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Abstract

Background. Researchers often report and discuss gender differences. However, recent research has drawn attention to interaction effects between gender and other social categories.

Aims. The present study analysed the development of disparities in students' reading-related self-concept, intrinsic motivation, and behaviour, as they relate to differences in gender and socio-economic family background. Drawing on expectancy-value theory, we regarded reading-related self-concept, motivation, and behaviour as key to explaining the growing differences between boys and girls in adolescence. Specifically, we focused on the interaction between gender and socioeconomic background in children, which has been discussed in the context of moderating gender differences but not in the context of reading-related attitudes and behaviour.

Sample. The investigation is based on a longitudinal sample of $N = 717$ German students between third and sixth grade.

Method. We used questionnaire data from both students and parents. To compare students' development across time, we applied multi-group latent growth curve models.

Results. We found evidence of increasing gender differences, which were also moderated by the socioeconomic status (SES) of parents: A gender gap either already existed (intrinsic motivation and reading behaviour) or intensified (reading self-concept and reading behaviour) between third and sixth grade. The interaction of gender and SES seemed particularly important for reading self-concept, with the gender gap growing less substantially for higher-SES children. Moreover, this pattern persisted for reading self-concept, even when controlling for achievement differences.

Conclusions. The results provide evidence that gender, social background, and the interaction of the two are relevant for development in the domain of reading, even in young children.

Keywords: reading self-concept, intrinsic reading motivation, reading behaviour, gender, socioeconomic status.

Introduction

The cultivation of positive attitudes toward learning is a key developmental goal for those educating children and adolescents; positive attitudes foster academic and personal development during schooling (Janosz, Archambault, Morizot, & Pagani, 2008) and in subsequent adult development (Kirsch et al., 2002; OECD, 2013). Yet, studies have reported that many students develop negative attitudes toward reading; the results for boys are particularly alarming. For example, large-scale international studies report that gender differences in reading attitudes even exist among elementary school children and grow during adolescence (Mullis, Martin, Foy, & Drucker, 2012; OECD, 2014).

Studies on gender differences in various outcomes have repeatedly focused on such main effects, but much less research has been dedicated to intersectionality, i.e. interactions between gender and other social categories (Hyde, 2014). Qualitative studies have especially highlighted the potential relevance of such interactions (Davis, 2008; Lopez, 2003). Recently, researchers suggested that socioeconomic family background may moderate gender differences in reading (Buchmann, DiPrete, & McDaniel, 2008; Entwisle, Alexander, & Olson, 2007). But despite this, the interaction between gender and socioeconomic status (SES) has received little direct attention. Specifically, no quantitative empirical study has tested this hypothesis regarding the implications of gender and SES interactions for reading self-concept, motivation, or behaviour. This is surprising, at least from a developmental perspective, as gender differences in reading self-concept, motivation, and behaviour typically precede achievement differences and are regarded as crucial for reading literacy development (Eccles, 1987).

We aim to address this research gap and investigate whether and how interactions of gender and family background – focusing on socioeconomic differences – may affect reading self-concept, intrinsic motivation, and behaviour. We draw on a longitudinal sample of students

from third to sixth grade, enabling us to describe the longitudinal dynamic between gender and socioeconomic differences for these variables. We thus make a contribution currently lacking in the literature.

The development of gender differences in reading-related domains

Hyde (2005, 2014) highlighted that gender differences in academic domains vary substantially according to social contexts and developmental stages. For instance, she argued that gender differences in reading vary substantially between countries and show a substantial developmental dynamic. In elementary school, differences are small or even non-existent in most countries (cf. Mullis et al., 2012), but when compulsory secondary school ends, these differences are fairly consistent (cf. OECD, 2014).

Expectancy-value theory and gender identity theories are important approaches that explain gender differences and their developmental and contextual dynamics in relation to reading. In their expectancy-value theory of academic development Eccles and colleagues (Eccles, 1987; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006) suggested that behaviour is guided by expectancy beliefs (i.e. how competent students think they are) and subjective value beliefs (i.e. what students like). Students engage in activities they find interesting (value beliefs) and in which they feel competent (expectancy beliefs); hence, different behavioural patterns emerge and different competencies develop over the life course (see Figure 1 for an adapted version of the Eccles' model). Both expectancy and value beliefs can be conceptualized as generalized beliefs (e.g. 'I am a good reader' or 'I like reading' for expectancy or value beliefs) and as task-specific ones (e.g. 'I can read this empirical text well'; 'I find this text appealing'). Typical operationalizations of generalized expectancy beliefs are academic self-concepts; value beliefs are usually operationalized as motivation and interest constructs (e.g., Archambault, Eccles, & Vida, 2010). Both are shaped by the child's previous academic

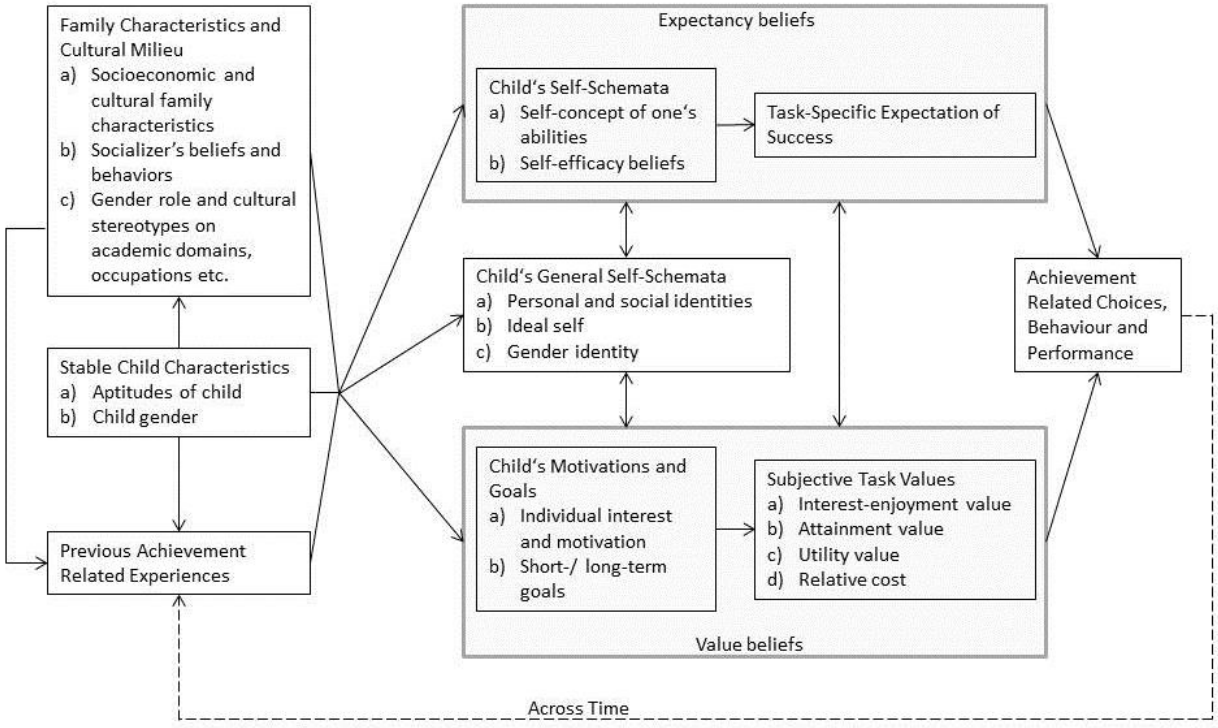

Figure 1. *Expectancy-value model of academic achievement behaviour and its development (adapted from Eccles & Wigfield, 2002, p. 119).*

achievement experiences and general characteristics (e.g. ability; gender) and how these are seen and evaluated in his/her life context (e.g. in the family). Both expectancy and value beliefs drive subsequent academic choices and behaviour; for example, the more competent a student feels and the more a student values reading, the greater his/her inclination toward reading will be.

At the same time, both expectancy and value beliefs are influenced by gender stereotypes (Eccles, 1987, 1994; Wigfield et al., 2006). Students' academic expectancy and value beliefs also factor into their inter-individual and intra-individual evaluations, which constitute gender identity and its development (Hannover & Kessels, 2004). Gender identity interacts with academic development to the extent that subjects are differentially connoted as gender-typical and gender-appropriate (see also Figure 1). In particular, students perceive maths and physics as 'male' subjects and language and reading as 'female' ones (Kessels, 2013; Plante, Théôret, & Favreau, 2009). Children draw inferences from attitudes and behaviours about their own and

others' identities (Hannover & Kessels, 2004); boys therefore find it difficult to integrate reading-related aspects into their identities because these are stereotyped as 'female' (Kessels, 2013; Watson, Kehler, & Martino, 2010). Theorists have proposed that this intensifies during adolescence, when gender identity becomes particularly relevant (Eccles, 1987; Erikson, 1968; Hannover & Kessels, 2004).

There is empirical support for the relevance of expectancy-value and gender-identity theoretical approaches for gender differences in the academic domain. Both expectancy and value beliefs matter (directly) for the development of gender differences in various fields of educational development (for an overview, e.g. Eccles, 1994), including reading achievement development (see, e.g. Durik, Vida, & Eccles, 2006). There are similar findings for the association between gender identity and academic achievement (Heyder & Kessels, 2013; for reading see McGeown, Goodwin, Henderson, & Wright, 2012). Theoretically, this relationship results from (gender-biased) expectancy and value beliefs, which give girls cumulative advantages in reading. Note that both expectancy-value models and gender-identity-related theoretical approaches make convergent predictions about the development of gender differences.

Nevertheless, it is unclear when these gender differences begin to increase. Regarding value beliefs, gender differences in reading motivation already seem to exist at the elementary school level. In their classic study, Baker and Wigfield (1999) found gender differences favouring girls in nine out of 11 subscales of reading motivation at the end of elementary school (between $d = 0.3$ and 0.8). Other researchers have hypothesized that these differences grow more in late childhood and puberty, in line with a gender intensification pattern during puberty (Archambault et al., 2010; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Van de Gaer, Pustjens, Van Damme, & Du Munter, 2009).

For self-concept, which is central to expectancy beliefs, it appears that boys and girls tend to rate themselves according to gender stereotypes: girls rate their language abilities more positively than boys, while the reverse pattern is observable for maths and science (Jacobs et al., 2002; Marsh & Hattie, 1996; Watt & Eccles, 2008; Wigfield & Eccles, 1994). Nevertheless, for reading self-concept, it is unclear whether gender differences intensify in elementary school or in secondary school (Archambault et al., 2010; Jacobs et al., 2002), and to what extent patterns converge. For example, Jacobs et al. (2002) found some evidence of increasing gender differences in language arts competency beliefs in late childhood/early adolescence but reported that these differences decreased in mid to late adolescence.

Reading frequency, understood as the primary behavioural manifestation of academic choices and behaviour, is an important mechanism through which differences in expectancy and value beliefs cause differences in reading achievement (e.g. Becker, McElvany, & Kortenbruck, 2010). This is relevant for the development of gender differences in reading, as most studies suggest that girls read more frequently than boys (Logan & Johnston, 2009; Millard, 1997). Yet, the development of gender differences in reading behaviour is still an open research question, as longitudinal studies remain scarce. Cross-sectional evidence suggests that gender differences in reading behaviour already exist in childhood and adolescence (Mullis, Martin, Kennedy, & Foy, 2007; OECD, 2010).

The development of gender differences: interactions with family background

Drawing on the aforementioned theoretical assumptions, there is reason to assume that gender effects should also vary by social background. In general, there is substantial evidence that social background, such as family SES, matters in educational domains (Sirin, 2005). Stephens, Markus, and Phillips (2014) argued that psychological mechanisms of expectancy and value beliefs formation play a key role in how social class is ‘inherited’ from one generation to

the next. Parental educational expectations and investment in activities that foster children's academic performance differ substantially by social class (Entwisle, Alexander, & Olson, 1997; Entwisle et al., 2007).

Research on intersectionality has stressed that social categories may interact (Cole, 2009). Some quantitative studies on academic development report that factors such as SES interact with gender; for example, lower SES families have more gendered expectations and reinforcement patterns for their children and offer more highly gender-differentiated role models (Entwisle et al., 2007). Specifically, researchers have hypothesized that high-SES fathers hold values and show behaviour more closely aligned with academic culture (e.g. men/fathers reading more; Entwisle et al., 2007). Opportunities to internalize values and imitate behaviour should thus be less gendered in higher SES families than in low-SES families. Studies have discussed to what extent lower- and middle-class boys hold more 'male' stereotyped values and show greater opposition to nonstereotypical activities, including academic engagement. For example, literature from the United Kingdom examined the emergence of a 'laddish' culture, which is overly present in boys from low-SES, immigrant families (Francis, 1999). 'Laddish' boys perform ostentatiously stereotypical 'male' behaviour and exhibit an explicitly anti-learning attitude – making it particularly difficult to adjust successfully to school and develop an interest in language and reading (Hannover & Kessels, 2011).

Buchmann et al. (2008) highlighted that evidence for this interaction between gender and social background is still scarce, which remains true today. Most existing studies examining the interaction between family background and gender have looked at the relation to ethnicity (e.g. Linnehan, 2001; Matthews, Kizzie, Rowley, & Cortina, 2010; Strand, 2014). To our knowledge, few quantitative studies have reported evidence of an interaction between socioeconomic background and gender on reading-related aspects. One such study, Entwisle et al. (2007), found

no evidence of any gender gap in reading competencies at school entrance but found that differences developed through elementary school. Most importantly, these were strongly moderated by social class. They found no differences in reading achievement between higher SES boys and girls, but there was a statistically significant gender difference for children with lower SES. More recently, in a cross-sectional data analysis, Gottburgsen and Gross (2012) found a gender and social class interaction for 15-year-old students, with a higher variability of SES effects on reading achievement in boys than in girls. Examining the development of young (preschool) children, Mensah and Kiernan's (2010) analyses of the Millennium Cohort Study uncovered stronger associations with the family environment (operationalized by maternal education) for boys than for girls (similarly but only cross-sectionally, Zadeh, Farnia, & Ungerleider, 2010).

These studies support the idea that a gender-SES interaction in academic competencies exists. Yet, there are still few studies that have investigated these interactions (see also Hyde, 2014) and, as Buchman et al. (2008) highlighted, the findings are inconclusive. Buchman et al. (2008) cited their own analyses of the Early Childhood Longitudinal Study (Kindergarten Cohort; ECLS-K), in which they found no evidence for an interaction between gender and SES in academic achievement (DiPrete & Jennings, 2012; similarly for Germany: Legewie & DiPrete, 2012; for the UK: Strand, 1999; Strand, 2014).

The present study

Although the literature highlights the importance of intersectionality, few quantitative studies have examined the interplay of gender and family background in academic achievement. This particularly holds for the interaction of gender and SES in reading. In addition, the findings are inconclusive and to our knowledge, all such studies have focused on reading competencies;

no study has examined reading-related expectancy and value beliefs and subsequent reading behaviour.

Therefore, our study focused on (1) testing whether gender differences increase in relation to reading-related self-concept (as a measure for expectancy beliefs), intrinsic motivation (as a measure for value beliefs), and reading behaviour, and (2) investigating to what extent an interaction between gender and socioeconomic background might play a role here, as researchers have hypothesized that particularly boys from lower SES families develop less favourable reading and language-related skills (e.g. Buchmann et al., 2008; Entwisle et al., 2007). We further examined (3) whether changes in gender differences and possible interactions with SES are based on differences in achievement or remain when controlling for achievement. We use a German longitudinal study with a sample of elementary school students from third to sixth grade.

Following the aforementioned theoretical accounts and previous findings, we expected to find differences between boys and girls in all three domains (i.e. reading self-concept, intrinsic reading motivation, and reading behaviour), even at the end of third grade (Hypothesis 1; H1a). In longitudinal terms, we expected this gender effect to increase over time (H1b). Similarly, we predicted that socioeconomic background would have a main effect on the initial level (H2a) and growth (H2b). Regarding our main concern, we expected to find an interaction between socioeconomic background and gender, namely that low-SES boys develop less favourably in all three domains. We expected the interaction effects to be present at baseline (H3a) and to grow over time, becoming more distinct by sixth grade (H3b). If differences in socialization patterns matter, these effects should be independent of initial ability levels. Therefore, we expected gender differences and the gender-SES interaction to remain, even when we controlled for initial achievement differences.

Method

Sample

The data originate from the Berlin Longitudinal Reading Study (READING 3-6), a large-scale longitudinal study conducted in Berlin, Germany. This study was conducted by the Max Planck Institute for Human Development, Berlin, Germany. A total of 772 students from 54 classes in 22 elementary schools participated in the longitudinal study. The average age at the end of third grade was just over nine years ($M = 9.1$, $SD = 0.5$). 47.1% of the participating students were girls. Across all three waves, the parents of $N = 703$ (91.1%) students answered at least once. In 50.8% of the households, at least one parent had a university entrance diploma (*Abitur*). 63.0% spoke only German at home, indicating that 37.0% of respondents had an immigrant background if using family language to operationalize this.

The data analysed in this article were collected in three waves: at the end of third grade in June 2003 (T1), halfway through fourth grade in January 2004 (T2), and at the end of sixth grade in May 2006 (T3). In all three waves, trained experimenters assessed students in classrooms during regular school hours. The experimenters read the questionnaires to the children in the first two waves (third and fourth grade), and in the last wave, children had to answer without an experimenter reading the questionnaire aloud. Experimenters gave the students questionnaires to be filled out at home by their parents and collected in closed envelopes by teachers. In the analyses presented here, we only considered elementary school students ($N = 717$) in order to hold school contexts constant (excluding those students who transferred into secondary school early after fourth grade, $N = 55$; 51% girls).

Instruments

Reading self-concept

We assessed reading self-concept as a measure for expectancy beliefs with seven items at each of the three measurement points. The items addressed both global self-perception (e.g. 'I am talented at reading') and specific reading occasions (e.g. 'I can read texts easily, even about things which I am not familiar with'). The scale was originally devised for the German translation of the questionnaire of the Progress in International Reading Literacy Study (PIRLS; Bos, Bonsen, Gröhlich, Guill, & Scharenberg, 2009; Kelly, 2003) but was adapted for younger children (i.e. all items were positively phrased). Students indicated their agreement on a 4-point Likert scale ranging from 1 = *completely disagree* to 4 = *completely agree*. The scale quality was satisfactory, with reliabilities of McDonald's ω from = .87 to .90 and a retest stability between r_{t1t2} = .76 (seven months) and r_{t1t3} = .68 (35 months).

Intrinsic reading motivation

At the three measurement points, we assessed intrinsic reading motivation as a measure of value beliefs; we used four items mostly covering reading interest. Three were positively phrased ('I like reading', 'Reading is fun', 'I read because I like reading stories') and one was negatively phrased ('I think reading is boring'; see McElvany, Kortenbruck, & Becker, 2008). As with the self-concept items, students rated their agreement on a 4-point Likert scale. The scale quality was satisfactory, with reliabilities of McDonald's ω from = .88 to .92 and a retest stability between r_{t1t2} = .61 (seven months) and r_{t1t3} = .44 (35 months).

Reading behaviour

We assessed reading behaviour by examining students' self-reports and parental information on how intensely their children engaged in reading activities. A three-item scale combined student and parental reports to capture time spent reading and reading frequency at all

three measurement points. Students reported durations of reading by answering the question 'How much time do you usually spend reading each day?' (from 1 = *none/less than half an hour* to 4 = *more than two hours*). Similarly, parents answered the question 'On average, how many hours does your child read outside school on a normal day?' (from 1 = *none at all*, 2 = *less than half an hour* to 5 = *more than two hours*). In addition, the item 'How often do you read for pleasure?' on the student questionnaire measured reading frequency using a 5-point Likert scale (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, and 5 = *always*). We used these three items to create a latent factor of reading behaviour (see also Becker et al., 2010). The scale quality was acceptable, with reliabilities of McDonalds ω from = .60 to .82 and a retest stability between r_{t1t2} = .74 (seven months) and r_{t1t3} = .70 (35 months).

Socioeconomic background

We used parental occupational data to operationalize SES in accordance with the *International Socio-Economic Index* (ISEI; Ganzeboom & Treiman, 2003). We determined parents' occupations using open-ended questions in the parent questionnaire, quantified them according to *International Standard Classification of Occupations* (ISCO) categories, and transformed them into ISEI scores, which range from 16 to 90 (Ganzeboom & Treiman, 2003). A high ISEI score corresponds to a higher occupational status. In the following analyses, we used the highest ISEI in the family (HISEI). Average HISEI in the families was M = 53.2 (SD = 16.8). To facilitate interpretation, the HISEI was z-standardized across all students.

Reading achievement

To control for achievement differences at T1, we operationalized reading achievement via a multiple choice test for reading comprehension (Hamburger Lesetest [Hamburg Reading Test]; Lehmann, Peek, & Poerschke, 1997). The test consisted of four texts, each with four items. The texts and tasks varied in their difficulty, covering a broad range of ability; task

complexity ranged from simple comprehension questions to more complex questions requiring inferential comprehension. The test showed good reliability ($\alpha = .78$) and Rasch-conformity; we used Warm's weighted likelihood estimators for scaling (Warm, 1989).

Statistical analysis

First, we examined measurement invariance for all measures for the overall group and in a multi-group model to test invariance between boys and girls for all three measurement occasions. We conducted model tests, ranging from configural measurement invariance to strong measurement invariance (Meredith & Horn, 2001). The latter allows an interpretation of mean changes on a common latent metric. Following Byrne (2012), we compared model fit using indicators that are independent of sample size such as CFI, TLI, SRMR, and RMSEA. We checked whether there was a substantial deterioration in model fit by assuming more restrictive models ($|<.01|$, cf. Byrne, 2012), but also whether the model fit remained satisfactory on an absolute level (CFI and TLI > .95; RMSEA and SRMR < .08; Byrne, 2012; Hu & Bentler, 1999). To establish a common metric across time and groups, we used metric invariance with invariant factor loadings, as well as intercepts across all three points of measurement and between both groups. Moreover, we allowed for residual correlations of the same measurement indicators between adjacent time points. The measurement models that assumed strong measurement invariance across measurement points and groups showed an acceptable model fit for all three domains.

We applied multi-group latent growth curve models (LGCM) to estimate the baseline level and growth (reflected in an intercept and slope parameter; Byrne, 2012) for boys and girls separately. LGCM allow for the specification of linear and non-linear growth rates. We specified both linear and non-linear developmental trajectories and compared their model fit. In the linear models, we fixed the factor loadings at the three points of measurement at $\lambda_{T1} = 0$, $\lambda_{T2} = 0.2$, and

$\lambda_{T3} = 1$, which is consistent with the time intervals between the individual points of measurement. In the non-linear models, the factor loading at T2 was freely estimated. As we applied multi-group models (boys and girls separately), we compared linear and non-linear models that were increasingly restrictive (1. non-linear growth freely estimated for both groups, 2. non-linear growth constrained to be equal between groups, and 3. linear growth; for results see *Development over time*).

We extended the model by using HISEI as an exogenous time-invariant predictor variable. Hence, we regressed both intercept and slope on HISEI. Specifying the models as multi-group models enabled us to test whether parameters differed between groups, with a statistically significant difference indicating an interaction with gender. In the last step, we also controlled for reading achievement to test which gender and SES differences were confounded with achievement differences.[1]

We conducted all analyses in M*plus* 7.11 (Muthén & Muthén, 1998-2011) using full information maximum likelihood estimation (FIML). We determined statistical significance based on *p*-values calculated for one-sided or two-sided tests, depending on whether the set of hypotheses had a pre-specified direction. We adjusted our standard errors using the *type = complex* analysis option in M*plus,* with class as a cluster variable to account for the hierarchical data structure.

Results

Measurement invariance across measurement points (age) and gender

In the first step, we tested the model fit for measurement invariance of the three latent domains

[1] We ran further tests to explore sensitivity to model specification. We tested different operationalizations of social background variables, replacing SES with parental education to test whether an operationalization addressing more of the cultural aspect of social background would be relevant. The alternative specification yielded virtually identical results to the presented ones. Additionally, the differential gender effects and interactions persisted when we controlled for students' immigrant background.

(reading self-concept, motivation, and behaviour), both for the overall group and for a multi-group model; we did so separately for boys and girls. For the overall group, all of the models assuming strong factorial invariance had at least a good fit (see Table 1). For reading self-concept and intrinsic reading motivation, the more restrictive models were not associated with statistically significant decreases in model fit. For reading behaviour, we detected a decrease in model fit from configural to strong measurement invariance as RMSEA declined from .025 to .042 or CFI from .990 to .960; however, considering absolute fit, it was still possible to maintain strong measurement invariance.

Table 1. *Test for measurement invariance over the three measurement occasions (from configural to strong factorial invariance) for the overall group (upper panel) and between boys and girls as a multi-group model (lower panel).*

Group-ing	*Construct*	*Invariance assumption*	RMSEA	CFI	TLI	SRMR
Overall	Reading self-concept	configural	0.025	0.983	0.979	0.032
		weak	0.029	0.975	0.971	0.052
		strong	0.031	0.972	0.967	0.051
	Intrinsic reading motivation	configural	0.019	0.997	0.995	0.039
		weak	0.023	0.995	0.993	0.045
		strong	0.023	0.994	0.993	0.047
	Reading behaviour	configural	0.025	0.990	0.980	0.039
		weak	0.026	0.987	0.979	0.048
		strong	0.042	0.960	0.942	0.053
Multi-group (boys, girls)[1]	Reading self-concept	configural	0.031	0.971	0.968	0.066
		weak	0.030	0.972	0.970	0.069
		strong	0.030	0.972	0.969	0.066
	Intrinsic reading motivation	configural	0.031	0.989	0.987	0.064
		weak	0.037	0.983	0.980	0.072
		strong	0.043	0.977	0.974	0.073
	Reading behaviour	configural	0.038	0.965	0.951	0.063
		weak	0.045	0.948	0.931	0.074
		strong	0.048	0.940	0.923	0.075

Annotations:

[1] We test model constraints in the multi-group model from configural to strong factorial invariance between boys and girls, assuming strong measurement invariance within both groups.

A similar picture emerged for the multi-group analyses testing measurement invariance between boys and girls (see Table 1, lower panel): for both reading self-concept and intrinsic reading motivation, assuming strong measurement invariance did not lead to any substantial changes in model fit, and even the most restrictive models had a very good model fit. Again, for reading behaviour, there was some indication of model misfit, as the TLI declined to TLI = .923 assuming strong factorial invariance. However, as RMSEA, CFI, and SRMR still indicated a model fit that was at least satisfactory, we decided to maintain the more restrictive model, which allowed us to interpret on a common metric across measurement occasions (for further implications, see *Discussion*).

Descriptive statistics

Table 2 shows the latent means and standard deviations for reading self-concept, intrinsic reading motivation, and reading behaviour for both boys and girls. These descriptive results confirm our first set of hypotheses (H1a) that by third grade, girls show higher favourable means for intrinsic reading motivation, d = -0.49, and for reading behaviour, d = -0.35, but not for reading self-concept, d = 0.07. At all three points of measurement, the respective mean levels of reading self-concept were not substantially different for boys and girls, with mean differences ranging from d = 0.07 to d = -0.14. However, intrinsic reading motivation and reading behaviour levels were consistently higher among girls, with effects sizes between $|d|$ = 0.23 and 0.56.

Development over time

We used LGCM to test whether differences between boys and girls *developed* over time. First, we compared non-linear and linear LGCM to assess an optimal growth function. As Table 3 shows, model fit was relatively good for all models, but following the BIC adjusted for sample size, non-linear growth models with equal non-linear growth parameters had the best fit for

reading self-concept and for intrinsic reading motivation. For reading behaviour, the linear model had the best fit (see Table 3).

We used these LGCM to test the hypothesis that gender differences increase over time (H1b). For each of the domains, Model M1 in Table 4 reports the estimated intercept and slope parameters for boys and girls and the difference between groups (Δ). Boys exhibited less favourable development in reading self-concept, slope = -0.12; girls showed no change. The difference between the two groups was statistically significant, $\Delta_{b\text{-}g}$ = -0.11, p = .04. For intrinsic reading motivation, a statistically significant decline was evident for boys (slope = -0.42) and girls (slope = -0.32). Contrary to hypothesis H1b, the difference between the two groups was not statistically significant. For reading behaviour, boys did not show a statistically significant increase, but girls' reading behaviour increased across time, slope = 0.25. Similar to reading self-concept, the reading behaviour slope parameters differed statistically significantly between boys and girls, $\Delta_{b\text{-}g}$= 0.16. Our hypothesis that gender differences increased over time was confirmed for reading self-concept and reading behaviour but not for intrinsic reading motivation.

Table 2. *Descriptive statistics of means and dispersion of latent variables for overall group and separately for boys and girls.*

		Boys			*Girls*				
Construct	*Time (in months)*	*M*	*SE*	*SD*	*M*	*SE*	*SD*	*t*	$d_{b\text{-}g}$
Reading self-concept	0	3.13	0.11	0.57	3.08	0.13	0.65	-0.25	0.07
	7	3.03	0.11	0.63	3.06	0.13	0.59	0.17	-0.05
	35	3.01	0.12	0.65	3.10	0.12	0.60	0.52	-0.14
Intrinsic reading motivation	0	3.24	0.06	0.86	3.62	0.05	0.59	4.85	-0.49
	7	3.05	0.07	0.98	3.47	0.07	0.74	4.18	-0.46
	35	2.83	0.06	0.84	3.30	0.07	0.75	5.17	-0.56
Reading behaviour	0	1.98	0.04	0.51	2.16	0.05	0.48	2.80	-0.35
	7	2.06	0.06	0.66	2.21	0.05	0.52	1.89	-0.23
	35	2.07	0.06	0.66	2.42	0.06	0.58	4.02	-0.51

Note: $d_{b\text{-}g}$: Mean differences between boys and girls relative to the overall standard deviation at each point of measurement.

Table 3. *Model comparison for latent growth curve model (LGCM) across both groups for boys and girls: item fit values for non-linear and linear models for all three domains.*

Construct	*Invariance assumption*	χ^2	*df*	*p*	RMSEA	CFI	BICadj.	
Reading self-concept	non-linear, free	476.0	395	<0.001	0.025	0.978	21038.7	
	non-linear, equ.	475.8	396	0.003	0.024	0.979	21035.5	*
	linear	485.2	397	0.016	0.026	0.976	21041.8	
Intrinsic reading motivation	non-linear, free	159.4	122	0.013	0.030	0.981	11764.5	
	non-linear, equ.	159.4	123	0.015	0.030	0.982	11761.2	*
	linear	164.3	124	0.009	0.031	0.980	11764.6	
Reading behaviour	non-linear, free	102.9	70	0.006	0.036	0.951	10064.7	
	non-linear, equ.	109.0	71	0.003	0.039	0.943	10067.0	
	linear	110.3	72	0.003	0.039	0.943	10065.2	*

Notes. BICadj: BIC adjusted for sample size; Non-linear, free: Second factor loading freely estimated for time and between groups; Non-linear, equ.: Second factor loading freely estimated for time, but constraint on equality between groups; Linear: Linear estimation of the factor loadings.
* Adopted as final LGCM.

Table 4. *Latent growth curve model (LGCM) parameters for boys and girls: Intercepts, slopes, and gender differences for each of these parameters.*

			Boys		*Girls*			
Construct	*Model*	*Parameter*	*Par*	*SE*	*Par*	*SE*	$\Delta_{b\text{-}g}$	*SE*
Reading self-concept	M1	Intercept	**3.13**	**0.11**	**3.08**	**0.13**	0.05	0.06
		Slope	**-0.12**	**0.05**	-0.01	0.05	**-0.11**	**0.07**
Intrinsic reading motivation	M1	Intercept	**3.24**	**0.06**	**3.62**	**0.05**	**-0.38**	**0.06**
		Slope	**-0.42**	**0.07**	**-0.32**	**0.07**	-0.10	0.08
Reading behaviour	M1	Intercept	**2.01**	**0.04**	**2.16**	**0.05**	**-0.15**	**0.06**
		Slope	0.09	0.07	**0.25**	**0.07**	-0.16	0.10

Notes. $\Delta_{b\text{-}g}$: Differences in parameters as boys - girls.
Coefficients in **bold** are statistically significantly different from zero at least below $\alpha < .05$.

Interaction between gender and SES at baseline and change over time

Reading self-concept

In the next step, we extended the LGCM and conducted regression analyses to test whether social background predicted initial differences and development (H2a and H2b), and whether gender and social background interacted for these variables (H3a and H3b). For reading self-concept, HISEI had a statistically significant effect on the intercept for girls, $b = 0.14$, and boys, $b = 0.07$ (see Table 5, upper panel, Model M2). These parameters did not differ statistically significantly between boys and girls for the intercept (H3a). Regarding growth, there was a positive effect of HISEI on change for boys, $b = 0.09$, indicating that SES differences increased over time, and a negative effect for girls, $b = -0.08$. The difference between groups for these parameters, $\Delta_{b\text{-}g} = 0.17$, was also statistically significant (confirming hypothesis H3b; cf. Figure 2 for a graphical depiction). When we added a control for reading achievement differences (see Table 5, upper panel, model M3), the main effect of HISEI disappeared; it was alternatively explained via achievement differences. However, the interaction between gender and HISEI remained statistically significant, even after controlling for reading achievement.

Intrinsic reading motivation

The results for intrinsic reading motivation confirm our hypotheses only partially. HISEI was a significant predictor of the intercept for both boys and girls (H2a) but did not differ between groups (see Table 5, middle panel, Model M2). HISEI did not have an effect on the growth parameter in either of the groups (H2b) and did not differ between groups (H3b); therefore, gender effects remained similar even after controlling for SES differences (see Figure 3). This pattern remained similar when we added a control for reading comprehension (Table 5, middle panel, Model M3). Reading comprehension, and not SES differences, appeared to be the statistically significant predictor for the intercept.

Reading behaviour

For reading behaviour, contrary to hypotheses H2a and H2b, HISEI did not predict the intercept or change in a statistically significant way. Additionally, there was no support for hypotheses H3a and H3b, as neither the effect of HISEI on the intercept nor its effect on the slope differed between groups (see Table 5, lower panel, Model M2). As in the model that did not control for SES differences, only the gender main effects for girls showed both a higher initial level and a greater increase in reading behaviour across time (see Figure 4). Although Figure 4 suggests a more positive development in high-SES girls, this effect was not statistically significant. When we controlled for reading comprehension, the effects of gender and HISEI remained unchanged, but reading comprehension appeared to be an additional predictor for the intercept of reading behaviour (see Table 5, lower panel, Model M3).

Discussion

The present study was concerned with the development of gender differences in reading-related self-concept, intrinsic motivation, and behaviour, all of which are considered key for explaining the growing differences between boys and girls in academic achievement in adolescence. Informed by discussions on intersectionality in the psychological literature (Cole, 2009; Hyde, 2014), we focused on the interaction between gender and socioeconomic background in children. This interaction is thought to have a moderating effect on gender differences in academic development (Entwisle et al., 2007; Hyde, 2014), but only a small number of studies have investigated this question to date, and none in the area of reading attitudes and behaviour.

In general, gender differences were salient in all three domains: Our results are in line with previous research showing strong gender main effects for such psychosocial constructs, even in younger children (e.g. Baker & Wigfield, 1999; Logan & Johnston, 2009). There were

Table 5. *Means in intercept and slope, and regression parameters for LGCM for reading self-concept, intrinsic reading motivation, and reading behaviour: Separately for boys and girls (multi-group model) with intercepts and slopes regressed on HISEI (Model M2) and additionally on reading comprehension (Model M3).*

			Boys		Girls			
Domain	*Model*	*Parameter*	*Par*	*SE*	*Par*	*SE*	Δ_{b-g}	*SE*
Reading self-concept	M2	Means						
		Intercept	**3.13**	**0.11**	**3.08**	**0.13**	0.05	0.06
		Slope	**-0.12**	**0.05**	-0.01	0.05	**-0.11**	**0.06**
		Regressed on HISEI[1]						
		Intercept	**0.07**	**0.04**	**0.14**	**0.06**	-0.07	0.07
		Slope	**0.09**	**0.05**	**-0.08**	**0.05**	**0.17**	**0.07**
	M3	Means						
		Intercept	**3.19**	**0.09**	**3.18**	**0.12**	0.01	0.05
		Slope	**-0.09**	**0.05**	-0.02	0.05	-0.07	0.06
		Regressed on HISEI[1]						
		Intercept	0.03	0.04	0.05	0.06	-0.02	0.07
		Slope	0.06	0.05	-0.07	0.05	**0.13**	**0.07**
		Regressed on RC[2]						
		Intercept	**0.17**	**0.03**	**0.27**	**0.04**	**-0.10**	**0.05**
		Slope	**0.08**	**0.04**	-0.02	0.04	**0.10**	**0.04**
Intrinsic reading motivation	M2	Means						
		Intercept	**3.24**	**0.06**	**3.62**	**0.05**	**-0.38**	**0.07**
		Slope	**-0.42**	**0.06**	**-0.32**	**0.07**	-0.10	0.08
		Regressed on HISEI[1]						
		Intercept	**0.12**	**0.06**	**0.10**	**0.06**	0.02	0.07
		Slope	-0.04	0.08	0.06	0.08	-0.10	0.13
	M3	Means						
		Intercept	**3.24**	**0.06**	**3.61**	**0.04**	**-0.37**	**0.07**
		Slope	**-0.43**	**0.06**	**-0.31**	**0.07**	-0.11	0.08
		Regressed on HISEI[1]						
		Intercept	0.08	0.06	0.03	0.05	0.05	0.08
		Slope	-0.06	0.09	0.06	0.09	-0.12	0.14
		Regressed on RC[2]						
		Intercept	**0.17**	**0.05**	**0.25**	**0.04**	-0.08	0.07
		Slope	0.06	0.08	0.03	0.06	0.03	0.12

Table 5 (continued):

			Boys		Girls			
Domain	*Model*	*Parameter*	*Par*	*SE*	*Par*	*SE*	*Δb-g*	*SE*
	M2	Means						
		Intercept	**2.01**	**0.04**	**2.16**	**0.05**	**-0.15**	**0.06**
		Slope	0.09	0.07	**0.25**	**0.08**	**-0.16**	**0.10**
		Regressed on HISEI[1]						
		Intercept	0.04	0.05	0.03	0.05	0.01	0.07
		Slope	0.04	0.06	0.10	0.08	-0.05	0.11
Reading behaviour	M3	Means						
		Intercept	**2.01**	**0.05**	**2.17**	**0.05**	**-0.16**	**0.06**
		Slope	0.07	0.07	**0.23**	**0.07**	**-0.16**	**0.09**
		Regressed on HISEI[1]						
		Intercept	-0.01	0.05	-0.01	0.05	0.00	0.07
		Slope	0.02	0.07	0.08	0.08	-0.07	0.12
		Regressed on RC[2]						
		Intercept	**0.22**	**0.05**	**0.16**	**0.04**	0.05	0.07
		Slope	0.07	0.09	0.06	0.07	0.01	0.11

Notes. Δ_{b-g}: Differences in parameters as boys - girls.
Coefficients in **bold** are statistically significantly different from zero at least below $\alpha < .05$.
[1] HISEI: Highest socioeconomic status in the family (*z*-standardized).
[2] RC: Reading comprehension (*z*-standardized).

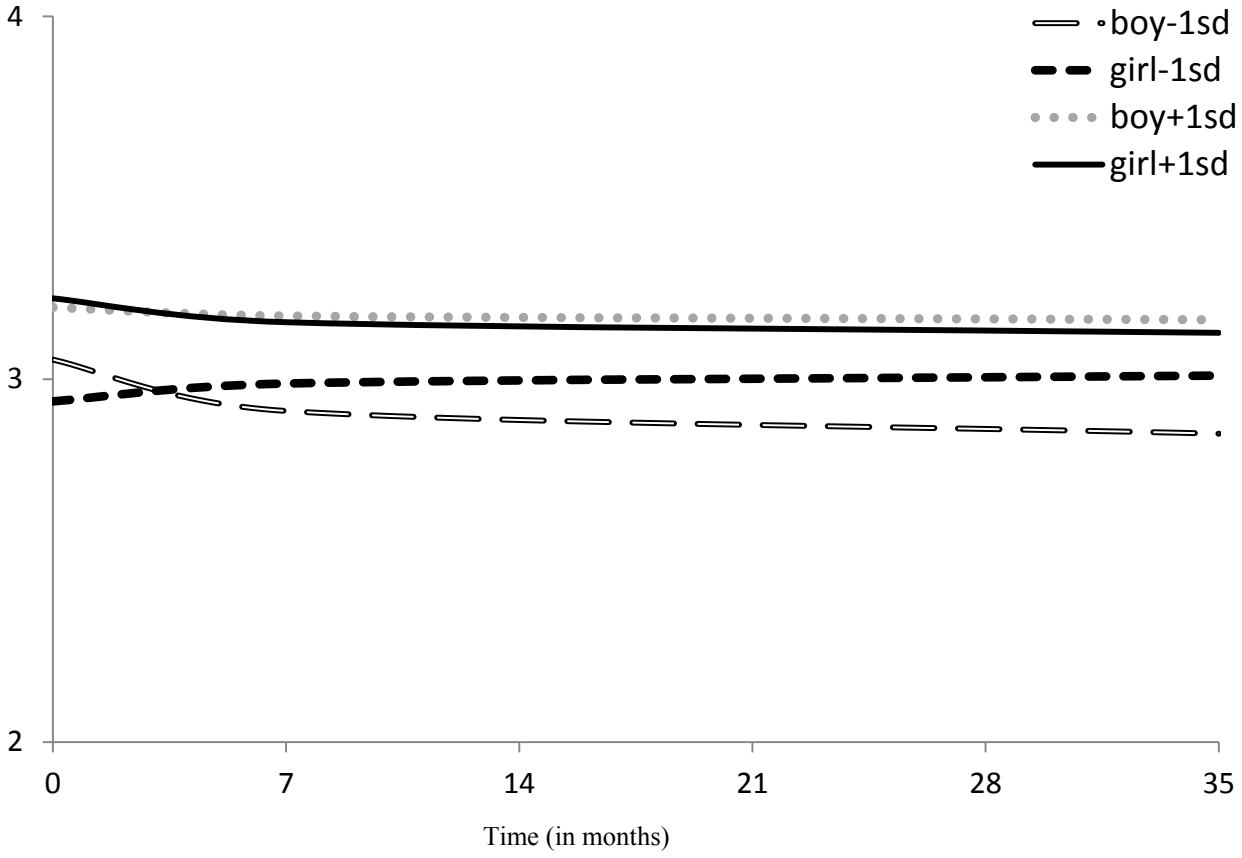

Figure 2. *Development of reading self-concept between third and sixth grades (time depicted in months) for four groups, that is, boys one standard deviation of parental HISEI above (+1 SD) and below (-1 SD) average and girls one standard deviation of parental HISEI above (+1 SD) and below (-1 SD) average.*

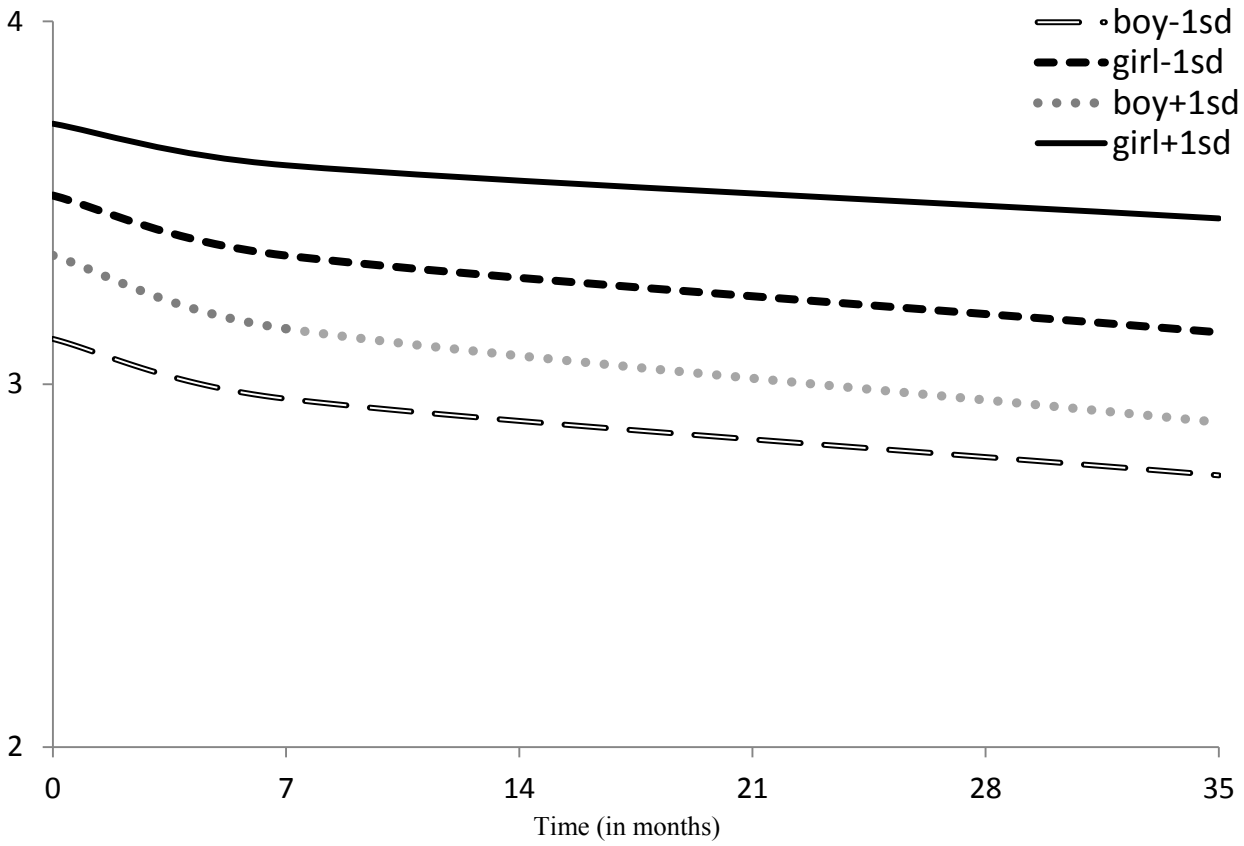

Figure 3. *Development of intrinsic reading motivation between third and sixth grades (time depicted in months) for four groups, that is, boys one standard deviation of parental HISEI above (+1 SD) and below (-1 SD) average and girls one standard deviation of parental HISEI above (+1 SD) and below (-1 SD) average.*

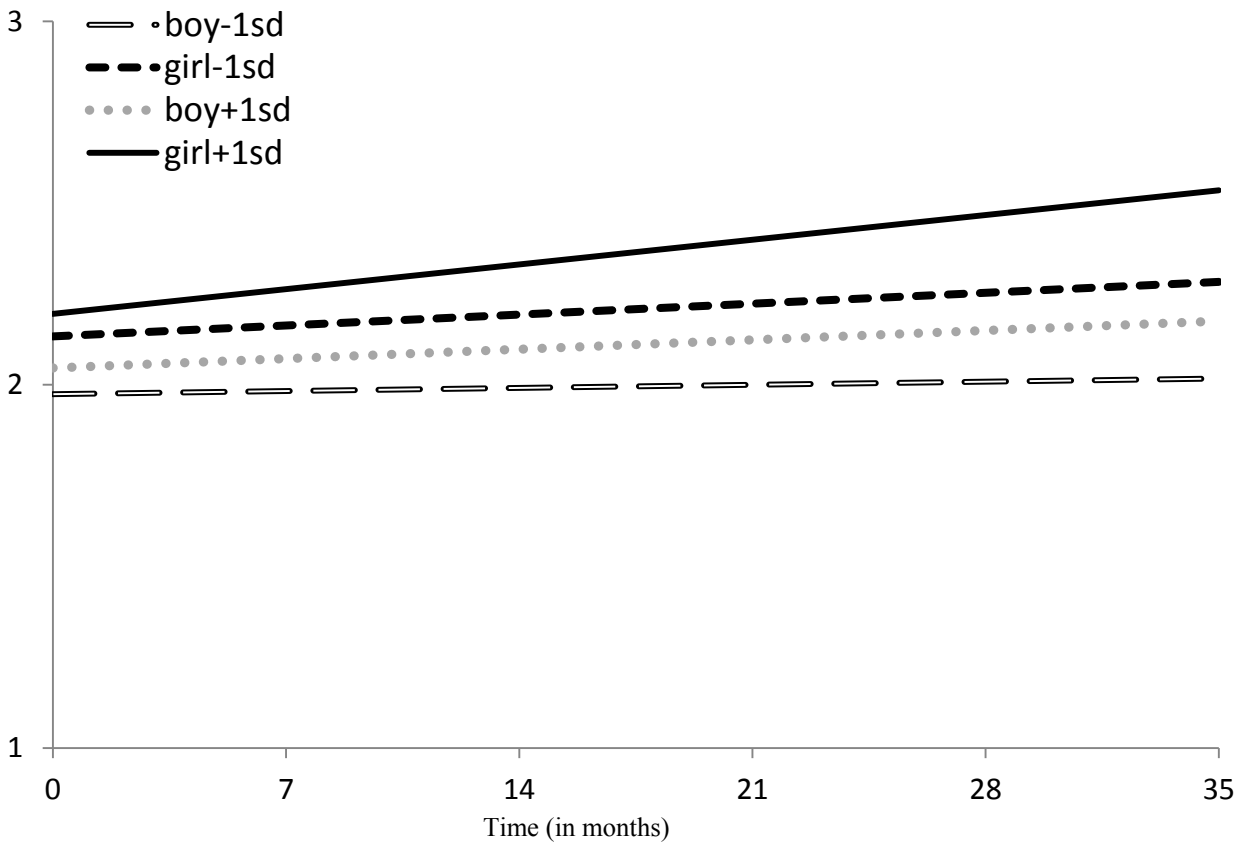

Figure 4. *Development of reading behaviour between third and sixth grades (time depicted in months) for four groups, that is, boys one standard deviation of parental HISEI above (+1 SD) and below (-1 SD) average and girls one standard deviation of parental HISEI above (+1 SD) and below (-1 SD) average.*

differences in intrinsic reading motivation as early as third grade, and these remained between third and sixth grade; similarly, for reading behaviour, differences existed in third grade and increased over time. For reading self-concept, we did not find absolute differences between boys and girls in third grade, but they showed differential development from third grade to sixth grade. These patterns are in accordance with other studies that suggest the intensification of gender differences by the end of elementary school (Archambault et al., 2010; Jacobs et al., 2002). These patterns also persisted regardless of differences in social background or achievement.

Furthermore, there were indications that the interaction of gender and SES is important: gender differences in reading self-concept increased over time according to social class. The pattern of effects suggests that development depended on SES background more for boys than for girls. Taking the main and interaction effects together, the developmental trajectories are more negative for boys from socioeconomically challenged families. These results are in line with Entwisle et al. (2007) and Mensah and Kiernan (2010), whose longitudinal results similarly showed that boys from socioeconomically less advantaged family backgrounds showed more negative development. Those studies focused on the development of reading *skills*. Our results support not only the hypotheses of general gender differences that increase over time but also suggest that an interaction with socioeconomic background differences matters for reading self-concept development (for a discussion see also Francis, 1999; Hannover & Kessels, 2011). Furthermore, the interaction of gender and SES for reading self-concept persisted even when we controlled for achievement differences.

Methodological Aspects and Limitations

Regarding the reading-related constructs and their indicators, specific issues in measuring reading behaviour should be noted. The measurement used was a composite of the total amount of time spent reading and the frequency of reading for pleasure. We mentioned earlier that establishing strong measurement invariance led to a reduction in model fit, although it was still acceptable. This was related to the fact that the two aspects – total amount of time spent reading vs. reading for pleasure – showed a slightly different mean development. There was a stronger indication of a growing differential gender gap for the total amount of time spent reading than for the pure measure of reading for pleasure. We have not further interpreted these differences here, but more exploration might be merited in future studies.

From a methodological point of view, the ordinal measures used here would be better represented in distribution-free models. As these models are computationally very elaborate and demand large data sets, we were only able to implement these models in part, as convergence problems arose (e.g. modelling the complex data structure at the same time). Therefore, we could not use this modelling type for all of our analyses although it may have been the more conservative and suitable approach.

It should be mentioned that the $N = 55$ students who transferred into the academic school track early before all other students had left elementary school were not included in the analyses in order to maintain the academic context constant (thereby avoiding results affected by contextual effects; e.g. Becker et al., 2014). When interpreting the results of our study, it should be kept in mind that this small, high-achieving percentage of the student population (7–8% of all students) was not part of the analyses presented here.

Educational Implications and Outlook for Future Research

Our findings indicate that gender differences interact with social class. It is necessary to further explore how boys, and particularly those from lower SES families, can develop an emotionally positive relationship with reading. Some scholars have raised concerns that gender research still takes an overly simplistic approach in terms of focusing on binary categories, without accounting for variability in boys and girls (Watson et al., 2010). Our results confirm this view. The interaction in reading self-concept suggests that development for boys depends more on social class, leading to less alarming results when boys come from more privileged socioeconomic backgrounds and more alarming results for those from underprivileged backgrounds. Even so, effects relevant for all boys, i.e. those that were independent of social background and reflected in the main effects of the statistical modelling, were also discernible since we did not find SES-specific differences in reading motivation or behaviour. To address

the question of when and in which areas to target ‘some’ boys (from certain families) rather than boys ‘in general’ (regardless of social background), some disentanglement is necessary – but this is also true for students from different social backgrounds in general.

Furthermore, it remains unclear whether the interaction of gender and SES is specific to the psychosocial constructs involved in reading or whether it is also present in other scholastic domains. For example, following hypotheses of interest diversification in adolescent development according to gender identity, it is possible that boys invest in other scholastic domains like mathematics or science to compensate for their negative development in reading, while girls invest in language-related skills. The cross-sectional results of Gottburgsen and Gross (2012), which show reversed effects for reading literacy and maths skills, indicate that this aspect is relevant also in relation to the interaction of gender and SES. More studies are warranted to further explore when, how, and in which dimensions these aspects become developmentally relevant for boys and girls from different social backgrounds.

Research on the interaction of gender with other social categories is especially important where the notion of ‘natural’ gender differences is concerned: the main effects of gender and social class may be explained by children’s dispositional differences. Yet, there is no reason to assume that supposed ‘dispositions’ vary intersectionally: ‘assignment’ to the male or female sex is random in each social class. Therefore, variations of gender effects in different social strata must be the product of social processes (see also Eagly & Wood, 1999; Hyde, 2014). This is most intriguing when gender differences disappear altogether in some strata.

References

Archambault, I., Eccles, J. S., & Vida, M. N. (2010). Ability self-concepts and subjective value in literacy: joint trajectories from grades 1 through 12. *Journal of Educational Psychology, 102*, 804-816. doi: 10.1037/a0021075

Baker, L., & Wigfield, A. (1999). Dimensions of children's motivation for reading and their relations to reading activity and reading achievement. *Reading Research Quarterly, 34*, 452-477. doi: 10.1598/RRQ.34.4.4

Becker, M., McElvany, N., & Kortenbruck, M. (2010). Intrinsic and extrinsic reading motivation as predictors of reading literacy: a longitudinal study. *Journal of Educational Psychology, 102*, 773-785. doi: 10.1037/a0020084

Bos, W., Bonsen, M., Gröhlich, C., Guill, K., & Scharenberg, K. (2009). *KESS 7: Skalenhandbuch zur Dokumentation der Erhebungsinstrumente [KESS 7: Scales' manual for the documentation of instruments]*. Münster: Waxmann.

Buchmann, C., DiPrete, T. A., & McDaniel, A. (2008). Gender inequalities in education. *Annual Review of Sociology, 34*, 319-337. doi: 10.1146/annurev.soc.34.040507.134719

Byrne, B. (2012). *Structural equation modeling with Mplus: Basci concepts, applications, and programming*. New York: Routledge.

Cole, E. R. (2009). Intersectionality and research in psychology. *American Psychologist, 64*, 170-180. doi: 10.1037/a0014564

Davis, K. (2008). Intersectionality as buzzword: A sociology of science perspective on what makes a feminist theory successful. *Feminist Theory, 9*, 67-85. doi: 10.1177/1464700108086364

DiPrete, T. A., & Jennings, J. L. (2012). Social and behavioral skills and the gender gap in early educational achievement. *Social Science Research, 41*, 1-15. doi: 10.1016/j.ssresearch.2011.09.001

Durik, A. M., Vida, M., & Eccles, J. S. (2006). Task values and ability believes as predictors of high school literacy choices: a developmental analysis. *Journal of Educational Psychology, 98*, 382-393. doi: 10.1037/0022-0663.98.2.382

Eagly, A. H., & Wood, W. (1999). The origins of sex differences in human behavior: evolved dispositions versus social roles. *American Psychologist, 54*, 408-423. doi: 10.1037//0003-066x.54.6.408

Eccles, J. S. (1987). Gender roles and women's achievement-related decisions. *Psychology of Women Quarterly, 11,* 135-172. doi: 10.1111/j.1471-6402.1987.tb00781.x

Eccles, J. S. (1994). Understanding woman's educational and occupational choices: applying the Eccles et al. model of achievement-related choices. *Psychology of Women Quarterly, 18*, 585-609. doi: 10.1111/j.1471-6402.1994.tb01049.x

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review in Psychology, 53*, 109-132. doi: 10.1146/annurev.psych.53.100901.135153

Entwisle, D. R., Alexander, K. L., & Olson, L. S. (1997). *Children, schools, & inequality*. Boulder: Westview Press.

Entwisle, D. R., Alexander, K. L., & Olson, L. S. (2007). Early schooling: The handicap of being poor and male. *Sociology of Education, 80*, 114-138. doi: 10.1177/003804070708000202

Erikson, E. H. (1968). *Identity, youth, and crisis*. New York, NY: Norton.

Francis, B. (1999). Lads, lasses and (new) labour: 14–16 year old students' responses to the ‹laddish behaviour and boys› underachievement' debate. *British Journal of Sociology of Education, 20*, 355–371. doi: 10.1080/01425699995317

Ganzeboom, H. B. G., & Treiman, D. J. (2003). Three internationally standardised measures for comparative research on occupational status. In J. H. P. Hoffmeyer-Zlotnik & C. Wolf (Eds.), *Advances in cross-national comparison: A European working book for demographic and socio-economic variables* (pp. 159-193). New York: Kluwer Academic Press.

Gottburgsen, A., & Gross, C. (2012). Welchen Beitrag leistet „Intersektionalität" zur Klärung von Kompetenzunterschieden bei Jugendlichen? [To what extent contributes "intersectionality" to explain achievement differences of young adolescents]. In R. Becker & H. Solga (Eds.), Soziologische Bildungsforschung [Sociological educational research] (pp. 86–110). Wiesbaden, Germany: Springer.

Hannover, B., & Kessels, U. (2004). Self-to-prototype matching as a strategy for making academic choices: why high school students do not like math and science. *Learning and Instruction, 14*, 51-67. doi: 10.1016/j.learninstruc.2003.10.002

Hannover, B., & Kessels, U. (2011). Sind Jungen die neuen Bildungsverlierer? Empirische Evidenz für Geschlechterdisparitäten zuungunsten von Jungen und Erklärungsansätze [Are boys the new losers in education? Empirical evidence and explanations for gender disparities unfavoring boys]. *Zeitschrift für Pädagogische Psycholgie, 25*, 89-103. doi: 10.1024/1010-0652/a000039

Heyder, A., & Kessels, U. (2013). Is school feminine? Implicit gender stereotyping of school as a predictor of academic achievement. *Sex Roles, 69*, 605-617. doi: 10.1007/s11199-013-0309-9

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55. doi: 10.1080/10705519909540118

Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist, 60*, 581-592. doi: 10.1037/0003-066X.60.6.581

Hyde, J. S. (2014). Gender similarities and differences. *Annual Review of Psychology, 65*, 373–398. doi: 10.1146/annurev-psych-010213-115057

Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J. S., & Wigfield, A. (2002). Changes in children's self-competence and values: gender and domain differences across grades one through twelve. *Child Development, 73*, 509-527. doi: 10.1111/1467-8624.00421

Janosz, M., Archambault, I., Morizot, J., & Pagani, L. S. (2008). School engagement trajectories and their differential predictive relations to dropout. *Journal of Social Issues, 64*, 21-40. doi: 10.1111/j.1540-4560.2008.00546.x

Kelly, D. L. (2003). Developing the PIRLS background questionnaires. In M. O. Martin, I. V. S. Mullis & A. M. Kennedy (Eds.), *PIRLS 2001 technical report* (pp. 29–40). Chestnut Hill, MA: Boston College.

Kessels, U. (2013). Why girls stay away from STEM: how the image of science clashes with teenagers' identity. In F. Sagebiel (Ed.), *Motivation: the gender perspective of young peoples's images of science, engineering and technology (SET). Proceedings of the final conference* (pp. 47-61). Opladen: Budrich UniPress.

Kirsch, I., Jong, J. d., Lafontaine, D., McQueen, J., Mendelovits, J., & Monseu, C. (2002). *Reading for change: performance and engagement across countries. Results from PISA 2000*. Paris: OECD.

Legewie, J., & DiPrete, T. A. (2012). School context and the gender gap in educational achievement. *American Sociological Review, 77*, 463-485. doi: 10.1177/0003122412440802

Lehmann, R. H., Peek, R., & Poerschke, J. (1997). *HAMLET 3–4: Hamburger Lesetest für 3 bis 4 Klassen [HAMLET 3–4: Hamburg Reading Test for Grades 3 to 4]*. Weinheim, Germany: Beltz.

Linnehan, F. (2001). Examining racial and family educational background differences in high school student beliefs and attitudes toward academic performance. *Social Psychology of Education, 5*, 31-48.

Logan, S., & Johnston, R. (2009). Gender differences in reading ability and attitudes: examining where these differences lie. *Journal of Research in Reading, 32*, 199-214. doi: 10.1111/j.1467-9817.2008.01389.x

Lopez, N. (2003). *Hopeful girls, troubled boys*. New York: Routledge.

Marsh, H. W., & Hattie, J. (1996). Theoretical perspectives on the structure of self-concept. In B. A. Bracken (Ed.), *Handbook of self-concept* (pp. 38-90). New York: Wiley.

Matthews, J. S., Kizzie, K. T., Rowley, S. J., & Cortina, K. (2010). African Americans and boys: Understanding the literacy gap, tracing academic trajectories, and evaluating the role of learning-related skills. *Journal of Educational Psychology, 102*, 757-771. doi: 10.1037/a0019616

McElvany, N., Kortenbruck, M., & Becker, M. (2008). Lesekompetenz und Lesemotivation: Entwicklung und Mediation des Zusammenhangs durch Leseverhalten [Reading literacy and reading motivation: their development and the mediation of the relationship by reading behavior]. Zeitschrift für Pädagogische Psychologie, 22, 207-219. doi: 10.1024/1010-0652.22.34.207

McGeown, S., Goodwin, H., Henderson, N., & Wright, P. (2012). Gender differences in reading motivaiton: does sex or gender identity provide a better account? *Journal of Research in Reading, 35*, 328-336. doi: 10.1111/j.1467-9817.2010.01481.x

Mensah, F. K., & Kiernan, K. E. (2010). Gender differences in educational attainment: influences of the family environment. *British Educational Research Journal, 36*, 239-260. doi: 10.1080/01411920902802198

Meredith, W., & Horn, J. (2001). The role of factorial invariance in modeling growth and change. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change. Decade of behavior* (pp. 203-240).

Millard, E. (1997). Differently literate: Gender identity and the construction of the developing reader. *Gender & Education, 9*, 31-48. doi: 10.1080/09540259721439

Mullis, I. V. S., Martin, M. O., Foy, P., & Drucker, K. T. (2012). *PIRLS 2011 international results in reading*. Chestnut Hill, MA: Boston College.

Mullis, I. V. S., Martin, M. O., Kennedy, A. M., & Foy, P. (2007). *PIRLS 2006 International Report: IEA's Progress in International Reading Literacy Study in primary school in 40 countries*. Chestnut Hill, MA: Boston College.

Muthén, B. O., & Muthén, L. K. (1998-2011). Mplus (Version 6.11) [Computer software]. Los Angeles, CA.

OECD. (2010). *PISA 2009 Results: Learning to Learn – Student Engagement, Strategies and Practices* Vol. III. doi:10.1787/9789264083943-en

OECD. (2013). *OECD skills outlook 2013: first results from the survey of adult skills*. Paris: OECD Publishing.

OECD. (2014). *PISA 2012 Results: What students know and can do: student performance in mathematics, reading and science* (Vol. 1, Revised edition, February 2014). Paris: OECD Publishing.

Plante, I., Théôret, M., & Favreau, O. E. (2009). Student gender stereotypes: contrasting the perceived maleness and femaleness of mathematics and language. *Educational Psychology, 29*, 385-405. doi: 10.1080/01443410902971500

Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research, 75*, 417-453. doi: 10.3102/00346543075003417

Stephens, N. M., Markus, H. R., & Phillips, L. T. (2014). Social class culture cycles: How three gateway contexts shape selves and fuel inequality. *Annual Review of Psychology, 65*, 611-634. doi: 10.1146/annurev-psych-010213-115143

Strand, S. (1999). Ethnic Group, Sex and Economic Disadvantage: associations with pupils' educational progress from Baseline to the end of Key Stage 1. *British Educational Research Journal, 25*, 179-202. doi: 10.1080/0141192990250204

Strand, S. (2014). Ethnicity, gender, social class and achievement gaps at age 16: intersectionality and 'getting it' for the white working class. *Research Papers in Education, 29*, 131-171. doi: 10.1080/02671522.2013.767370

Van de Gaer, E., Pustjens, H., Van Damme, J., & Du Munter, A. (2009). School engagement and language achievement: a longitudinal study of gender differences across secondary school. *Merril-Palmer Quarterly, 55*, 373-405.

Warm, T. A. (1989). Weighted likelihood estimation of ability in item response theory. *Psychometrika, 54*, 427-450. doi: 10.1007/BF02294627

Watson, A., Kehler, M., & Martino, W. (2010). The Problem of Boys' Literacy Underachievement: Raising Some Questions. *Journal of Adolescent & Adult Literacy, 53*, 356-361. doi: 10.1598/Jaal.53.5.1

Watt, H. M. G., & Eccles, J. S. (Eds.). (2008). *Gender and occupational outcomes: Longitudinal assessments of individual, social, and cultural influences*. Washington, D.C.: APA Books.

Wigfield, A., & Eccles, J. S. (1994). Children's competence beliefs, achievement values, and general self-esteem change across elementary and middle school. *Journal of Early Adolescence, 14*, 107-138. doi: .1177/027243169401400203

Wigfield, A., Eccles, J. S., Schiefele, U., Roeser, R. W., & Davis-Kean, P. (2006). Development of achievement motivation. In N. Eisenberg (Ed.), *Handbook of child psychology. Vol. 3: Social, emotional, and personality development* (pp. 933-1002). Hoboken, NJ: Wiley.

Zadeh, Z. Y., Farnia, F., & Ungerleider, C. (2010). How Home Enrichment Mediates the Relationship Between Maternal Education and Children's Achievement in Reading and Math. *Early Education & Development, 21*, 568-594. doi: 10.1080/10409280903118424