our results extend previous findings that investigated the changes in achievement goals and their relation to school achievement because we included different school tracks in our study. We confirmed an overall decline of achievement goals during the transition from elementary to secondary school. Furthermore, the results demonstrate that prior mastery-approach goals have significant effects on subsequent school achievement beyond the effects of prior achievement (gender and cognitive abilities), and

independent of the school track. Our study also demonstrates that performance-approach goals are detrimental for school achievement in elementary school and during the transition to the academic track, and that they lose their negative impact in secondary school.

Appendix A

List of the achievement goal items.

Items It is important to me...
Mastery-approach goals (Midgley et al., 2000)
...to learn as much as possible.
...to master a lot of new skills.
...that I thoroughly understand my class work.
...that I improve my skills.
Performance-approach goals (Köller & Baumert, 1998)
...that I know more than other students in my class.
...that the teacher thinks I am the best student.
...that I am the only one who knows the right answer.
...that I solve more task correctly than my classmates.
Performance-avoidance goals (Schwinger & Wild, 2006)
...that I do not make a fool of myself in front of my classmates.
...that others do not think I am stupid.

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