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On the effects of motivation on reading performance growth in secondary school

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Abstract

This research aimed at identifying unique effects of reading motivation on reading performance when controlling for cognitive skills, familial, and demographic background. We drew upon a longitudinal sample of $N = 1508$ secondary school students from 5th to 8th grade. Two types of intrinsic reading motivation (reading enjoyment, reading for interest), one type of extrinsic reading motivation (competition), and reading self-concept were measured by self-report questionnaires. Cognitive skills (reasoning, decoding speed) and reading performance were assessed using standardized tests and background variables were collected using student and parent questionnaires. Applying latent growth curve modeling, positive unique effects of reading enjoyment and reading self-concept and a negative unique effect of competition on the initial level of reading performance were recorded. Moreover, a positive unique effect of reading for interest on reading performance growth was recorded. One may conclude that enhancing students' interest might be fruitful in terms of nurturing reading performance.

Keywords: Reading motivation; Cognitive skills; Family background; Reading performance; Longitudinal study

1. Introduction

Reading motivation appears to be a core predictor of reading performance (Guthrie et al., 2007; Taboada, Tonks, Wigfield, & Guthrie, 2009). However, most existing research on this relationship drew upon preschool and elementary school samples since during these years the basics of reading are taught and developed. As a result of this focus we do not yet know much about reading performance and its prerequisites among older children. The present research aimed at analyzing unique effects of reading motivation on secondary school students' reading performance growth to address this gap. Therefore, we drew upon a longitudinal design and observed a large sample of students from late childhood to adolescence. We included predictors of reading performance from the fields of reading motivation, cognitive skills, family background, and demographic characteristics. Variables from these areas were correlated with reading performance in previous cross-sectional research on adolescents (Artelt, Schiefele, & Schneider, 2001).

1.1. Reading motivation

According to Guthrie and Wigfield (2000), reading motivation can be defined as "the individual's personal goals, values, and beliefs with regard to the topics, processes, and outcomes of reading" (p. 405). This concept of reading motivation is closely connected to the expectancy-value model (EVM) of achievement motivation (Eccles et al., 1983; Wigfield & Eccles, 2000). As is true for EVM in general, EVM of reading motivation (Möller & Schiefele, under review) makes a basic distinction between a person's expectancy ('Can I be a good reader?') and her or his subjective task value ('Will I enjoy reading and why?'). Thereby, the task value is a complex composite comprising attainment values, intrinsic values, utility values, and costs (Eccles, 2005). We covered several aspects of the

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subjective task value: two forms of intrinsic reading motivation (referring to the intrinsic task value) and one aspect of extrinsic reading motivation (referring to the utility value). Reading self-concept was included as a proxy for expectancy.

1.1.1. Intrinsic reading motivation

Two aspects are fundamental for the intrinsic value (Eccles, 2005): feelings of enjoyment a person gains from performing a certain task and the idea that learning is driven by interest. Therefore, we included reading enjoyment and reading for interest in our study. *Reading enjoyment* represents the activity-related component of intrinsic motivation: people read because they experience reading itself as inherently enjoyable. This understanding of reading enjoyment is strongly related to involvement in reading (Wigfield & Guthrie, 1997). The positive consequences of reading enjoyment on reading performance are related to higher reading activity and thus higher amounts of exercise (Baker & Wigfield, 1999). *Reading for interest* is related to personal topic interest, which is defined as an individual's relatively stable orientation towards a certain topic (Schiefele, 1991). Interest leads to a more frequent use of (adequate) strategies and more deep-level learning (Schiefele, 1999; Schraw & Lehman, 2001). As far as reading motivation is concerned, interest is a driving force that leads people to read. Thereby, reading may be understood as a tool for satisfying the desire to learn more about a certain topic. In the Wigfield and Guthrie (1997) model of reading motivation 'curiosity' strongly refers to reading for interest.

There are only a few longitudinal studies researching the effect of intrinsic reading motivation on reading performance among young children. Taboada et al. (2009) found that internal motivation (a composite of several dimensions of reading motivation) explained a unique proportion of variance in reading performance even when controlling for previous reading performance and background knowledge. In another longitudinal study, Guthrie et al. (2007) have shown that reading involvement and interest assessed by in-depth interviews ($N = 31$) significantly contributed to the prediction of reading comprehension growth. The amounts of unique variance explained by each dimension of reading motivation, however, were not reported, since each dimension was only tested in a separate regression analysis. Altogether, positive associations between intrinsic values for reading and reading performance seem to be theoretically plausible and—for elementary school children—empirically evident (Baker & Wigfield, 1999; Gottfried, 1990; Wang & Guthrie, 2004).

1.1.2. Extrinsic reading motivation

We included extrinsic motivation as a part of the utility value, which refers to action due to external values and demands (Ryan & Deci, 2000). As an indicator of utility we used *competition*, the desire to outperform others in reading (Wigfield, 1997; Wigfield & Guthrie, 1997), which has its use in enhancing students' self-worth. Extrinsic reading motivation has received less attention in research but Becker, McElvany, and Kortenbruck (2010) found a longitudinally negative effect of extrinsic reading motivation on performance even when controlling for reading amount and previous reading performance. They also found a negative association between extrinsic reading motivation and reading amount. Thus, less practice might be responsible for the negative effect of extrinsic reading motivation on reading performance. In a similar vein, Morgan and Fuchs (2007) argued that early experience of failures in reading motivates poor readers only to read when they have to, which in turn leads to poorer reading skills. Moreover, the negative association between extrinsic reading motivation and reading performance might arise due to the fact that extrinsically motivated students focus on social rewards rather than on the text (Wang & Guthrie, 2004), so that they are distracted from the actual reading task.

1.1.3. Reading self-concept

Self-concept can be broadly defined as an individual's self-perception of his or her ability (Shavelson, Hubner, & Stanton, 1976) and thus is a crucial aspect of competence beliefs (cf. Wigfield & Eccles, 2000). In EVM, competence beliefs are supposed to be a prerequisite for expectancies of success. However, Wigfield and Eccles (2002) themselves acknowledged that "two of the constructs proposed as separate in the model (competence beliefs, expectancies for success) are not empirically distinguishable" (p. 96). Thus, self-concept may be used as a proxy for the expectancy component in EVM. We defined the domain-specific *reading self-concept* as the individual's perceptions of competence in performing reading tasks. To date, only a few studies have examined associations of reading self-concept and reading performance. Several studies have consistently found that reading performance and reading self-concept are positively correlated when concurrently measured (Aunola, Leskinen, Onatsu-Arvilommi, & Nurmi, 2002; Chapman & Tunmer, 1995, 1997; Chapman, Tunmer, & Prochnow, 2000; Marsh, Smith, & Barnes, 1985). Katzir, Lesaux, and Kim (2009) have shown that reading self-concept was positively related to reading performance after controlling for aspects of home literacy environment, verbal ability, and word reading skills in a cross-sectional study. However, longitudinal studies are rare and two existing longitudinal studies failed to identify reading self-concept as a longitudinal predictor of reading achievement (Aunola et al., 2002; Chapman & Tunmer, 1997).

1.2. Family background and demographics

In EVM features of the social environment are more distal predictors of reading achievement, whose effects are supposed to be mediated by reading motivation (Möller & Schiefele, under review). Previous research has shown that family background affects students' reading achievement: Parents' *educational qualification* and their *occupational status* are well documented in terms of their affecting children's reading and other educational outcomes (e.g., Yeung, Linver, & Brooks-Gunn, 2002). The mode of action in the association between such indicators of socio-economic status (SES) and students' outcomes deals with the family's ability and willingness to invest in providing a stimulating learning environment. One particular aspect of learning environments deals with the availability of literacy resources on hand to a child. Thereby, the *number of books* a family possesses has been proven as a valid indicator of such a home literacy environment (Elley, 1992). Molfese, Modglin,

and Molfese (2003) found that preschool SES and literacy environment were related to later reading scores. Moreover, familial background was also related to students' achievement growth—even until the end of schooling (Entwisle, Alexander, & Olson, 2005).

Demographic characteristics that might affect reading are *ethnicity* and *gender*. Ethnicity might be connected to early differences in opportunities to learn and practice early reading skills because parents may be less able to read together with their children in the relevant language (McCoach, O'Connell, Reis, & Levitt, 2006). Regarding gender, there is a growing body of literature claiming that differences between females and males in most psychological variables become more and more negligible (Hyde, 2005). However, girls still outperform boys in reading in many countries (Kirsch et al., 2002; also see Leppänen, Aunola, Niemi, & Nurmi, 2008). Presumably, this association goes back to girls' higher engagement in reading as Stanat and Kunter (2001) have shown that achievement gaps between girls and boys disappear when controlling for intrinsic reading motivation.

1.3. Cognitive skills

Reading specific predictors and general cognitive abilities are two classes of cognitive skills connected to reading performance. To account for reading specific prerequisites, we included students' *decoding speed*. Good decoding skills enhance a person's reading performance, since text comprehension requires many cognitive resources for higher-level text processing (Kintsch, 1998). Automatic decoding frees resources for such higher-level processes, and readers are then able to invest more cognitive resources in comprehension. Thus, quick decoding enables a reader to create a more accurate and complete understanding of text contents. Within the PISA study, decoding speed uniquely contributed to reading performance in the international reading test when controlling for general cognitive abilities, learning strategies, and topic interest (Artelt, Stanat, Schneider, & Schiefele, 2001).

General cognitive abilities have also appeared to be a significant predictor of reading performance. Nation, Clarke, and Snowling (2002) found that poor readers had lower cognitive abilities than average readers. Within the aforementioned analysis of the PISA data, cognitive abilities measured by one core dimension—*reasoning*—were the strongest predictor of reading performance when controlling for decoding, learning strategies, and topic interest (Artelt, Stanat, et al., 2001). The effect of this rather non-reading-specific prerequisite seems to result from beneficial metacognitive processes (Körkel & Schneider, 1991), which are associated with higher general cognitive skills.

1.4. The present study

The present research aimed at identifying unique effects of reading motivation on reading performance growth among secondary school students when controlling for cognitive and background variables. The dimensions of reading motivation which were theoretically grounded in the EVM cover expectancy (reading self-concept) and three aspects of the subjective task value (reading enjoyment, reading for interest, competition). We addressed at least three shortcomings of previous research. First, the main body of existing research on the effects of reading motivation on reading performance draws upon rather young students. Second, only a few studies researching the effects of reading motivation applied a longitudinal design. Third, many studies—in particular the few longitudinal ones—completely failed to control for other important prerequisites for reading performance like cognitive skills or family background (Guthrie et al., 2007), or only included predictors from one of these areas (Taboada et al., 2009). To address these shortcomings, we drew upon a longitudinal design with students from late childhood (about 11 years old) to adolescence (about 14 years old) and controlled for cognitive skills, family background, and demographic characteristics.

1.4.1. Hypotheses

We tested each predictor's effects when considered as the only predictor of reading performance (in a series of simple conditional models; the regarding hypotheses are indexed by a) as well as its unique effects when controlling for all other predictor variables (full model; the regarding hypotheses are indexed by b). Following, we will first present our hypotheses according to the four dimensions of reading motivation before we describe our expectations regarding family background, demographics, and cognitive characteristics.

With regard to the intrinsic task value, we expected that reading enjoyment and reading for interest would positively predict the initial level of reading performance and its growth when tested as single predictors (Hypothesis 1a) as well as in the full model (Hypothesis 1b). Moreover, drawing on the findings from Becker et al. (2010), we expected negative effects of competition as an indicator of the utility value on the initial level of reading performance and its growth (Hypothesis 2a). These effects should also prevail in the full model (Hypothesis 2b). With regard to expectancy, we hypothesized reading self-concept to be positively associated with the initial level of reading performance in the simple model (Hypothesis 3a) as well as in the full model (Hypothesis 3b). Expecting an additional positive effect on reading performance growth would be theoretically feasible but, as yet, previous research has not been able to provide empirical support for this assumption (Aunola et al., 2002; Chapman & Tunmer, 1997). Thus, our expectations for the effects of reading self-concept on performance growth were ambiguous and no precise hypotheses were formulated.

According to family background and demographics, significant associations with the initial level of reading performance and its growth were expected when tested as single predictors (Hypothesis 4a). In detail, higher scores in parents' educational qualification, their occupational status, and the number of books at home should be associated with higher scores in reading performance. Furthermore, we expected that students whose parents were both born in Germany would achieve higher initial levels of reading performance than their counterparts and that girls would outperform boys. However, these associations were at least supposed to decline—if not to

disappear—in the full model when motivation and cognitive skills are also included as predictors of reading performance (Hypothesis 4b) since these variables are supposed to mediate the association between background characteristics and reading performance (e.g., Möller & Schiefele, under review).

Finally, we expected positive effects for the cognitive prerequisites—reasoning and decoding speed—on the initial level of reading performance and its growth (Hypothesis 5a). Since these skills have previously been recorded as strong predictors of reading achievement (Artelt, Stanat, et al., 2001; Nation et al., 2002), these effects should also prevail in the full model (Hypotheses 5b).

2. Method

2.1. Sample and procedure

The sample of our study comprised $N = 1508$ students (49% girls; age at T1: $M = 10.88$ years, $SD = 0.56$; age at T3: $M = 13.94$ years, $SD = 0.55$) from 60 schools that were drawn so as to be representative of the federal state of Schleswig-Holstein, Germany. The majority of our sample attended non-academic track schools ($n = 940$ from 39 schools). The remaining $n = 568$ students from 21 schools attended academic track schools. Data was collected by trained research students. The first occasion of data collection (T1) took place just at the beginning of 5th grade (September). The time intervals between each measurement point were approximately 18 months. Each instance of data collection took place within a time slot of 14 days. All covariates presented in this research were collected at T1, the reading performance data stems from all three occasions of data collection.

2.2. Measures

2.2.1. Reading performance

We used age-appropriate tests from the German PIRLS study (Bos et al., 2005) and the German study 'Aspects of Students' Initial Level and Development at Schools in Hamburg'. These achievement tests have been well developed in the context of large-scale studies. Means of test linking using an anchor item design were applied to obtain a common scale for the three occasions (Kolen & Brennan, 2004). Using ConQuest (Wu, Adams, & Wilson, 1998) weighted likelihood estimates (WLE) were estimated as subjects' ability scores. The WLE-reliabilities of the reading tests were sufficient ($\geq$.80) at all occasions. For a more vivid presentation reading test scores were transformed to a scale with $M = 50.00$ and $SD = 10.00$ at T1.

2.2.2. Reading motivation

The four aspects of reading motivation were measured using the 'Habitual Reading Motivation Questionnaire' (Möller & Bonerad, 2007). First, we assessed students' reading enjoyment, i.e. their intrinsic activity-related reading motivation, with five items (e.g., 'I enjoy reading books.'). Cronbach's α was good ($\alpha = .88$). Second, reading for interest was measured with six items as the motivation to read to get information about interesting topics (e.g., 'I read to learn about my topics of interest.'). The reliability for this scale was sufficient (Cronbach's $\alpha = .73$). Third, competition, the desire to outperform others, was measured as an aspect of extrinsic reading motivation. This scale comprised four items and Cronbach's α was good ($\alpha = .83$). An item example is 'I love being the best at reading.' Finally, reading self-concept was assessed with a subscale comprising four items measuring students' evaluations of their own reading skills (e.g., 'Generally, understanding texts is easy for me.'). Cronbach's α was sufficient ($\alpha = .74$). For all motivational measures, students rated their agreement with each item on a 4-point Likert-type scale anchored at 1 ('does not apply to me') and 4 ('applies to me').

2.2.3. Cognitive skills

First, the subtest 'Figure Analogies' from the 'Cognitive Abilities Test for grades 4–12' (Heller & Perleth, 2000), which is a German adaptation of the Cognitive Abilities Test developed by Thorndike and Hagen (1971), was used to assess children's reasoning. This subtest is considered to be a fair indicator of general cognitive abilities (Neisser et al., 1996). WLEs have been estimated as ability scores and the test's WLE reliability was good (.87). Second, we measured decoding speed as an indicator for automaticity applying a test that was developed in accordance with Mejding (2000). The students' task was to read a 740-word fairytale containing a great deal of numerals (e.g., 'seven', 'twenty-two') in 2 min and to underline all numerals. As the text was too long to finish within the given two minutes, the number of read words (marked by the students) indicated the speed of decoding. As for reading performance, the test score was transformed to a scale with $M = 50.00$ and $SD = 10.00$.

2.2.4. Family and ethnic background

We measured three aspects of family background. First, parents had to name their occupation by responding to a parent questionnaire. Families' 'Highest International Socio-Economic Index of Occupational Status' (HISEI, Ganzeboom & Treiman, 1996) was then derived on the basis of their answers. This index ranges between 16 and 90 and indicates the income that is usually associated with a particular occupational area (higher scores indicate higher income). Second, we asked the students' parents to report their highest educational qualification (graduation plus apprenticeship). These responses were coded from 1 (low track graduation without any apprenticeship) to 7 (university degree). Third, students were asked to report the number of books the family has at home. Students rated their answer on a five-point item anchored at 1 ('no or very few [0–10 books]') and 5 ('enough to fill three or more shelves [more than 200 books]'). Each response category was illustrated with a picture of shelves of the proper size. Finally, we captured students' ethnic background by asking if their mother and father were born in Germany. This question has been used in some recent large-scale studies like PISA and seems to be an appropriate proxy for the assessment of ethnicity. Ethnic background then was dummy coded (0 = at least one parent not born in Germany, 1 = both parents born in Germany).

2.3. Analytical issues

2.3.1. Missing data

We used multiple imputation (MI) as a state-of-the-art approach to address the plague of missing data (Graham, 2009). On average about 12.0% of the data was missing per variable in our study. MI was applied to create $m = 5$ complete data sets using NORM (Schafer, 1999). All available information has been used to obtain a good imputation model. All subsequent analyses were then conducted five times and the results have been combined in accordance with Rubin (1987).

2.3.2. Longitudinal data analyses

We applied latent growth curve analyses by means of structural equation modeling using M*plus* 5.2 (Muthén & Muthén, 2008). We specified a model that was able to capture any shape of change by constraining the first loading on the growth factor to 0 and the last loading to 1; the loading to T2 was freely estimated (e.g., Bollen & Curran, 2006). To test if this model was superior over a linear growth model, χ^2-difference tests were conducted. The χ^2-statistics for the multiple imputed data sets were merged using Allison's (2001) formula resulting in a test statistic that is approximately *F*-distributed. Reading prerequisites were included as covariates of initial level and growth. Thereby, we estimated the regression of the growth factor on the initial level (Blomqvist, 1977) instead of correlating both factors, which—as in regular regression—implies that effects of the covariates on the growth factor are adjusted for initial level.

A two-step strategy was then used to examine the covariates' effects. First, each predictor was individually included in a simple conditional model to test its association with the level and growth factor. Second, we tested all predictors at once in a full conditional model to determine which predictors uniquely contribute to reading performance. The motivational predictors were estimated as latent variables with questionnaire-items as manifest indicators. Reasoning was included as a latent variable using a single indicator (WLE score) with a constraint residual variance (mean of the squared standard errors from the individual WLEs) to identify this latent variable. The remaining predictors were included as manifest predictor variables in the model. Finally, we corrected standard errors in all analyses because of the hierarchical data structure (students nested in classes).

3. Results

3.1. Descriptive statistics and correlations

As represented in Table 1, nearly all predictors were correlated with reading test scores at all three time points. Most predictors turned out to be positively related to reading performance as well as with each other. The largest correlation with reading performance appeared for reasoning. As expected, reading enjoyment and reading for interest were positively correlated with reading performance and only competition was negatively correlated to reading performance. Correlations between reading performance scores at the three time points were moderate.

3.2. Longitudinal data analyses

3.2.1. Reading performance development

The parameter estimates for the reading performance model implying a freely estimated shape of growth are presented in Table 2. This model was clearly superior over a linear growth model, $F(1,879) = 12.53$, $p < .001$, and its fit was sufficient, $F(2,115) = 3.61$, $p < .05$, $CFI = .997$, $TLI = .995$,

Table 1
Means/frequencies, standard deviations, and correlations of the study variables ($N = 1508$).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Gender[a]														
2 Ethnic background[a]	**0.06**													
3 HISEI	−0.01	**0.15**												
4 Parents' education	0.01	−0.03	**0.64**											
5 Number of books	0.03	**0.15**	**0.30**	**0.35**										
6 Reasoning	0.04	**0.15**	**0.18**	**0.19**	**0.21**									
7 Reading enjoyment	**0.21**	−0.02	**0.12**	**0.19**	**0.21**	**0.10**								
8 Reading for interest	**0.12**	**−0.11**	−0.03	0.04	**0.08**	−0.05	**0.52**							
9 Competition	**−0.10**	**−0.10**	**−0.07**	−0.01	−0.02	**−0.06**	**0.06**	**0.25**						
10 Reading self-concept	−0.04	**0.09**	**0.21**	**0.21**	**0.26**	**0.15**	**0.35**	**0.16**	**0.06**					
11 Decoding speed	0.04	0.04	**0.16**	**0.15**	**0.20**	**0.09**	**0.26**	**0.16**	0.00	**0.34**				
12 Reading performance T1	**0.08**	**0.14**	**0.31**	**0.33**	**0.29**	**0.42**	**0.28**	0.05	**−0.10**	**0.37**	**0.31**			
13 Reading performance T2	**0.11**	**0.16**	**0.32**	**0.35**	**0.29**	**0.42**	**0.32**	**0.08**	**−0.08**	**0.38**	**0.33**	**0.73**		
14 Reading performance T3	**0.13**	**0.12**	**0.30**	**0.34**	**0.31**	**0.38**	**0.27**	**0.09**	**−0.09**	**0.30**	**0.26**	**0.62**	**0.69**	
M/*f*[a]	49.00	82.00	49.11	4.28	3.28	−0.07	3.16	3.35	2.79	3.04	50.00	50.00	54.66	57.26
SD	–	–	16.91	1.80	1.22	1.60	0.82	0.54	0.87	0.70	10.00	10.00	9.56	9.87

Note. Due to the large sample size, even rather small correlations yielded significance; therefore we suggest interpreting the effect size of a correlation rather than its significance level.

Bold printed correlations are significant: $p < .05$ (two-tailed).

[a] For dummy coded variables the frequency in percent of category '1' is reported instead of the mean: gender (0 = male, 1 = female); ethnic background (0 = at least one parent not born in Germany, 1 = both parents born in Germany).

Table 2
Parameters for the unconditional growth model for reading performance ($N = 1508$).

	Estimate	SE^a	z	p
Mean initial level	50.07	0.78	65.15	.000
Mean slope	7.29	0.34	21.44	.000
Variance initial level	76.76	7.29	10.52	.000
Variance slope	24.92	4.34	5.75	.000
Free loading	0.61	0.03	20.75	.000

[a] Corrected standard errors for nested data.

RSMEA = .047, *SRMR* = .033. The initial score at the beginning of 5th grade was 50.07 points; average growth was 7.29 points in 36 months which equates to an effect size of $d = 0.85$. Thereby, reading performance growth decelerated with an average growth of about 0.5 *SD* from T1 to T2 and an average growth of only about 0.33 *SD* from T2 to T3. The variance components of the initial level and the growth factor were significant. Thus, there was considerable interindividual variation, which might be explained by our predictor variables.

3.2.2. Conditional models of reading performance

Associations with the initial level of reading performance are presented at the top of Table 3. In the simple conditional models (each with a single predictor), all predictors except reading for interest, $p = .069$, were significantly associated with the initial level of reading performance. As expected, all predictors but competition were positively related to the initial level. The largest effects were recorded for reasoning and self-concept. As expected, fewer predictors were significantly associated with the initial level in a full conditional model including all covariates at once. However, reading motivation and cognitive skills remained significant predictors whereas the correlation of all background variables but parents' educational qualification disappeared. In summation, unique contributions to reading performance have been confirmed for reading enjoyment, self-concept, reasoning, and decoding speed (positively) and competition (negatively).

At the bottom of Table 3, the prediction of reading growth is presented. According to the simple conditional models, reading enjoyment and reading for interest were recorded as significant predictors. Moreover, when considered separately, reasoning, parents' highest educational qualification, number of books at home, and gender significantly predicted performance growth. With regards to the full conditional model, as expected, reading for interest still yielded significance when controlling for all other predictors. The remaining motivational predictors, however, failed significance. Moreover, reasoning, gender, and the number of books turned out as significant unique predictors of reading growth.[1]

[1] When testing moderating effects of school track (non-academic track vs. academic track schools) only two parameters differed significantly. Students from academic track schools had higher initial levels of reading performance, $p < .001$, and the association between reasoning and the initial level was higher in non-academic track schools, $p < .01$.

4. Discussion

In this study, we investigated unique effects of reading motivation on reading performance and its growth. We went beyond previous research with regard to three aspects. First, we drew on a sample of previously under-researched secondary school students. Second, we applied a longitudinal design. Third, we controlled for cognitive skills, family background, and demographic features such as ethnicity and gender. In light of research proposing intrinsic reading motivation to be a core condition of reading performance, we particularly expected reading enjoyment and reading for interest to contribute to reading performance and its growth. These hypotheses were, by and large, corroborated.

4.1. Effects of reading motivation

We found positive effects of the intrinsic task value on reading performance and its growth when reading for interest and reading enjoyment were accounted for as single predictors (Hypothesis 1a). The initial level of reading performance was positively related to reading enjoyment and the positive association with reading for interest just missed significance. Both were also significant predictors of reading performance growth. These results are in line with previous research (Guthrie et al., 2007; Taboada et al., 2009) and might be explained by students' higher engagement in reading activities (Wang & Guthrie, 2004) or cognitive processes. Accordingly, Taboada et al. (2009) concluded that if motivation for reading is present, "readers have a desire to comprehend text. This desire to understand energizes the use of reading strategies by causing the reader to be metacognitive, whether it is by asking a question, forming a summary of what has been read, or activating background knowledge to build a fuller text representation" (p. 98).

When controlling for other prerequisites for reading performance (Hypothesis 1b), however, our results were somewhat more equivocal. We then found a positive unique effect of reading enjoyment on the initial level of reading performance but not on its growth, whereas reading for interest was not associated with the initial level but turned out as the strongest predictor of growth. Thus, students who discover reading as an effective tool to satisfy their curiosity on certain topics gain higher levels of performance growth. This important role of reading for interest was in line with research showing that concept-oriented reading instruction (CORI) enhances students' reading engagement and performance (Guthrie et al., 2006). In CORI, practices like hands-on science activities are applied to enhance students' curiosity. Afterwards, students generate questions about the activity that they would like to further investigate. Therefore, students are prompted and motivated to use texts dealing with relevant subject-matters. This procedure enhances students' reading performance by familiarizing students with text processing. Regarding our results these beneficial effects of CORI might also apply to secondary school students (cf. Guthrie, 2008).

The missing association between reading for interest and initial reading performance was somewhat puzzling and might

Table 3
Conditional models for reading performance ($N = 1508$).

	Simple conditional models				Full conditional model			
	Est.	*SE*[a]	*z*	*p*	Est.	*SE*[a]	*z*	*p*
Predicting initial level								
Gender[b]	**0.09**	**0.03**	**2.62**	**.009**	0.05	0.03	1.75	.080
Ethnic background[b]	**0.17**	**0.03**	**5.04**	**.000**	0.04	0.03	1.60	.111
HISEI	**0.36**	**0.04**	**9.77**	**.000**	0.07	0.04	1.87	.062
Parents' education	**0.38**	**0.04**	**8.86**	**.000**	**0.14**	**0.04**	**3.35**	**.000**
Number of books	**0.33**	**0.04**	**8.13**	**.000**	0.03	0.03	0.90	.370
Reasoning	**0.52**	**0.03**	**15.81**	**.000**	**0.37**	**0.03**	**11.73**	**.000**
Reading enjoyment	**0.33**	**0.04**	**9.21**	**.000**	**0.11**	**0.05**	**2.53**	**.012**
Reading for interest	0.08	0.04	1.82	.069	−0.05	0.05	−0.94	.348
Competition	**−0.13**	**0.03**	**−4.45**	**.000**	**−0.09**	**0.03**	**−3.05**	**.002**
Reading self-concept	**0.50**	**0.04**	**14.14**	**.000**	**0.28**	**0.04**	**7.00**	**.000**
Decoding speed	**0.37**	**0.03**	**10.75**	**.000**	**0.16**	**0.03**	**5.29**	**.000**
Predicting growth								
Gender[b]	**0.13**	**0.05**	**2.49**	**.013**	**0.10**	**0.05**	**2.10**	**.036**
Ethnic background[b]	0.03	0.04	0.63	.527	0.02	0.04	0.46	.648
HISEI	0.10	0.06	1.68	.093	0.02	0.08	0.29	.773
Parents' education	**0.15**	**0.07**	**2.26**	**.024**	0.12	0.08	1.37	.171
Number of books	**0.16**	**0.05**	**3.25**	**.001**	**0.11**	**0.05**	**2.02**	**.043**
Reasoning	**0.13**	**0.07**	**1.99**	**.046**	**0.14**	**0.06**	**2.25**	**.025**
Reading enjoyment	**0.11**	**0.05**	**2.54**	**.011**	−0.02	0.08	−0.32	.751
Reading for interest	**0.13**	**0.05**	**2.59**	**.010**	**0.17**	**0.09**	**1.96**	**.049**
Competition	−0.03	0.05	−0.65	.515	−0.08	0.05	−1.48	.139
Reading self-concept	0.02	0.06	0.37	.714	0.00	0.06	0.01	.989
Decoding speed	0.03	0.05	0.68	.500	0.01	0.05	0.26	.796

Note. Est. = Standardized estimate. Bold printed estimates are significant (two-tailed).
[a] Corrected standard errors.
[b] dummy coded (gender: 0 = male, 1 = female; ethnic background: 0 = at least one parent not born in Germany, 1 = both parents born in Germany).

be connected to the actual meaning of reading for interest in our study. As the example-item 'I read to learn about my topics of interest' makes obvious, this kind of motivation assesses if students use reading as a tool to satisfy their curiosity. The assumption that only students who are good at reading recognize this tool, however, might not be valid. Poor readers probably also have certain interests and might also use reading to address these interests. Thus, students might report higher levels of reading for interest, regardless of their reading skills.

Reading enjoyment was recorded as a significant predictor of performance growth in the simple conditional model, however, not in the full conditional model. Thus, we might conclude that the effect of reading enjoyment was too weak to take hold against the other prerequisites. The missing unique effect of reading enjoyment on reading performance growth somehow matches results from Becker et al. (2010), who were not able to replicate an indirect effect of intrinsic reading motivation on reading achievement, when previous reading achievement was included in their model.

Altogether, it is difficult to conclude if our slightly equivocal results can be generalized since there are no other empirical studies testing the effects of reading for interest and reading enjoyment against each other. Indeed, there are studies applying both types of intrinsic reading motivation, however, either both dimensions were tested in separate regression analyses (Guthrie et al., 2007) or a composite measure of intrinsic reading motivation comprising interest and enjoyment together was used (Taboada et al., 2009). Thus, more research is needed to disentangle unique effects of different dimensions of intrinsic reading motivation.

Competition as an aspect of the utility of reading was negatively associated with initial performance (Hypotheses 2a and 2b). This result was in line with cross-sectional research from Wang and Guthrie (2004), who argued that the negative effect of extrinsic motivation might be due to surface learning strategies (cf. Section 1.1.2). Morgan and Fuchs (2007) suggest that this negative relation results from students avoiding reading, which leads to lower amounts of practice and, thus, to lower levels of performance. Contrary to the association with initial reading performance, competition failed as a negative predictor of growth (Hypotheses 2a and 2b). This might depend on our rather restricted operationalization of extrinsic reading motivation, since we only measured the desire to outperform others. Becker et al. (2010) found a clear negative effect of extrinsic reading motivation covering broader aspects of extrinsic reading motivation.

Finally, with regard to self-concept (Hypotheses 3a and 3b), our results were in line with previous research (Morgan & Fuchs, 2007). As in the present research, most of the studies investigating concurrent correlations between reading skills and self-concept found this relationship to be significant (e.g., Chapman & Tunmer, 1995, 1997). With regard to longitudinal studies, however, positive effects of reading self-concept on performance have not been conclusively demonstrated. Chapman and Tunmer (1997) as well as Aunola et al. (2002) did not find such a longitudinal effect.

4.2. Effects of cognitive skills, family background, and demographics

Reasoning and decoding speed (Hypotheses 5a and 5b) were both positively correlated with initial reading performance. These results are in line with research describing text comprehension as a resource demanding higher-level processes that benefit from readers' cognitive resources (Kintsch, 1998). Thereby, as in the study from Artelt, Stanat et al. (2001), reasoning as a proxy for general cognitive abilities had the largest unique effect on initial reading performance and also significantly predicted its growth. The non-significant effect of decoding speed on reading performance growth might be due to the fact that this association is fully mediated by the initial level of reading performance. Similarly, Schneider and Näslund (1999) found that the effect of phonological awareness in kindergarten on reading achievement in later elementary school was completely mediated by first grade reading achievement.

Concerning family background, gender, and ethnicity, we expected significant associations with reading performance when considered as a single predictor (Hypothesis 4a) but only to a lower extent when controlling for motivation and cognitive skills (Hypothesis 4b). This assumption was true for most background variables. Parents' educational qualification, however, uniquely contributed to initial reading performance, and the number of books significantly affected its growth. Since the effects of family background were not fully mediated by the motivational and cognitive predictors included in our model, further aspects like parental involvement or reading activities should additionally be taken into account to explain the mode of action that operates between family background and reading performance.

Similar considerations should be made with regard to gender. To some extent, it was surprising that gender significantly predicted reading performance after controlling for motivation. Previous research has shown that gender differences in reading achievement are mediated by intrinsic motivation (Stanat & Kunter, 2001). Maybe, other psychosocial variables like personality traits might explain the remaining gender differences (cf. Steinmayr & Spinath, 2008).

4.3. Limitations

Some limitations to the present study should be noted. First, we did not investigate bidirectional effects between reading motivation and reading performance. The unidirectional perspective of reading motivation affecting reading performance, however, has been challenged theoretically and empirically (Morgan & Fuchs, 2007). The idea of reading performance also influencing motivation goes back to Stanovich's (1986) classical essay on Matthew effects. He suggests that poor readers become poorer in the course of due to frustrating reading experiences, which in turn leads to less involvement in reading and, thus, to less practice resulting in an arrested development of reading performance. Indeed there is such an effect of reading performance on reading motivation (Morgan & Fuchs, 2007). Moreover, our selection of prerequisites was limited since, for example, we did not include the amount of reading in our analyses, which might explain the association between reading motivation and reading performance (Baker & Wigfield, 1999). Other aspects from the multidimensional view of reading motivation from Wigfield and Guthrie (1997) like self-efficacy or social interaction might as well additionally contribute to reading performance. There are also further cognitive prerequisites that might have predicted reading performance growth. In particular, reading strategies (Souvignier & Mokhlesgerami, 2006; Spörer, Brunstein, & Kieschke, 2009) or more language-related cognitive skills like vocabulary and listening comprehension (Nation & Snowling, 2004) have been recorded to contribute to reading performance.

Despite these limitations, our study addressed a considerable desideratum in research on the effects of reading motivation. To the best of our knowledge, our study was the first that longitudinally investigated unique effects of reading motivation on reading performance among students at secondary school age. Drawing on a relatively large sample, we not only accounted for different dimensions of reading motivation, but also controlled for cognitive skills, family background, gender, and ethnicity. Our results have shown that intrinsic reading motivation is still important for reading performance in adolescence and that stimulating students' interests might be fruitful for fostering reading performance at this age.

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