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THE CONTRIBUTIONS OF INTRINSIC AND EXTRINSIC READING MOTIVATION TO THE DEVELOPMENT OF READING COMPETENCE OVER SUMMER VACATION

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This study addressed the role of reading motivation as a potential determinant of losses or gains in reading competence over six weeks of summer vacation (SV). Based on a sample of 223 third-grade elementary students, structural equation analyses showed that intrinsic reading motivation before SV contributed positively to both word and sentence comprehension after SV when controlling for comprehension performance before SV. These effects were mediated by reading amount. Extrinsic reading motivation did not show significant associations with end-of-summer comprehension scores. Taken together, the findings suggest that intrinsic reading motivation facilitates students' development of reading comprehension over SV.

The effects of summer vacation (SV) on the development of student competencies have been intensely debated by researchers and educators (Alexander, Entwisle, & Olson, 2007; Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996; Gándara & Fish, 1994; Heyns, 1978). Some authors argued that children learn best when instruction is continuous because long periods of SV lead to forgetting. As a consequence, significant amounts of time would be required for reviewing previously learned material when the students return to school.

The question of whether students' competencies decline over SV has been mainly discussed in the United States, where SV en-

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compasses 12 weeks. Although there are other countries with comparably long periods of SV (e.g., Russia, Italy), the duration of SV is considerably shorter in countries such as France (eight weeks), Germany (six weeks), and Japan (five to six weeks). If students from countries with extended SV experience large summer setbacks and, consequently, learn less during their school career, then they might be less able to compete with other students in international labor markets (Patall, Cooper, & Allen, 2010).

Previous empirical research supports the assumption that academic achievement declines over extended SV. In their meta-analysis, Cooper et al. (1996) reported significant competence losses over 12 weeks of SV in different subject areas such as mathematics and reading. Changes in reading comprehension over SV are particularly important because reading comprehension is required to succeed in nearly all school subjects. Moreover, high levels of reading competence are conceived as being relevant for cultural and social participation in democratic societies and for attaining occupational success (Guthrie, Schafer, & Hutchinson, 1991; OECD, 2010). The fact that about 15% of all German 15-year-old students have been classified as extremely weak readers (Hohn, Schiepe-Tiska, Sälzer, & Artelt, 2013) underlines the necessity of identifying detrimental conditions of students' reading comprehension.

The primary focus of the present study is on the factors that are likely to impact on differential changes in reading comprehension during summer breaks. How can we explain, for example, that reading comprehension of one student declines over SV while for another student, reading comprehension is enhanced? Past research has demonstrated that aspects of the *family* (e.g., socioeconomic background) are related to differential changes in reading comprehension during SV (Alexander, Entwisle, & Olson, 2001; Becker, Stanat, Baumert, & Lehmann, 2008; Cooper et al., 1996; Heyns, 1978). However, the effects of *individual difference factors* (e.g., motivation, prior knowledge) on summer changes have been widely ignored. In the present study, we examined reading motivation as an individual difference factor because it has been found to be an important predictor of reading skills and comprehension (for an overview, see Schiefele, Schaffner, Möller, & Wigfield, 2012). Accordingly, we expected significant effects of reading motivation on the development of reading comprehension during SV. Because reading motivation is

likely to unfold its effects on reading competence through out-of-school reading amount (McElvany, Kortenbruck, & Becker, 2008; Schaffner, Schiefele, & Ulferts, 2013b), the latter variable was considered as an additional predictor of summer changes in reading comprehension.

In the following, we will first review previous studies on the effects of SV on reading competence and those factors that contribute to changes over SV. Then, research deficits will be highlighted and the objectives of the present study will be delineated.

Effects of Summer Vacation on Reading Skills and Comprehension

Extended SV breaks are assumed to influence student achievement negatively because they interrupt periods of instruction, lead to forgetting, and require previously learned material to be extensively reviewed after SV (Cooper et al., 1996). Empirically, this assumption gains support from Cooper et al. (1996), who conducted a meta-analysis of 13 studies that were published between 1975 and 1994 and investigated the effects of SV on student competencies. Ten of these studies focused on reading or language-related measures (e.g., reading comprehension, vocabulary, spelling) and revealed both negative (e.g., Johns & Vacca, 1984; Pelavin & David, 1977) and positive effects of SV on reading or language-related measures (e.g., McCormick & Mason, 1981; National Institute of Education, 1978).

Cooper et al. (1996) reported the total effect of SV across different subject areas as well as separate effects for *mathematics* and *reading and language*. The overall effect size for academic achievement was $d = -0.09$. For specific subject areas, the negative effects of SV were $d = -0.14$ (mathematics) and $d = -0.05$ (reading and language). The different effects for mathematics and reading were explained by the fact that reading activities more often take place in students' leisure time (e.g., during SV) than mathematical operations or problem solving (Cooper et al., 1996). Therefore, students are more likely to retain their knowledge about word meanings and grammatical rules than about mathematical concepts and formulas.

Moreover, Cooper et al. (1996) conducted in-depth analyses referring to specific aspects of reading and language (e.g., com-

prehension, spelling). The results showed negative effects of SV on reading comprehension ($d = -0.10$) and spelling ($d = -0.53$), a nonsignificant effect on word recognition ($d = 0.06$), and a positive effect on vocabulary ($d = 0.14$). Vocabulary knowledge thus seems to improve over SV, probably because of extensive informal literary activities such as reading self-selected books or listening to audio taped stories (Elley, 1989; Robbins & Ehri, 1994; Swanborn & de Glopper, 1999).

Cooper et al. (1996) further demonstrated that differential reading developments over SV were significantly related to students' socioeconomic status (SES). For students from low-income families, for example, the effect of SV on vocabulary turned out to be negative, while students from families with higher incomes showed an increase in vocabulary knowledge over SV. Effects of SES on reading development over SV were also reported in several more recent studies (Alexander et al., 2001, 2007; Becker et al., 2008; Burkam, Ready, Lee, & LoGerfo, 2004; Downey, von Hippel, & Broh, 2004). The dependence of SV effects on socioeconomic factors can be explained by different opportunities to practice and learn outside school (Alexander et al., 2001; Cooper et al., 1996; Patall et al., 2010). Compared to low SES students, high SES students have more learning opportunities at home (e.g., books) and their parents are probably better able to motivate them to read during SV, for example, by means of talking about books (Allington et al., 2010; Marks, Cresswell, & Ainley, 2006; Schaffner, Schiefele, & Schmidt, 2013a).

In contrast to the effects of socioeconomic factors, the contributions of individual difference variables (e.g., reading motivation) to the prediction of learning rates during SV have been rarely tested, although previous studies suggest a large variability of students' summer learning rates (Kim & Camilli, 2014). Some early studies on SV effects that were published prior to 1975 (e.g., Cook, 1942; cf. Cooper et al., 1996) considered intelligence as being associated with summer learning rates, but their findings were inconsistent. Later studies investigated the role of reading amount as a predictor of reading development over SV yielding mostly positive results. For example, Heyns (1978) demonstrated that middle students' reading amount exerted positive effects on word knowledge changes over SV. Furthermore, Burkam et al. (2004) investigated the effects of literacy activities (amount of reading, amount of writing, and the time spent in libraries and

book shops) on children's literacy learning rates between kindergarten and first grade. Their measure of literacy was composed of print familiarity, letter recognition, sound knowledge, word recognition, vocabulary, listening comprehension, and comprehension of words in context. The results showed that the development of literacy skills over SV was significantly and positively affected by literacy activities.

Becker et al.'s (2008) findings in a sample of German fourth-grade students were less positive and revealed only a marginally significant positive effect ($p < 0.10$) of reading amount on summer changes in reading comprehension. However, this result may have been caused by the fact that 44% of the students in the sample had an immigration background. It is possible that a substantial portion of these students were reading books in their native language but not in German. Thus, in this case, the effects of reading amount on summer changes in reading comprehension are likely to be less strong.

The Present Study

Although negative effects of SV on reading competence are likely to be small (Cooper et al., 1996), previous research suggests considerable inter-individual variation of these effects due to influential moderators such as family background and individual difference variables. In particular, substantial negative effects of SV are expected for students with low SES and low reading amount, whereas students with high SES and high reading amount may even increase their reading competence during SV (Burkam et al., 2004; Cooper et al., 1996). Apart from these findings, there is a lack of studies addressing relevant moderator variables. As a consequence, the present research focused on the effects of students' reading motivation on their level of reading comprehension at the end of SV when controlling for comprehension performance prior to SV. In particular, *intrinsic* reading motivation has been shown to be a significant predictor of reading comprehension and reading amount (cf. Schiefele et al., 2012) but has not been considered before in research on SV effects on reading comprehension.

Reading motivation is defined as the habitual readiness to initiate reading activities (Schiefele et al., 2012; Wigfield & Guthrie, 1997). Intrinsic and extrinsic forms of reading motivation are to

be distinguished depending on whether the activity of reading itself is regarded as satisfying and rewarding (intrinsic reading motivation) or whether the activity of reading is instrumental for attaining external consequences such as good grades in school or praise by parents and teachers (extrinsic reading motivation; Baker & Wigfield, 1999; Wang & Guthrie, 2004; Wigfield & Guthrie, 1997). Because intrinsically motivated readers perceive reading activities as positively rewarding, they practice a lot of reading in their spare time (Becker, McElvany, & Kortenbruck, 2010; Lau, 2009; Wang & Guthrie, 2004). In contrast, extrinsic reading motivation has been found to be nonsignificantly or negatively related to the amount of leisure-time reading (Becker et al., 2010; Schaffner, Schiefele, & Ulferts, 2013b; Wang & Guthrie, 2004; Wigfield & Guthrie, 1997). Because leisure-time activities (e.g., playing with friends, taking music lessons or dance classes, playing organized sports; Heyns, 1978) are strongly intrinsically motivated (Csikszentmihalyi, 1990; Csikszentmihalyi & LeFevre, 1989), the amount of leisure-time reading is likely to be affected by intrinsic but not extrinsic reading motivation. Thus, for students with high extrinsic reading motivation, reading in their free time might be particularly unattractive because they associate reading activities with school-related extrinsic incentives such as teachers' praise or good grades.

Higher amounts of reading are assumed to positively impact on reading comprehension skills in different ways (Krashen, 2004). For example, frequent reading has been associated with vocabulary growth (Gardner, 2004; Swanborn & de Glopper, 1999), knowledge about grammatical rules (Dienes, Broadbent, & Berry, 1991; Muter, Hulme, Snowling, & Stevenson, 2004), general world knowledge (Echols, West, Stanovich, & Zehr, 1996; Stanovich, West, & Harrison, 1995), and the ability to generate inferences while reading (Osana, Lacroix, Tucker, Idan, & Jabbour, 2007; Siddiqui, West, & Stanovich, 1998), which are all important prerequisites for successful reading comprehension.

Given the small effects of extended periods of SV on mean levels of reading comprehension in student populations, we did not expect significant effects of SV on the average comprehension performance in the present sample of German students who have only six weeks of SV. However, considerable individual variation of the effects of SV on changes in comprehen-

sion was anticipated. Moreover, we hypothesized that intrinsic reading motivation positively affects individual differences in the development of reading comprehension over SV. This effect was assumed to be mediated by reading amount (Guthrie & Anderson, 1999; Schaffner, Schiefele, & Ulferts, 2013b). Accordingly, intrinsically motivated students were expected to show higher amounts of reading activities in their free time, which, in turn, should positively affect their comprehension performance after SV. In contrast, students with lower levels of intrinsic reading motivation should read less in their free time and, thus, show reduced comprehension ability at the end of the summer break.

Moreover, extrinsic reading motivation was hypothesized to contribute negatively to the development of reading comprehension over SV. The negative effects of extrinsic reading motivation were expected to unfold directly and indirectly through reading amount (cf. Schaffner, Schiefele, & Ulferts, 2013b; Unrau & Schlackman, 2006; Wang & Guthrie, 2004). The *direct* negative effect of extrinsic reading motivation on reading comprehension is based on the assumption that extrinsically motivated students process texts at a more superficial cognitive level (e.g., not thinking about unknown words or ignoring particular lacks of understanding) leading to an impaired conceptual understanding of text content (e.g., Benware & Deci, 1984; Bergin, 1995).

Method

Sample

Fifteen public elementary schools in the federal state of Brandenburg (Germany) were asked to participate. The schools were selected to represent both rural and urban areas and to be attended by students from different socioeconomic backgrounds. Each school first received a letter including information material about the study. Then, the principal of each school was called by phone and asked whether the third-grade students of his or her particular school would be allowed to participate in the study. The principals of seven elementary schools gave their agreement for participation. Four of these schools were from urban areas and three schools were located in rural regions. The most frequent reason for not agreeing to participate was that shortly before SV,

organizational tasks such as preparing the annual reports of the students and organizing the time schedules of the new school term took most of the time of principals and teachers.

In the next step of recruiting the sample, the parents of all third-grade students were informed about the study and then asked for written consent. Parental consent was obtained for 70% of all third-grade students. Thus, the resulting sample comprised 233 third-grade students. Only 10 students (4%) had an immigration background (assessed by the main spoken language in the family). The low rate of immigrant students is typical for the particular federal state where our study took place. Because immigration background has been shown to moderate the effects of SV on reading comprehension development (Becker et al., 2010; Cooper et al., 1996), the immigrant students were excluded from all further analyses. This left us with a final sample of 223 students ($M_{\text{age}} = 8.9$; $SD = 0.59$). Girls were somewhat underrepresented (101 girls, 122 boys). This was mostly due to the fact that girls were less likely to receive their parents' consent to participate in the study.

Instruments

READING MOTIVATION

A slightly modified version of the *Reading Motivation Questionnaire* (RMQ) was used to assess students' habitual reading motivation. The RMQ was developed for secondary students (Schaffner & Schiefele, 2007; see also Schiefele et al., 2012) taking reference to the MRQ (Wigfield & Guthrie, 1997). It captures five different dimensions of reading motivation, each of them by means of four items. For the purpose of the present study, the RMQ was adapted to be more appropriate for elementary students. The adapted version includes two or three (instead of four) items per dimension. Moreover, the content of some items was simplified, however, without affecting the reading incentive addressed by the item. For example, the item, "I read because it allows me to deal with topics that are personally important to me" (curiosity subscale) was changed into "I read because some topics are important to me." As in the original RMQ, all items had to be answered on 4-point rating scales ranging from 1 (*not at all true*) to 4 (*very true*).

The five dimensions of reading motivation of the adapted RMQ were: (1) curiosity (3 items; e.g., “I read in order to learn more about things that interest me”), (2) involvement (3 items; e.g., “I read because the things that happen in books are often more thrilling than things at home”), (3) competence (2 items; e.g., “I read in order to become better at reading”), (4) competition (2 items; e.g., “I read because I want to be among the best students in my class”), and (5) social recognition (2 items; e.g., “I read because my parents appreciate that”). Prior studies confirmed the factorial validity of the RMQ (Schaffner & Schiefele, 2007; Schaffner, Schiefele, & Schmidt, 2013; Schaffner, Schiefele, & Ulferts, 2013). They also demonstrated that the different dimensions capture two higher-order factors: intrinsic reading motivation (interest and involvement) and extrinsic reading motivation (competence, competition, and social recognition).

The dimensional structure of the adapted RMQ was verified for the present sample by means of confirmatory factor analysis (CFA) carried out by using *Mplus* 7.31 (Muthén & Muthén, 1998–2014). The analysis was based on the mean- and variance-adjusted weighted least squares (WLSMV) estimator that is most appropriate for ordered categorical data (Flora & Curran, 2004). The examined CFA model included five first-order and two second-order factors (intrinsic reading motivation comprising interest and involvement; extrinsic reading motivation comprising competence, competition, and social recognition). The fit of this model proved to be acceptable, $\chi^2(30) = 54.52$, $p < 0.01$, CFI = 0.943, TLI = 0.954, RMSEA = 0.065, SRMR = 0.068, with all item loadings exceeding values of 0.60. The second-order factors of intrinsic and extrinsic reading motivation displayed a moderate positive latent correlation ($r = 0.52$, $p < 0.001$), which is in accordance with prior studies (cf. Schiefele et al., 2012). Moreover, the first-order factors demonstrated very high loadings (> 0.90) on the second-order factors. Therefore, only the second-order factors of intrinsic ($\alpha = 0.72$) and extrinsic reading motivation ($\alpha = 0.75$) were used in the following analyses.

READING AMOUNT

Reading amount was measured by means of a three-item scale ($\alpha = 0.70$) developed by Schaffner, Schiefele, & Schmidt (2013). The scale focuses on book reading that has been shown to pre-

dict students' reading achievement better than reading of other materials such as newspapers or chats (Pfost, Dörfler, & Artelt, 2013). It considers the number of books read in the last year as well as the length and frequency of reading activities (see also Becker et al., 2010). Specifically, the participants were asked (a) how many books they have read during the last 12 months (1 = no book at all, 2 = 1 to 5 books, 3 = 6 to 10 books, 4 = 11 to 20 books, 5 = more than 20 books), (b) how long they usually read in a book without making a break (1 = 5 min, 2 = 15 min, 3 = 30 min, 4 = 60 min, 5 = more than 60 min), and (c) how often they read in their spare time (1 = about once a month, 2 = about once a week, 3 = several times in the week, 4 = daily, 5 = several times during the day). The validity of the scale is supported by significant positive associations with intrinsic reading motivation, reading comprehension, and different aspects of the home literacy environment (Schaffner, Schiefele, & Schmidt, 2013; Schaffner, Schiefele, & Ulferts, 2013).

READING COMPREHENSION

To assess reading comprehension, the subtests for word and sentence comprehension of the standardized reading comprehension test ELFE for Grades 1 through 6 (Lenhard & Schneider, 2006) were used. For the present study, each subtest was divided into two parallel halves based on the indications of item difficulty and item type provided by Lenhard and Schneider (2006). Items of the same type and with equal difficulties were first paired and then allocated to the different halves of the test (four items of the word comprehension test were excluded because no adequate matches were available). As a consequence, the test halves of the word and sentence comprehension subtests were highly equivalent. One half of each subtest was administered before SV and the other half of each subtest after SV.

The *Word-Level subtest* (34 items; $\alpha = 0.92$ [before SV] and 0.93 [after SV]) requires the participants to choose one of four phonologically similar words (e.g., "Bote" – "Hose" – "Rose" – "Dose") that matches with a corresponding picture (e.g., the picture of a can [= "Dose"]). There were four different word types: words with one, two, three, or four syllables. In the *Sentence-Level subtest* (14 items; $\alpha = 0.84$ [before SV] and 0.86 [after SV]), the students are asked to replace a missing clause, usually a word, in

a given sentence (e.g., “If it . . . and the sun shines, a rainbow occurs”) by choosing the correct solution out of five alternatives belonging to the same category (e.g., “rains,” “reads,” or “reigns”). The target words involve five different types: nouns, verbs, adjectives, conjunctions, and prepositions. Working on the Word- and Sentence-Level subtest was restricted in time (90 seconds per subtest; cf. Lenhard & Schneider, 2006).

Procedure

The students were tested in their regular classes by a trained student assistant. Each participant was tested twice: shortly before SV (at the end of third grade) and immediately after SV (at the beginning of fourth grade). The SV interval encompassed 45 days from the middle of July to the end of August. Before SV, the students answered the questionnaires on reading motivation and reading amount. Moreover, the ELFE test for measuring reading comprehension was administered. After SV, reading comprehension was assessed again.

Missing Values

The percentage of missing values per variable ranged between 2% and 10%. Moreover, for individual participants, the percentage of missing values did not exceed 10%. In the case of descriptive analyses, missing values were imputed by means of NORM 2.03 (Schafer, 1999) based on the *expectation-maximization* (EM) covariance matrix (Graham, 2009). For the purpose of optimizing the EM estimation, several additional variables (e.g., school membership, gender, age) were included as auxiliary variables (Collins, Schafer, & Kam, 2001). In the case of structural equation modeling, missing data were taken into account by maximum likelihood estimation (Asparouhov & B. O. Muthén, 2010; Graham, 2003).

Results

Descriptive Statistics and Correlations

Descriptive statistics and intercorrelations for all variables are displayed in Table 1. Intrinsic and extrinsic reading motivation were

TABLE 1 Descriptive Statistics and Bivariate Correlations.

Variable (theoretical range)	1	2	3	4	5	6	7	8	<i>M (SD)</i>
1 Gender ^a	–								–
2 Intrinsic RM (1–4)	0.03	–							2.91 (0.71)
3 Extrinsic RM (1–4)	–0.17*	0.39**	–						2.86 (0.69)
4 Reading amount (1–5)	–0.12	0.53**	0.30**	–					3.08 (1.00)
Reading com- prehension before SV									
5 Word level (0–34)	0.10	0.23**	0.04	0.08	–				21.28 (5.65)
6 Sentence level (0–14)	0.09	0.28**	0.03	0.25**	0.70**	–			9.17 (2.79)
Reading com- prehension after SV									
7 Word level (0–34)	0.12	0.35**	0.10	0.26**	0.77**	0.76**	–		21.64 (6.21)
8 Sentence level (0–14)	0.08	0.41**	0.15*	0.37**	0.64**	0.74**	0.78**	–	9.19 (3.12)

Note. $N = 223$. RM = reading motivation. SV = summer vacation. ^aScoring for gender: 1 = boys, 2 = girls. * $p < 0.05$ (two-tailed). ** $p < 0.01$ (two-tailed).

both significantly and positively correlated with reading amount. However, reading amount was more closely related to intrinsic than to extrinsic reading motivation, $t(220) = 3.61$, $p < 0.01$. Moreover, intrinsic reading motivation showed significant positive associations with all levels of reading comprehension before and after SV. Extrinsic reading motivation in contrast proved to be unrelated to all reading comprehension measures with the exception of sentence comprehension after SV.

The correlations of reading amount with word and sentence comprehension were positive and of small or moderate size. Only word comprehension before SV was not significantly related to reading amount. Moreover, the obtained high test-retest correla-

tions for reading comprehension indicate high rank-order stability for word and sentence comprehension over SV (cf. Table 1). At the same time, however, the size of these correlations allows for substantial portions of variance in students' reading comprehension development over SV to be explained by interindividual differences in reading motivation and reading amount.

In previous research, gender has been proven to be associated with students' reading motivation, reading amount, and, in some instances, with reading comprehension (e.g., Coles & Hall, 2002; Naumann, Artelt, Schneider, & Stanat, 2010). The present study, however, did not reveal significant relations of gender with intrinsic reading motivation, reading amount, and reading comprehension. Only extrinsic reading motivation correlated significantly and negatively with gender indicating that boys displayed stronger extrinsic reading motivation than girls (see also Unrau & Schlackman, 2006; Wigfield & Guthrie, 1997). It should be also noted that gender differences in reading comprehension tend to be rather small (see overview by Logan & Johnston, 2010). In case of the ELFE test, either nonsignificant or small gender differences in favor of girls (less than 1% of explained variance) have been obtained in the past (Lenhard, 2013).

Contributions of Intrinsic and Extrinsic Reading Motivation to Reading Comprehension After Summer Vacation

Before testing the contributions of reading motivation to the development of reading comprehension over SV, the overall effects of SV on reading comprehension were analyzed by means of a latent variable approach (Jeng & Chen, 2013). In the first step of this approach, measurement invariance of the measures of reading comprehension across SV was examined by means of a multi-sample model (Little, Bovaird, & Slegers, 2006; Vandenberg & Lance, 2000). The multi-sample model involves treating the repeated measures of reading comprehension as if they were identical measures stemming from two different samples. This analysis was conducted by using *Mplus* 7.31 with maximum likelihood (ML) estimation.

The specified multi-sample model included the latent variables of word and sentence comprehension for Sample 1 (before SV) and Sample 2 (after SV). The latent variables of word and sen-

tence comprehension were each represented by two item parcels (odd-even assignment of items to parcels). Thereby, it was ensured that the mean item difficulty of each parcel was not different between measurement points (for example, word test Parcel 1 before SV had the same mean difficulty level as word test Parcel 2 after SV).

Measurement invariance was tested by using a step-down approach. Accordingly, all invariance assumptions of interest were first implemented into the baseline model and then subsequently relaxed in order to test their adequacy (Millsap, 2011; Vandenberg & Lance, 2000). In the present case, the baseline model included equal factor loadings and intercepts of corresponding item parcels before and after SV (strong measurement invariance). The test of this model yielded good fit indices, $\chi^2(6) = 9.20$, *ns*, CFI = 0.999, TLI = 0.997, RMSEA = 0.049, SRMR = 0.014.

In the next steps, the equality constraints were successively removed in order to examine whether removing an equality assumption significantly improved the model fit (according to the χ^2 -difference test; Steiger, Shapiro, & Browne, 1985). Removing the assumption of equal intercepts before and after SV (weak measurement variance) did not enhance the fit of the model (word comprehension: $\Delta\chi^2[1] = 2.44$, *ns*; sentence comprehension: $\Delta\chi^2[1] = 1.06$, *ns*). Moreover, setting free the equality constraints for all factor loadings (configural measurement invariance) did also not improve model fit (word comprehension: $\Delta\chi^2[1] = 1.04$, *ns*; sentence comprehension: $\Delta\chi^2[1] = 0.96$, *ns*). It follows from these findings that word and sentence comprehension were equally well represented by their corresponding item parcels before and after SV. In addition, the equality of intercepts demonstrates that the latent means for word and sentence comprehension at both measurement points are on the same metric and, thus, can be directly compared (cf. Widaman, Ferrer, & Conger, 2010).

For the purpose of testing mean differences, we referred to the model assuming strong measurement invariance. In this model, the means of word and sentence comprehension measured before SV were fixed to 0 (for model identification), while the means of word and sentence comprehension after SV were estimated and tested for significance. The results showed that the

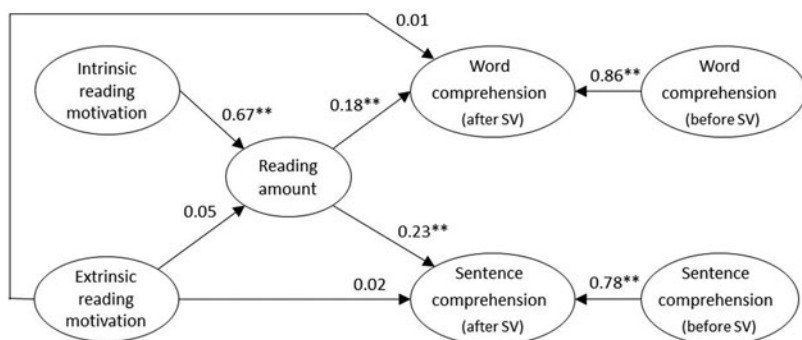


FIGURE 1 Structural equation model for the prediction of reading comprehension after SV. Only standardized path coefficients are displayed. For clarity, errors and indicators are not shown here. Bidirectional paths in the model are reported in the Appendix (Table A1). SV = summer vacation. ** $p < 0.01$.

latent means for word and sentence comprehension did not differ significantly between measurement points (word comprehension: $z = 0.51$, *ns*; sentence comprehension: $z = 0.15$, *ns*). These results are in line with previous studies that showed only small or non-significant effects on reading comprehension even for extended periods of SV (e.g., 12 weeks as opposed to 6 weeks in the present study; Cooper et al., 1996). However, despite the lack of substantial mean level differences in word and sentence comprehension before and after SV, considerable inter-individual variation in change scores is likely to occur (e.g., Alexander et al., 2007; Downey et al., 2004). The question of whether such variation is significantly related to individual differences in reading motivation represents the primary focus of the present study.

The effects of intrinsic and extrinsic reading motivation on summer changes in reading comprehension were investigated by means of structural equation analyses (carried out by using *Mplus* 7.31 using WLSMV estimation). A model was specified that incorporated the simultaneous effects of intrinsic and extrinsic reading motivation on reading comprehension after SV controlling for reading comprehension before SV (see Figure 1). The effect of intrinsic reading motivation on reading comprehension after SV was assumed to be positive and fully mediated by reading amount. Moreover, the effect of extrinsic reading motivation on reading comprehension after SV was hypothesized to be nega-

tive and should be only partly mediated by reading amount. Bidirectional paths were specified among all exogenous variables and among the residual terms of all outcome variables (see Appendix, Table A1). The model did not include gender as a control variable because gender was uncorrelated with reading comprehension and reading amount (see Table 1).

The latent variables of word and sentence comprehension were each indicated by two item parcels, as they were used in the multi-sample model for testing latent mean differences (see above). Intrinsic and extrinsic reading motivation were defined by their associated first-order factors, and reading amount was represented by its corresponding individual items.

In the first step, the measurement part of the model was tested including all latent variables without assuming directed relations among them (cf. Kline, 2011). The measurement model showed a close fit with the data, $\chi^2(69) = 77.94$, *ns*, CFI = 0.990, TLI = 0.984, RMSEA = 0.024.¹ Therefore, in the next step, the hypothesized directed paths were added to the model. As a result, satisfying fit values were obtained, $\chi^2(75) = 98.66$, $p < 0.05$, CFI = 0.973, TLI = 0.962, RMSEA = 0.038, suggesting a close correspondence of model-based predictions and observed data.

In the model, reading comprehension before SV contributed strongly to the prediction of reading comprehension after SV (see Figure 1). Despite the strength of these relations, reading amount still added significantly to the prediction of word and sentence comprehension after SV. Moreover, intrinsic reading motivation showed a large positive effect on reading amount and, therefore, predicted word and sentence comprehension after SV *indirectly*, $\beta = 0.12$, $z = 2.22$, $p < 0.05$, for word comprehension, and $\beta = 0.15$, $z = 3.17$, $p < 0.01$, for sentence comprehension. In contrast, extrinsic reading motivation did not contribute to reading amount and, thus, had no indirect effects on reading comprehension after SV, $\beta = 0.01$, $z = 0.51$, *ns*, for word comprehension, and $\beta = 0.01$, $z = 0.50$, *ns*, for sentence comprehension. Also, the assumed direct effects of extrinsic reading motivation on word and sentence comprehension after SV did not attain significance. Finally, all of the directed paths that have not been hypothesized failed to

¹SRMR is not available in *Mplus* for models that are estimated by means of WLSMV and take missing data into account.

reach the level of significance as was indicated by the size of their modification indices.

Discussion

In extending previous research on the effects of SV on reading comprehension, the present study examined the contributions of third graders' intrinsic and extrinsic reading motivation to differential changes in word- and sentence-level reading comprehension during six weeks of SV. Specifically, we expected that intrinsic reading motivation positively and indirectly (through reading amount) affects reading comprehension at the end of SV when controlling for levels of comprehension before SV. In contrast, extrinsic reading motivation was hypothesized to contribute negatively to the development of reading comprehension over SV. The contributions of extrinsic reading motivation were assumed to be both direct and indirect (mediated by reading amount).

First of all, the present findings suggest that the average levels of word and sentence comprehension do not change over six weeks of SV. This is according to expectations because of the reduced length of SV in the present study. Our main focus, however, was not on mean level changes but on explaining interindividual differences in the development of reading comprehension over SV. Structural equation analyses provided evidence for significantly positive contributions of intrinsic reading motivation to both word and sentence comprehension after SV when controlling for prior comprehension performance. Specifically, students with higher intrinsic reading motivation showed higher scores in word and sentence comprehension at the end of SV than students with lower intrinsic reading motivation. This finding confirms the particular importance of intrinsic reading motivation for the development of reading competence. Whereas previous studies have mostly focused on cross-sectional relations between reading motivation and reading comprehension (e.g., Schaffner, Schiefele, & Ulferts, 2013; Unrau & Schlackman, 2006; see overview by Schiefele et al., 2012), the present research suggests that intrinsic reading motivation before SV is positively associated with changes in reading comprehension over SV. As such, the present results strengthen previous studies showing that intrinsic reading motivation predicts later reading comprehension even when controlling

for prior comprehension performance (e.g., Froiland & Oros, 2014; McElvany et al., 2008; Retelsdorf, Köller, & Möller, 2011; Wang & Guthrie, 2004).

Another important result showed that the effects of intrinsic reading motivation on word and sentence comprehension were fully mediated by reading amount. This suggests that intrinsic reading motivation initiates frequent reading activities during SV, which, in turn, lead to improved word and sentence comprehension at the end of SV. In line with cognitive theories of reading comprehension (e.g., Kintsch, 1988, 1998), it may be assumed that frequent reading involves frequent activation of word meanings and propositions, which then become more easily accessible in the future. In addition, through frequent reading, intrinsically motivated readers tend to learn new words incidentally (Swanborn & de Glopper, 1999) and they practice grammatical rules, which are essential for the processing and comprehension of propositions or sentences (Dienes et al., 1991; Kintsch, 1998). Because grammar learning is likely to occur in a passive way, without an explicit intention to learn (Dienes et al., 1991; Knowlton & Squire, 1994), the amount of reading in SV could have well contributed to students' knowledge and use of grammar rules.

Extrinsic reading motivation did not exert significant effects on either reading amount or changes in word and sentence comprehension over SV. Accordingly, the hypothesis that leisure-time reading of extrinsically motivated readers is suppressed because they view reading as being mainly instrumental for achievement in school was not confirmed. The failure to obtain a significant negative effect of extrinsic reading motivation on reading amount may be partly explained by the fact that the present sample was younger than the samples of previous studies (e.g., Schaffner, Schiefele, & Schmidt, 2013; Wang & Guthrie, 2004). For younger students, the social acceptance of doing work for school (e.g., reading) during leisure time might be higher than for older students. Consequently, conceiving reading as an activity that is closely attached to school learning is probably not negatively associated with the amount of leisure-time reading in young students.

Moreover, in contrast to the present results, prior studies have reported that extrinsic reading motivation contributes directly and negatively to reading comprehension performance when important cognitive factors (e.g., prior reading comprehen-

sion) are controlled for (Schaffner, Schiefele, & Ulferts, 2013; Becker et al., 2010). These negative effects have been interpreted as indicating reduced attention following from self-concerns and worries due to high levels of extrinsic motivation (Brophy, 2005). It has been also shown that extrinsically motivated readers process texts at a rather superficial cognitive level (e.g., focusing on decoding) and, thus, do not understand texts deeply (e.g., Benware & Deci, 1984; Bergin, 1995). However, as indicated by our study, within short periods of SV, reading comprehension development at the word and sentence level does not seem to be impaired by extrinsic reading motivation. Possibly, negative effects of extrinsic reading motivation on reading comprehension require longer time periods to unfold.

Limitations and Future Research

The present study is among the first to demonstrate that readers with higher levels of intrinsic reading motivation are less likely to suffer from a summer setback in reading competence than readers with lower levels of intrinsic reading motivation. Despite this positive result, a few limitations of the present study have to be stated. First, it should be noted that we have assessed reading amount at a habitual level referring to students' average reading amount across a longer time period before SV. It might be argued that in order to predict summer changes in reading comprehension, reading amount *during* SV should be most relevant. However, students' retrospectively assessed habitual amount of reading emerged as a rather strong predictor of changes in word and sentence comprehension over SV. In addition, habitual reading amount fully mediated the effects of intrinsic reading motivation on word and sentence comprehension. Although the present results suggest that students' habitual reading amount represents a valid indicator of their reading behavior during SV, future studies should use more direct measures of students' amount of reading during SV.

Moreover, we have solely focused on students' reading motivation as a predictor of reading comprehension after SV when controlling for prior comprehension performance. However, it seems likely that there are also other effective predictors of interindividual differences in reading comprehension after SV. In

particular, there is evidence that the effect of SV on reading comprehension depends on students' SES (e.g., Cooper et al., 1996). Specifically, SV effects turned out to be less detrimental for students from socioeconomically advantaged families. Because students' family background (e.g., cultural capital) is positively associated with students' intrinsic reading motivation (Schaffner & Schiefele, 2008), it seems worthwhile examining the interplay of intrinsic reading motivation and family background as determinants of SV effects. For example, differences in intrinsic reading motivation might contribute to explain why high SES students' achievement does not deteriorate as a result of SV (Burkam et al., 2004; Heyns, 1978).

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Appendix

TABLE A1 Coefficients of Bidirectional Paths in the Model Predicting Reading Comprehension after Summer Vacation

		1	2	3	4	5	6
1	Intrinsic RM	–					
2	Extrinsic RM	0.47**	–				
3	Word comprehension before SV	0.28**	0.05	–			
4	Sentence comprehension before SV	0.40**	0.04	0.87**	–		
5	Word comprehension after SV ^a					–	
6	Sentence comprehension after SV ^a					0.46**	–

Note. *N* = 223. RM = reading motivation. SV = summer vacation. ^aEndogenous variable (residual term). ***p* < 0.01.