Arens, A. Katrin; Möller, Jens

The importance of intrinsic reading motivation goes beyond the reading domain. Relations to school performance and motivation in the language domain.

Journal of research in reading 48 (2025) 3, S. 220-239

Journal of Research in Reading
UKLA The United Kingdom Literacy Association
J. Res. Read., ISSN 0141-0423
Volume 48, Issue 3, 2025, pp 220–239
DOI:10.1111/1467-9817.70005

The importance of intrinsic reading motivation goes beyond the reading domain: Relations to school performance and motivation in the language domain

A. Katrin Arens
DIPF|Leibniz Institute for Research and Information in Education, Frankfurt, Germany

Jens Möller
Kiel University, Kiel, Germany

Abstract: **Background:** Intrinsic reading motivation has often been investigated regarding its relations to reading-related variables (e.g. reading achievement). Research has paid little attention to the relations between intrinsic reading motivation and variables related to the overarching language domain. We investigated the temporal relations between intrinsic reading motivation, reading achievement, language school performance, language self-concept, and language intrinsic value.
Methods: The constructs were measured at three annual measurement waves covering Grades 7–9 with a sample of German secondary school students (N = 1271). The relations among constructs were analysed using cross-lagged panel models in structural equation modelling.
Results: Previous intrinsic reading motivation was found to be positively related to later reading achievement, language school performance, and language self-concept. The patterns of relations were found to be stable across the two time lags and remained when including students' gender, secondary school track, and socio-economic status as covariates.
Conclusions: This study underscores the importance of intrinsic reading motivation which does not only address other reading-related variables but also motivational and achievement variables of the language domain.

Keywords: intrinsic reading motivation, reading achievement, language self-concept, language intrinsic value, language school performance, gender differences

Highlights

What is already known about this topic

- Intrinsic reading motivation is related to reading-related variables.
- Intrinsic reading motivation is important within the reading domain.

What this paper adds

- Intrinsic reading motivation is positively related to language school performance.
- Intrinsic reading motivation is positively related to language self-concept.

Implications for theory, policy or practice

- The importance of intrinsic reading motivation goes beyond the reading domain.
- In practice, it is important to foster intrinsic reading motivation.
- In theory, it is important to study relations of variables across different domains.

Intrinsic reading motivation has been often investigated with respect to its relations to other reading-related variables including reading achievement (e.g. Cartwright et al., 2016; Miyamoto et al., 2019; Soemer & Schiefele, 2018; Toste et al., 2020). The investigation of relations of intrinsic reading motivation is therefore limited to the reading domain itself, and little is known about the relations of intrinsic reading motivation beyond the reading domain. In this study, we explored whether intrinsic reading motivation is also positively related to the overall language domain including language achievement and language motivation.

Intrinsic Reading Motivation

Intrinsic reading motivation can be defined as an individual's enjoyment in reading activities; in other words, intrinsic reading motivation is at place when reading is only done for its own sake (Guthrie & Wigfield, 2000). Therefore, our definition of intrinsic reading motivation follows the concept of intrinsic motivation as defined in self-determination theory (SDT) according to which intrinsic motivation refer to activities that are only done for their 'inherent interest and enjoyment' (Ryan & Deci, 2020, p. 2). Intrinsic motivation has been found to demonstrate positive relations to desirable outcomes including favourable learning behaviour and achievement (e.g. Taylor et al., 2014; Tóth-Király et al., 2022). Accordingly, intrinsic reading motivation has been found to be positively related to various indicators of favourable reading behaviour such as reading amount, adaptive reading strategies or preferences for difficult text genres (e.g. Becker et al., 2010; Retelsdorf et al., 2011). Moreover, many studies have demonstrated positive relations between intrinsic reading motivation and reading achievement (e.g. Andreassen & Bråten, 2010; Cartwright et al., 2016; Froiland & Oros, 2014; Logan et al., 2011; Toste et al., 2020).

Intrinsic Reading Motivation and Language-Related Variables

There is a close connection between the language domain and the reading domain when considering achievement. The overall language domain is composed of different, yet interrelated language skills or language abilities such as reading, writing, listening, and oral

expression (Berninger & Abbott, 2010). Hence, reading achievement is a subcomponent of overall language achievement leading to relations between reading achievement and language achievement. For instance, academic language skills and reading comprehension skills were found to be positively related at Grade 6 and to show a similar developmental trajectory across middle school (Galloway & Uccelli, 2019).

When considering motivation, researchers have examined the relation between intrinsic reading motivation and other reading-related variables such as reading achievement or reading behaviour (e.g. Andreassen & Bråten, 2010; Cartwright et al., 2016; Froiland & Oros, 2014; Logan et al., 2011; Miyamoto et al., 2019; Schaffner et al., 2013; Soemer & Schiefele, 2018; Stutz et al., 2016). However, given the conceptual overlap between language and reading, intrinsic reading motivation might also be related to variables addressing the overall language or verbal domain. In this study, we examined the relation between intrinsic reading motivation and language-related variables. Given the conceptual overlap between reading and language, we expected positive interrelations between intrinsic reading motivation and language-related variables, but the temporal direction of the relations remains to be explored. In the following, we describe the variety of language-related variables for which we examined the temporal relations of intrinsic reading motivation, namely, language school performance, and language motivation, the latter differentiating between language self-concept and language intrinsic value.

Reading Achievement

Reading achievement addresses students' achievement in reading. It is often measured by standardised achievement test scores (e.g. Hebbecker et al., 2019; Miyamoto et al., 2018). Standardised achievement test scores are an objective achievement indicator reflecting students' achievement in a specific domain and they are comparable across classes and schools although they are difficult to understand and interpret for students.

Language School Performance

Language school performance reflects students' skills in a specific language in general and therefore relate to a variety of language skills such as reading, writing, oral expression, and listening; it thus subsumes reading achievement. We operationalise language school performance using students' school grades in the subject related to the language of instruction. School grades are highly salient, easy to interpret, and compare and bear important implications for students' further school career. However, school grades do not only reflect students' achievement but are also influenced by students' characteristics such as classroom behaviour, motivation or background variables (Lekholm & Cliffordson, 2009).

Language Motivation

Two facets of students' language motivation, that is, language self-concept and language intrinsic value, are examined with respect to their relation to intrinsic reading motivation. Language self-concept is defined as students' self-perceived competence in languages (Marsh & O'Mara, 2008). Hence, language self-concept reflects how students evaluate and perceive their own language skills. Language intrinsic value relates to students' enjoyment and interest in the language domain (Wigfield & Eccles, 2000) and is thus different

from intrinsic reading motivation only focusing on students' enjoyment of reading (see above).

The Present Study

This study aims to examine the temporal relations between intrinsic reading motivation and language-related variables whereby we differentiate between language school performance and language motivation (including language self-concept and language intrinsic value). All respective analyses were controlled for the relations with reading achievement (Figure 1). This results in a very complex model that includes a variety of different paths. In the following, we concentrate on the relations involving intrinsic reading motivation but do not ignore that the model includes a variety of other paths. Table 1 provides an overview of the different paths included and corresponding hypotheses.

Intrinsic Reading Motivation and Reading Achievement

Longitudinal studies have demonstrated reciprocal relations between intrinsic reading motivation and reading achievement, meaning that both constructs mutually reinforce each other (Hebbecker et al., 2019; McElvany et al., 2008; Schaffner et al., 2016; Schiefele et al., 2016). Our study design with three annual measurement waves is ideal to further probe and replicate reciprocal relations between intrinsic reading motivation and reading achievement.

Intrinsic Reading Motivation and Language School Performance

Regarding the relation between intrinsic reading motivation and language school performance, one can assume positive relations as language school performance integrates

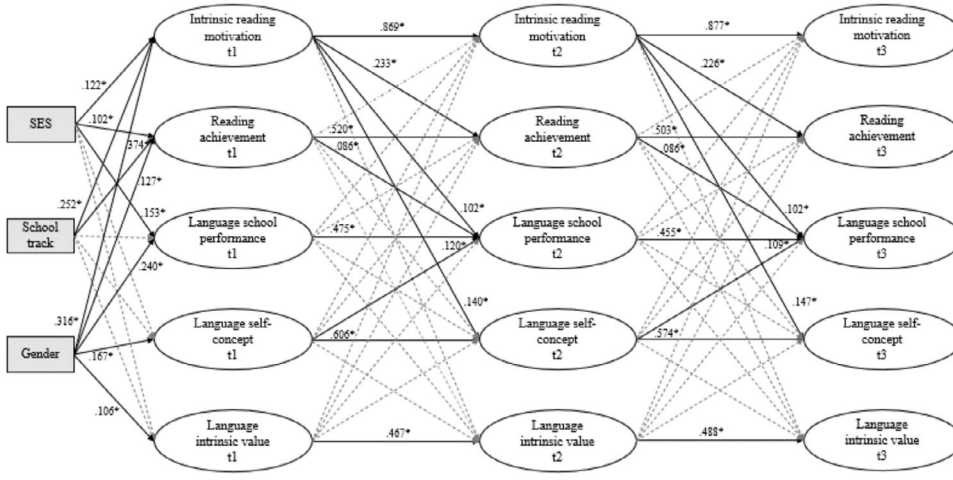

Figure 1. Findings from the cross-lagged panel model (Model 5 in Table 2). *Notes*: To maintain readability of the figure, correlations among constructs within waves are omitted. Abbreviations: Gender is coded 0 = *male*, 1 = *female*. HISEI, Highest International Socio-Economic-Index of Occupational Status. School track is coded 0 = *non-academic track*, 1 = *academic track*. Significant path coefficients are indicated by black solid paths; non-significant path coefficients are indicated by grey dotted paths.

Table 1. Paths of the Tested Model with Corresponding Hypotheses and Empirical Findings.

Tested relation	Corresponding hypotheses	Empirical findings (Model 5)
Temporal relations involving intrinsic reading motivation		
Intrinsic reading motivation and reading achievement	Reciprocal relations between intrinsic reading motivation and reading achievement (e.g. Hebbecker et al., 2019)	Unidirectional relation between previous intrinsic reading motivation and later reading achievement; no relation between previous reading achievement and later intrinsic reading motivation
Intrinsic reading motivation and language school performance	Positive relations between intrinsic reading motivation and language school performance as language school performance integrates reading achievement and intrinsic reading motivation is positively related to reading achievement	Unidirectional relation between previous intrinsic reading motivation and later language school performance; no relation between previous language school performance and later intrinsic reading motivation
Intrinsic reading motivation and language self-concept	Positive relation between previous language self-concept and later intrinsic reading motivation given the assumptions of EVT (Wigfield & Eccles, 2002) and SDT (Deci & Ryan, 2000)	Unidirectional relation between previous intrinsic reading motivation and later language self-concept; no relation between previous language self-concept and later intrinsic reading motivation
Intrinsic reading motivation and language intrinsic value	Positive interrelations given the conceptual and content overlap of both variables	No temporal relations
Other relations		
Reading achievement and language school performance	Positive interrelations as language achievement incorporates but also exceeds reading achievement	Unidirectional relation between previous reading achievement and later language school performance; no relation between previous language school performance and later reading achievement
Language self-concept and reading achievement	Positive interrelations because reading achievement is a subcomponent of language achievement and self-concept and achievement are found to be reciprocally related (Wu et al., 2021)	No temporal relations
Language self-concept and language school performance	Positive interrelations because self-concept and achievement of matching domains are found to be reciprocally related (Wu et al., 2021)	Unidirectional relation between language self-concept and language school performance; no relation between previous language school performance and later language self-concept
Language intrinsic value and language school performance	Positive interrelations as intrinsic value and achievement share positive relations within the same domains (Guay & Bureau, 2018)	No temporal relations
	Positive relation between former language self-concept and later	No temporal relations

(*Continues*)

Table 1. (Continued)

Tested relation	Corresponding hypotheses	Empirical findings (Model 5)
Language intrinsic value and language self-concept	language intrinsic value given the assumptions of SDT and EVT	
Language intrinsic value and reading achievement	Positive interrelations given the conceptual overlap between language and reading and the positive interrelations between intrinsic value and achievement (Guay & Bureau, 2018)	No temporal relations

reading achievement. However, the direction of the relation between intrinsic reading motivation and language school performance remains ambiguous. Previous intrinsic reading motivation might be related to later language school performance as intrinsic reading motivation might enhance reading skills (e.g. Becker et al., 2010; Miyamoto et al., 2019; Schaffner et al., 2013). This might enhance language school performance in general. Alternatively, previous language school performance might be related to later intrinsic reading motivation as high levels of language school performance might help and facilitate reading skills so that reading is more attractive and delightful for students leading to higher levels of intrinsic motivation. Finally, there might be reciprocal relations between intrinsic reading motivation and language school performance integrating both directions of influence.

Intrinsic Reading Motivation and Language Self-Concept

According to expectancy-value theory (EVT), students might enjoy and develop interest in a domain in which they feel competent (Wigfield & Eccles, 2002). According to SDT, self-perceptions of competence—that is academic self-concept—are assumed to be a prerequisite for the formation of intrinsic motivation (Deci & Ryan, 2000). Therefore, relations between previous language self-concept and later intrinsic reading motivation might be more probable than vice versa. However, it is not clear whether the assumptions of EVT and SDT only apply within the same domains (Jacobs et al., 2002; Lauermann et al., 2017) or also across the domains of language and reading as studied here.

Intrinsic Reading Motivation and Language Intrinsic Value

Regarding the relation between intrinsic reading motivation and language intrinsic value, it should be noted that both variables address students' enjoyment and liking of reading as a more specific domain (intrinsic reading motivation) or of the language domain in general (language intrinsic value). Thus, intrinsic reading motivation and language intrinsic value might share high levels of conceptual overlap—both regarding the underlying motivation construct and meaning (i.e. enjoyment, liking) and regarding the shared content domain (reading, language) leading to positive relations. However, the direction of the temporal relation is unclear.

The study was conducted in the German educational system. Hence, German was the language of instruction for all the students of our sample and the native language for most

of the students. The reading-related variables pertain to reading in German, and language school performance and variables of language motivation relate to the language domain of German.

Students' gender, secondary school track[1], and socio-economic status (SES) are included as covariates. Thereby, we can investigate the relations among reading-related and language-related variables when controlling for differences of the constructs concerning gender, students attending different achievement tracks of the German secondary school system, and students of different SES levels. Girls, students attending the academic track of German secondary schools, and students from higher SES households have been found to display higher levels of intrinsic reading motivation and language motivation and reading and language achievement (Cartwright et al., 2016; De Naeghel et al., 2014; Miyamoto et al., 2020; Reilly et al., 2019; Stutz et al., 2016; Voyer & Voyer, 2014).

Method

Data Origin

The data analysed in this study were part of the large-scale study 'Bildungsprozesse, Kompetenzentwicklung und Selektionsentscheidungen im Vorschul- und Schulalter' (BiKS BiKS 8-14) (Educational Processes, Competence Development and Selection Decisions in Preschool and School Age; Artelt et al., 2013). The BiKS 8-14 study was funded by the German Research Foundation, and the data were made available by the Research Data Centre at the Institute for Educational Quality Improvement in Berlin. Ethics approval was granted by the Ministries of Education of Hesse and Bavaria (the two German federal states participating in the study). In addition, the data protection officials of the universities were involved in the ethical review of the study. The BiKS 8-14 study comprises eight measurement waves starting in Grade 3 (elementary school) and ending in Grade 9 (secondary school). Intrinsic reading motivation was only measured at the sixth to eighth measurement waves of the BiKS 8-14 study. Hence, only these three measurement waves were considered [labelled t1 (end of Grade 7; usual age of students: 14–15 years), t2 (end of Grade 8) and t3 (end of Grade 9)].

Sample

We first excluded students from special needs schools, students without any valid information on their class and school membership, and students from classes with fewer than four other students participating in the study. We then only included students with at least one valid item on all variables considered on one of the three measurement waves. This resulted in a sample of $N = 1271$ students [$n = 603$ (47.4%) male; $n = 688$ (52.6%) female, for more information, see Online Supplements S1].

[1]Between the third and fourth measurement waves, the students transitioned from elementary school to secondary school. In Germany, there are different ability tracks for secondary school [academic track (Gymnasium), intermediate track, vocational track, and comprehensive track]. Graduation from the academic track allows entry to university, graduation from the intermediate track allows vocational training, and graduation from the vocational track qualifies for an apprenticeship in trade and craft with a focus on manual labour (Becker et al., 2016). The comprehensive track combines different ability levels. The choice of ability track is based upon students' achievement at elementary school, teachers' recommendations, and students' and parents' wishes.

Measures

Intrinsic Reading Motivation

Intrinsic reading motivation was measured with four items at each of the three measurement waves ('I only read when I have to' (reversely coded); 'I am always pleased when I receive a book as a present'; 'Reading is one of my favorite hobbies'; 'I like visiting bookshops or libraries') retrieved from the PISA 2000 study (Kunter et al., 2002). The students responded to the items using a 4-point-Likert scale ranging from *does not apply* to *applies*. The coefficient alpha (α) as well as the McDonald's omega (ω) estimates of reliability were good at each measurement wave (t1: α = 0.908/ω = 0.908; t2: α = 0.905/ω = 0.911; t3: α = 0.898/ω = 0.905).

Reading Achievement

Reading achievement was measured by the reading achievement test specifically designed for and implemented in the BiKS 8-14 study (Artelt et al., 2013; for more information, see Online Supplements S3). The reliability of the test scores calculated by using the Kuder–Richardson 20 formula was found to be satisfactory at the three measurement waves: t1: KR-20 = 0.816; t2: KR-20 = 0.673; t3: KR-20 = 0.704.

Language School Performance

As an indicator for language school performance, we used students' self-reported school grades in German as a school subject from the recent school reports (mid-term school reports received at the end of January in Grades 7, 8 and 9). In Germany, school grades range from 1 (*best grade*) to 6 (*poorest grade*). The grades were reversely coded before all analyses for easier interpretation; thus, higher values indicated higher levels of achievement.[2]

Language Self-Concept

Students' language self-concept was assessed with three items asking for students' self-perception of competence in German as a school subject ('German is easy for me'; 'I learn quickly in German'; 'I am good at German'). The students responded to the items using a 5-point-Likert scale ranging from *not at all* to *very much*. Reliability estimates were good at each measurement wave (t1: α = 0.908/ω = 0.907; t2: α = 0.860/ω = 0.865; t3: α = 0.897/ω = 0.898).

Language Intrinsic Value

Students' language intrinsic value was measured with two items addressing German as a school subject ('How much do you look forward to German lessons?'; 'How much would

[2]There were also teacher-reported school grades in German available in the dataset, but the amount of missing data was even higher (t1: 34.0%; t2: 77.5%; t3: 82.0%) compared to the self-reported school grades in German. Therefore, we did not include the teacher-reported school grades in German in the analyses. Still, to support the validity of self-reported grades, we considered the correlations between self-reported grades and teacher-reported grades. The findings showed that self-reported grades and teacher-reported grades were highly correlated indicating the validity of self-reported grades (t1: $r = 0.788$; t2: $r = 0.753$; t3: $r = 0.804$). When conducting the missing completely at random (MCAR) test (Little, 1988) using teacher-reported and student-reported school grades, the findings indicated that the missing values are missing completely at random within each measurement wave [t1: $\chi^2(2) = 3.916$, $p = 0.141$; t2: $\chi^2(2) = 0.955$, $p = 0.620$; t3: $\chi^2(2) = 0.086$, $p = 0.958$].

you like to have more German lessons?'). The students responded to the items using the same 5-point Likert scale as used for the self-concept scale. Reliability estimates were good at each measurement wave (t1: $\alpha = 0.838/\omega = 0.840$; t2: $\alpha = 0.834/\omega = 0.827$; t3: $\alpha = 0.815/\omega = 0.824$).

Covariates

As covariates, students' gender (0 = male, 1 = female), secondary school track [0 = non-academic (intermediate, vocational, and comprehensive) tracks (n = 442), 1 = academic track (n = 829)] and the highest International Socio-Economic Index of Occupational Status (HISEI; Ganzeboom et al., 1992) (as an indicator for SES) were considered.

Statistical Analyses

Missing data on the measures[3] were handled by multiple imputation (e.g. Sinharay et al., 2001). As recommended by Enders (2010), we created 20 sets of imputed data in Mplus based on an imputation model that is described in detail in the Online Supplements S2. Using the 'type = imputation' option in Mplus, all analyses were conducted with all the imputed datasets separately and were then combined (Little & Rubin, 2002).

All analyses were based on structural equation modelling (Kline, 2005) and the models were estimated using Mplus 8.4 (Muthén & Muthén, 1998–2019). In all models, we defined factors for intrinsic reading motivation, reading motivation, language self-concept, and language intrinsic value using the corresponding item indicators. The two achievement factors were modelled as single-item factors in the analyses, whereby reading achievement was defined by the reading achievement test score and language school performance was defined by the school grade in German. All models were estimated using the robust maximum likelihood estimator and the Mplus option 'type = complex' with students' classes as cluster variables. The latter option corrects for possible biased standard errors resulting from the hierarchical data structure with students nested in classes. Correlated uniquenesses were allowed between the same items across measurement waves (Marsh & Hau, 1996).

The analyses started with a confirmatory factor analytic (CFA; Brown, 2015) model. The factor loadings were first estimated freely across time. Given that this study focused on the temporal relations among factors, measurement invariance of factor loadings (i.e. metric invariance; Millsap, 2011) was required. Invariant factor loadings ensure that the same constructs with the same meanings are measured across time (Widaman et al., 2010). We therefore compared the initial CFA model to a CFA model in which the loadings for each factor were constrained to be equal across time.

[3]The amount of missing data on the different measures were as follows: intrinsic reading motivation: range between 4.2% and 69.0%; reading achievement: range between 13.9% and 68.7%; language school performance: range between 7.5% and 57.4%; language self-concept: range between 4.2% and 57.0%; language intrinsic value: range between 5.0% and 64.8%. Table S6 provides a complete overview of the extent of missing values. Conducting the missing completely at random (MCAR) test (Little, 1988) shows that within each measurement wave, the missing values on all variables were missing completely at random [t1: $\chi^2(310) = 329.763$, $p = 0.211$; t2: $\chi^2(120) = 138.689$, $p = 0.117$; t3: $\chi^2(106) = 123.375$, $p = 0.119$]. However, when considering all variables across all three measurement waves, the MCAR test got significant [$\chi^2(2400) = 2604.656$, $p = 0.002$], indicating that the number of missing values gets larger across time. However, the multiple imputation method used in the analyses to deal with missing values account for missing values that are not missing completely at random (Austin et al., 2021).

The main analyses were based on the approach of cross-lagged panel models (Curran & Bollen, 2001) and thus probed for the relations among the constructs across time. Hence, we estimated the stability of the constructs considered and the temporal associations among them (Figure 1). The correlations among the disturbances of the constructs were estimated within each measurement wave. In a first cross-lagged panel model, the path coefficients were tested freely. In a second cross-lagged panel model, we restricted the path coefficients to be of equal size across time. For instance, the stability of intrinsic reading motivation across t1 and t2 was set to be the same value as the stability of intrinsic reading motivation across t2 and t3. Thereby, we tested for stationarity of the relations—in the case of stationarity, the relations among constructs did not differ across time (Arens et al., 2019). Moreover, the assumption of stationarity helps stabilise the model (Marsh et al., 2016). In the third cross-lagged panel model, the covariates (gender, secondary school track and HISEI) were included as manifest variables to test whether the findings remain when controlling for these variables.

To assess model fit, we reported the most commonly used goodness-of-fit indices including the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardised root mean square residual (SRMR) (for interpretation of the goodness-of-fit-indices, see Online Supplements S4) Measurement invariance and stationarity were stated as long as the change in the CFI did not drop by more than $\Delta CFI \leq -0.01$ between two nested models (models with more and less invariance constraints) (Cheung & Rensvold, 2002).

Results

A CFA model including the factors for all constructs at all three measurement waves had a good model fit: $\chi^2(371) = 1875.072$; CFI = 0.947; TLI = 0.925; RMSEA = 0.056; SRMR = 0.031 (Model 1 in Table 1). Given the high positive loadings of the item indicators on the corresponding factors, the factors were well defined at the three measurement waves (Table S1).[4] When restricting the factor loadings to invariance across time, the CFI value only declined by $\Delta = -0.002$ (Model 2 in Table 1). Hence, factor loading invariance across time could be confirmed, which enabled us to examine temporal relations among constructs.

For this purpose, we stated a cross-lagged panel model (Model 3 in Table 1; Table S3). When constraining the stability and cross-lagged path coefficients to be of the same size across time (Model 4 in Table 1; Table S4), the CFI value remained nearly the same, and the TLI and RMSEA value indicated a marginally improved model fit—presumably due to the increased model parsimony. Hence, the sizes of the path coefficients were equal across time. In the final model (Model 5 in Table 2; Table 3; Figure 1; Table S5), we included gender, secondary school track, and HISEI as covariates. The findings indicated statistically significant positive relations between previous intrinsic reading motivation and later reading achievement (t1–t2: $\beta = 0.233$; t2–t3: $\beta = 0.226$; for both $p < 0.05$), later language school performance (t1–t2: $\beta = 0.102$; t2–t3: $\beta = 0.102$; for both $p < 0.05$), and later language self-concept (t1–t2: $\beta = 0.140$; t2–t3: $\beta = 0.147$; for both $p < 0.05$).[5] The relations between previous language self-concept and later language achievement were also

[4]See Table S2 for the factor correlations of Model 1.

[5]In this model, the sample size decreased to $N = 1143$ students because $n = 128$ students had missing values on the HISEI.

Table 2. Goodness-of-Fit Indices.

Model		χ^2	df	CFI	TLI	RMSEA	SRMR
1	CFA model	1875.072	371	0.947	0.925	0.056	0.031
2	CFA model with factor loading invariance across time	1957.975	383	0.945	0.924	0.057	0.034
3	Cross-lagged panel model	2264.128	408	0.935	0.916	0.060	0.042
4	Cross-lagged panel model with invariant path coefficients	2335.933	433	0.934	0.919	0.059	0.050
5	Cross-lagged panel model with invariant path coefficients and covariates included	2372.308	517	0.930	0.915	0.056	0.049

Note: All χ^2 values are statistically significant ($p < 0.001$).
Abbreviations: CFA, confirmatory factor analysis; CFI, comparative fit index; TLI, Tucker–Lewis index; RMSEA, root mean square error of approximation; SRMR, standardised root mean squared residual.

statistically significant (t1–t2: β = 0.120; t2–t3: β = 0.109; for both $p < 0.05$). Previous reading achievement was found to be related to later language school performance (t1–t2: β = 0.086; t2–t3: β = 0.086; for both $p < 0.05$). The other cross-lagged paths were non-significant.

Girls, compared to boys, were found to have higher levels on all variables. Students from higher SES households had higher levels on intrinsic reading motivation, reading achievement, and language school performance but did not differ from students from lower SES households regarding language self-concept and language intrinsic value. Students attending the academic track of secondary school demonstrated higher levels of intrinsic reading motivation and reading achievement, but there were no differences between academic track students and non-academic track students on the language-related variables, that is, language school performance, language self-concept and language intrinsic value.

Discussion

Intrinsic reading motivation has been underexplored with respect to its relation to language-related variables. We therefore examined the temporal relations between intrinsic reading motivation, reading achievement, language school performance, and language motivation (while distinguishing between language self-concept and language intrinsic value). Table 1 gives an overview about the empirical finding of our complex model.

Intrinsic Reading Motivation and Reading Achievement

The results supported positive relations between previous intrinsic reading motivation and later reading achievement. This finding matches various previous findings showing a positive relation between intrinsic reading motivation and reading achievement (e.g. Andreassen & Bråten, 2010; Cartwright et al., 2016; Froiland & Oros, 2014; Logan et al., 2011). However, the findings did not replicate reciprocal relations between intrinsic reading motivation and reading achievement as found in some longitudinal studies (Hebbecker et al., 2019; McElvany et al., 2008; Schaffner et al., 2016; Schiefele et al., 2016). In fact, we did not find a relation between previous reading achievement

Table 3. Results of the Cross-Lagged Panel Model 5 in Table 2.

Stability	Intrinsic reading motivation	Language self-concept	Language intrinsic value	Reading achievement	Language school performance
t1 → t2	0.869*	0.606*	0.467*	0.520*	0.475*
t2 → t3	0.877*	0.574*	0.488*	0.503*	0.455*
Cross-lagged paths					
	Intrinsic reading motivation → language self-concept	Intrinsic reading motivation → language intrinsic value	Intrinsic reading motivation → reading achievement	Intrinsic reading motivation → language school performance	Reading achievement → language self-concept
t1 → t2	0.140*	0.071	0.233*	0.102*	0.010
t2 → t3	0.147*	0.077	0.226*	0.102*	0.010
	Reading achievement → language intrinsic value	Reading achievement → language school performance	Reading achievement → intrinsic reading motivation	Language self-concept → language intrinsic value	Language self-concept → reading achievement
t1 → t2	0.012	0.086*	0.040	0.056	0.019
t2 → t3	0.012	0.086*	0.040	0.055	0.017
	Language self-concept → language school performance	Language self-concept → intrinsic reading motivation	Language intrinsic value → language self-concept	Language intrinsic value → reading achievement	Language intrinsic value → language school performance
t1 → t2	0.120*	−0.003	0.009	0.017	−0.061
t2 → t3	0.109*	−0.003	0.010	0.016	−0.060
	Language intrinsic value → intrinsic reading motivation	Language school performance → language self-concept	Language school performance → language intrinsic value	Language school performance → intrinsic reading motivation	Language school performance → reading achievement
t1 → t2	0.024	0.021	−0.069	0.033	0.058
t2 → t3	0.024	0.021	−0.071	0.032	0.055

(*Continues*)

Table 3. (Continued)

Stability	Intrinsic reading motivation	Language self-concept	Language intrinsic value	Reading achievement	Language school performance
Covariation					
	Intrinsic reading motivation ⊠ language self-concept	Intrinsic reading motivation ⊠ language intrinsic value	Intrinsic reading motivation ⊠ reading achievement	Intrinsic reading motivation ⊠ language school performance	Language self-concept ⊠ language intrinsic value
t1	0.263*	0.240*	0.403*	0.224*	0.490*
t2	−0.023	0.002	0.089	0.037	0.428*
t3	0.147	0.169*	0.059	0.177*	0.434 *
	Language self-concept ⊠ reading achievement	Language self-concept ⊠ language school performance	Language intrinsic value ⊠ reading achievement	Language intrinsic value ⊠ language school performance	Reading achievement ⊠ language school performance
t1	0.147*	0.495*	0.007	0.208*	0.265*
t2	0.085	0.380*	0.011	0.392*	0.052
t3	−0.050	0.434*	−0.057	0.245*	0.008
Covariates at t1					
	Outcome: intrinsic reading motivation	Outcome: language self-concept	Outcome: language intrinsic value	Outcome: reading achievement	Outcome: language school performance
Gender	0.316*	0.167*	0.106*	0.127*	0.240*
HISEI	0.122*	0.058	−0.049	0.102*	0.153*
School track	0.252*	0.071	0.038	0.374*	0.011

Notes: t = measurement wave. Gender is coded 0 = *male*, 1 = *female*. School track is coded 0 = *non-academic track*, 1 = *academic track*. The sample size of this model is $N = 1143$ because $n = 128$ students had missing values on the HISEI.
Abbreviation: HISEI, Highest International Socio-Economic-Index of Occupational Status.
*$p < 0.05$.

and later intrinsic reading motivation but only a unidirectional relation between previous intrinsic reading motivation and later reading achievement. Previous studies indicating reciprocal relations focused on elementary school students (Hebbecker et al., 2019; McElvany et al., 2008; Schiefele et al., 2016) or students at the beginning of the secondary school system (Grades 5–7; Miyamoto et al., 2018; Schaffner et al., 2016). The students were thus younger than the students examined in our study (Grades 7–9). Reading achievement might be less important for intrinsic reading motivation for older students; due to the decelerated growth of reading achievement in secondary school years (Retelsdorf et al., 2011), older students might receive little competence feedback for reading that might be needed to foster students' intrinsic reading motivation. In addition, the high level of stability of intrinsic reading motivation might impede previous reading achievement to be related to later intrinsic reading motivation.

Intrinsic Reading Motivation and Language School Performance

Previous intrinsic reading motivation was found to demonstrate positive relations to later language school performance. Hence, intrinsic reading motivation is not only related to achievement in reading but also to language school performance. The positive relation between previous intrinsic reading motivation and later language school performance could be explained by mediated relations as intrinsic reading motivation might enhance reading amount and metacognitive knowledge of strategy use (Miyamoto et al., 2019; Schaffner et al., 2013; Soemer & Schiefele, 2018; Stutz et al., 2016), which might augment language skills and therefore language school performance in general.

Intrinsic Reading Motivation and Language Self-Concept

Previous intrinsic reading motivation was found to be linked to later language self-concept, but the relation between previous language self-concept and later intrinsic reading motivation was non-significant. Hence, students who like reading (intrinsic reading motivation) form the belief that they are good at the school subject related to the language of instruction (language self-concept). This direction of the temporal relation does not match the assumptions of EVT or SDT according to which previous competence beliefs including self-concept are related to later enjoyment and interest (Deci & Ryan, 2000; Wigfield & Eccles, 2002). Still, the findings correspond to empirical studies that showed relations between previous intrinsic value and later self-concept within the language domain (Arens et al., 2019). Thus, both within the language domain (Arens et al., 2019) and across the reading and language domains (this study), value facets including students' liking and enjoyment seem to be more important for self-concept formation than conversely. Hence, the theoretical assumptions of EVT and SDT regarding the temporal relation between self-perceptions of competence and intrinsic value might be revised while considering the domain specificity of these motivation facets.

Intrinsic Reading Motivation and Language Intrinsic Value

Previous intrinsic reading motivation was unrelated to later language intrinsic value and previous language intrinsic value was unrelated to later intrinsic reading motivation. This finding might be surprising as both constructs are conceptually related as they

address feelings of enjoyment and liking as well as conceptually related domains (reading, language). The reasons for this lack of relationship should be explored in future research that might refer to the measures of the constructs considered and sample characteristics.

Theoretical Implications and Directions for Future Research

Our findings demonstrated positive relations between previous intrinsic reading motivation and later language school performance, later language self-concept, and later reading achievement. Thus, intrinsic reading motivation seems to foster students' motivation (self-concept) and achievement in the broader and more general language domain. These findings match the assumptions of SDT as we found positive relations between intrinsic motivation and desirable outcomes; the outcome variables considered here involve motivation and achievement. The relations between intrinsic motivation and outcomes address relations within the same domain of reading and relations across the different, but conceptually closely related domains of language and reading. Relations across language and reading might be due to general verbal abilities or verbal intelligence that might impact both reading-related and language-related variables (Beauducel et al., 2001). As previous research of intrinsic reading motivation has concentrated on relations between intrinsic reading motivation and other reading-related variables (reading achievement, reading behaviour), the innovative part of the study was to reveal relations between intrinsic reading motivation and variables related to the language domain, that is, relations between conceptually related constructs. Future research should continue examining relations among constructs of conceptually related domains such as math and physics.

In our study, we found several relations between previous intrinsic reading motivation and later reading-related and language-related variables. However, we did not find any reverse relation between the reading-related and language-related variables considered and later intrinsic reading motivation. The high level of stability of intrinsic reading motivation might prevent relations between previous reading achievement, language school performance, language self-concept, and language intrinsic value and later intrinsic reading motivation. Our findings should thus be replicated with alternative instruments for the variables. In addition, our study built upon a sample of middle school students (Grades 7–9). In secondary school, language lessons cover text interpretations, creative writing, and discussions, that is, the application of reading and writing. In contrast, in elementary school, language lessons mainly consist of reading and writing instructions, that is, the acquisition of reading and writing skills. Therefore, future research should consider samples spanning a wider age range. The shift of the instructional focus (from the acquisition to the application of reading skills) might impact the stability and relations of intrinsic reading motivation. Students in middle secondary school might have built up a relatively stable level of intrinsic reading motivation that has been formed through accumulated experiences of reading instruction, their own reading behaviour, home reading experiences, and competence feedback (e.g. De Naeghel et al., 2014: Sutter & Campbell, 2022; Troyer et al., 2019). Finally, the high stability of intrinsic reading motivation might be due to specificities of our study sample. In our sample, students from the academic track were over-represented. Previous research has indicated that the pattern of relations between intrinsic reading motivation and reading achievement can differ between native and immigrant students (Miyamoto et al., 2018), between

students with different levels of reading ability (Logan et al., 2011) or between students attending different school tracks (Schaffner et al., 2016). Thus, further studies should consider more diverse samples.

Future studies on the relations between language-related and reading-related variables might benefit from further extensions. For instance, the trait and state components of intrinsic reading motivation should be differentiated to get an insight into between-person variance and within-person variance (Witte et al., 2024). Within-person fluctuations of intrinsic reading motivation might depend on situational characteristics such as specific reading instructions, topics (e.g. fictional or nonfictional reading) or reading contexts (reading from printed or online sources; reading outside or inside school). Moreover, we only considered intrinsic reading motivation. Further facets of reading motivation should be included in order to consider reading motivation in broad terms and discern potentially divergent relations to language achievement and language motivation (see Hebbecker et al., 2019 who argue for a combined examination of intrinsic and extrinsic reading motivation). Finally, despite evidence of validity for student-reported school grades (see footnote 2 and Sticca et al., 2017), other indicators of language school performance should be included. In this context, more direct and objective measures of students' language school performance such as standardised test scores should be considered.

Practical Implications

This study demonstrates that intrinsic reading motivation is of high importance as it is not only related to reading achievement but also to language self-concept and language school performance. This finding underscores the relevance of interventions that aim to foster intrinsic reading motivation. There are many school-based programmes particularly designed to enhance students' reading motivation; these programmes base on different motivational theories, realise differential instructional approaches, and target different outcome variables (for a recent overview, see McBreen & Savage, 2021). Beyond school-based instructional programmes, the role of parents and home environment in fostering students' reading motivation should also be considered (e.g. Klauda, 2009). An ideal approach might be to combine school-based and home-based intervention programs to effectively foster students' reading motivation (Villiger et al., 2012).

Conclusion

Our study underscores the importance of intrinsic reading motivation as it shares temporal relations with later reading achievement, language school performance, and language self-concept. Hence, the importance of intrinsic reading motivation transcends the reading domain and also addresses the language domain. Practitioners should thus place an emphasis on enhancing students' intrinsic reading motivation, which might in turn foster students' motivation and achievement in the language domain. Future studies are needed to explore the underlying mechanisms and to replicate the findings with more diverse samples.

Acknowledgement

Preparation of this article was supported by a Heisenberg fellowship grant from the German Research Foundation to A.K. Arens (AR 877/3-1). Open Access funding enabled and organized by Projekt DEAL.

Conflict of Interest

There is not conflict of interest associated with this manuscript.

Data Availability Statement

The data analysed in this study came from the large-scale longitudinal study "Bildungsprozesse, Kompetenzentwicklung und Selektionsentscheidungen im Vorschul- und Schulalter" (BiKS 8-14) (Educational Processes, Competence Development and Selection Decisions in Preschool and School Age; Artelt et al., 2013), funded by the German Research Foundation. The data were made available by the Research Data Centre at the Institute for Educational Quality Improvement in Berlin. Ethics approval was granted by the Ministries of Education of Hesse and Bavaria (the two German federal states participating in the study). In addition, the data protection officials of the universities were involved in the ethical review of the study. We confirm that no materials or illustrations from other sources have been used in this manuscript. All figures included are original and created specifically for this work.

References

Andreassen, R., & Bråten, I. (2010). Examining the prediction of reading comprehension on different multiple-choice tests. *Journal of Research in Reading*, *33*(3), 263–283. https://doi.org/10.1111/j.1467-9817.2009.01413.x

Arens, A. K., Schmidt, I., & Preckel, F. (2019). Longitudinal relations among self-concept, intrinsic value, and attainment value across secondary school years in three academic domains. *Journal of Educational Psychology*, *111*(4), 663–684. https://doi.org/10.1037/edu0000313

Artelt, C., Blossfeld, H.-P., Faust, G., Roßbach, H.-G., & Weinert, S. (2013) Bildungsprozesse, Kompetenzentwicklung und Selektionsentscheidungen im Vorschul- und Schulalter (BiKS-8-14) [Educational processes, competence development and selection decisions in preschool and school age (BiKS 8-14)] (version 2) [Data set]: Berlin: IQB–Institut zur Qualitätsentwicklung im Bildungswesen. Datensatz. https://doi.org/10.5159/IQB_BIKS_8_14_v2

Austin, P. C., White, I. R., Lee, D. S., & van Buuren, S. (2021). Missing data in clinical research: A tutorial on multiple imputation. *Canadian Journal of Cardiology*, *37*, 1322–1331. https://doi.org/10.1016/j.cjca.2020.11.010

Beauducel, A., Brocke, B., & Liepmann, D. (2001). Perspectives on fluid and crystallized intelligence: Facets for verbal, numerical, and figural intelligence. *Personality and Individual Differences*, *30*(6), 977–994. https://doi.org/10.1016/S0191-8869(00)00087-8

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*(4), 773–785. https://doi.org/10.1037/a0020084

Becker, M., Neumann, M., & Dumont, H. (2016). Recent developments in school tracking practices in Germany: An overview and outlook on future trends. *ORBIS SCHOLAE*, *10*(3), 9–25. https://doi.org/10.14712/23363177.2017.8

Berninger, V. W., & Abbott, R. D. (2010). Listening comprehension, oral expression, reading comprehension, and written expression: Related yet unique language systems in grades 1, 3, 5, and 7. *Journal of Educational Psychology*, *102*(3), 635–651. https://doi.org/10.1037/a0019319

Brown, T. A. (2015). *Confirmatory factor analysis for applied research*. Guilford Publications.

Cartwright, K. B., Marshall, T. R., & Wray, E. (2016). A longitudinal study of the role of reading motivation in primary students' reading comprehension: Implications for a less simple view of reading. *Reading Psychology*, *37*(1), 55–91. https://doi.org/10.1080/02702711.2014.991481

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, *9*(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Curran, P. J., & Bollen, K. A. (2001). The best of both worlds: Combining autoregressive and latent curve models. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change* (pp. 105–136). American Psychological Association. https://doi.org/10.1037/10409-004

De Naeghel, J., Valcke, M., De Meyer, I., Warlop, N., van Braak, J., & van Keer, H. (2014). The role of teacher behavior in adolescents' intrinsic reading motivation. *Reading and Writing*, *27*, 1547–1565. https://doi.org/10.1007/s11145-014-9506-3

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Enders, C. K. (2010). *Applied missing data analysis*. Guilford.

Froiland, J. M., & Oros, E. (2014). Intrinsic motivation, perceived competence and classroom engagement as longitudinal predictors of adolescent reading achievement. *Educational Psychology*, *34*(2), 119–132. https://doi.org/10.1080/01443410.2013.822964

Galloway, E. P., & Uccelli, P. (2019). Examining developmental relations between core academic language skills and reading comprehension for English learners and their peers. *Journal of Educational Psychology*, *111*(1), 15–31. https://doi.org/10.1037/edu0000276

Ganzeboom, H. B., De Graaf, P. M., & Treiman, D. J. (1992). A standard international socioeconomic index of occupational status. *Social Science Research*, *21*(1), 1–56. https://doi.org/10.1016/0049-089X(92)90017-B

Guay, F., & Bureau, J. S. (2018). Motivation at school: Differentiation between and within school subjects matters in the prediction of academic achievement. *Contemporary Educational Psychology*, *54*, 42–54. https://doi.org/10.1016/j.cedpsych.2018.05.004

Guthrie, J. T., & Wigfield, A. (2000). Engagement and motivation in reading. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. *3*, pp. 403–422). Lawrence Erlbaum Associates Publishers.

Hebbecker, K., Förster, N., & Souvignier, E. (2019). Reciprocal effects between reading achievement and intrinsic and extrinsic reading motivation. *Scientific Studies of Reading*, *23*(5), 419–436. https://doi.org/10.1080/10888438.2019.1598413

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*(2), 509–527. https://doi.org/10.1111/1467-8624.00421

Klauda, S. L. (2009). The role of parents in adolescents' reading motivation and activity. *Educational Psychology Review*, *21*, 325–363. https://doi.org/10.1007/s10648-009-9112-0

Kline, R. B. (2005). *Principles and practice of structural equation modeling*. Guilford.

Kunter, M., Schümer, G., Artelt, C., Baumert, J., Klieme, E., Neubrand, M., Prenzel, M., Schiefele, U., Schneider, W., Stanat, P., Tillmann, K.-J., & Weiß, M. (2002). *PISA 2000: Dokumentation der Erhebungsinstrumente*. Max-Planck-Institut für Bildungsforschung.

Lauermann, F., Tsai, Y.-M., & Eccles, J. S. (2017). Math-related career aspirations and choices within Eccles et al.'s expectancy-value theory of achievement-related behaviors. *Developmental Psychology*, *53*(8), 1540–1559. https://doi.org/10.1037/dev0000367

Lekholm, A. K., & Cliffordson, C. (2009). Effects of student characteristics on grades in compulsory school. *Educational Research and Evaluation*, *15*(1), 1–23. https://doi.org/10.1080/13803610802470425

Little, R., & Rubin, D. (2002). *Statistical analysis with missing data*. John Wiley. https://doi.org/10.1002/9781119013563

Little, R. J. A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, *83*, 1198–1202. https://doi.org/10.1080/01621459.1988.10478722

Logan, S., Medford, E., & Hughes, N. (2011). The importance of intrinsic motivation for high and low ability readers' reading comprehension performance. *Learning and Individual Differences*, *21*(1), 124–128. https://doi.org/10.1016/j.lindif.2010.09.011

Marsh, H. W., Craven, R. G., Parker, P. D., Parada, R. H., Guo, J., Dicke, T., & Abduljabbar, A. S. (2016). Temporal ordering effects of adolescent depression, relational aggression, and victimization over six waves: Fully latent reciprocal effects models. *Developmental Psychology*, *52*(12), 1994–2009. https://doi.org/10.1037/dev0000241

Marsh, H. W., & Hau, K.-T. (1996). Assessing goodness of fit: Is parsimony always desirable? *Journal of Experimental Education*, *64*(4), 364–390. https://doi.org/10.1080/00220973.1996.10806604

Marsh, H. W., & O'Mara, A. J. (2008). Self-concept is as multidisciplinary as it is multidimensional. In H. W. Marsh, R. G. Craven, & D. M. McInerney (Eds.), *Self-processes, learning, and enabling human potential. dynamic new approaches* (pp. 87–115). Information Age.

McBreen, M., & Savage, R. (2021). The impact of motivational reading instruction on the reading achievement and motivation of students: A systematic review and meta-analysis. *Educational Psychology Review*, *33*, 1125–1163. https://doi.org/10.1007/s10648-020-09584-4

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*(34), 207–219. https://doi.org/10.1024/1010-0652.22.34.207

Millsap, R. E. (2011). *Statistical approaches to measurement invariance*. Routledge.

Miyamoto, A., Murayama, K., & Lechner, C. M. (2020). The developmental trajectory of intrinsic reading motivation: Measurement invariance, group variations, and implications for reading proficiency. *Contemporary Educational Psychology*, *63*, 101921. https://doi.org/10.1016/j.cedpsych.2020.101921

Miyamoto, A., Pfost, M., & Artelt, C. (2018). Reciprocal relations between intrinsic reading motivation and reading competence: A comparison between native and immigrant students in Germany. *Journal of Research in Reading*, *41*(1), 176–196. https://doi.org/10.1111/1467-9817.12113

Miyamoto, A., Pfost, M., & Artelt, C. (2019). The relationship between intrinsic motivation and reading comprehension: Mediating effects of reading amount and metacognitive knowledge of strategy use. *Scientific Studies of Reading*, *23*(6), 445–460. https://doi.org/10.1080/10888438.2019.1602836

Muthén, L. K., & Muthén, B. O. (1998–2019). *Mplus User's Guide* (Eighth ed.). Muthén & Muthén.

Reilly, D., Neumann, D. L., & Andrews, G. (2019). Gender differences in reading and writing achievement: Evidence from the National Assessment of educational Progress (NAEP). *The American Psychologist*, *74*(4), 445–458. https://doi.org/10.1037/amp0000356

Retelsdorf, J., Köller, O., & Möller, J. (2011). On the effects of motivation on reading performance growth in secondary school. *Learning and Instruction*, *21*(4), 550–559. https://doi.org/10.1016/j.learninstruc.2010.11.001

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, *61*, 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Schaffner, E., Philipp, M., & Schiefele, U. (2016). Reciprocal effects between intrinsic reading motivation and reading competence? A cross-lagged panel model for academic track and nonacademic track students. *Journal of Research in Reading*, *39*(1), 19–36. https://doi.org/10.1111/1467-9817.12027

Schaffner, E., Schiefele, U., & Ulferts, H. (2013). Reading amount as a mediator of the effects of intrinsic and extrinsic reading motivation on reading comprehension. *Reading Research Quarterly*, *48*(4), 369–385. http://www.jstor.org/stable/43497161, https://doi.org/10.1002/rrq.52

Schiefele, U., Stutz, F., & Schaffner, E. (2016). Longitudinal relations between reading motivation and reading comprehension in the early elementary grades. *Learning and Individual Differences*, *51*, 49–58. https://doi.org/10.1016/j.lindif.2016.08.031

Sinharay, S., Stern, H. S., & Russell, D. (2001). The use of multiple imputation for the analysis of missing data. *Psychological Methods*, *6*(4), 317–329. https://doi.org/10.1037/1082-989X.6.4.317

Soemer, A., & Schiefele, U. (2018). Reading amount as a mediator between intrinsic reading motivation and reading comprehension in the early elementary grades. *Learning and Individual Differences*, *67*, 1–11. https://doi.org/10.1016/j.lindif.2018.06.006

Sticca, F., Goetz, T., Bieg, M., Hall, N. C., Eberle, F., & Haag, L. (2017). Examining the accuracy of students' self-reported academic grades from a correlational and a discrepancy perspective: Evidence from a longitudinal study. *PLoS ONE*, *12*(11), e0187367. https://doi.org/10.1371/journal.pone.0187367

Stutz, F., Schaffner, E., & Schiefele, U. (2016). Relations among reading motivation, reading amount, and reading comprehension in the early elementary grades. *Learning and Individual Differences*, *45*, 101–113. https://doi.org/10.1016/j.lindif.2015.11.022

Sutter, C. C., & Campbell, L. O. (2022). The role of academic self-determined reading motivation, reading self-concept, home reading environment, and student reading behavior in reading achievement among American Indian and Hispanic students. *Contemporary Educational Psychology*, *70*, 1–12. https://doi.org/10.1016/j.cedpsych.2022.102093

Taylor, G., Jungert, T., Mageau, G. A., Schattke, K., Dedic, H., Rosenfield, S., & Koestner, R. (2014). A self-determination theory approach to predicting school achievement over time: The unique role of intrinsic motivation. *Contemporary Educational Psychology*, *39*, 342–358. https://doi.org/10.1016/j.cedpsych.2014.08.002

Toste, J. R., Didion, L., Peng, P., Filderman, M. J., & McClelland, A. M. (2020). A meta-analytic review of the relations between motivation and reading achievement for K–12 students. *Review of Educational Research*, *90*(3), 420–456. https://doi.org/10.3102/0034654320919352

Tóth-Király, I., Morin, A. J. S., Litalien, D., Valuch, M., Bőthe, B., Orosz, G., & Rigó, A. (2022). Self-determined profiles of academic motivation. *Motivation and Emotion*, *46*(2), 152–170. https://doi.org/10.1007/s11031-021-09918-x

Troyer, M., Kim, J. S., Hale, E., Wantchekon, K. A., & Armstrong, C. (2019). Relations among intrinsic and extrinsic reading motivation, reading amount, and comprehension: A conceptual replication. *Reading and Writing*, *32*, 1197–1218. https://doi.org/10.1007/s11145-018-9907-9

Villiger, C., Niggli, A., Wandeler, C., & Kutzelmann, S. (2012). Does family make a difference? Mid-term effects of a school/home-based intervention program to enhance reading motivation. *Learning and Instruction*, *22*(2), 79–91. https://doi.org/10.1016/j.learninstruc.2011.07.001

Voyer, D., & Voyer, S. D. (2014). Gender differences in scholastic achievement: A meta-analysis. *Psychological Bulletin*, *140*(4), 1174–1204. https://doi.org/10.1037/a0036620

Widaman, K. F., Ferrer, E., & Conger, R. D. (2010). Factorial invariance within longitudinal structural equation models: Measuring the same construct across time. *Child Development Perspectives*, *4*(1), 10–18. https://doi.org/10.1111/j.1750-8606.2009.00110.x

Wigfield, A., & Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary Educational Psychology*, *25*(1), 68–81. https://doi.org/10.1006/ceps.1999.1015

Wigfield, A., & Eccles, J. S. (2002). The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 91–120). Academic Press. https://doi.org/10.1016/B978-012750053-9/50006-1

Witte, K., Spinath, B., & Ziegler, M. (2024). Dissecting achievement motivation: Exploring the link between states, situation perception, and trait-state dynamics. *Learning and Individual Differences*, *112*, 102439. https://doi.org/10.1016/j.lindif.2024.102439

Wu, H., Guo, Y., Yang, Y., Zhao, L., & Guo, C. (2021). A meta-analysis of the longitudinal relationship between academic self-concept and academic achievement. *Educational Psychology Review*, *33*, 1749–1778. https://doi.org/10.1007/s10648-021-09600-1

Received 22 January 2024; revised version received 12 February 2025.

Address for correspondence: A. Katrin Arens, DIPF|Leibniz Institute for Research and Information in Education, Frankfurt, Germany. Email: arens@dipf.de