Motivational developments in primary school: Group-specific differences in varying learning contexts

Hornstra, T.E.

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CHAPTER 2

DEVELOPMENTS IN MOTIVATION AND ACHIEVEMENT DURING PRIMARY SCHOOL: A LONGITUDINAL STUDY ON GROUP-SPECIFIC DIFFERENCES [1]

Abstract To gain insight in developmental trajectories of motivation during upper primary school, the present study focused on how different aspects of students' motivation, i.e., task-orientation, self-efficacy, and school investment develop from grade three to six of primary school and how these developments differ for boys and girls, and students with different ethnic or social backgrounds. Furthermore the longitudinal relation between motivation and achievement in reading comprehension was examined. A total of 722 students completed questionnaires during five measurements. Latent growth curve analyses were performed. Results showed a negative development in task-orientation, self-efficacy remained relatively stable and school investment increased over time, but there were considerable differences in developments across different groups of students. Regardless of gender and background, however, developments in these aspects of motivation were substantially positively related to developments in achievement, beyond what can be explained by cognitive ability and background characteristics.

Keywords: *motivation, academic achievement, growth trajectories, primary school*

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INTRODUCTION

Previous research has consistently found a decline in students' motivation for school during the secondary school years (e.g., Gottfried, Fleming, & Gottfried, 2001; Van der Veen & Peetsma, 2009). Although not many studies have been performed in primary school, there are indications that this decline is already apparent then (e.g., Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Spinath & Spinath, 2005; Stoel, Peetsma, & Roeleveld, 2001). Given the considerable impact of motivation on achievement (e.g., Steinmayr & Spinath, 2009), this can be considered worrisome. Moreover, little is known about whether or not such a decline in motivation is apparent for both boys and girls and for students with different backgrounds. More insight is needed therefore on how developmental patterns of motivation may vary by gender and background and how this relates to developments in achievement during primary school.

MOTIVATION

Most theories of motivation include motivational values, expectancies and motivated behaviors (Boekaerts, 2010; Covington, 2000; Wigfield & Eccles, 2000). Motivational values form a very broad component of motivation that entails many different aspects, among others, intrinsic motivation (Ryan & Deci, 2000b), task value (Wigfield & Cambria, 2010), interest (Renninger, 2000), and goal orientations (Pintrich, 2000). The present study limited its focus to the reasons why students engage in learning, namely their learning goals. More specifically, it focused on task-orientation, which means the extent to which students are oriented towards increasing their competence and understanding (Covington, 2000). Different aspects of the value component, including task-orientation, have been found to predict motivated behavior and achievement (e.g., Spinath, Spinath, Harlaar, & Plomin, 2006; Wigfield & Cambria, 2010).

Expectancies refer to one's perceived academic competence (Eccles & Wigfield, 2002). Expectancies are closely related to competence beliefs. However, competence beliefs focus on present abilities, while expectancies are predictions

for future outcomes (Pajares, 1997). Academic self-efficacy is the most thoroughly studied expectancy-related concept, and is found to be more predictive of effort and achievement outcomes than any other aspect of motivational beliefs (e.g, Eccles & Wigfield, 2002; Peetsma, Hascher, Van der Veen, & Roede, 2005; Pajares, 1997). It refers to judgments about one's capabilities to carry out actions that are needed to complete academic tasks successfully (Bandura, 1977).

Students' investment in school refers to the behavioral activity which results from motivational beliefs. Investment can vary in terms of the intensity, persistence, and direction of school related behaviors (Pintrich, 2004; Schunk, Pintrich, & Meece, 2008). The present study limited its focus to three aspects of motivation: task-orientation, self-efficacy, and school investment to examine how these aspects develop over time and how this relates to developments in achievement. Previous research has shown that these aspects of motivation predict achievement beyond cognitive abilities and background characteristics (e.g., Steinmayr & Spinath, 2009), although these relations do not seem to be unidirectional. In their review, Wigfield and Cambria (2010) discuss that relations between different aspects of motivation and achievement are reciprocal and continuously affect one another.

DEVELOPMENTS IN MOTIVATION

Many studies have examined the development of motivation. Various aspects of motivational values are found to decrease during primary school and beyond, including intrinsic motivation (Gottfried et al., 2001), task value (Jacobs et al., 2002; Spinath & Spinath, 2005), as well as task-orientation (Anderman & Anderman, 1999; Bong, 2009). This decrease has not been found in the first years of primary school (Nurmi & Aunola, 2005), the onset appears to be in the later years of primary school (Spinath & Spinath, 2005). Studies on competence beliefs mostly showed a decline (De Fraine, Damme, & Onghena, 2007; Jacobs et al., 2002; Spinath & Spinath, 2005; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2008), while self-efficacy has been found to increase from fifth to

11th grade (Zimmerman & Martinez-Pons, 1990). This may be attributed to the conceptual difference between these concepts. While competence beliefs are usually based on a comparison with classmates, self-efficacy measures concern students' ability to control their own actions and are based on prior experiences (Bandura, 1997). When students get older, they develop this sense of control, suggesting that their self-efficacy may increase with age (Schunk & Pajares, 2002). Other studies, however, have reported a decrease in self-efficacy (Anderman, Maehr, & Midgley, 1999; Pajares & Valiante, 1999). Although it is a main predictor of achievement outcomes, the development of self-efficacy has hardly been studied (Wigfield et al., 2008). The development of school investment has mostly been studied in secondary school. Van der Veen and Peetsma (2009) found investment to decline during secondary school. Stoel, et al. (2001) showed that school investment decreased from start of primary school, but started to increase slightly toward the end of primary school. Almost all of the aforementioned studies, except those by Stoel et al. (2001) and De Fraine et al. (2007), examined linear growth trends. However, students' motivation does not necessarily develop linearly. The present study therefore also examined possible curvilinearity in motivational growth patterns.

GROUP DIFFERENCES

Achievement outcomes are found to vary by socio-economic and ethnic background (Park & Sandefur, 2010; Roeleveld et al., 2011) and, according to some, a gender gap has emerged to the disadvantage of boys (e.g., Tyre, 2006; Steinmayr & Spinath, 2008). Given the reciprocal nature of the relation between motivation and achievement (Wigfield & Cambria, 2010), these achievement gaps could be reflected in students' motivation for school. Other reasons to expect motivation to vary by gender or background can include, for example, differences in school-related attitudes that are encouraged at home or different expectations from parents (e.g., Van der Veen, 2003) or teachers (Van den Bergh, Denessen, Hornstra, Voeten & Holland, 2010). Although

differences in motivation have been studied before, not much is known about differences in motivational developments over time.

PRESENT STUDY

As research on motivational developments during primary school is scarce, the present study examined developmental patterns of task-orientation, self-efficacy, and school investment in upper primary school and how these relate to developments in achievement, taking into account cognitive ability and background factors. The study focused specifically on group-specific differences. The following research questions were addressed:

1. How do task-orientation, self-efficacy, and school investment develop during the second half of primary school? To what extent do these developments differ by gender, social and ethnic background?
2. To what extent do developments in task-orientation, self-efficacy, and school investment relate to developments in academic achievement? To what extent does this differ by gender, social and ethnic background?

METHODOLOGY

SAMPLE AND PROCEDURE

Data on students' motivation in third and sixth grade were available from the triennial "COOL" study, a national Dutch cohort study on students' educational careers (Driessen, Mulder, Ledoux, Roeleveld, & van der Veen, 2009). The COOL study includes cohorts of students from kindergarten, grade three, and grade six (N=38060). A subsample from the third grade cohort of 722 students from 37 classes of 25 schools across the Netherlands participated in this additional study. Three additional waves of data were collected from this

subsample [2]. Students and teachers filled out questionnaires during each measurement wave. Table 1 shows a schematic overview of the data collection.

Table 1.
Schematic overview of waves of data collection

Wave	Grade	Months
1 (COOL-1)	Half way through grade 3	January/February, 2008
2	Beginning of grade 5	September/October, 2009
3	Half way through grade 5	January/February/March, 2010
4	Beginning of grade 6	September/October, 2010
5 (COOL-2)	Half way through grade 6	January/February/March, 2011

During the first COOL-measurement, students' average age was 9 years. 361 (50.0%) students were boys and 361 (50.0%) girls. Schools provided information on students' background characteristics. Ethnicity was based on the mothers' country of origin. When a student was from a single-parent family, ethnicity was determined based on the ethnicity of this parent. A dichotomy was made between ethnic majority and ethnic minority students (see table 2). Even though the group of ethnic minority students consisted of students with backgrounds in a wide variety of countries, these students were considered one group in the larger COOL-study and in the present study, because of their similarities (Driessen et al., 2009). Likewise, students with parents from another European or western country were included in the group of majority students. Parental educational level was considered an indication of students' socio-economic status (SES). Three groups were distinguished based on the highest educational level attained by either of the parents (see table 2). From 121 students, SES information was missing. Analyses showed a significant relation

[2] Analyses showed that in grade three, the motivation of the students in the subsample of schools only slightly differed from the motivation of students in a representative sample of schools (effect sizes between -0.13 and 0.01).

between ethnicity and SES of students in this sample (*Spearman's Rho*=.112, $p<.05$).

Table 2.
Ethnic background and socio-economic status of participants in the study

Ethnic background	N	%	SES (parental education)	N	%
Ethnic majority (Dutch, other Western and European countries)	644	89.2%	Low: maximum lower vocational education	96	16.0%
Ethnic minority (Morocco, Turkey, Dutch-Antilles, Surinam, Iraq and other non-western countries)	78	10.8%	Middle: maximum intermediate vocational education	301	50.1%
			High: higher education	204	33.9%

MEASURES

Motivation. Questionnaires on motivation were administered to students and their teachers during regular class time. These included self-reports on task-orientation and academic self-efficacy, and teacher reports on students' investment. Although self-report measures have some limitations, as they are susceptible to self-presentation bias (Jobe, 2000), the internal nature of motivational beliefs makes self-reports one of the most suitable measures. Motivated behavior, however, is a visible part of motivation and was therefore assessed by teacher ratings. This scale included items that represent two key aspects, intensity and perseverance, of school investment. The task-orientation and school investment scales were formulated in Dutch. The self-efficacy scale was originally formulated in English and translated to Dutch for use in the COOL study. Moreover, all scales were validated for use in the COOL study (Driessen et al., 2009; Jungbluth, Roede, & Roeleveld, 2001). All items were on a 5-point Likert-scale ranging from totally not applicable to me (1) to totally applicable to me (5). Further information about the scales is reported in table 3. Furthermore, to check whether the motivational variables reflected the same

construct over time and across groups, a series of multi-group factor analyses were performed, yielding satisfactory results.

Table 3.
Example items, number of items, and reliabilities of the scales used in the study

Scale	Example items	*N* of items	Reliability m1 – m5
Task-orientation from Goal Orientation Questionnaire (Seegers, Van Putten, & De Brabander, 2002)	*"I like when I learn something new in school."*	5	.65 - .82
Academic self-efficacy from 'Patterns of Adaptive Learning Survey' (PALS) (Midgley et al., 2000)	*"I can do even the hardest work in school if I try."*	6	.70 - .84
School investment from COOL student profiles (Jungbluth, Peetsma, & Roeleveld, 1996)	*"This student quickly gives up when he/she does not succeed."* *"This child works accurately"*	3	.82 - .85

Achievement in reading comprehension. Reading comprehension scores were used as a measure of achievement, as this is an essential skill for gaining understanding in all other subject domains (Hulme & Snowling, 2011). Tests from the Dutch National Institute for Educational Measurement (CITO) are administered to students in the Netherlands each year to monitor student progress. Students' scores from grade four to grade six were provided by the schools. The test has good reliability (α>0.80) (Evers, 2002).

Cognitive ability. To exclude the possibility that motivational differences between groups could be attributed to cognitive ability, cognitive ability was included in the study as a control variable. It was measured in grade three by a cognitive ability test. This test consists of 85 verbal and non-verbal items. There are five subtests: 'composition of figures', 'exclusion', 'number series', 'categories', and 'analogies'. Factor analyses revealed that these subtests form one general cognitive ability factor. Reliability of the test was 0.91 (Van Batenburg & Van der Werf, 2004).

DATA ANALYSES

Students with missing data are often removed from the analysis (listwise deletion), although this practice has been criticized (Little & Rubin, 1987; Little & Rubin, 1989) as it assumes that missing values are completely at random (MCAR) and not related to for example scores on specific variables or group membership. Instead of removing participants with missing values from the analyses, missing values were estimated by full-information maximum likelihood estimation (FIML), which is based on the assumption that missing values are missing at random (MAR) and can be predicted from the available data. Imputation of missing data thus prevents bias that may occur by removing cases when missingness may be related to for example group membership.

The data were analyzed using multivariate Latent Growth Curve Analyses (LGCA) (McArdle & Epstein, 1987). The analyses were performed with Mplus (Muthén & Muthén, 2007). The underlying assumption of LGCA is that, individuals can vary in their initial scores and growth patterns. For each individual, LGCA estimates an intercept (initial level in grade three) and slope (growth a year) on each variable. These latent variables are estimated based on observed scores on multiple measurement occasions. To examine potential curvilinear growth patterns, a quadratic growth term can also be estimated for each individual.

Beforehand, a series of multi-group factor analyses were performed to check whether the variables reflected the same construct over time and across groups,. For measurement invariance across groups (boys vs. girls, ethnic majority vs. minority students, and low vs. middle vs. high SES), a model was estimated for each variable in which measurement parameters were held equal across groups. Likewise, to check for measurement invariance across measurement occasions, multi-group factor analyses were performed with groups being the measurement occasions. All models fitted the data well (CFI and TLI were above .95) and fit was not significantly better in less restrictive models.

To study motivational developments (research question 1), univariate growth curves were fitted to the data of each motivational variable. The error terms of

subsequent measurements of motivation were allowed to covary. In estimating each model, the multilevel nested structure of the data (students within classes) was taken into account. Linear and quadratic growth models were compared to determine whether developments showed a linear or quadratic growth pattern. Model fit was determined by Chi-square difference tests, the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). A significant Chi-square difference indicates whether or not model fit significantly improved by adding quadratic growth. A CFI above .90 indicates good fit of a model. An RMSEA below .05 indicates good fit of a model and scores between .05 and .08 indicate reasonable fit (Hu & Bentler, 1999). After determining which type of growth model –linear or quadratic– fitted the data best, multigroup latent growth curve analyses were performed on the univariate models with groups being boys vs. girls, ethnic majority vs. minority, and low, medium and high SES students. For these multigroup analyses, first a model with no equality constraints was defined. One by one, equality constraints were added to the model. Fit indices indicated whether model fit significantly declined by adding the equality constraint, indicating that a parameter differed across the groups. If model fit did not significantly worsen by adding the equality constraint, the parameter was considered equal. To evaluate the size of differences between groups, effect sizes for differences in intercepts, slopes or quadratic terms were calculated by means of Cohen's *d*, with 0.2 being indicative of a small effect, 0.5 a medium, and 0.8 a large effect size (Cohen, 1988).

To answer research question 2 on the relation between developments in motivation and reading comprehension, models relating the intercept (initial level) and slopes (growth a year) – and quadratic growth term, if applicable – of each motivational variable and reading comprehension were related to each other (see figure 1 for an example). Three of these models, one for each motivational variable, were examined with gender, ethnicity, SES, and cognitive ability as control variables. Again, we corrected for the multilevel structure of the data. Relations between initial levels of motivation and achievement are comparable to relations that can be examined in cross-sectional data. The

longitudinal nature of these data, however, also allowed for examining relations between slopes, or in other words, whether developments in motivation over time related to developments in achievement. Effect sizes to assess the strength of these relations were estimated based on the standardized coefficients of the relations between intercepts and/or slopes. Standardized correlations of 0.1, 0.3, and 0.5 are indicative of small, medium, and large effects, respectively (Cohen, 1988). Subsequently, we examined multigroup differences in the relation between motivation and achievement with similar groups, while controlling for the remaining control variables. For these multigroup analyses, first a model with no equality constraints was defined. One by one, equality constraints were added to the model. Fit indices again indicated whether parameters differed across groups.

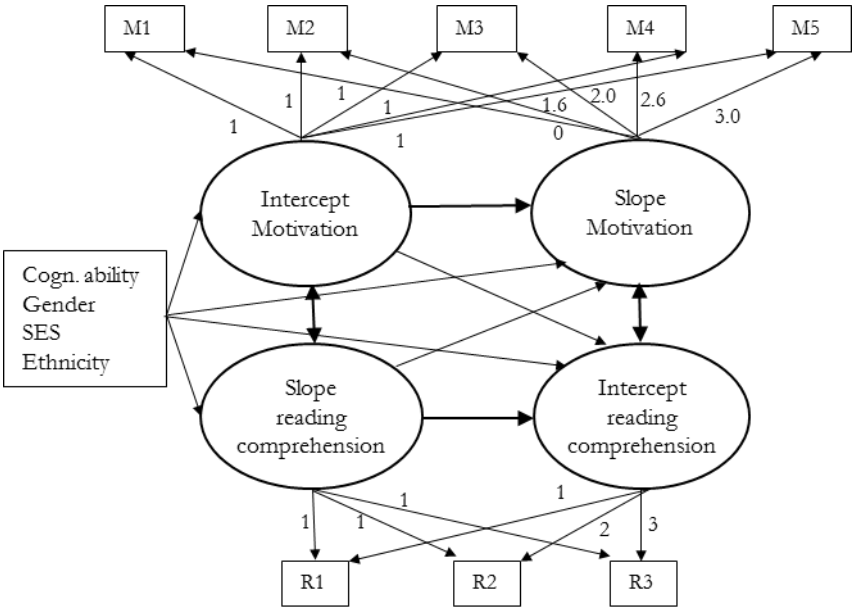

Figure 1. Example model examining the relation between motivation and reading comprehension (variance and error terms not depicted).

Table 4.

Descriptive statistics and correlations of task-orientation (TO), self-efficacy (SE), school investment (SI), and reading comprehension (RC) (N=722).

		M	*sd*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.	TO gr 3	4.11	0.60	1.00																	
2.	TO gr 5_1	4.05	0.54	.07	1.00																
3.	TO gr 5_2	3.92	0.60	.09*	.50*	1.00															
4.	TO gr 6_1	3.92	0.59	.05	.41*	.59*	1.00														
5.	TO gr 6_2	3.85	0.61	.04	.33*	.43*	.57*	1.00													
6.	SE gr 3	3.71	0.62	.44*	.04	.06	.02	.01	1.00												
7.	SE gr 5_1	3.62	0.61	.06	.47*	.27*	.27*	.21*	.07	1.00											
8.	SE gr 5_2	3.65	0.57	.03	.34*	.43*	.32*	.21*	.02	.56*	1.00										
9.	SE gr 6_1	3.72	0.57	.07	.31*	.41*	.48*	.34*	.02	.49*	.66*	1.00									
10.	SE gr 6_2	3.76	0.61	.02	.27*	.25*	.34*	.52*	-.01	.40*	.52*	.61*	1.00								
11.	SI gr 3	3.38	0.89	.15*	.04	.02	-.01	.02	.06	.02	.01	.02	.03	1.00							
12.	SI gr 5_1	3.43	0.93	.07	.10*	.13*	.14*	.13*	.12*	.13*	.15*	.09*	.15*	-.02	1.00						
13.	SI gr 5_2	3.44	0.97	-.03	.07	.11*	.11*	.10*	.04	.15*	.15*	.09*	.13*	.01	.77*	1.00					
14.	SI gr 6_1	3.43	0.88	.01	.11*	.21*	.20*	.15*	.02	.17*	.15*	.14*	.17*	.06	.58*	.60*	1.00				
15.	SI gr 6_2	3.53	0.87	.06	.09	.15*	.17*	.16*	.02	.15*	.14*	.16*	.20*	.11*	.57*	.63*	.70*	1.00			
16.	RC gr 4	34.5	13.8	.10	.04	.04	.01	-.04	.12*	.11*	.16*	.11*	.09	.01	.37*	.27*	.26*	.27*	1.00		
17.	RC gr 5	44.0	14.1	.01	.04	.14*	.08	-.01	.08	.18*	.25*	.21*	.15*	.01	.40*	.40*	.38*	.42*	.69*	1.00	
18.	RC gr 6	57.9	16.5	-.04	.02	.13*	.06	.01	.00	.19*	.30*	.21*	.17*	-.01	.41*	.42*	.32*	.37*	.53*	.68*	1.00

**$p < 0.01$ level (2-tailed); *$p < 0.05$ level (2-tailed).

RESULTS

DESCRIPTIVE STATISTICS

Table 4 shows means and standard deviations of task-orientation, self-efficacy, school investment, and reading comprehension for each measurement and correlations between these variables.

UNIVARIATE GROWTH MODELS OF MOTIVATION

To examine developments in task-orientation, self-efficacy and school investment, univariate latent growth models were defined. Table 5 shows the estimates of the means, variances and fit indices as well as the outcomes of the multigroup comparisons for each variable. Table 5 shows that a linear growth model of *task-orientation* fitted the data reasonably well (χ^2 (6) = 20.77, CFI=0.98, RMSEA=0.06), while the quadratic model fitted the data significantly worse (χ^2 (2) = 12.02, CFI=0.98, RMSEA=0.08). Task-orientation thus showed a linear negative trend during the second half of primary school. Boys and girls as well as children with different SES backgrounds did not differ in development of task-orientation. Ethnic majority and minority students showed the same initial level of task-orientation, but the growth rates significantly differed. While task-orientation of ethnic minority students remained stable, task-orientation of majority students declined between third and sixth grade. Figure 2 shows the development in task-orientation for the total group, and separately for ethnic majority and minority students.

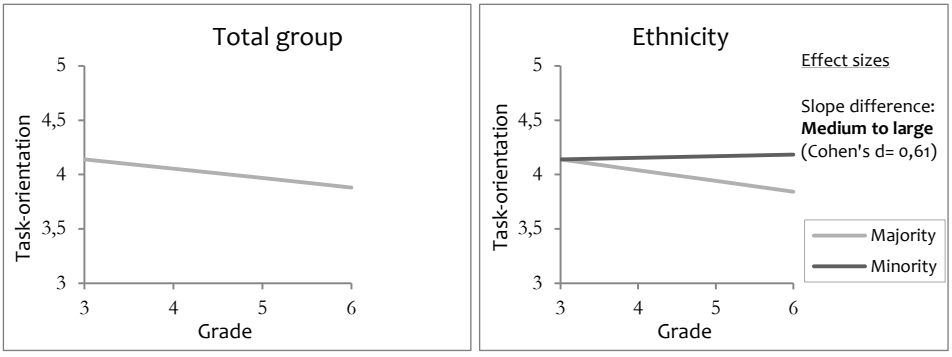

Figure 2. The development of task-orientation for the total group, and ethnic minority and majority students.

Table 5.

Unstandardized means and variances for univariate (multi-group) latent growth curves of task-orientation, self-efficacy, and school investment and model fit statistics

	Intercept		Slope		Quadratic		Fit indices		
	M	*Var*	*M*	*Var*	*M*	*Var*	χ^2 (df)	CFI	RMSEA
Task-orientation									
Total group	4.14	0.09	-0.09*	0.04			2.77	0.98	0.06
Boys	4.14	0.08	-0.09	0.04			37.37	0.97	0.06
Girls	4.14	0.10	-0.09	0.04					
Ethnic	4.14	0.11	*-0.10*	0.03			31.91	0.99	0.04
Ethnic	4.14	0.00	*0.02*	0.04					
Low SES	4.15	0.00	-0.10*	0.03			37.17	0.99	0.03
Middle SES	4.15	0.11	-0.10*	0.03					
High SES	4.15	0.19	-0.10*	0.05					
Self-efficacy									
Total group	3.70	0.00	-0.13*	0.18	0.05	0.02	2.20	1.00	0.00
Boys	3.70	0.00	*-0.06*	0.17	*0.03*	0.02	9.35	1.00	0.00
Girls	3.70	0.00	*-0.20*	0.19	*0.07*	0.02			
Ethnic	*3.69*	0.00	-0.14*	0.18	0.06	0.02	8.21	1.00	0.00
Ethnic	*3.94*	0.00	-0.14*	0.19	0.06	0.03			
Low SES	3.72	0.00	*-0.19**	0.21	0.06	0.03	18.84	1.00	0.00
Middle SES	3.72	0.00	*-0.17**	0.16	0.06	0.02			
High SES	3.72	0.00	*-0.14**	0.15	0.06	0.02			
School investment									
Total group	3.36	-0.06	0.05*	0.06			5.06	1.00	0.00
Boys	*3.28*	0.00	*-0.02*	0.09			17.85	1.00	0.00
Girls	*3.47*	0.00	*0.10**	0.07					
Ethnic	3.37	0.00	*0.06**	0.08			24.98	0.99	0.02
Ethnic	3.37	0.00	*-0.06*	0.12					
Low SES	*3.24*	0.00	*0.03*	0.08			47.42	0.98	0.04
Middle SES	*3.38*	0.00	*0.03*	0.08					
High SES	*3.38*	0.00	*0.10**	0.08					

* $p < 0.05$

Note. Parameter estimates printed in italics indicate significant differences between groups.

With regard to *self-efficacy*, a quadratic growth model fitted the data best ($\chi^2(2) = 2.20$, CFI=1.00, RMSEA=0.00). In general, students' self-efficacy first declined after third grade and then increased. This curvilinear "u-shape" was stronger for girls than for boys. Ethnic majority and minority students only differed in their initial level of self-efficacy, with ethnic minority students having higher self-efficacy than majority students. For the three SES groups, self- efficacy became more differentiated over time. All three SES groups had equal intercepts in grade 3, and first showed a decline and then an increase, but the slopes of the three groups significantly differed. At the end of primary school, self-efficacy was thus higher in groups with higher SES. Figure 3 shows the development of self-efficacy for the total and separate groups.

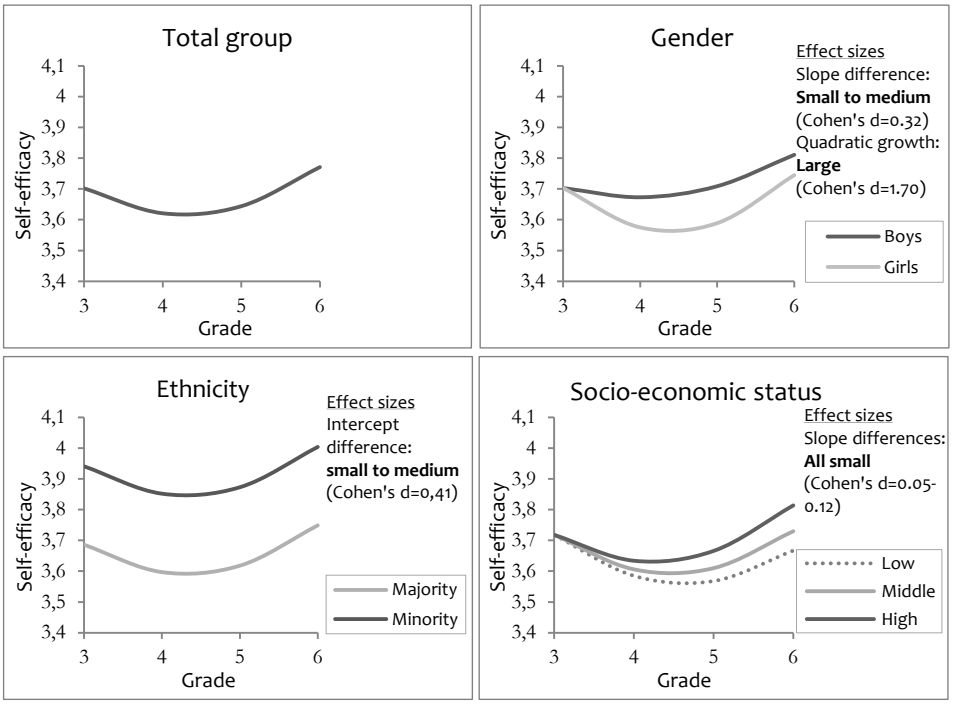

Figure 3. The development of self-efficacy for the total group, and separately for boys and girls, ethnic minority and majority students, and low, middle and high SES students.

For *school investment*, both the linear and quadratic model had a good fit to the data. The quadratic model ($\chi^2(6) = 4.63$, CFI=1.00, RMSEA=0.00) did not significantly fit better than the linear model ($\chi^2(8) = 9.40$, CFI=1.00, RMSEA=0.02). Also, the mean of the quadratic term was not significant (M=0.02, p>.05). Students' investment in school thus linearly increased over time (see figure 4). Multigroup analyses showed that girls' initial level of investment was higher than that of boys and this gap widened over time as girls showed a significant increase in school investment from grade three to six, while boys remained stable. Teacher ratings of investment of ethnic majority and minority students did initially not differ. However, investment of majority students became more positive over time, while investment of minority students remained stable. The high and middle SES group had higher initial levels of investment than low SES students. Investment of the high SES group increased between grade three and six while investment of the low and middle SES did not significantly change.

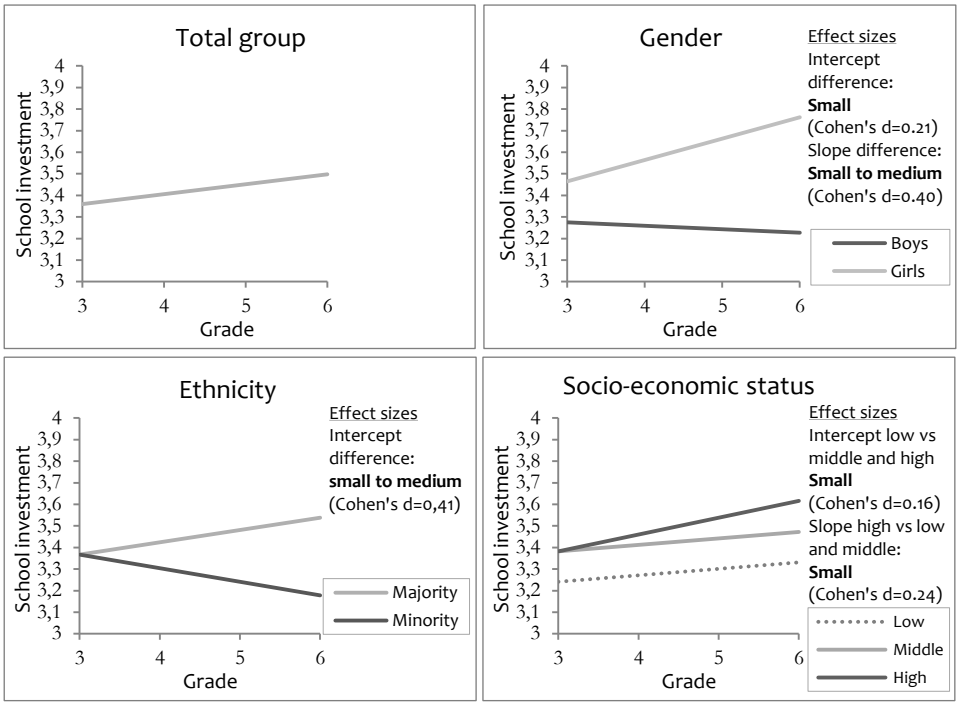

Figure 4. The development of school investment for the total group, and separately for boys, girls, ethnic minority and majority students, low, middle and high SES students.

MULTIVARIATE GROWTH MODELS OF MOTIVATION AND ACHIEVEMENT

After the univariate models were estimated, the relations between developments in motivation and reading comprehension were examined. Results are displayed in table 6. First, the relation between developments in *task-orientation* and reading comprehension was examined. The initial levels of task-orientation and reading comprehension were not related. The growth curves of both variables were however positively related to each other. More specifically, an increase of one point in task-orientation a year resulted in an increase of an extra 0.12 points a year in achievement. Although this does not give information with regard to the causal direction, this finding indicates that either positive or negative developments in task-orientation are associated with similar developments in achievement. The effect size of this relation is small to medium (r=0.19). Note that this was after controlling for background characteristics and cognitive ability.

Table 6.

Multivariate growth models of relations between developments in motivation and reading comprehension: Unstandardized path coefficients are displayed and standard errors in parentheses

	Total group	Gender		Ethnicity		SES		
		Boys	Girls	Majority	Minority	Low	Middle	High
Task-orientation								
Task-orientation: Int ↔ Slope	-	-	-	-	-	-	-	-
Achievement: Int ↔ Slope	-38.36* (14.72)	-38.67*(14.56)	-38.67*(14.56)	-37.01* (14.62)	-37.01* (14.62)	-40.56* (16.84)	-40.56* (16.84)	-40.56* (16.84)
Int Task-orientation ↔ Int achievement	-	-	-	-	-	-	*0.57* (0.26)*	-
Sl Task-orientation ↔ Sl achievement	0.12* (0.04)	0.13* (0.04)	0.13* (0.04)	0.12* (0.04)	0.12* (0.04)	*0.16 (0.12)*	-	*0.31* (0.09)*
Int Task-orientation → Sl achievement	-	-	-	-	-	-	-	-
Int achievement → Sl Task-orientation	-	-	-	-	-	-	-	-
Fit statistics								
χ^2 (df)	104.70 (51)		149.85 (94)		135.52 (93)			192.54 (136)
CFI	0.96		0.96		0.97			0.95
RMSEA	0.04		0.04		0.06			0.05
Self-efficacy								
Self-efficacy: Int ↔ Slope	-	-	-	-	-	-	-	-
Self-efficacy: Int ↔ Q	-	-	-	-	-	-	-	-
Self-efficacy: Slope ↔ Q	-	-0.05* (0.02)	-0.05* (0.02)	-0.05* (0.02)	-0.05* (0.02)	*-.0.09* (0.05)*	*-.06* (0.02)*	-
Achievement: Int ↔ Slope	-37.31* (14.51)	-28.98*(12.77)	-28.98*(12.77)	-24.09 †(14.55)	-24.09 †(14.55)	-26.41 (16.91)	-26.41 (16.91)	-26.41 (16.91)
Int Self-efficacy ↔ Int achievement	-	-	-	-	-	-	*1.13* (0.31)*	*1.13* (0.31)*
Sl Self-efficacy ↔ Sl achievement	0.52* (0.14)	0.28* (0.06)	0.28* (0.06)	0.21* (0.05)	0.21* (0.05)	*0.26* (0.07)*	-	*0.26* (0.07)*
Int Self-efficacy → Sl achievement	-	-	-	-	-	-	-	-
Int achievement → Sl Self-efficacy	0.010* (.002)	0.008* (.002)	0.008* (.002)	0.009* (.003)	0.009* (.003)	-	*0.003 † (.001)*	*0.003† (.001)*
Intl achievement ↔ Q Self-efficacy	-0.002* (.001)	-0.003* (.001)	-0.003* (.001)	-0.003* (.001)	-0.003* (.001)	-	-	*-0.002* (.001)*
Sl achievement ↔ Q Self-efficacy	-0.013* (.005)	*-0.004* (.001)*	-	-	-	-	-	-
Fit statistics								
χ^2 (df)	88.28		123.23 (85)		128.02 (89)			129.60 (121)
CFI	0.97		0.98		0.98			0.99
RMSEA	0.04		0.04		0.04			0.02

Table 6 (*continued*)

	Total group	Gender		Ethnicity		SES		
		Boys	Girls	Dutch	Ethic minority	Low	Middle	High
School investment								
Investment: Int ↔ Slope	-0.06† (0.03)	-	-	-	*-0.10 (0.13)*	-	-	-
Achievement: Int ↔ Slope	-34.77* (14.42)	-32.94* (14.21)	-32.94* (14.21)	-37.56* (14.54)	-37.56* (14.54)	-34.98* (16.66)	-34.98* (16.66)	-34.98* (16.66)
Int Investment ↔ Int achievement	1.37* (0.36)	*0.51 (0.53)*	*2.02* (0.49)*	-	*2.40* (1.10)*	-	-	-
Sl Investment ↔ Sl achievement	0.41* (0.08)	*0.57* (12)*	*0.28* (0.09)*	0.55* (0.06)	0.55* (0.06)	0.55* (0.07)	0.55* (0.07)	0.55* (0.07)
Int Investment → Sl achievement	-	-	-	-	-	-	-	-
Int achievement → Sl Effort	-	-	-	-	-	-	-	-
Fit statistics								
χ^2 (df)	105.24 (46)		149.57 (87)		174.73 (92)			174.00 (136)
CFI	0.97		0.97		0.96			0.98
RMSEA	0.04		0.05		0.05			0.04

*p< .05, †p<.10

Multigroup comparisons only showed differences in the relation between task-orientation and reading comprehension between groups with different SES. The results for students with either a low or high SES were comparable to the results of the total group. For the middle SES group, however, growth in task-orientation and reading comprehension were not related, but the initial levels were (B=0.56, p<.05). Middle SES students with higher initial levels of task-orientation in grade three on average also had higher reading comprehension scores. Changes over time in task-orientation and reading comprehension were however not related for this group of students.

Initial levels of *self-efficacy* and reading comprehension were not related for the total group, but growth in self-efficacy was positively related to growth in reading comprehension (B=*0*.52, p<.05). Growth of one point a year in self-efficacy related to an increase of 0.52 point in reading comprehension. The effect size was large (r=0.55). Again, this was after controlling for background and cognitive ability. Furthermore, students with higher initial levels of reading comprehension showed more growth in self-efficacy (B=0.01, p<.05), with a small to medium effect size (r=0.32). Because of the curvilinear growth pattern of self-efficacy, the relation between self-efficacy and reading comprehension became a bit more complex, as not only the initial level and linear growth (slope), but also the quadratic growth of self-efficacy related to developments in reading comprehension. The initial level and linear growth of reading comprehension were slightly negatively related to the quadratic growth rate of self-efficacy (B=-0.002, p<.05; B=-0.013, p<.05, respectively). This means that students with lower initial levels or less growth in reading comprehension showed a slightly stronger u-shape in their development of self-efficacy. The relation between self-efficacy and reading comprehension only varied by SES. The results again showed that the outcomes for students with either low or high SES resembled the outcomes of the total group, which means that for those groups, the initial levels were not related, but linear growth in self-efficacy was related to growth in reading comprehension (for both groups: B=0.26, p<.05). For the middle SES group however, growth in self-efficacy and reading

comprehension were not related, but the initial levels were positively related (B=1.13, p<.05).

School investment was positively related to reading comprehension through both the initial level (B=1.37, p<.05) and the growth rates (B=0.41, p<.05). These results indicate that students, who are initially rated one point higher on investment, score 1.37 points higher on reading comprehension. Moreover, an increase of one point in investment a year can be associated with a 0.41 increase a year in reading comprehension. This effect size was medium to large (r=0.41), after controlling for background and cognitive ability. Multigroup comparisons first of all showed differences between boys and girls. The relation between initial levels of investment and reading comprehension was only significant for girls (B=2.02, p<.05) but not for boys (B=0.51, p>.05), but the relation between the developments in investment and reading comprehension was stronger for boys (B=0.57, p<.05) than for girls (B=0.28, p<.05). This indicates that a similar increase in investment would relate to bigger reading comprehension gains for boys than for girls. Furthermore, for ethnic minority students, there was a positive relation between the initial levels of investment and reading comprehension (B=2.40, p<.05), while for majority students, initial levels of investment and reading comprehension were not related. When ethnic minority students were rated higher on investment at the first measurement, they showed better reading comprehension at this measurement. For both groups, a similar significant positive relation between developments in investment and reading comprehension was found (B=0.55, p<.05). There were no differences between the three SES groups with regard to the relation between investment and reading comprehension.

DISCUSSION

This study aimed to extend previous research on motivation by focusing on group-specific developments in task-orientation, self-efficacy, and school investment during primary school and examined whether these developments related to developments in achievement. Overall, we found evidence for

negative developments in task-orientation, but self-efficacy showed a curvilinear pattern that over time remained relatively stable, and school investment even increased over time. However, these developments differed considerably across groups. Furthermore, regardless of gender, ethnic or social background, developments in motivation were substantially related to developments in achievement, beyond students' background and cognitive ability. Below, we will discuss the results more in depth.

In line with previous research (Gottfried et al., 2001; Jacobs et al., 2002; Spinath & Spinath, 2005), task-orientation was found to decline during the second half of primary school. Given the relation with achievement outcomes, such a decline can be considered undesirable. However, this decrease was only found for ethnic majority students. Ethnic minority students' task-orientation remained stable over time and as a result, ethnic minority students were more task-oriented than majority students at the end of primary school. Previous research showed ethnic minority parents to value school more and to have higher expectations of their children's school success than non-immigrant parents (Van der Veen, 2003). The outcomes of the present study may suggest that these parents are indeed more likely to encourage positive school-related attitudes. Nevertheless, although ethnic minority students did not decline in task-orientation, this did not seem to result in a decrease in the achievement gap, as both ethnic minority and majority students on average showed similar growth in reading comprehension.

Self-efficacy showed the strongest relation to developments in reading comprehension, as has been found before (e.g., Eccles & Wigfield, 2002). As a result of the "u-shaped" curvilinear shape, self-efficacy increased toward the end of primary school and thus did not show an overall decline. The mixed findings of previous research on developments in self-efficacy may actually be accounted for by the nonlinear nature of the development of self-efficacy, that previous studies often have not taken into account. Some interesting group differences in self-efficacy were found. Girls showed a stronger "dip" in their self-efficacy around fourth and fifth grade than boys. Although earlier research on competence beliefs has suggested that with age gender differences increase,

these results show that for self-efficacy, this is only found initially. These outcomes may indicate that around age ten, especially girls, may experience a vulnerable phase with regard to their sense of efficacy, but fortunately, they also seem to make a quick recovery toward the later grades. Furthermore, self-efficacy differences due to socio-economic status became more pronounced towards the end of primary school. As students with higher SES indeed tend to do better in school, this suggests that over time students' self-efficacy becomes more in accordance with actual achievement levels. Bandura (1981) has argued that experiences of success and failure in school may make students' efficacy judgments more accurate. Moreover, with age, children become more able to accurately make efficacy judgments. Ethnic minority students, however, reported higher self-efficacy than majority students, while their actual achievement levels are lower than that of majority students. A similar incongruence has been reported by Graham (1994) for African American students. Although they tend to lag behind in school, they still report optimistic expectations with regard to their success in school (Usher & Pajares, 2008). Ethnic minority students may be held up to lower standards, as teacher expectations of ethnic minority students tend to be lower (Van den Bergh et al., 2010). Therefore, it may be easier for ethnic minority students to reach these standards and live up to expectations. This may lead to positive reinforcement and higher self-efficacy.

Teacher ratings of school investment indicated that students become more invested in their schoolwork toward the end of primary school, contrary to previous studies that found school investment to decrease (e.g., Van der Veen & Peetsma, 2009). It seems that students' investment may actually develop more positively than what is often concluded based on self-reports. However, group comparisons revealed that school investment developed less favorably for boys, ethnic minority students, and low SES students. Teacher judgments may be susceptible to bias and such differences could reflect a teachers preference for behaviors that are more typical for girls, majority students, or students with higher SES. However, it is noteworthy that these differences were much smaller, or even absent, in the earlier grades, making it less likely that

teacher bias sufficiently explains the increasing group differences in school investment. These findings may thus also represent real differences that suggest that boys, ethnic minority students and low SES students show less favorable developments in school investment in comparison to other groups. It seems that differences in motivational beliefs cannot account for these findings, as our results show that task-orientation and self-efficacy in most instances did not develop more negatively for these groups. The differences in school investment were not found initially, but only started to emerge in later years, suggesting that less beneficial developments in school investment could be the result of lagging behind in school, rather than the other way around. Since our results also show that the relations between developments in investment and achievement were actually somewhat stronger for boys, ethnic minority students and students with lower SES than for the other groups, the question of *why* school investment of these students develops more negatively, seems crucial to address in further in future research.

Some limitations of the study need to be acknowledged. First, the groups of ethnic minority students and low SES students were both relatively small. Therefore, the conclusions have to be interpreted with caution. Moreover, some of the outcomes may be specific to the Dutch societal and educational context, which could limit the generalizability of the findings. Still, it is worth noting that the study shows the importance of taking students' background characteristics into account when examining developments in motivation. Second, in the present study, developments in task-orientation, self-efficacy, and investment were related to developments in achievement, but not to each other, as the sample size did not allow for more complex models that also include such interactions. Further research could help unravel the relations between these different aspects of motivation over time. Third, given that the focus of the study was on developmental patterns in motivation and group differences, we did not specifically address the causal direction between the different aspects of motivation and achievement. Based on previous studies, however, it seems that the relations between motivation and achievement appear to be bidirectional (Wigfield & Cambria, 2010).

In conclusion, despite the aforementioned limitations, the present study gives more insight into developments in motivation during primary school and has some important implications for theory and practice. The outcomes show that developments in motivation depend, at least partly, on students' gender and background. These factors are thus important to consider when examining why many students become less motivated during their educational careers. Regardless of these differences, the findings show that for all types of students, positive developments in motivation are clearly related to achievement gains. As many schools deal with diverse student populations, it is important to find out what types of learning environments are motivating to different types of students. Future research is thus needed to examine factors that explain differences in developmental patterns and to gain more insight into what types of learning contexts are associated with positive developments in motivation for all types of students.