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PREDICTORS OF THE DROP IN SCHOOL MARKS IN SECONDARY SCHOOL: EVIDENCE FOR EFFECTS OF STUDENTS' SOCIO-DEMOGRAPHIC BACKGROUND

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ABSTRACT

Referring to the stage environment fit theory (Eccles and Midgley, 1989) we examined whether after the transition from Luxembourgish primary to secondary school students' school marks would drop. Actually, using latent growth curve modeling it was found that school marks deteriorated in their main school subjects German, French, and mathematics. The drop of school marks was larger in mathematics than in languages. Moreover, the drop of school marks was affected by various socio-demographic variables as the students' gender, their socio-economic background, and their ethnicity. This finding stimulates the assumption that certain subpopulations of students in Luxembourg receive different support in school, regardless of their academic competences. However, even students' competences were predictive of the development of their school marks. In the vocational track, high achievers were more likely to drop in school marks than low achievers. We presume that this result indicates a lack of academic challenges in the vocational track, which might eventually hinder better performing students in keeping their initial high achievement level.

1. INTRODUCTION

Virtually all students experience one or more transitions between schools during their entire school career. Particularly for the transition from primary to secondary school, Eccles and Midgley (1989) proposed in their stage-environment fit theory that negative developmental changes might result from the fact that secondary schools often do not provide developmentally appropriate educational environments for young adolescents. The exposure of adolescent students to developmentally inappropriate environments might lead do declines in both the students' motivation to learn, and their attachment to the goals of the school (Eccles and Roeser, 2009). These declines may then result in poorer achievements and/or school marks of the students after the transition (Blyth *et al.*, 1978; Alspaugh and Harting, 1995; Alspaugh, 1998; Smith, 2006; Kuhn and Fischer, 2011). To our knowledge, no study so far has examined whether the drop of school marks in secondary school is affected by socio-demographic characteristics of the students, and whether this potential influence is identical in different school tracks and for different school subjects. Therefore, the present study aimed at closing this research gap by investigating whether the development of school marks obtained in grades 7, 8, and 9 was affected by students' gender, their ethnicity, and their socio-economic status, while controlling for their proficiency level as assessed by standardized tests. Moreover, we investigated the presumed decline in school marks separately for the different school tracks in secondary school and for the main school subjects. For the purpose of this study, a Luxembourgish sample of secondary-school students was used. All analyses were done using latent growth curve modeling.

1.1. The Transition from Primary School to Secondary School

At the end of primary school, which is—depending on the state or the country—in 4th or 6th grade, most of the students are familiar with the school environment, which—among others—consists of their teachers, their classmates and peers, the physical buildings, the curriculum and the temporal schedules. This familiar environment will be lost after the transition to secondary school. In hierarchical school systems, as they are prevalent in Luxembourg, Germany, Austria, Switzerland, and some other European countries, the primary-school students are separated into different school tracks according to the achievements they showed in the final year of primary school. These environmental changes are contrasted by the changing needs of students being in puberty, which—among others—are opportunities for autonomous decision making along with an optimal level of structure provided by the school (Eccles *et al.*, 1993) emotional and social support (Malecki and Demaray, 2002) peer orientation (Simmons and Blyth, 1987) and self-focus (Simmons and Blyth, 1987; Eccles *et al.*, 1993).

1.2. The Stage-Environment Fit Theory

A theory that might account for the students' difficulties in secondary school is the stage-environment fit theory proposed by Eccles and co-workers (Eccles and Midgley, 1989; Wigfield *et al.*, 1996; Eccles and Roeser, 2009). According to this theory, problems would arise when there is a misfit between processes and needs occurring during students' development, and the opportunities afforded to them in their schools. For a student progressing through early puberty, switching from primary school to secondary school may not be entirely appropriate, and academic difficulties may arise as a result. Furthermore, transitions into tracked school systems are done on the basis of a supposed best fit between a requirements profile corresponding to a certain school track and the proficiency profile of the student. However, this matching might also lead to situations of misfit, especially if the proficiency profile of the student is partly in correspondence with the requirements profile of the school track, but partly also considerably deviates from it.

Since between-class tracking becomes more common in secondary school, the curriculum is differentiated across different tracks, from which follows that students of different ability levels are provided with different kinds of academic work, classmates, teachers, and teaching methods (Oakes, 2005; Eccles and Roeser, 2009). Especially at lower tracks, teachers show lower qualifications and provide students with less academic input (Oakes, 2005). Moreover, especially in school systems with hierarchical school tracks (e.g., in Luxembourg), the transition to secondary school means that students have to change not only the entire school location, but will also get acquainted with a large number of unknown students who were not members of their primary school, and will lose a substantial part of their peers due to the separation of the school tracks.

1.3. Consequences of the Misfit on Student School Marks

After the transition (which is, depending on the duration of primary school, in most European countries between 5th grade and 7th grade; (Hörner *et al.*, 2007) school marks of the students are likely to drop (e.g., (Blyth *et al.*, 1978; Alspaugh and Harting, 1995; Alspaugh, 1998; Urdan and Midley, 2003; Smith, 2006; Kuhn and Fischer, 2011)). The decline of school marks typically starts in the first year after the transition and continues until the end of compulsory secondary school (Kuhn and Fischer, 2011). Whether or not the decline of school marks is due to the transition itself, or just its by-product, is difficult to examine, since an appropriate control group is rarely available. However, the temporal proximity of the drop in school marks and the time of transition, as well as reports from students indicating subjective difficulties with the new school environment (Feldlaufer *et al.*, 1988) make a causal relationship between transition and the drop of school marks at least plausible.

Several changes in the educational environment have been discussed as causes for the drop of school marks. For example, a decline in the teacher-student relationship is likely to correspond with lower engagement, less respect of self and others, more resistant behaviors, and lower achievement outcomes (Cornelius-White, 2007). Teachers

having lower self-efficacy beliefs are less likely to implement high-quality instructions and adequate teaching methods than teachers with high self-efficacy beliefs (Ross, 1998; Muijs and Rejnolds, 2001). Secondary-school tracking is likely to lead to high achieving students on the higher tracks and low achieving students on the lower tracks, although both students might have performed equally well in primary school (Schaltz and Klapproth, 2014). As opposed to primary school, secondary-school teachers use stricter and more social-comparison based standards to evaluate student performance (Randall and Engelhard, 2009). Different grading standards may not only lead to lower school marks, but could also result in a loss of motivation (Reeve, 2001) and a lowering of the students' academic self-concept (Hansford and Hattie, 1982; Skaalvik and Skaalvik, 2002) which in turn might affect their further achievement.

1.4. Student Characteristics That Might Affect the Development of Achievement after the Transition to Secondary School

1.4.1. Students' Ethnicity

Under certain circumstances, ethnic minority students have been shown to outperform their majority peers, particularly when they are male (Dekkers *et al.*, 2000) or when their socioeconomic status is low (Strand, 2014). However, usually ethnic minority students show poorer achievements in school compared to their majority peers (e.g., (Bankston and Caldas, 1997; Bacharach *et al.*, 2003)). The difference in achievement between different ethnicities is also mirrored in differences of teachers' grading (Farkas *et al.*, 1990) which occur at an early stage in the educational system and tend to persist for the remaining time in school (Cunha *et al.*, 2006; Hanushek and Rivkin, 2009). Differences in school marks in relation with students' ethnicities were also obtained from German-speaking countries (e.g., Bergmüller and Herzog-Punzenberger (2012)) and from Luxembourg (Carey and Ernst, 2006; Hadjar *et al.*, 2015). In Luxembourg, the majority of non-native students holds the Portuguese citizenship and speaks Portuguese at home (Hu *et al.*, 2015).

The effects of ethnicity on school marks may also extend to the development of school marks over time. Eccles and Roeser (2009) for example, cite several studies which showed that students of ethnic minorities suffer more from the size and bureaucratic structure of high schools compared to middle schools than majority students do, so that the achievement of the former drops more than that of the latter (e.g., (Darling-Hammond, 1997; Jackson and Davis, 2000)). Moreover, several further results suggest that immigrant students would experience more difficulties in secondary school compared to native students, which in turn could affect their achievement and grading. For instance, the literature documents ethnic differences in the teacher-student relationship. Specifically, teachers report fewer positive relationships with minority students (African American) than with majority students (Hamre and Pianta, 2001; Hughes and Kwok, 2007). This difference is particularly important since it has been found that the teacher-student relationship is more important for students from ethnic minorities than for students from native majorities (Brok *et al.*, 2010).

1.4.2. Students' Gender

Transition effects might also differ between boys and girls. With respect to grading, some authors found that even after controlling for achievement assessed by standardized tests, girls were graded better than boys both in primary school (Valtin *et al.*, 2005) and in secondary school (Stanat and Kunter, 2001; Helbig, 2010; Neumann *et al.*, 2010; Kuhl and Hannover, 2012). Differences in grading between males and females were also found to depend on the school subject. Female students are evaluated as performing lower in mathematics and science (Bacharach *et al.*, 2003; Fleischman *et al.*, 2010) and male students as performing lower in language proficiency (Fleischman *et al.*, 2010; Driessen and van Langen, 2013).

Students' gender seems also to correlate with the adaptation to a new school or classroom environment. Girls show on average more positive attitudes to school than boys (OECD, 2004). Additionally, girls usually enjoy going

to school more than boys (van Ophuysen, 2008; Segeritz *et al.*, 2010). Both a positive attitude to school and experiencing more joy in school might alleviate the subjective burden that comes along with the transition from primary to secondary school. Data from Luxembourg on drug abuse and violence in schools corroborate the assumption that girls are better adapted to secondary school than boys, as boys are more likely than girls to become victims or perpetrators, and more boys than girls reported having consumed drugs (Steffgen, 2009).

1.4.3. Students' Socioeconomic Status

The socioeconomic status (SES) of students has turned out to be one of the larger predictors of academic achievement. In a meta-analysis from Sirin (2005) the effect size between achievement and parental occupation (one frequently used indicator for the SES) was $d = 0.56$, with a tendency of an increase of effect sizes from primary school to secondary school. A low SES is often related to a lack of academic resources, lower levels of involvement in teaching and schooling, and the lack of knowledge about the language of learning (Hattie, 2009). Thus, students coming from low-SES families often academically lay behind their high-SES peers when starting school (Hart and Risley, 1995) and this disadvantage might even enlarge throughout successive grades (Ma and Wilkins, 2002). These findings suggest that at the beginning of secondary school, low-SES students would show lower achievements and hence lower school marks than high-SES students. Moreover, as the transition from primary to secondary school poses a challenge for all students experiencing this transition, the quality of home environment might attenuate or intensify the negative effects of the transition. Thus, poor families might not be able to provide their children with enough resources in order to smooth their transition process. Indeed, there is evidence that low SES individuals interpret ambiguous social events (of which the transition is an example) more negatively than high SES individuals (Chen and Matthews, 2001) because they maintain only few interpersonal and intrapersonal resources to deal with stressful events (Gallo and Matthews, 2003).

1.5. The Students' Academic Environment after the Transition to Secondary School

1.5.1. The School Tracks

In some European countries, secondary school is subdivided into different tracks, each of which serves a distinct curriculum and offers different final degrees. For example, in Luxembourg secondary school consists of an academic track and a vocational track, each offering different curricula with different achievement levels. The potential of both tracks in Luxembourg to alleviate students' transition processes may be different. In the academic track, the academic standards are higher, the students receive a higher amount of academic input, and they usually show higher learning rates than in the vocational track. These differences may suggest that students in the academic track would benefit more in terms of academic adjustment than those in the vocational track. However, in the vocational track, learning is less competitive, and the curriculum is more focused on the acquisition of vocational competences. Moreover, for students being at risk of failure, the vocational track offers programs aiming at supporting these students mainly in (foreign) language acquisition. Thus, the transition from primary to secondary school appears to be somewhat smoother in the vocational track than in the academic track.

1.5.2. The Academic Domains

Transition effects on achievement and school marks may not be equally sized in either academic domain. Alspaugh and Harting (1995) reported decreases in achievement test scores after transition from primary to secondary school for both reading and mathematics, with a tendency for higher losses in math in the first school year after transition, and a higher loss for reading than for math in the second school year after transition. In a Canadian study from Whitley *et al.* (2007) teacher ratings of students' achievements were lower for math than for reading after transition from primary to junior high school.

In a review of 39 studies, Cooper *et al.* (1996) could show that achievement test scores declined on average during the summer holidays. However, the effect of the summer break was more detrimental for mathematics than for reading and spelling. The authors attributed these differences to the different opportunities in summer holidays for practicing different academic material, with languages being more likely to be practiced than math.

As the transition from primary school to secondary school is interrupted by a quite long period of summer holidays, it is likely that all students lose some academic capabilities over the summer break and start secondary school with a greater loss in math than in languages. If both teachers and the curriculum do not try to catch up these losses, the differences may persist to occur or even grow in the following school year.

1.6. Research Questions and Hypotheses

With the present study three research questions were addressed. First, we aimed at examining whether after the transition from primary to secondary school a drop of school marks occurred in the first three grades (grade 7 to grade 9) of secondary school in the main school subjects. Grade 9 marks the end of compulsory schooling in Luxembourg, and after that students either continue their school career within their track, or leave school (with a few exceptions of students changing between tracks). Since the transition from primary to secondary school might result in a misfit between the students' needs and the school's demands (Midgley *et al.*, 1988) we assumed that in both school tracks school marks would on average drop from grade 7 to grade 9.

Second, we wanted to know whether the development of school marks was affected by the students' gender, their ethnicity, and their socioeconomic status. Since effects of gender, ethnicity, and socioeconomic status on school marks are often confounded with achievement, we controlled for achievement. As female students, students from ethnic majorities (often native students), and students with a comparatively high socioeconomic status usually are better graded than boys (Stanat and Kunter, 2001; Helbig, 2010; Neumann *et al.*, 2010; Kuhl and Hannover, 2012) ethnic-minority students (Bergmüller and Herzog-Punzenberger, 2012) and low-status students (Sirin, 2005) we supposed that this pattern of results would also occur with our sample of secondary-school students in Luxembourg, regardless of the school track.

We additionally expected that the decline of school marks would be stronger for boys than for girls, as girls have been shown to be better adapted to secondary school than boys (van Ophuysen, 2008; Steffgen, 2009; Segeritz *et al.*, 2010). Similarly, we expected a stronger drop of school marks for immigrant students than for native students, as the former have been shown to suffer more from the structure of secondary schools compared to native students (Darling-Hammond, 1997; Jackson and Davis, 2000). We also proposed a stronger decline of school marks for socioeconomically disadvantaged students, as differential growth rates have previously been found for low- and high-SES students (Ma and Wilkins, 2002). These effects should occur in both school tracks.

Third, we examined whether the school track exerted an effect on the development of school marks. This question addressed the fact that both tracks offered in Luxembourgish secondary school provide different levels of aid for students with language difficulties (less aid in the academic track and more aid in the vocational track). We therefore expected that the fit between the needs of the students and the demands of the schools with respect to languages would be better in the vocational track than in the academic track. Hence, we hypothesized that in the vocational track the drop in school marks would be stronger in math than in languages, whereas in the academic track no differences in the drop in school marks between the school subjects were expected to occur.

2. METHOD

2.1. The Sample

The data set of the present study consisted of two parts. The first part were data stemming from the national standardized achievements tests that were administered in Luxembourg at the end of primary school in 6th grade in school year 2008/2009. These data were supplied by the Luxembourgish Ministry of Education after the data files

had been anonymized. The second part were data obtained from national standardized achievement tests which were delivered at the beginning of 9th grade in school year 2011/2012. These data were provided by the Luxembourg Centre for Educational Testing (LUCET - University of Luxembourg), which developed these test in close cooperation with the Luxemburgish Ministry of Education. Moreover, the school marks obtained for the main subjects mathematics, French, and German from grade 7 through 9 were also supplied by the LUCET.

Both parts of the entire data set were merged such that—by using an arbitrary student ID—each student was assigned to both parts. We had access to data from 3,204 students in total, who switched from primary to secondary school in the school year 2008/2009. We discarded file entries from all students who changed from primary school to the lowest branch[1] of the vocational track (n = 218), since in this branch the grading system was different to that for the remaining students, and hence the comparability between these students and the remaining students was rather low. Additionally, we did not consider students for subsequent analyses who changed the track within the period of observation (from the vocational track to the academic track, or vice versa), or who were retained in grade (n = 412). This reduction of the entire sample was necessary since with track-changing students a distinct assignment to a single track was not possible. For students who were retained in grade, no achievement data were available for 9th grade since retention prolonged their school career for one year. Of the remaining students, there were 192 boys and girls of whom no information was provided with respect to their school marks or their school track. Hence, we excluded these students from subsequent analyses. This left a sample of 2,382 students on which all further analyses were based. Though many students were not included, the sample was representative for the whole same-age cohort student population, since essential characteristics of these students (e.g., gender, nationality, school track) were in close accordance with data from national statistics open to the public (Ministry of National Education and Vocational Training, 2010). The mean age of the students in school year 2008/2009 was 12.51 years (SD = 0.50). 51.1 % of the students were girls. About two-third of the students (68.0 %) of the entire sample were Luxembourgish. The largest non-Luxembourgish minority were students with a Portuguese background (17.5 %). 45.6 % of the students attended schools within the academic track, whereas 54.4 % went to schools belonging to the vocational track. In the academic track, 79.3 % were Luxembourgish, 7.3 % were Portuguese, and 13.4 % were from other countries. In the vocational track, the distribution of ethnicities was quite different. In this track, 57.3 % were Luxembourgish, 25.8 % were Portuguese, and 16.9 % were from other countries.

2.2. Instruments and Variables

2.2.1. Students' Academic Competences

In order to assess the academic competences of the students, we resorted to results obtained from a standardized academic achievement test, which was administered at the end of 6th grade. This test assessed the students' academic achievement in the curricular domains German, French, and mathematics. The test scores were standardized such that the population mean was fixed at 0, and the standard deviation was set to 1. Model-based reliabilities, defined as the proportions of variance accounted for by a latent construct relative to the observed score variance (Brunner *et al.*, 2012) were estimated on the basis of a larger sample (Brunner *et al.*, 2010) and were as follows: $r_{\text{German}} = .84$, $r_{\text{French}} = .85$, and $r_{\text{Math}} = .89$. To ensure high content validity, the test items were linked to the educational standards specified by Luxembourgish Ministry of Education, and were developed in teams consisting of researchers, teachers, and members of the Ministry.

[1]The lowest branch of the vocational track is called the "Régime Préparatoire" which is a branch offering special education to students who show severe learning disabilities.

2.2.2. School Marks

We used school marks obtained from grade 7 through grade 9 in the main subjects (German, French, and mathematics) as indicators of teachers' evaluations of the students' academic achievement. School marks varied between 0 and 60, with higher values indicating better achievement. Values below 30 indicate insufficient achievements in the evaluated school subject.

2.2.3. Students' Gender

The gender of the students was coded as 1 (*female*) or 2 (*male*).

2.2.4. Students' Ethnicity

The ethnicity of the students was assessed by their nationality. We distinguished between native (i.e., Luxembourgish) students, Portuguese students, and students from other ethnicities. We created two dummy variables, of which the first represented the Luxemburgish students (1 = Luxemburgish, 0 = non-Luxembourgish), whereas the second represented the Portuguese students (1 = Portuguese, 0 = non-Portuguese).

2.2.5. Students' Socioeconomic Status (SES)

The SES was estimated as the families' wealth, using information about the parents' occupations, the number of books per household, and the number of automobiles. Parts of this information were provided by the students' parents. We calculated an index that displayed family wealth as a number, ranging between 1 and 4, with higher numbers representing higher wealth.

2.2.6. Secondary-School Track

Luxembourgish secondary schools are composed of an academic track (1) and a vocational track (0), each offering a different curriculum and different achievement levels.

2.3. Data Analyses

Latent growth curve modeling (Meredith and Tisak, 1990; Bollen and Curran, 2006) was applied to test the hypotheses of the present study by using the software package Mplus, version 7.1 (Muthén and Muthén, 2012). The first step in this process was to define the Level-1 within-person individual growth curves. Observed data (i.e., the covariances among measures at each time point) were mapped onto a latent growth curve model, as is depicted in Figure 1.

The model represented individual growth and was defined by two latent growth parameters, which were the intercept and the slope factor. Both were assumed to have a direct effect on the observed school marks from grade 7 through grade 9. For all factor loadings, values were fixed a-priori. Concerning the intercept factor, all factor loadings were the same, which means that the intercept was assumed to be constant. The intercept thus represented school marks that were expected to occur if school marks would not change over time. In contrast, the slope factor had different loadings, depending on the time of measurement of the students' achievements. Since the differences between adjacent factor loadings were equal, the model represented linear growth.

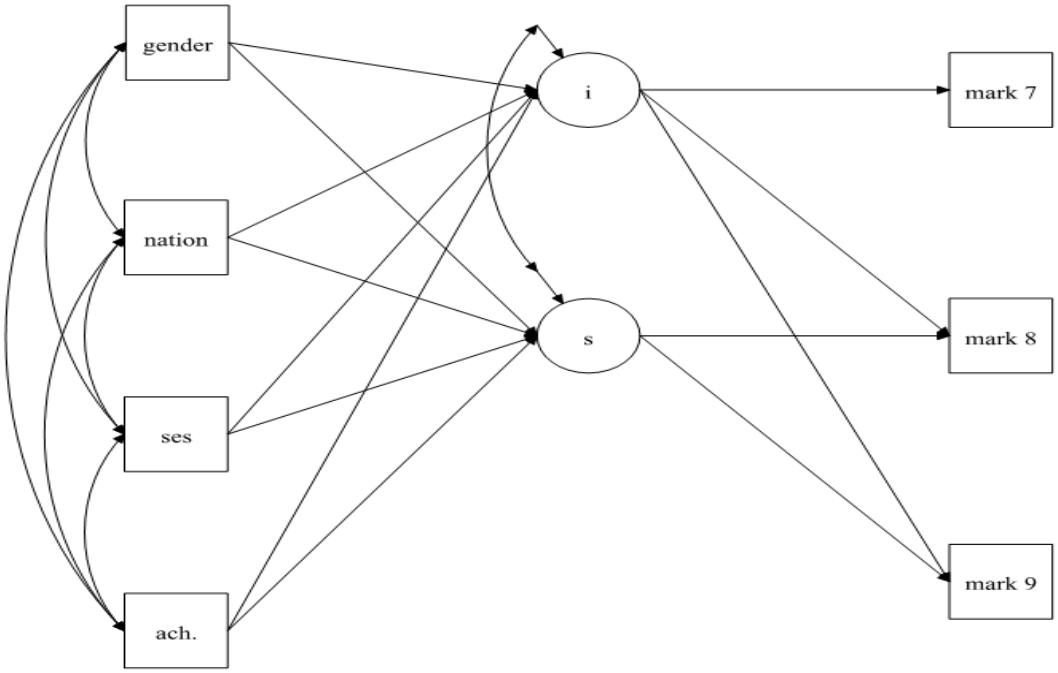

Figure-1. Visualization of the latent growth curve model used in this study. On the left hand side the predictors are depicted (gender, nationality, socioeconomic status, achievement) of which the effects on the latent parameters intercept and slope were estimated. The latent parameters (i = intercept, s = slope) are shown in the middle of the figure. The latent parameters were estimated by the manifest variables "school marks" which are shown on the right hand side (from grade 7 through grade 9). The model assumes equal temporal distance between adjacent school marks, and therefore linear growth.

Note that all students were assumed to have the same linear pattern of growth, but different individuals may have different values for the two latent growth parameters. The intercept represented the true initial status of the students in the 7th grade, and the slope represented the students' true rate of change over time.

The Level-1 growth model was defined as

$$Y_{ip} = \pi_{0p} + \pi_{1p} t_i + \varepsilon_{ip}, \quad (1)$$

where Y_{ip} is the school mark for a person p obtained at time i, π_{0p} represents the initial status at time $t = 0$ (i. e., in 7th grade), π_{1p} represents the growth trajectory (the slope), t_i represents the time between school marks (i.e., the grade level), and ε_{ip} is the error term.

Equation (1) was extended by incorporating predictors of individual differences in the initial status and the growth trajectory parameter. In the terminology of multilevel modeling, two models were specified, one for the initial status parameter (the intercept), and one for the growth trajectory parameter (the slope). Thus, the following Level-2 model was specified:

$$\pi_{0p} = \mu_{\pi 0} + \gamma_{\pi 0}\text{Competence}_p + \gamma_{\pi 0}\text{Gender}_p + \gamma_{\pi 0}\text{Nation}_p + \gamma_{\pi 0}\text{SES}_p + \zeta_{0p} \quad (2)$$

and

$$\pi_{1p} = \mu_{\pi 1} + \gamma_{\pi 1}\text{Competence}_p + \gamma_{\pi 1}\text{Gender}_p + \gamma_{\pi 1}\text{Nation}_p + \gamma_{\pi 1}\text{SES}_p + \zeta_{1p} \quad (3),$$

where $\mu_{\pi 0}$ and $\mu_{\pi 1}$ are intercept parameters representing the true population status and the true population growth when the covariate values are zero. $\gamma_{\pi 0}$ and $\gamma_{\pi 1}$ are slope factors, which relate the covariate values to the initial status and growth.

The effects of the covariates on the intercept and the slope factors were estimated with random intercept and random slope, thus permitting random variation of both parameters between the students. Missing values were replaced through multiple imputation (Rubin, 1987; Schafer, 1997). For each model, data were imputed using an unrestricted H1 model (Muthén and Muthén, 2012). The maximum likelihood parameter estimates for the growth

models were then averaged over the set of 20 analyses and the between analysis parameter estimate variation (Muthén and Muthén, 2012).

We analyzed the effects of the predictors on the intercept and the slope factor separately for each main school subject (French, German, and mathematics) and for each school track (academic versus vocational track).

3. RESULTS

We first present the descriptive results. Before comparing the development of school marks between the school tracks and the school subjects, which necessitates multiple-sample growth curve analyses, we performed separate growth curve analyses for each track and each school subject (Duncan *et al.*, 2006). The significance level was fixed to $\alpha = 5$ %.

3.1. Descriptive Statistics

We were primarily interested in the drop of school marks in the main subjects in secondary school. Therefore, we start the results section with a figure depicting the development of school marks in either subject for each school track separately.

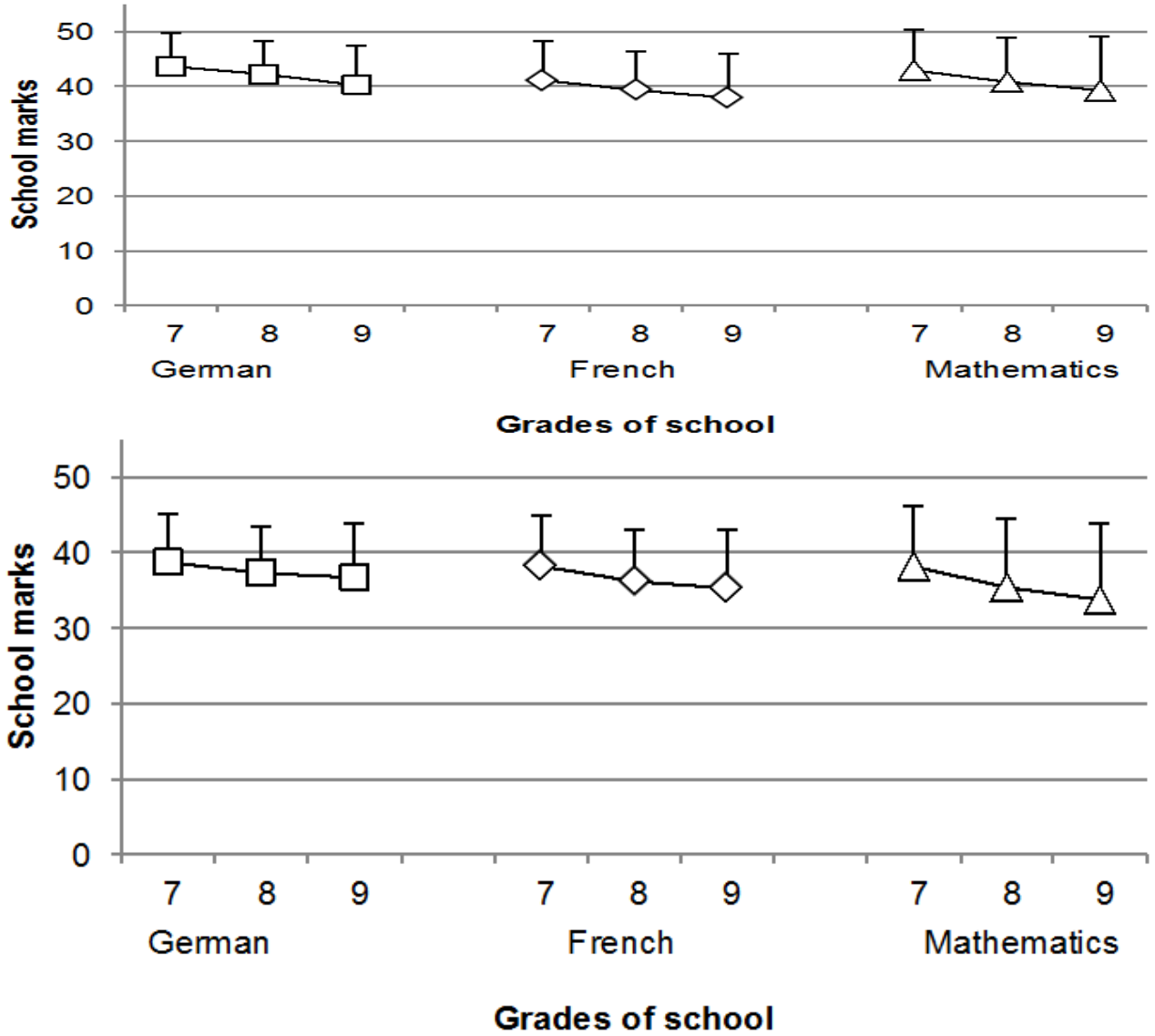

Figure-2. Development of school marks (on the ordinate) in the main subjects German (indicated by squares), French (indicated by diamonds), and mathematics (indicated by triangles) from grade 7 through 9 (on the abscissa). Error bars represent standard deviations. Upper panel: School marks obtained from the academic track. Lower panel: School marks obtained from the vocational track

Figure 2 clearly shows that in all subjects and in both school tracks, the school marks dropped on average.

3.2. The Estimation of the Intercept and the Slope of the Development of School Marks from Grade 7 through Grade 9

In the following, latent growth curve models were estimated separately for the academic domains, and for students from the academic and the vocational track. Table 1 shows the estimates of the latent variables (intercept and slope).

Table-1. Mean estimates of the intercept and the slope (with standard errors in parentheses).

School track	School subject	Intercept	Slope
Academic	German	43.63*** (0.18)	-1.65*** (0.10)
	French	41.02*** (0.21)	-1.64*** (0.10)
	Math	42.83*** (0.22)	-1.90*** (0.12)
Vocational	German	38.50*** (0.18)	-1.12*** (0.09)
	French	38.09*** (0.19)	-1.54*** (0.10)
	Math	38.06*** (0.23)	-2.37*** (0.13)

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

The mean of the intercept indicates the estimated level of the school marks at 7th grade if the development of the school marks is assumed to be linear. As Table 1 displays, the differences between the school subjects were rather small. Moreover, for all school subjects the mean slope factor was negative, which means that the students' school marks declined on average during their first three years in secondary school, with a mean decline of 1.73 grade points per year in the academic track, and a mean decline of 1.68 grade points per year in the vocational track. In both school tracks, the decline was more pronounced in math than in languages. Since grade points below 30 indicate failure, an average decline of about 5 grade points within three successive school years means a drop of roughly 1/6 of the grade point scale above failure, which approximately corresponds to a numerical school mark in the German school system, or a letter mark in the U. S. school system (e.g. from B to C).

3.3. The Estimation of the Effect of Socio-Demographic Variables on the Intercept and the Slope of the School Marks' Development

Next, the standardized estimates of the effects of the predictor variables on the latent variables as well as indicators of the model fit are reported. Table 2 depicts the results for the academic track, Table 3 the results for the vocational track. Note that for the competence measure test scales were used that were specific for the academic domain at hand. For instance, in predicting the development parameters in German school marks, the test scales representing achievements in German were used.

Table-2. Estimates of the effects of the predictor variables on the latent variables specified by latent growth curve models. Results obtained in the academic track.

Predictor	School marks in German		School marks in French		School marks in Math	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Gender	-0.180***	-0.044	-0.220***	-0.126	-0.093**	-0.163*
Ethnicity Lux.	0.093**	-0.063	-0.072*	-0.102	-0.075*	0.226*
Ethnicity Por.	-0.074*	-0.034	-0.098**	0.004	-0.092*	0.171
SES	-0.075*	0.051	-0.059	-0.085	-0.053	0.137
Compet.	0.492***	0.004	0.508***	-0.062	0.590***	-0.0866
R^2	.337***	.007	.327***	.041	.350***	.090
Model fit	$\chi^2 = 6.166$, df = 6, p = .405		$\chi^2 = 7.103$, df = 6, p = .311		$\chi^2 = 3.539$, df = 6, p = .739	
RMSEA	0.005, p = .991		0.013, p = .984		0.000, p = .999	
CFI	1.000		0.999		1.000	

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Concerning the intercept factor, there was a significant positive effect of students' competences for all school subjects, meaning that higher competences came along with better school marks in 7th grade. Moreover, gender exerted a significant negative effect on the intercept in all school subjects, which indicates that boys scored lower than girls in grade 7. This gender effect was stronger in languages than in math. Effects of ethnicity on the intercept factor were found for all school marks. Concerning the school subjects French and math, both Portuguese and Luxembourgish students received on average lower school marks in grade 7 compared to their peers. However, Luxembourgish students were more likely to get better school marks in German than non-native students. In regard to the SES, a significant effect on the intercept was found only for school marks in German, with lower SES corresponding to better school marks.

The slope factor was obviously lesser affected by the predictors than the intercept factor. Only in math, there was a significant negative effect of gender and a positive effect of (Luxembourgish) ethnicity, meaning that the decline of school marks was on average more pronounced for boys than for girls, and more pronounced for non-native students than for Luxembourgish students. The gender effect means that when the student was a boy (represented by an increase in the binary variable "gender" from 1 to 2), the slope decreased by 0.163. Correspondingly, when the binary variable "Ethnicity: Luxembourgish" increased from 0 (not Luxembourgish) to 1 (Luxembourgish), the slope increased by 0.226.

The lower part of Table 2 displays indices of the model fit. Explained variances were given by R^2, and the values of R^2 were quite similar across the school subjects. Obviously, variation of the intercept factor was much better explained by the covariates than variation of the slope factor. The model fit according to the Chi-Square test was appropriate. Likewise, the RMSEA and the CFI indicated a good fit between the model and the data (Browne and Cudeck, 1993).

Table-3. Estimates of the effects of the predictor variables on the latent variables specified by latent growth curve models. Results obtained in the vocational track.

Predictor	School marks in German		School marks in French		School marks in Math	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Gender	-0.125***	-0.017	-0.163***	0.106*	-0.093***	-0.008
Ethnicity Lux.	0.118**	-0.060	-0.064	-0.140*	-0.015	-0.011
Ethnicity Por.	-0.051	-0.020	0.006	-0.023	0.020	-0.034
SES	0.029	-0.091	0.006	-0.111*	-0.016	-0.049
Compet.	0.482***	-0.043	0.599***	-0.123*	0.519***	-0.189***
R^2	.343***	.017	.413***	.044*	.256***	.041**
Model fit	χ^2 = 19.041, df = 6, p = .004		χ^2 = 39.456, df = 6, p < .001		χ^2 = 17.575, df = 6, p = .007	
RMSEA	0.041, p = .□30		0.066, p = .081		0.039, p = .789	
CFI	0.992		0.983		0.993	

Note: * p < .05, ** p < .01, *** p < .001

Table 3 depicts the results of the latent growth curve models for the vocational track. Both the students' gender and their competences were significant predictors for the intercept factor in all school subjects. As in the academic track, higher competences came along with better school marks in grade 7, and boys were given worse school marks than girls in that particular grade. Additionally, Luxembourgish students scored on average higher in German, compared to immigrant students. The SES apparently had no effect on the intercept.

Concerning the slope factor, significant effects were found particularly for the school subject French. All predictor variables (except "Ethnicity: Portuguese") exerted a significant effect on the development of the school marks over time. The decline of school marks was on average lower for boys than for girls, but more severe for Luxembourgish students than for students from other ethnicities. Moreover, high-SES students were more likely to

show a stronger decline of school marks than low-SES students. Finally, the higher the competence was, the stronger was the decline of the school marks in secondary school. This latter effect was also observed for school marks in math.

The models explained less variance in the vocational track than in the academic track. However, in contrast to the academic track, the variance of the slope factor for the domains French and math was explained by the predictors to a significant degree. The model fit was apparently lower for the vocational track than for the academic track. Yet, since both the RMSEA and the CFI were acceptable, the validity of the results was not to at risk.

We then examined weather the slope factor and the intercept factor differed significantly between school tracks. To address this question, we conducted multiple group analysis. In this analysis we first estimated the model simultaneously for the academic track and the vocational track for each school subject, with no constraints on the parameters slope and intercept. We then tested whether the slopes and the intercepts in both tracks were significantly different by re-estimating the models while keeping either the slopes or the intercepts invariant (Palardy, 2008; Duncan and Duncan, 2009). If there were significant differences in the slopes or in the intercepts between school tracks, models that allow for freely varying slopes or intercepts should yield a better fit than models where the slope or the intercept were fixed. We therefore compared four models for each school subject, which where (a) slope and intercept constrained, (b) slope unconstrained, intercept constrained, (c) slope constrained, intercept unconstrained, and (d) slope and intercept unconstrained.

The differences in the model fit are depicted in Table 4. Overall, unconstrained models yielded a better fit than constrained models for each school subject. This means that differences between school tracks were better explained by models with parameters allowed to freely vary than by models where either the slope or the intercept or both were fixed. If the slopes in either school subject were equal between tracks, than there should be no significant difference in model fit between the unconstrained model and the model with a constrained slope. However, for both German and math the differences were found to be significant, indicating significant differences in the slope of the school marks. The slope in German was smaller (i.e., "more negative") in the academic track than in the vocational track, whereas the slope in math was smaller in the vocational track than in the academic track. Even more pronounced were the differences in regard to the intercepts of the school subjects' trajectories. Models constraining the intercept yielded a much lower model fit than models with freely varying intercepts, confirming the impression (as is depicted in Table 1) that in the vocational track students on average end their first school year with considerably lower school marks than students from the academic track.

Finally, we examined whether the slopes and the intercepts for the different school subjects within the tracks were different or the same. This was done again by running models with the slope or the intercept (or both) being constrained. If the slopes for different school subjects were different within a certain track, we would expect a difference in model fit between an unconstrained model and a model where the slope parameter is fixed. This was actually found for the vocational track, but not for the academic track (see Table 5). However, in both tracks the intercept parameter for the school subjects differed significantly, with the differences being more pronounced in the academic track than in the vocational track.

4. DISCUSSION

With the present study, three hypotheses were tested. First, we assumed that after the transition from primary to secondary school in Luxembourg, a decline of school marks would occur. We expected this decline to happen in all main school subjects as well as in the academic track and the vocational track. This hypothesis was confirmed, indicated by the significant negative slopes obtained in both tracks and for all school subjects. In regard to the stage-environment fit theory (Eccles and Midgley, 1989; Eccles *et al.*, 1993; Wigfield *et al.*, 1996) the school marks' drop might be the result of discrepancies between what adolescent students need in terms of academic and emotional support, and what they actually get in school.

These discrepancies might even be more pronounced for certain subpopulations of students. We therefore hypothesized that girls would be better graded than boys, Luxembourgish students would be better graded than immigrant students, and students with high SES would be better graded than students with low SES, while controlling for their academic competences measured at the end of primary school. This hypothesis was confirmed fully for the students' gender. We interpret the lower school marks of boys compared to those obtained by girls as the result of an adaptation to a new school environment that might have been occurred more easily for girls than for boys (van Ophuysen, 2008; Steffgen, 2009; Segeritz *et al.*, 2010). The proposed ethnicity effect on the intercept was shown to be significant only in German (in both the academic and the vocational track), meaning that Luxembourgish students were superior to immigrant students. This effect might be due to the fact that Luxembourgish students (as well as their parents) more frequently speak German than immigrant students. The opposite, however, was true for French and math, where immigrant students from the academic track outperformed Luxemburgish students. Rather unexpectedly, Portuguese students from the academic track finished their first year in secondary school with even lower school marks in all school subjects compared to the remaining immigrant students. This general disadvantage of Portuguese students in the academic track might result from biased grading of their teachers even if their achievements were the same as those of native students or students from other ethnicities. However, caution in interpreting this result is advisable since both the number of Portuguese students attending the academic track and the size of the effects obtained were quite small. The hypothesized positive effect of the SES on the intercept was absent in all school subjects and in both tracks. Contrarily, a negative effect of the SES for German in the academic track occurred, meaning that students with a high socioeconomic status were (slightly) more likely to receive lower school marks than their low-status peers. Again, we can only speculate about this rather surprising result. As a possible explanation, teachers might have tried to support students from poorer families by giving them slightly higher grades.

Since the misfit between students' needs and schools' demands—as assumed in the stage-environment fit theory—may continue throughout secondary school and may even get worse, we expected that gender, ethnicity, and the SES would affect the development of the school marks from grade 7 through grade 9. However, the slope was lesser than assumed affected by these predictors. With gender, for instance, we presumed a drop of school marks being more pronounced for boys than for girls. This assumption was confirmed only for mathematics in the academic track. In contrast, the change of school marks in the vocational track was positively affected by the students' gender in French, meaning that the drop was less severe for boys than for girls. All further effects of the slope occurred only in the vocational track in the subject French: Luxembourgish students' school marks deteriorated more than the school marks of their immigrant peers. Students from wealthier families experienced a larger decline of school marks than students from poorer families. Even the students' academic competences affected the school marks' development in the vocational track. The higher the achievements were, the more pronounced was the fall of the school marks in both French and mathematics.

Since most of the predictors' effects on the slope occurred in the vocational track, this track is given special consideration in the following discussion. The gender effect on both the intercept and the slope in this track formally means that boys were on average initially (i.e., after accomplishing their first year in secondary school) graded lower than girls, but experienced then a less severe decline of school marks than girls. This kind of compensation process might suggest that male students received some kind of support, provided by their French teachers, in order to compensate for their initial low school marks. However, the difference in signs between the intercept and the slope effect does also imply that girls scoring rather high in 7th grade dropped behind their male peers in the following school years. In contrast to the academic track where Luxembourgish students scored lower in French than other students in their first year in secondary school, but developed similarly to the other students in subsequent years, Luxembourgish students experienced on average a stronger drop of school marks in French in the vocational track (although they initially were not different from non-native students). As a preliminary

interpretation, we assume that this effect was partly due to the fact that Luxembourgish students use French in daily conversation less often than francophone (e.g., Portuguese) students. In addition, teachers' support in French might have been not as adequate as needed in order to enable those students to perform well.

One striking observation applies to the different effects of the students' competence on both the intercept and the slope. In the academic track, only the intercept, but not the development of the school marks was affected by the students' competence, which means that high achievers continued to show rather good school marks throughout the first three years of secondary school. In contrast, high-achieving students in the vocational track significantly deteriorated regarding their school marks, at least in French and mathematics. Furthermore, these effects were among the strongest effects on the slope that were identified by the present study, pointing—according to our theoretical background—to a potentially strong misfit between student's needs and the curricular offer in these two subjects in the vocational track. This finding might indeed be explained by the logic that is inherent in the transition from primary to secondary school in Luxembourg. This logic foresees that only students showing a flawless competency profile, with high levels of proficiency in German, mathematics and French, are oriented towards the academic track. Whenever there is a partial weakness identified (e.g., not having high proficiency in German), students are oriented towards the vocational track. The curricular response of the vocational track is to offer a less demanding school program in all the curricular areas, because this track receives students with potential specific weaknesses in any of these areas. As a result of this logic, notably a large proportion of students with Portuguese background are oriented towards the vocational track, mainly because of a specific weakness in German. But these students have very often a relatively good proficiency level in French, and might also have a high proficiency level in mathematics. However, in the vocational track these students are confronted with a less demanding curriculum, which might indicate a lack of challenging learning experiences in the vocational track, compared to the academic track (Oakes, 2005).

In our third hypothesis we proposed that the decline in school marks should be more pronounced in math than in languages in the vocational track, but not in the academic track, since in the vocational track more support for students with language difficulties is probably offered than in the academic track. This hypothesis was confirmed. Our hypothesis is corroborated by the fact that in Luxembourg great emphasis is given to the learning of languages since the country's social and economic development strongly depends on people speaking more than one language. Therefore, learning languages is of high priority in Luxembourgish schools. The curricula of secondary schools suggest that students in Luxembourg were given more time to learn languages than in other European countries (Ministry of National Education Children and Youth, 2014). Hence, it might be the case that the different allocation of time to the school subjects was responsible for the students' different adaption to the academic requirements in language and math courses.

However, we would not interpret this effect as evidence in favor of successful interventions in the vocational track to smooth the transition process for students showing difficulties in languages, since we have shown that certain groups of students (female, Luxembourgish) seem to be rather disadvantaged in the vocational track particularly in French. In addition, although the decline of school marks in the vocational track was less pronounced in German compared to the academic track, the reverse was the case in math, and in French both declines were approximately of the same amount. This result might be accounted for by assuming that learning languages was less demanding than learning math, and students might adapt better to the learning content provided by language lessons than in mathematics. Alternatively, mathematics may be seen by students (and by their parents) as a less important subject, compared to languages (Stevenson, 1987) which in turn might have lowered their learning motivation and their achievements. Finally, parental support, which has to be shown a strong predictor for academic achievement (e.g., Jeynes (2005)) might have resulted in better achievements in languages than in math.

5. LIMITATIONS

Although this study provides further insights into how students' school marks develop after their transition from primary to secondary school, and by which factors this development is affected, we see some limitations pertinent to this study.

First, it should be noted that the transition from one school type to another may not universally be negative. For some students, the transition to a new school offers new opportunities and may be regarded as a challenge rather than a risk. For example, Kinney (1993) could show that low-accepted middle school students found more options for entrance and acceptance in high school, and thus benefitted socially from the transition. To look at transition processes as a stimulating event for student development rather than a problem has also been encouraged by Bronfenbrenner (1977). We therefore would like to encourage researchers (us included) to examine more closely conditions that might result in rather positive transition effects.

Second, we realized only a subset of possible predictors that might affect both school marks in the first year of secondary school and their further development through the grades. For instance, school marks are known to be affected by a variety of factors, which origin from the students (cognitive abilities, e.g., (Krumm *et al.*, 2008; McClure *et al.*, 2011)) the teachers (expectations, e.g., Jussim (1989)) or the class (as a reference group, e.g., Trautwein and Lüdtke (2005)). In this regard, it should be noted that we were not able to control for possible fluctuations of the teachers within a school subject, which could additionally have produced variance in the school marks. To give a comprehensive picture on the predictors on the school marks' development, future studies are strongly recommended.

6. CONCLUSIONS

This study's primary contribution is the finding that after the transition from primary to secondary school the school marks of the students deteriorated in their main school subjects. The school marks' trajectories proved to be affected by various socio-demographic variables, which were the students' gender, their socio-economic background, and their ethnicity. This finding stimulates the assumption that certain subgroups of students did not receive the academic and social support in school that they needed. Since in the vocational track high achievers were more likely to drop in school marks than low achievers, we presume that there is a lack of academic challenges in the vocational track due to an orientation procedure that focuses primarily on student's weaknesses. This under-demanding curriculum corresponding to a misfit between student's need and their learning environment might eventually hinder better performing students keeping their initial achievement level.

Whatever the reasons were for the school marks' decline, it should be noted that the subjective experience of a drop in school marks usually corresponds with a lowering of the students' self-concept (Skaalvik and Skaalvik, 2002) and motivation (Reeve, 2001) which in turn might again result in a further drop in school marks. Therefore, we recommend that teachers and schools should acknowledge that students need positive instead of negative feedback in order to alleviate the transition from primary to secondary school, for instance by adapting their normative standards or by increasing their efforts to help students adapt to the new school environment.

However, current research (including the present study) shows that in general students do not benefit from the transition, and in particular that some students even fall behind more than others.

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REFERENCES

Alspaugh, J.W., 1998. Achievement loss associated with the transition to middle school and high school. Journal of Educational Research, 92(1): 20-25. *View at Google Scholar | View at Publisher*

Alspaugh, J.W. and R.D. Harting, 1995. Transition effects of school grade-level organization on student achievement. Journal of Research and Development in Education, 28(3): 145-149. *View at Google Scholar*

Bacharach, V.R., A.A. Baumeister and R.M. Furr, 2003. Racial and gender science achievement gaps in secondary education. Journal of Genetic Psychology, 164(1): 115-126. *View at Google Scholar | View at Publisher*

Bankston, C.L. and S.J. Caldas, 1997. The American school dilemma. Sociological Quarterly, 38(3): 423-429. *View at Google Scholar*

Bergmüller, S. and B. Herzog-Punzenberger, 2012. Die Lesekompetenz ein- und mehrsprachiger Kinder im Ländervergleich. [Reading competence of monolingual and bilingual children in different countries.] In B. Suchán, C. Wallner-Paschon, S. Bergmüller, & C. Schreiner (Hrsg.), PIRLS & TIMSS 2011. Schülerleistungen in Lesen, Mathematik und Naturwissenschaft in Der Grundschule. Erste Ergebnisse. Graz, Austria: Leykam. pp: 50–51.

Blyth, D.A., R.G. Simmons and D. Bush, 1978. The transition into early adolescence: A longitudinal comparison of youth in two educational contexts. Sociology of Education, 51(3): 149-162. *View at Google Scholar | View at Publisher*

Bollen, K.A. and P.J. Curran, 2006. Latent curve models: A structural equation perspective. New York: Wiley.

Brok, P., J. Tartwijk, T. Wubbels and I. Veldman, 2010. The differential effect of the teacher–student interpersonal relationship on student outcomes for students with different ethnic backgrounds. British Journal of Educational Psychology, 80(2): 199-221. *View at Google Scholar | View at Publisher*

Bronfenbrenner, U., 1977. Toward an experimental ecology of human development. American Psychologist, 32(7): 513-531. *View at Google Scholar | View at Publisher*

Browne, M.W. and R. Cudeck, 1993. Alternative ways of assessing equation model fit. In K. Bollen & J. S. Long (Eds.), Testing structural equation models. New York: Sage. pp: 136-162.

Brunner, M., U. Keller, C. Dierendonck, M. Reichert, S. Ugen, A. Fischbach and R. Martin, 2010. The structure of academic self-concepts revisited: The nested Marsh/Shavelson model. Journal of Educational Psychology, 102(4): 964-981. *View at Google Scholar | View at Publisher*

Brunner, M., G. Nagy and O. Wilhelm, 2012. A tutorial on hierarchically structured constructs. Journal of Personality, 80(4): 796-846. *View at Google Scholar | View at Publisher*

Carey, D. and E. Ernst, 2006. Improving education achievement and attainment in Luxembourg. OECD Economics Department Working Papers, No. 508.

Chen, E. and K.A. Matthews, 2001. Cognitive appraisal biases: An approach to understanding the relationship between socioeconomic status and cardiovascular reactivity in children. Annals of Behavioral Medicine, 23(2): 101-111. *View at Google Scholar | View at Publisher*

Cooper, H., B. Nye, K. Charlton, J. Lindsay and S. Greathouse, 1996. The effects of summer vacation on achievement test scores: A narrative and meta-analytic review. Review of Educational Research, 66(3): 227-268. *View at Google Scholar | View at Publisher*

Cornelius-White, J., 2007. Learner-centered teacher-student relationships are effective: A meta-analysis. Review of Educational Research, 77(1): 113-143. *View at Google Scholar | View at Publisher*

Cunha, F., J.J. Heckman, L. Lochner and D.V. Masterov, 2006. Interpreting the evidence on life cycle skill formation. In E. Hanushek & F. Welch (Eds.), Handbook of the economics of education. Amsterdam: Elsevier, 1: 697–812.

Darling-Hammond, L., 1997. The right to learn: A blueprint for creating schools that work. San Francisco, CA: Jossey-Bass.

Dekkers, H.P., R.J. Bosker and G.W. Driessen, 2000. Complex inequalities of educational opportunities. A large-scale longitudinal study on the relation between gender, social class, ethnicity and school success. Educational Research and Evaluation, 6(1): 59-82. *View at Google Scholar | View at Publisher*

Driessen, G. and A. van Langen, 2013. Gender differences in primary and secondary education: Are girls really outperforming boys? International Review of Education, 59(1): 67-86. *View at Google Scholar | View at Publisher*

Duncan, T.E. and S.C. Duncan, 2009. The ABC's of LGM: An introductory guide to latent variable growth curve modeling. Social and Personality Psychology Compass, 3(6): 979-991. *View at Google Scholar | View at Publisher*

Duncan, T.E., S.C. Duncan and L.A. Strycker, 2006. An introduction to latent variable growth curve modeling. 2nd Edn., New York: Lawrence Erlbaum.

Eccles, J.S. and C. Midgley, 1989. Stage/environment fit: Developmentally appropriate classrooms for young adolescents. In R. E. Ames & C. Ames (Eds.), Research on motivation in education. San Diego, CA: Academic Press, 3: 139-186.

Eccles, J.S., C. Midgley, A. Wigfield, C.M. Buchanan, D. Reuman, C. Flanagan and D. Mac Iver, 1993. Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. American Psychologist, 48(2): 90-101. *View at Google Scholar | View at Publisher*

Eccles, J.S. and R.W. Roeser, 2009. Schools, academic motivation, and stage-environment fit. In R. M. Lerner & L. Steinberg (Eds.), Handbook of adolescent psychology. Hoboken, NJ: Wiley, 1: 404-434.

Farkas, G., R.P. Grobe, D. Sheehan and Y. Shuan, 1990. Cultural resources and school success: Gender, ethnicity, and poverty groups within an urban school district. American Sociological Review, 55(1): 127-142. *View at Google Scholar | View at Publisher*

Feldlaufer, H., C. Midgley and J.S. Eccles, 1988. Student, teacher, and observer perceptions of the classroom environment before and after transition to junior high school. Journal of Early Adolescence, 8(2): 133-156. *View at Google Scholar | View at Publisher*

Fleischman, H.L., P.J. Hopstock, M.P. Pelczar and B.E. Shelley, 2010. Highlights from PISA 2009: Performance of US 15-year-old students in reading, mathematics, and science literacy in an international context. NCES 2011-004. Washington, DC: US Department of Education.

Gallo, L.C. and K.A. Matthews, 2003. Understanding the association between socioeconomic status and physical health: Do negative emotions play a role? Psychological Bulletin, 129(1): 10-51. *View at Google Scholar | View at Publisher*

Hadjar, A., A. Fischbach, R. Martin and S. Backes, 2015. Educational inequalities in the Luxembourg education system. In Ministry of national education, childhood and youth & University of Luxembour (Eds.), Luxembourg Education Report 2015. Luxembourg: MENJE. pp: 34-56.

Hamre, B.K. and R.C. Pianta, 2001. Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. Child Development, 72(2): 625-638. *View at Google Scholar | View at Publisher*

Hansford, B.C. and J.A. Hattie, 1982. The relationship between self and achievement/performance measures. Review of Educational Research, 52(1): 123-142. *View at Google Scholar | View at Publisher*

Hanushek, E. and S. Rivkin, 2009. Harming the best: How schools affect the black-white achievement gap. Journal of Policy Analysis and Management, 28(3): 366-393. *View at Google Scholar | View at Publisher*

Hart, B. and T.R. Risley, 1995. Meaningful differences in the everyday experience of young American children. Baltimore: P. H. Brookes.

Hattie, J.A.C., 2009. Visible learning: A synthesis of 800+ meta-analyses on achievement. Abingdon: Routledge.

Helbig, M., 2010. Are female teachers responsible for the lower school achievement of boys? KZfSS Cologne Journal of Sociology and Social Psychology, 62(1): 93–111. *View at Google Scholar*

Hörner, W., H. Döbert, B. Kopp and W. Mitter, 2007. The education systems of Europe. Dordrecht: Springer Netherlands.

Hu, A., M.A. Hansen-Pauly, M. Reichert and S. Ugen, 2015. Multilingualism in Luxembourgish Secondary School. in ministry of national education, childhood and youth & University of Luxembourg (Eds.), Bildungsbericht Luxemburg 2015. Luxembourg: MENJE. pp: 63-75.

Hughes, J.N. and O. Kwok, 2007. The influence of student-teacher and parent-teacher relationships on lower achieving readers' engagement and achievement in the primary grades. Journal of Educational Psychology, 99(1): 39-51. *View at Google Scholar | View at Publisher*

Jackson, A.W. and G.A. Davis, 2000. Turning points 2000: Educating adolescents in the 21st century. New York: Teachers College Press.

Jeynes, W.H., 2005. A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. Urban Education, 40(3): 237-269. *View at Google Scholar | View at Publisher*

Jussim, L., 1989. Teacher expectations: Self-fulfilling prophecies, perceptual biases, and accuracy. Journal of Personality and Social Psychology, 57(3): 469-480. *View at Google Scholar | View at Publisher*

Kinney, D.A., 1993. From nerds to normals: The recovery of identity among adolescents from middle school to high school. Sociology of Education, 66(1): 21-40. *View at Google Scholar | View at Publisher*

Krumm, S., M. Ziegler and M. Buehner, 2008. Reasoning and working memory as predictors of school grades. Learning and Individual Differences, 18(2): 248-257. *View at Google Scholar | View at Publisher*

Kuhl, P. and B. Hannover, 2012. Different grading for girls and boys. Journal of Developmental Psychology and Educational Psychology, 44(3): 153-162. *View at Google Scholar*

Kuhn, H.P. and N. Fischer, 2011. Correlations between GPA and problem behavior at all-day schools: Do all-day students develop better? Journal of Educational Science, 14(3): 143-162. *View at Google Scholar*

Ma, X. and J.L.M. Wilkins, 2002. The development of science achievement in middle and high school: Individual differences and school effects. Evaluation Review, 26(4): 395-417. *View at Google Scholar | View at Publisher*

Malecki, C.K. and M.K. Demaray, 2002. Measuring perceived social support: Development of the child and adolescent social support scale. Psychology in the Schools, 39(1): 1-18. *View at Google Scholar | View at Publisher*

McClure, J., L.H. Meyer, J. Garisch, R. Fischer, K.F. Weir and F.H. Walkey, 2011. Students' attributions for their best and worst marks: Do they relate to achievement? Contemporary Educational Psychology, 36(2): 71-81. *View at Google Scholar | View at Publisher*

Meredith, W. and J. Tisak, 1990. Latent curve analysis. Psychometrika, 55(1): 107-122. *View at Google Scholar | View at Publisher*

Midgley, C., H. Feldlaufer and J.S. Eccles, 1988. The transition to junior high school: Beliefs of pre- and post-transition teachers. Journal of Youth and Adolescence, 17(6): 543-562. *View at Google Scholar | View at Publisher*

Ministry of National Education and Vocational Training, 2010. Key figures of national education - statistics and indicators 2008-2009. [key figures of education - statistics and indicators 2008-2009.]. Luxembourg: MENFP.

Ministry of National Education Children and Youth, 2014. Was tun nach dem 4. Zyklus der grundschule? , Luxembourg: Ministry of National Education, Childhood and Youth.

Muijs, R.D. and D. Rejnolds, 2001. Teachers' beliefs and behaviors: What really matters. Journal of Classroom Interaction, 37(2): 37.

Muthén, L.K. and B.O. Muthén, 2012. Mplus user's guide. 7th Edn., Los Angeles, CA: Muthén & Muthén.

Neumann, M., A. Milek, K. Maaz and C. Gresch, 2010. On the influence of class composition on the transition from primary to secondary education. In K. Maaz, J. Baumert, C. Gresch & N. McElvany (Eds.), The transition from elementary to secondary school - achievement and performance regional, social and ethnic-cultural disparities. Bonn & Berlin: BMBF. pp: 229-251.

Oakes, J., 2005. Keeping track. 2nd Edn., New Haven: Yale University Press.

OECD, 2004. Learning for tomorrow's world: First results from PISA 2003. Paris: OECD.

Palardy, G.J., 2008. Differential school effects among low, middle, and high social class composition schools: A multiple group, multilevel latent growth curve analysis. School Effectiveness and School Improvement, 19(1): 21-49. *View at Google Scholar | View at Publisher*

Randall, J. and G. Engelhard, 2009. Differences between teachers' grading practices in elementary and middle school. Journal of Educational Research, 102(3): 175-186. *View at Google Scholar | View at Publisher*

Reeve, J., 2001. Understanding motivation and human emotion. 3rd Edn., Orlando, FL: Harcourt.

Ross, J.A., 1998. The antecedents and consequences of teacher efficacy. In J. Brophy (Ed.), Advances in research on teaching. Greenwich, CT: JAI Press, 7: 49-74.

Rubin, D.B., 1987. Multiple imputation for nonresponse in surveys. New York: John Wiley & Sons.

Schafer, J.L., 1997. Analysis of incomplete multivariate data. London: Chapman & Hall.

Schaltz, P. and F. Klapproth, 2014. The effect of ability-based tracking in secondary school on subsequent school achievement: A longitudinal study. British Journal of Education, Society & Behavioural Science, 4(4): 440-455. *View at Google Scholar | View at Publisher*

Segeritz, M., P. Stanat and O. Walter, 2010. Pattern of academic success of girls and boys with a migration background. In C.P. Allemann-Ghionda, Stanat, K. Göbel & C. Röhner (Ed.), Migration, identity, language and educational success. Weinheim, Germany: Beltz. pp:165-186.

Simmons, R.G. and D.A. Blyth, 1987. Moving into adolescence: The impact of pubertal change and school context. Hawthorne, NY: Aldine de Gruyter.

Sirin, S.R., 2005. Socioeconomic status and academic achievement: A meta-analytic review of research. Review of Educational Research, 75(3): 417-453. *View at Google Scholar | View at Publisher*

Skaalvik, E.M. and S. Skaalvik, 2002. Internal and external frames of reference for academic self-concept. Educational Psychologist, 37(4): 233-244. *View at Google Scholar | View at Publisher*

Smith, J.S., 2006. Examining the long-term impact of achievement loss during the transition to high school. Journal of Secondary Gifted Education, 17(4): 211-221. *View at Google Scholar | View at Publisher*

Stanat, P. and M. Kunter, 2001. Gender differences in basic skills. [Gender differences in basic competences.] In J. Baumert, E. Klieme, M. Neubrand, M. Prenzel, U. Schiefele, W. Schneider, P. Stanat, K.-J. Tillmann & M. Weiss (Ed.), PISA 2000: Basic Competencies of Pupils in International Comparison. Opladen, Germany: Leske + Budrich. pp: 249-269.

Steffgen, G., 2009. Deviant behaviour and violence in Luxembourg schools. International Journal of Violence and School, 10(2): 54-70. *View at Google Scholar*

Stevenson, H.W., 1987. America's math problems. Educational Leadership, 45(2): 4-10. *View at Google Scholar*

Strand, S., 2014. School effects and ethnic, gender and socio-economic gaps in educational achievement at age 11. Oxford Review of Education, 40(2): 223-245. *View at Google Scholar | View at Publisher*

Trautwein, U. and O. Lüdtke, 2005. The big-fish-little-pond effect: Future research questions and educational implications. Journal of Educational Psychology, 19(3): 137-140. *View at Google Scholar | View at Publisher*

Urdan, T.M. and C. Midley, 2003. Changes in the perceived classroom goal structure and pattern of adaptive learning during early adolescence. Contemporary Educational Psychology, 28(4): 524-551. *View at Google Scholar | View at Publisher*

Valtin, R., C. Wagner and K. Schwippert, 2005. Pupils at the end of fourth grade - academic achievement, learning-related attitudes and out-of-school learning conditions. [Students at the End of Primary School Achievements, attitudes, and extracurricular conditions.] In W. Bos, E.-M. Lankes, M. Prenzel, K. Schwippert, R. Valtin & G. Walther (Eds.), IGLU. In-depth analyzes on reading comprehension, general conditions and additional studies. Münster, Germany: Waxmann. pp: 187-238.

van Ophuysen, S., 2008. To change the joy of school from grade 4 to 7: A longitudinal analysis of school-specific effects of holidays and primary school transition. Journal of Educational Psychology, 22(34): 293-306. *View at Google Scholar*

Whitley, J., J.L. Lupart and T. Beran, 2007. Differences in achievement between adolescents who remain in a K-8 school and those who transition to a junior high school. Canadian Journal of Education, 30(3): 649-669. *View at Google Scholar | View at Publisher*

Wigfield, A., J.S. Eccles and P.R. Pintrich, 1996. Development between the ages 11 and 25. In D. C. Berliner & R. C. Calfee (Eds.), Handbook of educational psychology. New York: Simon & Schuster, Macmillan. pp: 148-185.

Table-4. Test for differences in slopes and intercepts between school tracks.

School subject	Model	df	χ^2	$\Delta\chi^2$	Δdf	□□□EA	CFI
Germa□	unconstrained	2	16.58			0.078	0.994
	slopes constrained only	3	31.83	□5.25***	1	0.090	0.989
	intercepts constrained only	3	390.74	374.16***	1	0.330	0.847
	slopes and intercepts constrained	4	412.70	396.12***	2	0.293	0.838
□□ench	unconstrained	2	25.27			0.099	0.993
	slopes constrained only	3	25.75	0.48	1	0.080	0.993
	intercepts constrained only	3	129.04	103.77***	1	0.188	0.960
	slopes and intercepts constrained	4	138.60	113.33***	2	0.168	0.957
Math	unconstrained	2	12.43			0.066	0.994
	slopes constrained only	3	19.76	7.33**	1	0.068	0.994
	intercepts constrained only	3	229.72	217.29***	1	0.252	0.920
	slopes and intercepts constrained	4	279.09	266.66***	2	0.240	0.902

Note: * p < .05, ** p < .01, *** p < .001

Table-5. Test for differences in slopes and intercepts between school subjects.

School track	Model	df	χ^2	$\Delta\chi^2$	Δdf	RMSEA	CFI
Academic	unconstrained	18	94.06			0.062	0.987
	slopes constrained only	20	98.48	4.42	2	0.060	0.986
	intercepts constrained only	2□	256□03	161.97***	2	0.104	0.958
	slopes and intercepts constrained	22	295.19	201.13***	4	0.107	0.952
Vocational	unconstrained	18	340.29			0.118	0.936
	slopes constrained only	20	417.99	77.70***	2	0.124	0.921
	intercepts constrained only	20	346.35	6.06*	2	0.112	0.936
	slopes and intercepts constrained	22	449.22	108.93***	4	0.122	0.916

Note: * p < .05, ** p < .01, *** p < .001

Figure Captions

Figure 1. Visualization of the latent growth curve model used in this study. On the left hand side the predictors are depicted (gender, nationality, socioeconomic status, achievement) of which the effects on the latent parameters intercept and slope were estimated. The latent parameters (i = intercept, s = slope) are shown in the middle of the figure. The latent parameters were estimated by the manifest variables "school marks" which are shown on the right hand side (from grade 7 through grade 9). The model assumes equal temporal distance between adjacent school marks, and therefore linear growth.

Figure 2. Development of school marks (on the ordinate) in the main subjects German (indicated by squares), French (indicated by diamonds), and mathematics (indicated by triangles) from grade 7 through 9 (on the abscissa). Error bars represent standard deviations. Upper panel: School marks obtained from the academic track. Lower panel: School marks obtained from the vocational track.