Reading Related Activities in Second Grade and Their Effect on Fluency:

An Evaluation of Teachers' Classroom Practices

Elisabeth Kraus¹, Johannes Wild², Anita Schilcher¹ & Sven Hilbert¹

¹University of Regensburg, ²Otto-Friedrich-University of Bamberg

Correspondence can be addressed to:

Elisabeth Kraus: elisabeth.kraus@ur.de

Johannes Wild: johannes.wild@ur.de; Johannes.Wild@uni-bamberg.de

Abstract

There is a large number of scientifically evaluated reading trainings recommended by literature, that have shown to be effective on the process level. However, field studies indicate that teachers rarely adopt those but use reading animation methods and self-invented methods instead. Yet, scientific evidence for those teacher-constructed methods is still missing. We therefore asked 87 teachers about their reading lessons and assessed the reading ability development of their 1469 students with a standardized reading test. The results show that teachers hardly use any evidence-based methods, but mainly rely on reading animation. Further, the methods reported by the teachers did not show a measurable impact on the development of the students' reading competence. On the contrary, teacher constructed methods seemingly lead to a growth of heterogeneity of competence.

Keywords: *reading literacy, reading fluency, primary school, instructional materials, instructional strategies, longitudinal data, hierarchical modelling*

Reading is considered a key to education and social participation. Developing a sufficient literacy enables one to succeed in future employment and to earn a living (UNESCO, 2005; OECD, 2018). However, recent studies in reading consistently show that a large number of students still fails to develop satisfactory reading skills (Mullis, Martin, Foy, & Hooper, 2017; OECD, 2019). Weak students do not get the support they need (Solis, Miciak, Vaughn, & Fletcher, 2014; Bos, Valtin, Hußmann, Wendt, & Goy, 2017). Hence the range of students' achievements is getting broader from primary to secondary schools (Hippmann, Jambor-Fahlen, & Becker-Mrotzek, 2019; OECD, 2019).

The differences in the students' reading development are partly due to the professional knowledge of the teachers as research shows (Didion, Toste, & Filderman, 2020; Myrberg, Johansson & Rosén, 2018; National Reading Panel, 2000; Darling-Hammond, 2000; De Coster, Baidak, Motiejunaite, & Noorani, 2011; Lotz, 2016). Teachers themselves do not feel well prepared, nor are they trained in the assessment of reading (Anmarkrud & Bråten, 2012; Artelt et al., 2007; Bremerich-Vos, Stahns, Hußmann, & Schurig, 2017). There are hardly any special courses preparing for reading promotion in teacher education. That might be one reason for differences in how much time is spent for reading promotion (Mullis, et al., 2017) or which activities are deployed in class (Anmarkrud, & Bråten, 2012; National Reading Panel, 2000). In general, there is little instruction on reading comprehension in class and supportive feedback is seldomly given (Lotz, 2016; Durkin, 1978; Anmarkrud, & Bråten, 2012; Pressley, Wharton-McDonald, Allington, Collins Block & Mandel Morrow, 1998; Stahns, Rieser, & Lankes, 2017). Additionally, several studies mention that methods are often used regardless of the class' reading performance (Österbauer, Bachinger, Winter, Paasch, & Illetschko, 2020; Bremerich-Vos, et al., 2017). The acceptance of research driven, effective innovations in reading instruction is usually low in practice (Souvignier & Philipp, 2016). "[S]everal studies indicate that teachers often base their classroom practice on personal

experience rather than research-based knowledge" (Anmarkrud, & Bråten, 2012, p. 593).

Current reading lessons are often criticized for being insufficient, especially for weak students (Bremerich-Vos, et al., 2017; Postlethwaite & Ross, 1992; Österbauer, et al., 2020; Hiebert, 2010; Wild & Schilcher, 2019). In spite of that there is little research, which teacher-constructed methods may prove as effective or which evidence-based methods are actually used in regular classrooms (science-practice gap).

Theoretical Framework

Effective reading lessons. In the past decades, much research has been dedicated to research on effective reading promotion. The National Reading Panel (2000), for example, identifies three crucial aspects of reading comprehension, which ought to be trained by teachers: vocabulary, fluency, and reading comprehension.

At the basic level, reading can be understood as a primarily visual process, which is characterized by the automatization of word recognition (Richter & Christmann, 2009). Therefore, the knowledge of vocabulary is important. As studies show, it predicts the level of reading competence (Cromley & Azevedo, 2007; Almasi & Hart, 2019; Tighe & Schatschneider, 2016; Gankse, 2019). There is a close relationship between the level of education of the parents and the development of their children's vocabulary (Hart & Risley, 2003), which often leads to disadvantages of students with lower socioeconomic background. Research demonstrated that interventions can improve vocabulary with small to moderate effects (e.g. Mol, Bus, & de Jong, 2009). For example, vocabulary learning can be enhanced by including explanations, questions while reading together, or other supportive reading activities. Lenhard, Lenhard, Vaahtoranta, and Suggate (2020) show that after shared reading activities, students benefit most from live story-telling-settings, in comparison to audiotaped conditions.

Also, students have to develop a sufficient reading fluency. Whereas fluency was neglected in the 1980s, today its importance for reading comprehension is unquestioned (Allington, 1983; National Reading Panel, 2000). For a long time, "reading aloud" in class was considered as an effective method for promoting fluency in German schools. However, as we know now, reading aloud has no measurable effect on reading development. Other approaches, like paired or repeated reading have been identified as effective instead (Kuhn, Rasinski, & Young, 2018; Stanovich, 1991). In paired or assisted reading programs, students are guided by a supportive role model. Each student (trainee) who has difficulties in reading is assigned to a more competent student (coach) who monitors, praises, and corrects the weaker student while their oral reading, "which enables students to access and comprehend texts somewhat above their independent readability level, within a framework of predictable and non-intrusive error correction" (Topping, 2014, p. 59). A special form of paired reading is the so-called reading while listening (Gailberger, 2011). In those methods the coach is "replaced" by an auditive media. Repeated reading approaches aim at enhancing automaticity by a repetitive reading of the same text. Students prepare and re-read a short text or passage aloud. They continue to practice until they meet the criterion of at least about 100 words per minute. Among other aspects, it has proven to be highly effective in promoting reading speed. However, the frequent repetitions become very monotonous and boring in the long run, if they have no other function. Nix (2006) therefore suggests to stage the reading situation (the so-called "reading theatre").

Regarding reading comprehension, students need to develop strategic thinking and learn different kinds of reading strategies (Duffy, 1993; Artelt, Beinicke, Schlagmüller, & Schneider, 2009). They need to understand reading as a problem-solving process, in which strategies are a meaningful toolset for achieving situation-specific goals. Reading strategies are considered a special type of general learning strategies. According to Hasselhorn and

Gold (2013), (reading) strategies are used intentionally, consciously, and spontaneously. They are selected and controlled by learners and the use of strategies consumes parts of the limited capacity of the working memory. Depending on their function for reading, the strategies can be classified into three intentional categories: cognitive, metacognitive, and supportive strategies (Philipp & Schilcher, 2012). Cognitive strategies support the reading process itself by structuring the way of dealing with information from the text (order, explore, repeat). Metacognitive strategies help to plan and regulate strategy use and supportive strategies enhance the reading environment, for instance by establishing a pleasant atmosphere. According to a study by Durkin (1978) "[p]ractically no comprehension instruction was seen [in classes]. Comprehension assessment, carried on for the most part through interrogation, was common. Whether children's answers were right or wrong was a big concern. Other kinds of reading instruction were not seen with any frequency either." (p. 520) The mediation of reading comprehension strategies occurs mostly implicitly and in the plenary (Anmarkrud & Bråten, 2012; Duffy, Roehler, Meloth, Vavrus, Book, Putnam, & Wesselman, 1986). Yet, teachers modelling reading strategies while thinking aloud has proven to be effective in research (Graham & Harris, 2005; Lienemann & Reid, 2006).

Ineffective reading lessons. Although there is knowledge about effective reading programs at schools, teachers are largely not willing to implement those. They tend to choose less cognitive activating and less supportive programs (Learned & Birr 2016; Lotz, 2016) and often focus on the isolated development of reading motivation. In practice many teachers understand “promoting reading” as “promoting reading motivation”, such as a night of reading, reading a text by the author her-/himself etc. (Artelt et al, 2007; De Coster, Baidak, Motiejunaite & Noorani, 2011; Österbauer, et al., 2020). But popular methods such as sustained silent reading or Bamberger's “Reading Olympics” (Bamberger, 2000) only benefit strong readers, if there is no additional support on the reading process itself. Promoting

reading motivation without experiencing competence is just a flash in the pan (Schiefele, Schaffner, Möller, & Wigfield, 2012; Guthrie & Taboada Barber, 2019). According to Deci and Ryan (1993), there are three main factors that have a decisive influence on learning motivation: perception of competence, autonomy, and social integration. All three factors can be taken into account in teaching. Thus it is important to provide students with the possibility to track their own progress, for example by implementing self-regulated reading. The experience of autonomy can be facilitated by children choosing their own books or by at least participating in the selection process. Social inclusion is generated by talking about texts and content that students have read (Lindsay, 2010; Allington & Gabriel, 2016).

Methods and programs that teachers use in their classrooms can be clustered by the categories mentioned before: vocabulary, fluency, strategies, and reading motivation. A classification like this takes into account, which methods are considered effective and which are not. In summary, reading motivation promotion methods can again be clustered into methods for reading animation and to sustained silent reading methods that aim at sustaining existing motivation. These try to foster the habitual reading motivation by creating neat reading situations.

Time invested in reading. Several studies found correlations between the amount of reading and the progress students make (Retelsdorf & Möller, 2008; Schaffner, Schiefele & Ulferts, 2013). Therefore, the **time** invested in reading instruction must be considered, too. PIRLS shows that the amount is quite low in Germany, compared to the rest of Europe: range 10-262 minutes with a mean time of 136 minutes (Schmich, Breit, Lanzdorf, & Itzlinger-Bruneforth, 2017; Bremerich-Vos, et al., 2017). On average, over half of the teachers in Europe spend more than 150 minutes a week reading with their classes. In general, German teachers seem to invest less time in reading promotion compared to other countries. Most of the time, students seem to read short texts, whereas longer texts are of secondary importance

(Schmich, et al., 2017). This might be one reason why especially weak students do not receive the support they need (Stahns, Rieser, Lankes, 2017). It has been criticized that strong readers seem to benefit most from reading lessons (Weis, Doroganova, Hahnel, Becker-Mrotzek, Lindauer, Artelt, & Reiss, 2019). In consequence, heterogeneity in reading competence increases, leading to strong second graders outperforming weak readers in grade eight in reading speed (Hasbrouck & Tindal, 2005). Furthermore, the amount of low achieving readers at primary and secondary schools is still high and the detrimental link between educational background and reading competence is still unsatisfactory (Bremerich-Vos, Wendt, & Bos, 2017; McElvany, Kessels, Schwabe, & Kasper, 2017). This is particularly disadvantageous for children from less educated backgrounds.

Involvement of parents. Neither do parents with lower socioeconomic status value reading as an important and satisfying activity themselves, nor do they know how to support their children in engaging in reading enough (Cotton & Wikelund, 1989). Reading is often regarded as less important in families with a low level of education. Audiovisual media are preferred, as they usually offer quicker and easier gratification than print media. For weak readers this strengthens the perception that reading is a cultural activity of another social group (Ennemoser & Schneider, 2007). In contrast, if reading is integrated into everyday life as a matter of routine and is connoted positively, this turns out to be positive for the development of a stable reading habitus. In addition, it proved to be beneficial if the parents encourage the child to talk about the reading experience (Lenhard, et al., 2020). Furthermore, it is beneficial, if the parents themselves act as a role model, support the child by giving advice for the selection and purchase of books, and consider the child's reading preferences (Lindsay, 2010).

In conclusion, it can be argued that teachers need sufficient knowledge of effective teaching methods. This includes the involvement of the teaching staff and the parents.

However, there is little research, which methods that teachers use on a regular basis are effective.

Research Question

In the present study, we investigated which reading promotion methods are predominantly used by second grade teachers and which are offered at their schools. As argued above, we expect teachers to use only a few cognitively activating methods (Lotz, 2016). We further investigated what other support strategies teachers apply, such as the involvement of parents or the use of reading related activities like for example strategy teaching. We analyzed whether the choice of reading promotion methods was influenced by the classes' characteristics such as their initial attainment level in reading speed or their educational backgrounds and linked method choices to the instructional behavior of the teachers such as involvement of parents or the use of reading related activities during classes. We also conducted analyses on how those reading promotion and instructional behavior measures affect the development of reading competence and diversification in reading ability over a course of seven months.

Method

Sample Description

The study sample was part of a longitudinal evaluation of a reading training (FiLBY; "Fachintegrierte Leseförderung Bayern"), in which a total of 461 classes participated. For this study datasets of 137 classes were available, comprising a total of 2665 students. Out of these, we had information about the teachers' reading instruction in 87 classes. This resulted in a total of 1469 students in the study. All children attained grade two in Bavarian elementary schools and belonged to the control group of the evaluation study. Thus, this

sample did not receive a special reading training, but conventional reading lessons on a regular basis. Out of the 87 classes, 79 also provided demographic data: In these classes 49.13% of the students were male, 91.24% of the sample spoke German at home and 34.23% spoke at least one other language at home than German. The educational background was assessed via the number of books in the children's households. The mode indicated that most children had enough books to fill one bookshelf (26-100 books).

Measures

Students' demographic data was gathered via a questionnaire, adopted from PIRLS (Bos, Hornberg, Arnold, Faust, Fried, Lankes, & Valtin, 2010). The students were asked about their gender, which language(s) they spoke at home and how many books there were in their households. This last question was answered on a rating scale with five categories: *“none or very few (0-10 books)”*, *“enough to fill one rack of a bookshelf (11-25 books)”*, *“enough to fill one bookshelf (26-100 books)”*, *“enough to fill two bookshelves (101-200 books)”*, *“enough to fill three or more bookshelves”*. The students' reading fluency was assessed via the Salzburger Lesescreening 2-9 (SLS 2-9; Wimmer & Mayringer, 2016). The SLS is a standardized reading fluency assessment during which participants are asked to evaluate the semantic correctness of as many sentences as possible during a three minute period. Test items were scored afterwards according to the test manual. The results were interpreted according to norm tables, resulting from Rasch modelling of the total sample of the evaluation study.

Information about reading instruction in class and at school was collected via a teacher questionnaire. We asked for available reading promotion methods at the respective schools with an open question and for the use of the methods by the teachers. The answers were rated by experienced raters afterwards. Teachers reported on a closed items scale how satisfied they were with these methods and how much time they allocated to reading lessons

during their weekly schedule. The questionnaire also comprised two scales about the teachers' instructional behavior. These scales were adapted from PIRLS as well (Bos, et al., 2010). The first scale asked about the feedback that teachers provide to the students' parents (for example: "How often do you inform parents about their child's development of language, writing and reading?").

The second scale asked about demonstrably effective reading-related activities during classroom instruction (for example: "how often do you teach new vocabulary to your students?", or "how often do you read aloud to your class?"). Both scales can be found in Appendix A.

Procedure

The design of the study was longitudinal and quasi-experimental. It comprised two measurements within an interval of seven months. The first measurement took place in the beginning of grade two. The second measurement was carried out at the end of grade two. At the first measurement, class mean and standard deviation of reading fluency of the students were assessed via the SLS. The class mean of the SLS served as a measure for the level of reading fluency. The class standard deviation of the SLS served as a measure for the diversity in reading fluency. Simultaneously, information from the teacher questionnaire about teachers' applied reading promotion methods and reading instruction behavior were assessed and put into relation to their students' reading fluency measures.

Reading fluency was monitored over the second measurement. Progress of mean class reading fluency as well as change in class standard deviation of reading fluency were related to the applied reading promotion methods, to the initial level of reading fluency and to the classes' mean educational backgrounds, and to the standard deviation of the classes' educational backgrounds. Again, the class mean of the students' educational background scores was considered as a measure for the level of educational backgrounds. The standard

deviation of the educational background scores was considered a measure for educational background diversity. Figure 1 displays an overview of the design of the study.

* SLS-M: Class mean of SLS scores; SLS-SD: Class standard deviation of SLS scores;

ToM: Time of Measurement

Figure 1. Overview over study design and analyses.

Analysis

The statistical computations were conducted using the open statistical software R (R Core Team, 2019). Data preparation was performed using the packages *dplyr* (Wickham, Francois, Henry, & Müller, 2015) and *tidyr* (Wickham & Henry, 2018). Missing data was not imputed, and datasets were excluded from single analyses. This was for example the case when demographic data were needed for the analyses, but only test data were available.

Modelling of measured constructs. All reported reading promotion methods were categorized by raters according to their theoretical affiliation, resulting in five categories: reading fluency, reading animation, differentiation, sustained silent reading, and other. Subsequently, the use of categorized methods was scored dichotomously for each teacher. So, if a teacher used one or more reading promotion methods that fell into the respective category, he or she would be scored positively on each. A complete overview of the assignment of reported methods to categories can be found in Appendix B.

The teacher questionnaire scales of feedback for parents and reading related activities were psychometrically modelled via classical test theory models. Models were estimated by maximum likelihood estimation and model quality evaluation was based on χ^2 -deviance tests, comparative fit indices (*CFI*), root mean squared error of approximation (*RMSEA*), and standardized root mean square residuals (*SRMR*). As χ^2 -based statistics are known to be sensitive towards sample size as well as to diversity in factor loadings (Heene, Hilbert, Draxler, Ziegler, & Bühner, 2011), model fit evaluation was mainly based on the fit indices. As recommended by Hu and Bentler (1999) values $> .90$ for *CFI* and values $< .06$ for *RMSEA* and *SRMR* indicate good fit. Factor scores of the confirmatory factor analyses were used for further calculations. The *lavaan* package (Rosseel, 2012) was used to conduct the confirmatory factor analyses and to compute the factor scores.

Reading comprehension was assessed via the SLS. It was evaluated according to norm tables based on the evaluation study sample. The same norm tables were used for the interpretation for all measurements, in order to receive comparable results.

Class means and class standard deviations for the SLS were computed and class progress was modeled using the pretest and the posttest score of the SLS.

Inference statistics. The relationship between the teachers' reading promotion methods (reading fluency promotion, differentiation, reading animation, sustained silent reading methods) and the teachers' instructional behavior (feedback for parents and reading related activities scales), the students' initial reading fluency levels, diversity of reading fluency levels (standard deviation), educational backgrounds, and the diversity of educational backgrounds were assessed via multiple logistic regressions with random intercepts, taking the hierarchical data structure of classes being nested within schools into account. Reading fluency and reading fluency diversity measures were centered before their inclusion in the analyses to adjust for diverse scaling and to produce stable estimates.

To identify the influencing factors of progress and change in diversity of reading fluency, longitudinal mixed linear regression models with random intercepts were estimated, regressing the teachers' instruction behavior scales, the scores for reading promotion methods as well as the students' initial reading fluency level and level diversity and the students' educational background and background diversity on the progress of reading fluency and the change in the diversity of reading fluency. In these models, the data were nested within times of measurement to account for the dependencies in the longitudinal measurements. The change in time was dummy coded, so that the interaction effects with the covariates were essential for the interpretation of their influence on the change in diversity of reading fluency (see Hilbert, Stadler, Lindl, Naumann, & Bühner, 2019).

Model selection was performed via best subset regression analyses, using the *olsrr* package (Hebbali, 2018) for the linear regressions and the *MuMIn* package (Barton & Barton, 2015) for the random intercept regressions. The adjusted R^2 and the $AICc$ served as decision criteria. The *MuMIn* package was also used to calculate marginal and conditional R^2 of the random intercept regression models (Nakagawa & Schielzetz, 2013).

Results

Psychometric Modelling of Instruction Behavior Scales

The two instruction behavior scales were fit by τ -congeneric models. These models assume unidimensionality in the data but allow for varying item error variances and item slopes (Jöreskog 1971). Therefore, a confirmatory factor analysis with a single latent variable was computed for each scale. The models showed adequate fit and almost all item loadings were significant (see table 1).

Table 1

Tau-congeneric models of the questionnaire scales

<i>item statistics</i>	reading related activities (RRA)				feedback for parents (FFP)			
	<i>loadings</i>		<i>error variances</i>		<i>loadings</i>		<i>error variances</i>	
	λ 95% CI	<i>p</i> - value	σ^2 95% CI	<i>p</i> - value	λ 95% CI	<i>p</i> - value	σ^2 95% CI	<i>p</i> - value
item1: RRA1/ FFP1	1 -	-	0.49 [0.33, 0.66]	< 0.001	1 -	-	0.25 [0.14, 0.36]	< 0.001
item2: RRA2/ FFP2	0.27 [-0.13, 0.67]	0.192	0.19 [0.13, 0.25]	< 0.001	1.08 [0.73, 1.42]	< 0.001	0.20 [0.09, 0.31]	< 0.001
item3: RRA3/ FFP3	0.33 [-0.11, 0.77]	0.143	0.22 [0.15, 0.29]	< 0.001	1.08 [0.72, 1.43]	< 0.001	0.25 [0.13, 0.37]	< 0.001
item4: RRA4/ FFP4	0.88 [0.02, 1.73]	0.044	0.64 [0.43, 0.85]	< 0.001	1.01 [0.34, 1.68]	0.003	2.09 [1.41, 2.78]	< 0.001
item5: RRA5	1.75 [0.55, 2.94]	0.004	0.39 [0.22, 0.56]	< 0.001	-	-	-	-
item6: RRA6	1.74 [0.56, 2.91]	0.004	0.27 [0.12, 0.41]	< 0.001	-	-	-	-
item7: RRA7	1.57 [0.24, 0.56]	0.005	0.40 [0.24, 0.56]	< 0.001	-	-	-	-
<i>global model fit</i>								
χ^2	16.91				8.33			
<i>df</i>	14				2			
<i>p</i> -value	0.261				0.016			
CFI	0.95				0.93			
RMSEA	0.05				0.20			
SRMR	0.07				0.06			

Note. λ = unstandardized item loading, CI = confidence interval, *df* = degrees of freedom, CFI = Comparative Fit Index, RMSEA = Root Mean Squared Error of Approximation, SRMR = Standardized Root Mean Square Residual.

Prevalence of Reading Promotion Methods and Time Spent on Reading Instruction

Teachers were offered an average number of 4.83 different reading promotion methods by their schools and reported to engage into 5.48 different reading promotion methods on average in their class. Teachers tended to use a wider range of different reading promotion methods when their schools offered a higher number of methods ($r = .68$, $p < .001$). Most often teachers reported to use “Antolin”, a commercial website, that offers

quizzes about children's books and recompenses right answers with points in a scoring system. This reflects the general preference for reading animation methods. Reading animation methods were most often reported to be used in class (42.20% of all reported methods), followed by sustained silent reading methods (19.13%), differentiation (16.37%), and reading fluency methods (6.51%). A further substantial amount of reported methods were other methods (15.78%), like “reading exercises”, that could not be classified as one of the categories presented above.

The teachers spent an average of 190 min per week on reading instruction and reading related activities. Thus, the teachers spent almost one additional hour for reading compared to their colleagues in fourth grade that took part in the PIRLS (Hußmann, Wendt, Bos, Bremerich-Vos, Kasper, Lankes, McElvany, Stubbe, & Valtin, 2017) study (190 min vs. 136 min). The standard deviation was as high as 125.6 min, indicating substantial differences in the time dedicated to reading in class during lessons.

Choice of Reading Promotion Methods

The following subsections present four analyses on the choices for the categorized reading promotion methods (reading fluency methods, reading animation methods, differentiation and sustained silent reading methods). We used the classes' characteristics like their initial reading fluency, educational backgrounds as well as the instructional behavior of the teachers as predictors. Choices for reading methods were coded dichotomously, so logistic regression models were used. We estimated unconditional random effect models, and used the intra class correlation (*ICC*) to investigate the relevance of the nested data structure.

All unconditional random effects models indicated that, when analyzing the choices of categorized reading promotion methods, the hierarchical data structure was not negligible for any method category (all *ICCs* > .22). Subsequently, logistic random coefficient

regression models were computed. Random intercepts for the schools were estimated. Fixed effect predictor variables were selected via an all subset regression.

Choice of reading fluency methods. Model selection was guided by a minimum *AICc* of 73.0. It indicated mean reading fluency, and educational background to be most influential for the choice of reading fluency methods. It appeared that teachers tended to choose reading fluency methods more often when their classes performed poorly and when they had a higher educational background. However, the effects were not significant.

Fixed effects resulted in a marginal R^2 of .13, whereas fixed effects and random effects combined resulted in a conditional R^2 of .61. This indicated that the hierarchical data structure had a considerable effect on the choice of reading fluency methods. The specific statistical values can be seen in table2.

Table 2
Choice of reading fluency and reading animation methods

	reading fluency methods				reading animation methods			
	null model		full model		null model		full model	
<i>fixed effects</i>	<i>b</i>	<i>p</i> - value	<i>b</i>	<i>p</i> - value	<i>b</i>	<i>p</i> - value	<i>b</i>	<i>p</i> - value
	95% CI		95% CI		95% CI		95% CI	
Intercept	0.69 0.173 [-1.68,0.3]		-2.85 [-6.44,0.75]	0.120	2.13 [0.5,3.75]	0.01	24.81 [-5.74,55.36]	0.112
mean educational background	-	-	2.01 [-0.92,4.93]	0.179	-	-	-10.53 [-26.76,5.7]	0.204
mean reading fluency	-	-	-0.33 [-0.75,0.09]	0.122	-	-	-	-
reading related activities scale	-	-	-	-	-	-	-	-
<i>random effects</i>	σ^2		σ^2		σ^2		σ^2	
ICC _{school}	0.53		0.61		0.55		0.99	
R ² _{marginal}	-		0.13		-		0.03	
R ² _{conditional}	-		0.61		-		0.99	
AICc	101.6		90.0		90.1		62.0	

Note. *b* = regression coefficient, CI = confidence interval, AICc = conditional Aikake Information Criterion.

Choice of reading animation methods. Model selection was guided by a minimum $AICc$ of 33.4. It pointed to the educational background as being most influential for the choice of reading animation methods. Teachers tended to choose reading animation methods, when their students came from less privileged educational backgrounds. Again, the conditional R^2 (.99) exceeded the marginal R^2 (.03) by far, indicating that the hierarchical data structure had a strong impact on the choice of reading animation methods.

Table 3
Choice of differentiation and sustained silent reading methods

	differentiation				sustained silent reading methods			
	null model		full model		null model		full model	
	<i>b</i> 95% CI	<i>p</i> - value	<i>b</i> 95% CI	<i>p</i> - value	<i>b</i> 95% CI	<i>p</i> - value	<i>b</i> 95% CI	<i>p</i> -value
<i>fixed effects</i>								
Intercept	0.41 [-0.46,1.29]	0.356	0.24 0.59 [-0.64,1.12]		1.07 [0.33,1.8]	0.004	1.09 [0.32,1.86]	0.006
mean educational background	-	-	-	-	-	-	-	-
mean reading fluency	-	-	-	-	-	-	-	-
reading related activities scale	-	-	1.31 0.325 [-1.3,3.92]		-	-	-1.89 [-4.11,0.34]	0.097
<i>random effects</i>	σ^2		σ^2		σ^2		σ^2	
ICC _{school}	0.55		0.50		0.22		0.21	
R^2 marginal	-		0.02		-		0.05	
R^2 conditional	-		0.46		-		0.20	
AICc	112.2		103.4		108.5		95.7	

Note. *b* = regression coefficient, CI = confidence interval, AICc = conditional Aikake Information Criterion.

Choice of differentiation methods. Model selection was again guided by a minimum $AICc$ of 80.2. The final model pointed to the reading-related-activity scale as being most influential for the choice of differentiation methods. Teachers tended to choose differentiation methods more often when they also engaged more often in reading related activities like “asking students to read out aloud” or “teaching new vocabulary to the

students”, see table 3. However, the relationship was not significant. Again, the conditional R^2 (.37) exceeded the marginal R^2 (.02) by far, indicating that the hierarchical data structure had a strong impact on the choice of differentiation methods.

Choice of sustained silent reading methods. Model selection was guided by a minimum $AICc$ of 56.4. The final model revealed the reading-related-activity scale as being most influential for the choice of sustained silent reading methods. Teachers tended to choose those methods more often, when they engaged less often into reading related activities like “asking students to read out aloud” or “teaching new vocabulary to the students”. The relationship was not significant. Statistical values can be seen in table 3.

Reading Promotion Methods and Development of Reading Fluency Measures

In this subsection, we present the results of two analyses investigating the determinants of the progress of reading fluency as well as for the increase in reading fluency diversity in the classes.

Table 4
Mean progress and change in diversity of reading fluency

	mean progress in reading fluency				change in reading fluency diversity			
	null model		full model		null model		full model	
<i>fixed effects</i>	<i>b</i>	<i>p</i> -value	<i>b</i>	<i>p</i> -value	<i>b</i>	<i>p</i> -value	<i>b</i>	<i>p</i> -value
	95% CI		95% CI		95% CI		95% CI	
Intercept	0.04 [-1.13,1.20]	0.953	-2.18 0.595 [-10.20,5.84]		0.01 [-0.50,0.52]	0.968	-1.68 [-5.21,1.85]	0.352
feedback for parents scale	-	-	-0.37 [-2.98,2.24]	0.783	-	-	0.27 [-0.92,1.45]	0.659
reading related activities scale	-	-	2.03 [-2.59,6.65]	0.392	-	-	-	-
use of sustained silent reading methods	-	-	0.60 [-2.77,3.97]	0.729	-	-	-	-
use of reading fluency methods	-	-	-	-	-	-	0.78 [-0.51,2.07]	0.240
mean initial reading fluency	-	-	-	-	-	-	0.45 [0.26,0.64]	< 0.001

mean educational background	-	-	1.52 [-1.94,4.98]	0.392	-	-	-	-
diversity of educational backgrounds	-	-	-0.37 0.928 [-8.36,7.61]	-	-	1.63 [-2.52,5.78]	0.444	
ToM			5.33 0.303 [-4.70,15.36]			-0.68 [-5.03,3.66]		
ToM:feedback for parents scale			-1.99 0.242 [-5.29,1.31]			-2.12 [-3.58,-0.65]		
ToM:reading related activities scale			7.80 0.013 [1.82, 13.78]			-	-	
ToM:use of sustained silent reading methods			-2.64 0.234 [-6.93,1.65]			-	-	
ToM:use of reading fluency methods						-2.78 [-4.46,-1.09]	0.002	
ToM:mean initial reading fluency						-0.75 [-1.00,-0.51]	< 0.001	
ToM:mean educational background			3.13 0.157 [-1.14,7.39]			-	-	
ToM:diversity of educational backgrounds			-8.28 0.112 [-18.31,1.76]			2.23 [-2.84,7.30]	0.393	
<i>random effects</i>	σ^2		σ^2		σ^2	σ^2		
ICC _{school/class}	0.36		0.33		0.68	0.32		
R ² _{marginal}	-		0.22		-	0.26		
R ² _{conditional}	-		0.47		-	0.50		
AICc	793.3		615.3		647.4	580.6		

Note. *b* = regression coefficient, CI = confidence interval, ToM = Time of Measurement, AICc = conditional Aikake Information Criterion.

Progress in reading fluency. The unconditional random effect model indicated that the hierarchical data structure of classes being clustered in schools and in time, was substantial for the mean progress in reading fluency ($ICC = .36$). Subsequently, we estimated mixed linear regression models with random intercepts for schools and classes. The regression coefficients and fit values of this analysis are presented in table 4.

Regression coefficients indicated that the use of sustained silent reading methods, a high frequency in feedback for the students' parents, as well as a high diversity of

educational backgrounds in the class were detrimental for the class' progress in reading fluency. On the upside, a high frequency of reading-related activities and a high mean for educational backgrounds of the students was beneficial for the class' progress in reading fluency. However, the scale of reading related activities was the only predictor of progress in reading fluency that reached statistical significance.

Change in reading fluency diversity. Again, the unconditional random effects model indicated that the hierarchical data structure was not negligible ($ICC = .68$). We estimated a mixed linear regression model with random intercepts for schools and classes to investigate the influencing factors for the changes of reading fluency diversity in the classes.

The model indicated that a lower initial mean in reading fluency, the use of reading fluency methods as well as a frequent feedback for the students' parents inhibited the increase in reading fluency diversity (indicated by the interaction effects in table 4). This means these factors helped to keep the students' performances closer together. Only a high diversity of educational backgrounds descriptively seemed to go along with an increase in reading diversity in the classes. However, this effect was not significant. Fixed effects accounted for 26% of the variance, fixed and random effects combined accounted for 50% of the variance in the reading fluency diversity changes. Further regression coefficients and fit indices are available in table 4.

Discussion

As we expected, there is a prevalence of reading promotion methods aiming at increasing the amount of reading rather than improving reading technique itself. Despite the obvious problems of current reading instruction, teachers are often unwilling to abandon established routines and procedures and adopt new approaches that they feel are unlikely to

succeed (Philipp & Scherf, 2012; Souvignier & Philipp, 2016). Teachers tend to rely on fostering reading animation. They predominantly do not focus on fluency or other cognitively activating methods. Our data supports this finding, as teachers reported to use a lot of reading animation methods, notably Antolin. But - even though popular - such programs are rather detrimental to the reading motivation of weak readers, as they limit the experience of autonomy and lead to a negative concept of reading (Deci & Ryan, 1993; Meier, 2017).

This finding may be due to the fact that teachers did not choose reading programs on the basis of the characteristics of their class, but by the availability at school. Especially teachers of students with low educational backgrounds liked to emphasize reading animation methods. This seems to confirm the results of Anmarkrud and Bråten (2012). They found that teachers tend to rely on personal experience rather than research-based knowledge.

Our findings allow us to draw several conclusions: First, teachers need advice as to which evaluated reading methods suit best for their class and require precise instructions on how to employ them (Rosaen, Carlisle, Mihocko, Melnick, & Johnson, 2013). Second, one should try to convince the whole staff of a new method if a reading training aims at being implemented long-term in everyday practice (Souvignier & Philipp, 2016). This assumption is supported by the strong influence of the clustering in the data structure. The choice of reading promotion methods depended more strongly on the choices of colleagues at the same school than on the characteristics of the students at hand.

Therefore, the question arises, whether teachers do not care to adopt their reading lessons to their classes or whether they are not able to do so. The latter appears more likely, since insufficient diagnostic skill is commonly reported in the literature (e.g. Spinath, 2005; Feinberg & Shapiro, 2009). Without sufficient knowledge about the class' level of achievement, planning adaptive reading lessons is impossible. Therefore, teachers do need

more than just evidence-based reading programs but must be trained in diagnostics (Schrader, 2013, Vogt & Rogalla, 2009).

Progress of Reading Fluency

Teaching behavior was the strongest predictor for the development of reading fluency at an average class level. It is important for teachers to read aloud to their students, to encourage them to practice reading aloud or silently during class, and to systematically teach new vocabulary and reading strategies to their students in everyday classroom situations. These study results go well along with lots of earlier findings (e.g., National Reading Panel, 2000; Lenhard, et al., 2020).

On the other hand, sustained silent reading methods and frequent feedback to the students' parents have shown to be detrimental to the average progress of the classes. Overall, we find that an integration of reading promotion into everyday teaching lessons is accompanied by progress. Apparently, parents and students are either unable or unwilling to promote reading in a way that could be equivalent to regular reading in school during lessons. This result also fits into the picture of past findings. Especially when print media have to compete with non-print-media, preferences for the latter were related to reduced reading competencies in elementary class children (Ennemoser & Schneider, 2007). Since especially students from disadvantaged households are affected by the preference of non-print media, relying on parental support will lead to enlarging educational inequalities (Stein & Endepohls-Ulpe, 2019). In line with these findings, classes with students from similar educational backgrounds progress more than classes with students from different educational backgrounds. This also leads to the conclusion that teachers do not yet show the flexibility to adapt their methods to the manifold needs of children with different educational backgrounds.

Change in Reading Fluency Diversity

Findings on changes in reading fluency diversity are also in line with the study results discussed above. Again, we find that a high diversity of educational backgrounds leads to a high diversity in the progress a class makes over a period of seven months. One interpretation of this finding could be that most of the chosen teaching methods are not able to compensate for background differences. In recent studies, it has been shown that students from different educational backgrounds have different needs with regard to reading promotion (Arnold & Doctoroff, 2003). If these needs are not met during reading lessons, students will benefit to a varying extent from the chosen reading promotion methods. In consequence a diversification of reading competence is likely to arise.

Also, a high initial reading speed level helps to keep classroom diversity low. This is in line with the assumption that current reading promotion methods are unable to cope with diverse student needs. This suggests that teachers appear unwilling or unable to meet the different needs of children with different or low levels of reading fluency. These results point towards a need for specially adapted reading promotion that can meet different students' needs. Thereby it does not matter whether different needs root in different educational backgrounds or in different levels of reading competence.

On the contrary, we see that the use of reading fluency methods proved to be beneficial in reducing the diversity of reading fluency. Thus, reading fluency methods could help to close the gap that might be enlarged by differences in the educational background or initial reading speed of students. Typical reading fluency trainings comprise paired reading methods or reading while listening (Gailberger, 2011; Kuhn & Stahl, 2003). Hence, texts are usually read multiple times and discussed in student tandems or in the classroom group afterwards. This repetitive process is known to meet the needs of weaker and stronger readers at the same time (Kuhn & Stahl, 2003). Weaker students benefit from reading a text multiple

times and receiving additional chances to decode difficult words or to understand difficult vocabulary. Stronger readers in turn benefit from explaining difficult paragraphs to their tandem partners. As one implementation of reading while listening uses audiotaped texts, stronger readers quickly adopt a high reading speed, as well as the prosody of professional readers (Allington, 1983; Kuhn & Stahl, 2003). Even though these explanations fit well into our findings, they are post-hoc explanations. So, the positive effect of reading fluency methods on the reading fluency diversity has to be consolidated by future analyses. This provides a first promising impulse towards more efficient reading promotion in elementary school.

While frequent feedback to parents is considered detrimental to overall progress in reading fluency, it proved beneficial in terms of changes in diversity. The impact of parents' involvement in their children's reading has been studied extensively (e.g. Cotton & Wikelund, 1989; Ennemoser & Schneider, 2007; Hoover-Dempsey, Battiato, Walker, Reed, DeJong, & Jones, 2001). Yet, this study can refine the possible impact parents have on the reading progress of their children. Parental support could not improve the mean level of reading fluency, but parental involvement reduced achievement diversity. Thus, one explanation could be that parental support may not foster overall development but help weaker students to catch up. Therefore, we suggest that parents take part in the reading promotion process purposely, by supporting weaker students. But we want to refrain from proposing to generally rely on a domestic reading promotion, sustained by parents. This notion is also supported by our analyses, which indicates that sustained silent reading methods might be detrimental for the overall reading development. Since sustained silent reading methods usually rely on reading during leisure time, they are one example of how domestic reading promotion can be put into practice.

Limitations

Several limitations must be taken into account and may have impacted the results of the present study. First of all, some of the methods reported by the teachers were difficult to classify. On the one hand, one term could be interpreted in multiple ways, on the other hand, teachers rarely used scientifically precise terms. For example, teachers may understand “reading aloud” as a method differently than research.

Secondly, the study was conducted in second grade. Second graders may not yet have grasped all the questions in the demographic questionnaire in their proper meaning. Finally, a larger sample size would have led to higher statistical power in the analyses. Thus, it is possible that some teacher-invented methods were actually effective but not identified as such, due to lack of statistical power.

Conclusion

Overall, it can be concluded that our results support the assumed teacher preference for fostering reading motivation, whereas promoting reading on a process level is still uncommon. Still, the educational background is particularly predictive for the development of students' performances, as well as for the development of the diversity of performance. Similar findings emerge in the PIRLS studies published up to now: A significant link between socioeconomic status and educational success has been identified more than once (Goy, Valtin, & Hußmann, 2017). The education system reproduces social injustice, for example by structurally presupposing the cooperation of parents in the school system (El-Mafaalani, 2020). Apart from reading fluency methods, the reading promotion methods chosen by teachers do not have a significant impact on the average development of their students' reading speed. We therefore conclude that teachers need support in their assessment in order to adapt lesson contents to the needs of their students. Also, teachers need specific,

scientifically evaluated materials, tailored to foster different aspects of the reading process. These materials should be easy to implement and promote reading activity during lessons not during leisure time. In the best case, the entire staff of a school is trained for its use and is convinced of its effectiveness. Our results clearly reinforce the need for action in terms of enabling all students to reach sufficient literacy needed to succeed in future employment and to earn a living.

References

- Allington, R. L. (1983). Fluency: The neglected reading goal. *The reading teacher*, 36(6), 556-561.
- Allington, R. L., & Gabriel, R. (2016). Classroom Influences on individual differences. In P. Afflerbach (Eds.), *Handbook of individual differences in reading. Reader, text, and context* (pp. 196-208). Routledge.
- Almasi, J., & Hart, S. (2019). Best practices in narrative text comprehension instruction. In L. Mandel Morrow, & L. Gambrell (Eds.), *Best practices in literacy instruction* (pp. 221–249). 6. Edition. Guilford Press.
- Anmarkrud, Ø., & Bråten, I. (2012). Naturally-Occurring Comprehension Strategies Instruction in 9th-Grade Language Arts Classrooms. *Scandinavian Journal of Educational Research*, 56(6), 591–623.
- Arnold, D. H., & Doctoroff, G. L. (2003). The early education of socioeconomically disadvantaged children. *Annual review of psychology*, 54(1), 517-545.
- Artelt, C., McElvany, N., Christmann, U., Richter, T., Groeben, N., Köster, J., Schneider, W., Stanat, P., Ostermeier, C., Schiefele, U., Valtin, R., & Ring, K. (2007). *Förderung von Lesekompetenz. Expertise*. [w/o publisher].
- Artelt, C., Beinicke, A., Schlagmüller, M., & Schneider, W. (2009). Diagnose von Strategiewissen beim Textverstehen. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie*, 41(2), 96–103, <https://doi.org/10.1026/0049-8637.41.2.96>.
- Bamberger, R. (2000). *Erfolgreiche Leseerziehung in Theorie und Praxis : mit besonderer Berücksichtigung der Projekts "Leistungs- und Motivationssteigerung im Lesen und Lernen unter dem Motto Lese- und Lernolympiade"*. Schneider.
- Barton, K., & Barton, M. K. (2015). Package ‘MuMIn’. *Version*, 1, 18.

- Bos, W., Hornberg, S., Arnold, K., Faust, G., Fried, L., Lankes, E., & Valtin, R. (2010). *Internationale Grundschul-Lese-Untersuchung 2006 (IGLU/PIRLS 2006)*. Waxmann.
- Bos, W., Valtin, R., Hußmann, A., Wendt, H., & Goy, M. (2017). IGLU 2016: Wichtige Ergebnisse im Überblick. In A. Hußmann, H. Wendt, W. Bos, A. Bremerich-Vos, D. Kasper, E. Lankes, N. McElvany, T. C. Stubbe, & R. Valtin (Eds.), *IGLU 2016. Lesekompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich* (pp. 13–28). Waxmann.
- Bremerich-Vos, A., Stahns, R., Hußmann, A., & Schurig, M. (2017). Förderung von Leseflüssigkeit und Leseverstehen im Leseunterricht. In A. Hußmann, H. Wendt, W. Bos, A. Bremerich-Vos, D. Kasper, E. Lankes, N. McElvany, T. C. Stubbe, & R. Valtin (Eds.), *IGLU 2016. Lesekompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich* (pp. 279–296). Waxmann.
- Bremerich-Vos, A., Wendt, H., & Bos, W. (2017). Lesekompetenzen im internationalen Vergleich: Testkonzeption und Ergebnisse. In A. Hußmann, H. Wendt, W. Bos, A. Bremerich-Vos, D. Kasper, E. Lankes, N. McElvany, T. C. Stubbe, & R. Valtin (Eds.), *IGLU 2016. Lesekompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich* (pp. 79–142). Waxmann.
- Cotton, K., & Wikelund, K. R. (1989). Parent involvement in education. *School improvement research series*, 6(3), 17–23.
- Cromley, J., & Azevedo, R. (2007). Testing and refining the direct and inferential mediation model of reading comprehension. *Journal of Educational Psychology*, 99(2), 311–325.
- Darling-Hammond, L. (2000). Teacher Quality and Student Achievement: A Review of State Policy Evidence. *Education Policy Analysis Archives*, 8(1), 1–44.

- De Coster, I., Baidak, N., Motiejunaite, A., & Noorani, S. (2011). *Leseerziehung in Europa. Kontexte, politische Maßnahmen und Praktiken*. Exekutivagentur Bildung, Audiovisuelles und Kultur (Eurydice).
- Deci, E., & Ryan, R. M. (1993). Die Selbstbestimmungstheorie der Motivation und ihre Bedeutung für die Pädagogik. *Zeitschrift für Pädagogik*, 39(2), 223–238.
- Didion, L., Toste, J. R., & Filderman, M. J. (2020). Teacher Professional Development and Student Reading Achievement: A Meta-Analytic Review of the Effects. *Journal of Research on Educational Effectiveness*, 13, 29-66.
- Duffy, G. (1993). Rethinking Strategy Instruction: Four Teachers' Development and Their Low Achievers' Understandings. *The Elementary School Journal*, 93(3), 231–247.
- Duffy, G., Roehler, L., Meloth, M., Vavrus, L., Book, C., Outnam, J., & Wesselman, R. (1986). The Relationship between explicit verbal explanations during reading skill instruction and student awareness and achievement: A study of reading teacher effects. *Reading Research Quarterly*, 21(3), 237–252.
- Durkin, D. (1978). What Classroom Observations Reveal about Reading Comprehension Instruction. *Reading Research Quarterly*, 14(4), 481–533.
- El-Mafalaani, A. (2020). *Mythos Bildung: Die ungerechte Gesellschaft, ihr Bildungssystem und seine Zukunft*. Kiepenheuer&Witsch.
- Ennemoser, M., & Schneider, W., (2007). Relations of television viewing and reading: Findings from a 4-year longitudinal study. *Journal of Educational Psychology*, 99(2), 349–368.
- Feinberg, A. B., & Shapiro, E. S. (2009). Teacher accuracy: An examination of teacher-based judgments of students' reading with differing achievement levels. *The Journal of Educational Research*, 102(6), 453-462.

- Gailberger, S. (2011). *Lesen durch Hören: Leseförderung in der Sek. I mit Hörbüchern und neuen Lesestrategien*. Beltz.
- Ganske, K. (2019). Best practices in vocabulary instruction. In L. Mandel Morrow, & L. Gambrell (Eds.), *Best practices in literacy instruction* (pp. 199–220). 6. Edition. Guilford Press.
- Goy, M., Valtin, R., & Hußmann, A. (2017). Leseselbstkonzept, Lesemotivation, Leseverhalten und Lesekompetenz. In A. Hußmann, H. Wendt, W. Bos, A. Bremerich-Vos, D. Kasper, E. Lankes, N. McElvany, T. C. Stubbe, & R. Valtin (Eds.), *IGLU 2016. Lesekompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich* (pp. 143–176). Waxmann.
- Graham, S., & Harris, K. (2005). *Writing Better. Effective Strategies for Teaching Students with Learning Difficulties*. Brookes.
- Guthrie, J., & Taboada Barber, A. (2019). Best practices for motivating students to read. In L. Mandel Morrow, & L. Gambrell (Eds.), *Best practices in literacy instruction* (pp. 52–74). 6. Edition. Guilford Press.
- Hart, B., & Risley, T. (2003). The Early Catastrophe. The 30 Million Word Gap by Age 3. *American Educator*, 4-9.
- Hasbrouck, J., & Tindal, G. (2005). Oral Reading Fluency: 90 Years of Measurement. *Behavioral research & testing*, [unpag.], <http://files.eric.ed.gov/fulltext/ED531458.pdf>.
- Hasselhorn, M., & Gold, A. (2013). *Pädagogische Psychologie: Erfolgreiches Lernen und Lehren* (3., vollständig überarb. und erweiterte Aufl). Standards Psychologie.
- Hebbali, A. (2018). Olsrr: tools for building OLS regression models. *R package version 0.5, 1*.

- Heene, M., Hilbert, Sven, Draxler, C., Ziegler, M., & Bühner, Markus (2011). Masking misfit in confirmatory factor analysis by increasing unique variances: A cautionary note on the usefulness of cutoff values of fit indices. *Psychological methods*, 16(3), 319.
- Hiebert, E. H. (2010). Revisiting Silent reading in 2020 and Beyond. In E. Hiebert, & R. D. Reutzel (Eds.), *Revisiting Silent Reading: New Directions for Teachers and Researchers* (pp. 290–300). Newark: International Reading Association.
- Hilbert, S., Stadler, M., Lindl, A., Naumann, F. & Bühner, M. (2019). Analyzing longitudinal intervention studies with linear mixed models. *Testing, Psychometry, Methodology in Applied Psychology*, 26, 101–119.
- Hippmann, K., Jambor-Fahlen, S., & Becker-Mrotzek, Michael (2019). Der Einfluss familiärer Hintergrundvariablen auf die Leseleistung von Grundschulkindern im Anfangsunterricht. *Zeitschrift für Erziehungswissenschaft*, <https://doi.org/10.1007/s11618-018-0861-8> (last: 07.02.2019).
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.
- Hußmann, A., Wendt, H., Bos, W., Bremerich-Vos, A., Kasper, D., Lankes, E., McElvany, N., Stubbe, T., & Valtin, R. (2017). *IGLU 2016. Lesekompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich*. Waxmann.
- Jöreskog, K. G. (1971). Statistical analysis of sets of congeneric tests. *Psychometrika*, 36(2), 109-133.
- Kuhn, M., Rasinski, T., & Young, C., (2018). Best Practices in Fluency Instruction. In L. Mandel Morrow, & L. B. Gambrell (Eds.), *Best practices in literacy instruction* (pp. 217–288). 6. Edition. New York, London: Guilford Press.

- Kuhn, M., & Stahl, S. A. (2003). Fluency: A review of developmental and remedial practices. *Journal of educational psychology*, 95(1), 3.
- Learned, J. E., & Birr M., E. (2016). School Contexts and individual differences. In P. Afflerbach (Ed.), *Handbook of individual differences in reading. Reader, text, and context* (pp. 177-195). Routledge.
- Lenhart, J., Lenhard, W., Vaahtoranta, E., & Suggate, S. (2020). More than words: Narrator engagement during storytelling increases children's word learning, story comprehension, and on-task behavior. *Early Childhood Research Quarterly*, 51, 338–351.
- Lienemann, T. O. & Reid, R. (2006). Self-Regulated Strategy Development for Students with Learning Disabilities. *Teacher Education and Special Education*, 29(1), 3–11.
- Lindsay, J. J. (2010). *Children's access to print material and education-related outcomes: Findings from a meta-analytic review*. Learning Point Associates.
- Lotz, M. (2016). *Kognitive Aktivierung im Leseunterricht der Grundschule. Eine Videostudie zur Gestaltung und Qualität von Leseübungen im ersten Schuljahr*. Springer.
- McElvany, N., Kessels, U., Schwabe, F., & Kasper, D. (2017). Geschlecht und Lesekompetenz. In A. Hußmann, H. Wendt, W. Bos, A. Bremerich-Vos, D. Kasper, E. Lankes, N. McElvany, T. C. Stubbe, & R. Valtin (Eds.), *IGLU 2016. Lesekompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich* (pp. 177–194). Waxmann.
- Meier, C. (2017). Antolin im Leseunterricht der Grundschule: Eine empirische Studie zur Lesesozialisationsforschung. In F. Dietz, & G. P. Wind (Eds.), *Zwischen Büchern und Bildschirmen. Lesen und Schreiben lernen in verschiedenen Medien* (pp. 117–144). Deutsche Gesellschaft für Lesen und Schreiben.

- Mol, S. E., Bus, A. G., & de Jong, M. T. (2009). Interactive Book Reading in Early Education: A Tool to Stimulate Print Knowledge as Well as Oral Language. *Review of Educational Research*, 79(2), 979-1007.
- Myrberg, E., Johansson, S. & Rosén, M. (2018). The Relation between Teacher Specialization and Student Reading Achievement. *Scandinavian Journal of Educational Research*, 63 (5), 744–758.
- Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2017). *PIRLS 2016. International results in reading*. TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College and International Association for the Evaluation of Educational Achievement (IEA).
- Nakagawa, S., & Schielzeth, H. (2013). A general and simple method for obtaining R² from generalized linear mixed-effects models. *Methods in ecology and evolution*, 4(2), 133-142.
- National Reading Panel (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups (NIH Publication No. 00-4754)*. U.S. Government Printing Office.
- Nix, D. (2006). Das Lesetheater. Integrative Leseförderung durch das szenische Vorlesen literarischer Texte. *Praxis Deutsch*, 199, 23–29.
- Österbauer, V., Bachinger, A., Winter, B., Paasch, D., & Illetschko, M. (2020). Leseförderung revisited – Sind die verschiedenen Verfahren zur Leseförderung im österreichischen Deutschunterricht der 4. Schulstufe angekommen? *Leseforum.ch*, 1, 1–26.

- OECD (2018), *PISA for Development Assessment and Analytical Framework: Reading, Mathematics and Science*. OECD Publishing,
<https://doi.org/10.1787/9789264305274-en>.
- OECD (2019), *PISA 2018 Results (Volume I): What Students Know and Can Do*. OECD Publishing, <https://doi.org/10.1787/5f07c754-en>.
- Philipp, M., & Scherf, D. (2012). Die zentrale Bedeutung der Lehrkraft für die Vermittlung selbstregulierten Lesens. In M. Philipp, & A. Schilcher (Eds.), *Selbstreguliertes Lesen. Ein Überblick über wirksame Förderansätze* (pp. 226–242). Kallmeyer.
- Philipp, M., & Schilcher, A. (2012). *Selbstreguliertes Lesen: Ein Überblick über wirksame Leseförderansätze*. Kallmeyer.
- Postlethwaite, N., & Ross, K. (1992). *Effective Schools in Reading: Implications for Educational Planners. An Exploratory Study*. IEA.
- Pressley, M., Wharton-McDonald, R., Allington, R., Collins Block, C., & Mandel Morrow, L. (1998). *The Nature of Effective First-Grade Literacy Instruction*. The National Research Center on English Learning & Achievement. Report Series 11007.
- Richter, T., & Christmann, U. (2009). Lesekompetenz: Prozessebenen und interindividuelle Unterschiede. In N. Groeben, & B. Hurrelmann (Eds.), *Lesekompetenz. Bedingungen, Dimensionen, Funktionen* (pp. 25–58). 3. Edition. Juventa.
- Retelsdorf, J., & Möller, J. (2008). Familiäre Bedingungen und individuelle Prädiktoren der Lesekompetenz von Schülerinnen und Schülern. *Psychologie in Erziehung und Unterricht*, 55 (4), 227–237.
- Rosaen, C., Carlisle, J., Mihocko, E., Melnick, A., & Johnson, J. (2013). Teachers learning from analysis of other teachers' reading lessons. *Teaching and Teacher Education*, 35, 170–184.

- Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA). *Journal of statistical software*, 48(2), 1-36.
- 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.
- Schiefele, U., Schaffner, E., Möller, J., & Wigfield, A. (2012). Dimensions of Reading Motivation and Their Relation to Reading Behavior and Competence. *Reading Research Quarterly*, 47(4), 427–463.
- Schrader, F. (2013). Diagnostische Kompetenz von Lehrpersonen. *Beiträge zur Lehrerinnen- und Lehrerbildung*, 31(2), 154-165.
- Schmich, J., Breit, S., Lanzdorf, R., & Itzlinger-Bruneforth, U. (2017). Schulischer Kontext: Leseunterricht, Fortbildung und Schulressourcen. In C. Wallner-Paschon, U. Itzlinger-Bruneforth, & C. Schreiner (Eds.), *PIRLS 2016. Die Lesekompetenz am Ende der Volksschule. Erste Ergebnisse* (pp. 83–102). Leykam.
- Solis, M., Miciak, J., Vaughn, S., & Fletcher, J. M. (2014). Why Intensive Interventions Matter: Longitudinal Studies of Adolescents With Reading Disabilities and Poor Reading Comprehension. *Learning Disability Quarterly*, 37(4), 218–229.
- Souvignier, E., & Philipp, M. (2016). Implementation – Begrifflichkeiten, Befunde und Herausforderungen. In M. Philipp, & E. Souvignier (Eds.), *Implementation von Lesefördermaßnahmen. Perspektiven auf Gelingensbedingungen und Hindernisse* (pp. 9–22). Waxmann.
- Spinath, B. (2005). Akkuratheit der Einschätzung von Schülermerkmalen durch Lehrer und das Konstrukt der diagnostischen Kompetenz: Accuracy of teacher judgments on student characteristics and the construct of diagnostic competence. *Zeitschrift für pädagogische Psychologie*, 19(1/2), 85-95.

- Stahns, R., Rieser, S., & Lankes, E. (2017). Unterrichtsführung, Sozialklima und kognitive Aktivierung im Deutschunterricht in vierten Klassen. In A. Hußmann, H. Wendt, W. Bos, A. Bremerich-Vos, D. Kasper, E. Lankes, N. McElvany, T. C. Stubbe, & R. Valtin (Eds.), *IGLU 2016. Lesekompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich* (pp. 251–278). Waxmann.
- Stein, M., & Endepohls-Ulpe, M. (2019). Die erlebte Selbstbestimmung als Einflussfaktor auf die Lesemotivation von Jungen und Mädchen im Grundschulalter. *Zeitschrift für Grundschulforschung*, 12, 181–196.
- Stanovich, K. (1991). Word recognition: Changing perspectives. In R. Barr, M. Karnil, P. Mosenthal, & P. D. Pearson (Eds.), *Handbook of reading research. Volume II* (pp. 418-452). Routledge.
- Tighe, E. L., & Schatschneider, C. (2016). Examining the Relationships of Component Reading Skills to Reading Comprehension in Struggling Adult Readers: A Meta-Analysis. *Journal of Learning Disabilities*, 49(4), 395-409.
- Topping, K. (2014). Paired Reading and Related Methods for Improving Fluency. *International Electronic Journal of Elementary Education*, 7(1), 57-70.
- UNESCO (2005) = United Nations Educational, Scientific and Cultural Organization. (2005). *Education for All Global Monitoring Report: Literacy for life*. UNESCO Publishing.
- Vogt, F., & Rogalla, M. (2009). Developing adaptive teaching competency through coaching. *Teaching and Teacher Education*, 25(8), 1051-1060.
- Weis, M., Doroganova, A., Hahnel, C., Becker-Mrotzek, M., Lindauer, T., Artelt, C., & Reiss, K. (2019). Lesekompetenz in PISA 2018 – Ergebnisse in einer digitalen Welt. In K. Reiss, M. Weis, E. Klieme, & O. Köller (Eds.), *PISA 2018. Grundbildung im internationalen Vergleich* (pp. 47-80). Waxmann.

- Wickham, H., Francois, R., Henry, L., & Müller, K. (2015). dplyr: A Grammar of Data Manipulation. R package version 0.4. 3. *R Found. Stat. Comput., Vienna*.
<https://CRAN.R-project.org/package=dplyr>.
- Wickham, H., & Henry, L. (2018). tidyr: Easily Tidy Data with ‘spread ()’ and ‘gather ()’ Functions. *R package version 0.8, 2*.
- Wild, J., & Schilcher, A. (2019). Grundlagen einer systematischen schulischen Leseförderung. In G. Stückl, & M. Wilhelm (Eds.), *Lehren und Lernen in der bayerischen Grundschule* (pp. 1-17). Carl Link.
- Wimmer, H., & Mayringer, H. (2016). *Salzburger Lese-Screening für die Schulstufen 2-9: SLS 2-9*. Huber.

Appendix A

Scales and demographic data translations

Reading related activity scale (RRA)

	English	German
<i>instruction</i>		
	When you teach reading or engage in reading related activities during class: how often do you...	Wenn Sie Lesen unterrichten und/oder lesebezogene Unterrichtsaktivitäten mit den Schülern durchführen, wie oft tun Sie folgende Dinge?
<i>items</i>		
RRA1	read aloud to your class?	Der Klasse laut vorlesen
RRA2	ask your students to read aloud?	Schüler auffordern, laut vorzulesen
RRA3	ask your students to read silently?	Schüler auffordern, leise für sich selbst zu lesen
RRA4	spend time on having students read books of their own choice?	Den Schülern Zeit geben, Bücher ihrer eigenen Wahl zu lesen
RRA5	explain strategies on word and phoneme recognition?	Den Schülern Strategien erklären, wie sie Laute und Wörter entschlüsseln können
RRA6	systematically teach new vocabulary?	Den Schülern systematisch neuen Wortschatz beibringen
RRA7	teach strategies for selective reading and skimming?	Den Schülern Strategien zum überfliegend, selektiven (gezielt suchenden) und zum überfliegend orientierenden Lesen zeigen oder mit ihnen erarbeiten
<i>answer options</i>		
1	Every day or almost every day	Jeden oder fast jeden Tag
2	Once or twice a week	Ein- bis zweimal pro Woche
3	Once or twice a month	Ein- bis zweimal pro Monat
4	Never or almost never	Nie oder fast nie

Feedback for parents scale (FFP)

	English	German
<i>instruction</i>		
	How often do you ...	Wie häufig kommt es vor, dass Sie...
<i>items</i>		
FFP1	give advice to parents how to support their child's development of language, writing and reading?	Eltern Anregungen geben, wie sie die Sprach-/Schreib-/Leseentwicklung ihres Kindes unterstützen können?
FFP2	inform parents about their child's development of language, writing and reading?	die Eltern über die Sprach-/Schreib-/Leseentwicklung ihres Kindes informieren?
FFP3	talk to parents about their child's development of language, writing and reading?	Elterngespräche über die Sprach-/Schreib-/Leseentwicklung ihres Kindes führen?
FFP4	have parents take part in promotion measures for their child's development of language, writing and reading?	Eltern an Sprach-/Schreib-/Lesefördermaßnahmen für ihr Kind beteiligen?
<i>answer options</i>		
1	More often than every 3 months	Häufiger als alle 3 Monate
2	Every 3 months	Alle 3 Monate
3	Every 6 months	Alle 6 Monate
4	Once a year	Alle 12 Monate
5	Less often	Seltener
6	Never	Nie

Educational background question and answer options

English	German
<i>question</i>	
How many books are there in your home? (Don't consider magazines, newspapers or schoolbooks)	Wie viele Bücher gibt es bei dir zu Hause ungefähr? (Zähle nicht mit: Zeitschriften, Zeitungen und deine Schulbücher).
<i>answer options</i>	
None or very few (0-10 books)	Keine oder nur sehr wenige (0-10 Bücher)
Enough to fill one rack of a bookshelf (11- 25 books)	Genug, um ein Regalbrett zu füllen (11-25 Bücher)
Enough to fill one bookshelf (26-100 books)	Genug, um ein Regal zu füllen (26-100 Bücher)
Enough to fill two bookshelves (101-200 books)	Genug, um zwei Regale zu füllen (101- 200 Bücher)
Enough to fill three or more bookshelves	Genug um drei oder mehr Regale zu füllen

Appendix B

Categorization of reported reading promotion methods

method and assignment	reading fluency	reading animatio n	differe ntiatio n	sustained silent reading	not to be classified
Reading partnership project		1	1		
Reciprocal reading	1				
Splitting the class according to reading ability			1		
Reading aloud		1			
Class readings		1			
Reading workbooks		1	1		
Non further specified reading promotion materials					1
Reading excercises					1
Periods during classes, reserved for individual reading				1	
Reading „passport“				1	
Book presentations		1			
Differentiation			1		
Remedial classes			1		
Antolin (Website with quizzes about books)		1		1	
Non further specified digital media					1
Public library		1			
Library bus		1			
Classroom library		1			
Additional voluntary reading groups			1		
Special programs and events (eg. authors readings)		1			

Note. 1 indicates the assigned category.