# THE EFFECTS OF TEACHING STRATEGIES ON PRIMARY SCHOOL STUDENTS' READING OUTCOMES AND INTEREST IN READING

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Abstract

Teaching text comprehension in primary school aims to develop long-lasting skills. This study assessed the direct and indirect effects of teaching strategies on students' reading and interest in reading in primary school. Two hundred and twenty Estonian primary school students and their 18 native language teachers participated in the study. Correlation analysis indicated that students who achieved better results in reading and who were interested in reading in grade 1 had better results in vocabulary, text comprehension and reading interest in grade 3. Moreover, students' vocabulary acquisition and text comprehension in grades 1 and 3 were associated with the promotion of students' reading interest by teachers in grade 3. A structural equation model revealed that the frequent use of teaching strategies by teachers in grade 1 had a small positive longitudinal effect on students' reading outcomes and interest in reading in grade 3. Knowledge of the different effects of teaching strategies on students' reading outcomes and interest in reading would optimally promote students' text comprehension.

Keywords*:* teaching strategies, text comprehension, vocabulary, interest in reading, native language

## 1.  INTRODUCTION

Student- and teacher-related factors, including properly guided instruction, influence the development of text comprehension (Alvermann & Eakle, 2003; Cain & Oakhill, 2011). The instruction is effective when teachers use prudent, age-appropriate strategies in their lessons to develop students' competencies (Calero & Escardíbul, 2019). Wisely chosen strategies enhance students' reading skills and foster their interest in reading (Wigfield et al., 2016). They subsequently support students' reading outcomes, which are measured by their vocabulary breadth and depth and mastery to comprehend texts (Pearson et al., 2005). However, teachers tend to use teaching strategies quite persistently (Guskey, 2002; HITS, 2019;), and the effects of these strategies on students' outcomes in reading and interest in reading are lower than expected (Guthrie et al., 2013). In other words, *teacher effects* are not fully understood.

Text comprehension improves over time as the reader matures cognitively and socially, acquires experience with more challenging texts and benefits from classroom instruction (Cain & Oakhill, 2011). Therefore, teaching strategies for enhancing students' reading competencies should vary according to students' developmental and school levels (Stipek, 2004). Nevertheless, prior research has demonstrated the controversial effects of teaching strategies on students' proficiency in text comprehension (Saxton, 2010; Tang et al., 2017), vocabulary acquisition (Fahrurrozi, 2017) and reading interest (Guthrie et al., 2007; Wigfield et al., 2016). More precisely, cross-sectional studies have investigated the confluence of these variables and mainly indicated short-term effects (Kikas et al., 2018; Käsper et al., 2018).

Instead of a simple assessment of the immediate effects of teaching strategies on students' reading and interest in reading (Cambria & Guthrie, 2010), investigating simultaneously the short- and long-term effects of teaching strategies on students' text comprehension, vocabulary and interest in reading is more relevant. In this regard, this study aimed to determine the direct and indirect effects of teachers' teaching strategies on students' reading outcomes and interest in reading in primary school.

### 1.1  Teaching strategies for the development of students' text comprehension

Scholars use various concepts to describe teaching strategies. Some researchers believe that teaching strategies are based on instructional approaches and involve different instructional methods (Tennent, 2015) and specific actions or techniques (Cohen, 1996). Other authors assert that teaching strategies encapsulate concrete teaching activities, such as conducting discussions, brainstorming or group work, to achieve specific academic goals (Akdeniz, 2016; Wehrli & Nyquist, 2003). In accordance with their instructional goals, teachers select strategies which are designated for each lesson (Brophy, 2001). According to Hattie (2015), strategies have different effects on students' outcomes. If teachers aim to improve students' vocabulary and

text comprehension and support their reading interest, they should use multiple strategies. In the current study, the concept of *teaching strategy* is considered a structured plan formed from a set of specific teaching activities that teachers use in classrooms to achieve their defined goals (Adom et al., 2016).

A major focus in language lessons at the beginning of primary school is developing vocabulary (Foorman et al., 2006; Rockoff, 2004). Activities that widen existing vocabulary and enhance reading comprehension are implemented to build students' vocabulary (Cain & Oakhill, 2011). These activities include determining the meanings of unfamiliar words and explaining them with synonyms (Marzano, 2004), reframing the definitions of words with age-appropriate language, encouraging students to implement new words in familiar contexts (Fisher & Frey, 2008) and solving puzzles and word games to expand vocabulary (Foorman et al., 2006). To encourage vocabulary retention, teachers may support novice readers with repetition, explicit explanations and the use of open-ended questions about new words (Garner & Bochna, 2004). According to research, vocabulary is a main predictor of text comprehension and, consequently, of academic success (Biemiller, 1999; Cunningham & Stanovich, 1997; Lesaux & Kieffer, 2010). Students with poor reading outcomes often fail to understand the meaning of a text because their capacity to comprehend it is compromised by their limited vocabulary (Cain & Oakhill, 2011).

Teaching text comprehension includes activities ranging from decoding words to promoting inference-making skills (Oakhill et al., 2015). Text comprehension strategies include instructing students how to rewrite a text (Duke & Pearson, 2002), divide the text into sections, identify the main idea of story events and generate an overview of the topics of a text (Cain & Oakhill, 2011; Eilers & Pinkley, 2006). By using these activities over several years, teachers can help students become independent readers. When students' reading skills have improved, teachers can teach students how to combine words into larger units, to analyse, integrate and summarise the text, and to make inferences about its content (Cain & Oakhill, 2011). Considering that reading outcomes and interest in reading are related (Wigfield et al., 2016), teachers should support students' interest by using different types of texts and combining various tasks (Graesser et al., 2005).

To encourage students' interest in new vocabulary and reading, teachers should make the learning process interactive (e.g. using role plays, word games and Jeopardy-style quizzes). By activating students' prior knowledge through examples and making connections to real-life situations, teachers establish a more precise purpose for reading or teach students how to analyse text with discussions (Francois, 2016; Guthrie et al., 2007). Consistently reading for pleasure typically culminates in competent and high-achieving readers (Tang et al., 2017). It has been found that students with poor reading skills are less motivated to read than their peers who demonstrate better reading results. Therefore, students with low interest in reading need continuous instructional support from their teachers with age-relevant texts and topics that are relatable to the students' real-life experiences (McRae & Guthrie, 2009).

*1.2  Effects of teaching strategies on students' reading and interest*

The effects of teaching strategies on primary school students' reading outcomes and reading interest have been studied cross-sectionally and longitudinally. Cross-sectional studies, however, have yielded controversial results. On the one hand, teachers' strategies improve students' reading outcomes and support their interest in reading (Barber & Rutherford, 2011; Perry et al., 2007). On the other hand, evidence shows that teaching strategies may negatively affect both students' reading outcomes and interest in reading (Käsper et al., 2018; Lerkkanen et al., 2012; Stipek et al., 1995). Previous research has shown that if teachers focus on teaching grammar, students' vocabulary building may impede. Moreover, strategies to teach grammar and text comprehension should be used consciously to avoid diminishing students' reading interest (Käsper et al., 2018).

At the beginning of primary school, the focus is on students' elementary reading skills (e.g. decoding speed and accuracy, acquisition of the meaning of words). Vocabulary acquisition is a relatively slow process (Cain & Oakhill, 2011), and the meanings of unfamiliar words make it difficult to understand the text (Gleason & Ratner, 2009). These are the reasons why students need playful age-appropriate activities. Developing vocabulary through games has been found to have a positive longitudinal effect on subsequent results (Silva & Cain, 2015). In a study conducted amongst grades 1 and 2 students and their teachers, the researchers found that by teaching to students how to expand their vocabulary, students' performance in vocabulary tests (VTs) improved by 75% over two years (Van Hees, 2011). Another study examined whether students' reading outcomes improved over time when they received up to three years of individualised teaching strategies from grades 1 to 3 (Connor et al., 2013). The results revealed that students who received individualised instructions in all three grades demonstrated better reading outcomes by the end of grade 3 compared with those who did not receive such instructions.

In the upper grades of primary school, texts become more complex, the number of concepts in texts increases and students need to acquire more knowledge. Monitoring the text comprehension process and promoting students' critical thinking, self-regulating and analysis skills are appropriate activities for teachers (Kärbla et al., 2018). A two-year study with grades 5 and 6 students examined the effects of content instruction (McKeown et al., 2009). Teachers asked open-ended questions from the students (e.g. What is happening in the text?), and they emphasised thinking and learning processes to evoke the meaning of a text (e.g. How can a text be summarised?). The findings of this research revealed a modest effect of content instruction on students' text comprehension results.

*1.3 Estonian practice of teaching reading in primary school*

In Estonia, there is an integrated syllabus for Estonian Language and Literature up to grade 4, which includes both language and literacy instruction goals and describes the achievements of mother-tongue students (see Põhikooli riiklik õppekava, 2011/2014). According to the syllabus, teaching text comprehension involves using age-appropriate oral and written texts in the classroom and developing students' communication competence by enhancing their cognitive skills (e.g. how to apply knowledge and make inferences or understand and evaluate texts). The majority of Estonian children acquire the basic skill of reading simple one- and two-syllable words in kindergarten (Torppa et al., 2019). When they enter primary school at seven years old, their reading instruction focuses on decoding speed and accuracy and comprehension at the literal level (Soodla et al., 2019). By the end of grade 3 (age 10), students are expected to read fluently and comprehend various types of listening and reading texts, such as fictional and informational texts (Põhikooli riiklik õppekava, 2011/2014). However, there is a potential risk that poorer readers—those who would still need support in basic skills—may suffer from a premature focus on advanced competence (Torppa et al., 2019).

In Estonia, primary school teachers provide education to the same students in the first three or four grades, sometimes up to grade 6. Previous studies have shown that in consecutive years, Estonian primary school teachers remain quite stable in their teaching practice preferences (Uibu et al., 2010; Uibu & Männamaa, 2014). In particular, there is no significant difference in their practice of developing students' comprehension and knowledge application (Uibu & Männamaa, 2014). Only the promotion of the mechanical acquisition of knowledge and skills increases over the years. Another study which focused on teachers' teaching strategies indicated that during the first three grades, teachers prefer to use active learning for promoting students' text comprehension skills (Käsper et al., 2020). In grade 1, teachers prefer strategies that give students opportunities to choose what they would like to read (Kikas et al., 2018). This can be effective when students have already acquired decoding fluency and lower-level comprehension skills. Thus far, studies concerning the effects of teachers' teaching strategies on students' reading outcomes and interest in reading have not been conducted in Estonia.

*1.4 Aim and hypotheses*

Strategies for developing students' text comprehension, vocabulary and interest in reading have been found to be effective in many cross-sectional studies (Fahrurrozi, 2017; Tang et al., 2017; Wigfield et al., 2016), but other studies have failed to identify a positive effect (Lerkkanen et al., 2012; Stipek et al., 1995). Likewise, studies on the long-term benefits of utilising specific teaching strategies for improving students' reading and interest in reading over several years are limited. The aim of this research was to assess the direct and indirect effects of teaching strategies on

students' reading outcomes and interest in reading in primary school. Two research questions and hypotheses were established.

1) *How do grade 1 students' vocabulary, text comprehension and reading interest affect their outcomes and interest in grade 3?* During primary grades, students learn how to infer implicit information from texts when interest in reading supports the continuous learning process (Pearson et al., 2005). Immediate positive associations between text comprehension, vocabulary and interest in reading are established (Becker et al., 2010). However, there remains a need for research to investigate the extent of these associations from the beginning of primary grade students' reading outcomes and interest in reading to their reading results in upper grades. We assumed an effect of students' reading outcomes and interest in grade 1 on their vocabulary, text comprehension and interest in reading in grade 3.

2) *How do language teachers' strategies directly and indirectly affect their students' reading outcomes and interest in reading in grade 3?* Earlier studies have shown that teaching strategies, in general, are effective in promoting students' text comprehension, vocabulary and reading interest (Connor et al., 2013; Silva & Cain, 2015; Van Hees, 2011). A clear understanding of the efficacy of particular strategies at the beginning of primary grades will prevent the use of potentially inadequate strategies in upper grades. However, there is no clear evidence of how teaching strategies will affect students' reading outcomes and reading interest. We hypothesised that the strategies used to develop students' vocabulary and enhance their text comprehension and reading interest would be effective in the short and long terms.

On the basis of previous research, we constructed a hypothesised mediation model (Kärbla et al., 2018; Käsper et al., 2018). The relations between students' reading outcomes (i.e. vocabulary and text comprehension) and interest in reading and the effects of teachers' teaching strategies on students' reading outcomes and interest are summarised in Figure 1.

Figure 1. *Hypothesised mediation model.*

GRADE 1: TEACHERS          GRADE 1: STUDENTS          GRADE 3: STUDENTS
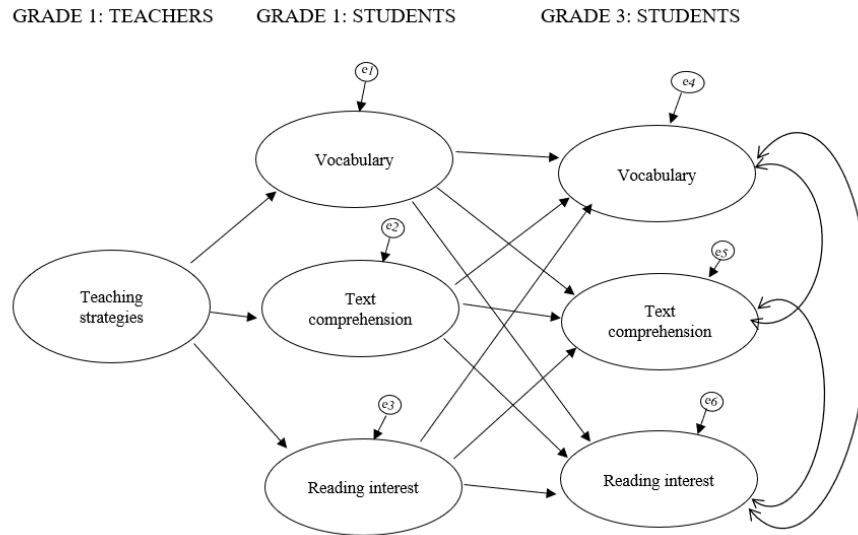


In the model, students' grade 1 reading results and reading interest directly affect their vocabulary acquisition, text comprehension and interest in reading in grade 3. Teachers' teaching strategies describing various activities for promoting students' vocabulary, text comprehension and reading interest have been combined into one latent factor. According to the model, teaching strategies affect students' grade 3 vocabulary, text comprehension and reading interest via the grade 1 results. Students' vocabulary, text comprehension and reading interest values may also be influenced by other factors, as well as by potential measurement errors, which are designated by the letter 'e' in the model.

## 2.   METHOD

### 2.1  Sample

Primary school students from grades 1 and 3 and their native language teachers from 12 Estonian schools participated in the study. Only those students (N = 220) and their teachers (N = 18) who were assessed over two years were analysed in this study. They came from small and large schools in rural and urban areas. The participants' principal language was Estonian. The average age of the students at the beginning of grade 1 was 7.18 years (standard deviation [SD] = .43; min = 6; max = 9), whereas their average age in grade 3 was 9.10 years (*SD* = .37; min = 8; max = 11). The sample consisted of 103 boys (46.8%) and 117 girls (53.2%).

All teachers provided education in regular classes to the same students in the first three grades. The average class size was 21.14 students ($SD$ = 4.56; min = 7; max = 26). The teachers were all females aged between 25 and 60 years ($M$ = 43.42; $SD$ = 9.76). Grade 1 teachers' teaching experience ranged from one to 39 years ($M$ = 18.04; $SD$ = 11.94). Grade 3 teachers' average age was 46.92 ($SD$ = 10.06), and their teaching experience ranged from 2 years to 41 years ($M$ = 22.12; $SD$ = 12.38).

## 2.2 Instruments

The authors developed all the tests and questionnaires used in the present study. For both grades 1 and 3 students, the test included text comprehension and vocabulary parts and a questionnaire for assessing interest in reading. For teachers, a questionnaire was developed to measure their use of teaching strategies. To ensure construct validity, the authors analysed subject-related theoretical materials and considered previous studies (Sullivan, 2011). The relevance of items was discussed in the research group and with in-service teachers to achieve content validity in the instruments. The instruments for students were piloted in grade 1 (N = 48) and grade 3 (N = 58). A teaching strategy questionnaire was developed for teachers and piloted amongst four primary school teachers. The questionnaire was completed and piloted two years later. In both versions, minor changes were made to the wording of items and instructions and to the layout of the instruments.

### 2.2.1    The instruments for the students

*Text comprehension tests (TCTs).* Students' skills in text comprehension were measured by several tasks formulated based on theoretical principles (Kintsch, 1998) and earlier studies (Cambria & Guthrie, 2010; Uibu & Timm, 2014; Wang & Guthrie, 2004). Moreover, the authors also considered the requirements of the National Curriculum for Basic Schools (Põhikooli riiklik õppekava, 2011/2014). Students in both grades 1 and 3 were assigned a fictional text to read. The grade 1 text included 304 letters, 59 words and 5 sentences (the average length of words was 5.15 letters, and the average length of sentences was 12 words). After reading the text, the students had to choose the right answer ($n$ = 9) from a multiple-choice list (e.g. *Girls want to play with …* (a) bricks, (b) boys, (c) dolls [in text: *dolls*]).

In grade 3, the text was more complicated, including 2071 letters, 350 words and 40 sentences (the average length of words was 5.76 letters, and the average length of sentences was 8.75 words). Students' text comprehension was measured with various tasks, which included 18 items altogether. In the first task, sentences had to be arranged in accordance with the text (four items). The following is an example: (a) *A boy read a new book*, (b) *The friends became famous because they released the city from rats* (correct answer: [b]). In the second task, which involved identifying the main idea, the students were given three sentences for each passage and were instructed to decide which sentence best expressed the main idea of the passage

(three items). The following is an example: (a) *The friends ordered cakes and lemonade at the restaurant*, (b) *The friends had lunch at the restaurant* and (c) *The friends felt uncomfortable at the restaurant* (correct answer: [a]). In the third task, which involved matching, the students were instructed to mark the right answer to each of the three questions (six items). For example, one of the questions was as follows: *What did the friends order at the restaurant?* The list of possible answers was as follows: (a) *The friends planned a vacation*, (b) *The waitress kept the customers waiting for too long*, (c) *The friends did not go on vacation yet*, (d) *One of the friends read about their fame from the newspaper*, and (e) *The friends could not order anything because the waitress did not come* (correct answer: [e]). The last task consisted of multiple-choice questions focused on evaluating the text (five items). The following is an example: *What kind of text was this?* (a) *fiction*, (b) *based* on real life, and (c) folktale (correct answer: [a]).

The students' answers in the TCTs were calculated as the number of correct answers. One-factorial exploratory factor analyses (EFA) for grades 1 and 3 TCTs were conducted with a fixed loading of items in one factor. All items with factor loadings below .40 were excluded (Field, 2009). Therefore, the number of items in both TCTs was decreased, and the final solution for grade 1 was four items and for grade 3, 12 items. The internal consistencies (Cronbach's α) of the grade 1 TCT was .59 and for the grade 3 test, α = .81.

*Vocabulary tests* (VTs). For the VTs, words were selected from the texts used in grades 1 and 3. Only the words included in the 10,000 most frequently used words in the Estonian frequency dictionary (Kaalep & Muischnek, 2002) and the words used in primary school textbooks (Kitsnik & Metslang, 2011) were included in the test. In both grades, the students had to connect words from two columns. The first column contained words from the text (five items in grade 1; nine items in grade 3), whereas the second column included the synonyms of these words in random order (eight items in grade 1; 27 items in grade 3). The students were instructed to choose the correct synonyms. Their answers were coded dichotomously: 1 (right answer) or 0 (wrong or unanswered). The one-factorial model for vocabulary was conducted using EFA. The solution for grade 1 VT was four items (Cronbach's α = .60), and that for grade 3 VT was eight items (α = .82).

*Reading interest questionnaire* (RIQ). The questionnaire for measuring students' interest in reading was developed based on the PISA survey (2015; 2018) and the requirements of the National Curriculum for Basic Schools of Estonia (Põhikooli riiklik õppekava, 2011/2014). Students were asked to rate their interest in reading on a three-point scale: 1 – I do not agree, 2 – I agree partially and 3 – I agree. The RIQ for grade 1 measured pupils' reading interest generally (six items), whereas the questionnaire for grade 3 was more comprehensive (21 items). After exclusion of the items with loadings below .40 with the one-factorial EFA, the solution for grade 1 RIQ included five items (Cronbach's α = .63). Furthermore, the best-fit EFA model for grade 3 RIQ contained two factors. The first scale, *Reading interest* (*n* = 7; α = .80), aimed at assessing students' interest in reading (e.g. *Reading is my favourite*

*activity*). The second scale, *Interest in vocabulary* (*n* = 5; α = .72), aimed at measuring students' interest in vocabulary (e.g. *I like to learn new vocabulary in my native language lessons*).

### 2.2.2    Questionnaire for teachers

The *Teaching Strategies Questionnaire* (TSQ) was compiled to assess the frequency of use of teachers' activities in order to support students' text comprehension, acquisition of vocabulary and reading interest in grade 1 (seven items) and grade 3 (21 items). TSQ was created based on earlier studies (Käsper et al., 2020; Marzano, 2004; Sekelj & Rigo, 2011; Silva & Cain, 2015). In formulating items suitable for Estonian teachers, the requirements of the National Curriculum for Basic Schools were considered (Põhikooli riiklik õppekava, 2011/2014). The 18 teachers were asked to rate on a six-point Likert scale how often they promote students' vocabulary, text comprehension and reading interest in lessons (1 – not at all, 2 – not more than once a month, 3 – twice a month, 4 – once a week, 5 – twice a week, 6 – almost every day). The instructions for each item read as follows in both grades: 'In language lessons, I use...', which was followed by a list of teaching activities. Example 1, the sentence 'In language lessons, I use rewriting new vocabulary from the text to help students memorise words better', assessed how often teachers improve the breadth of vocabulary of students. Example 2, the sentence, 'In language lessons, I use different types of texts to ensure interest for out-of-class reading', assessed how often teachers draw students' interest in extra-curricular reading. The TSQ score was calculated for each teacher as the mean of item scores. The internal consistency of the TSQ for grade 1 was α = .74. For the three scales of the TSQ, the internal consistencies were as follows: developing students' vocabulary (α = .56), text comprehension (α = .81) and reading interest α = .68 (see Table 1 in the Results).

### 2.3  Procedure

School principals and teachers provided approval to conduct the study in two data collection phases (in grades 1 and 3). Parents provided their written consent to allow their children to participate in the study. The authors and study assistants took the consent documents and instruments for students and teachers to the schools in closed envelopes. The procedure of the study was explained to the teachers before data collection (e.g. how to administer the tests for the students in the lessons) and followed by the teachers with the aid of printed instructions (e.g. how to start with a short introduction about the test and how to perform the test). The students completed the tests and questionnaire during one native language lesson (approximately 45 minutes) under their teacher's supervision. Those students who did not accomplish at least half of the tasks or questions on the TCT, VT and RIQ were excluded from the analysis. After the students had completed the tests, their teachers filled out the TSQ, which had a response rate of 100%.

*2.4  Data analyses*

The analyses were conducted using SPSS and Amos, version 26. To identify the phenomena underlying the measured variables in the students' instruments (TCT, VT and RIQ) and in the teachers' TSQ, the one- or two-factorial models were tested using EFA. Descriptive statistics were carried out, and Pearson correlation coefficient was used to find statistically significant correlations between the teachers' teaching strategies and their students' aggregated results at the class level for text comprehension, vocabulary and reading interest.

A mediated structural equation model (SEM) was built to determine the effects of grade 1 students' text comprehension, vocabulary and reading interest and the indirect and direct effects of teachers' teaching strategies on grade 3 students' text comprehension, vocabulary and reading interest. SEM as a multivariate statistical method enabled the testing of hypotheses related to the latent structure of variables and their predictive relations (Kline, 2005). For that purpose, the standardised mean scores of the students' tests and questionnaires and the teachers' questionnaires were calculated, as the instruments included different numbers of items. To develop the mediation model, several fit indices of goodness-of-fit were considered whilst accepting the conclusions about measured effects. The comparative fit index (CFI), Tucker-Lewis index (TLI) and incremental fit index (IFI) indicated a good fit, with a cut-off point of .90 (Hu & Bentler, 1999). According to Hu and Bentler (1999), the root means square error of approximation (RMSEA) goodness-of-fit measure has a modest fit if it yields scores greater than .10, a mediocre fit if it yields scores from .08 to .10 and an excellent fit if it yields scores from .01 to .07.

## 3.    RESULTS

This study aimed to examine the effects of teachers' teaching strategies on students' text comprehension, vocabulary and reading interest in primary school. For a better understanding, descriptive statistics were carried out. Table 1 shows the means, SDs, minimum and maximum scores and internal consistencies of all measures.

Table 1. *Descriptive statistics of the students' results and teaching strategies.*

| Measures | Students' Results (N = 220) | | | | |
|---|---|---|---|---|---|
| | M | SD | Min | Max | *a* |
| *Grade 1* | | | | | |
| 1 Vocabulary | 2.85 | 1.21 | 0 | 4 | .60 |
| 2 Text comprehension | 2.25 | 1.33 | 0 | 4 | .59 |
| 3 Reading interest | 2.51 | .41 | 1 | 3 | .63 |
| *Grade 3* | | | | | |
| 4 Vocabulary | 6.45 | 2.03 | 0 | 8 | .82 |
| 5 Text comprehension | 7.78 | 2.93 | 0 | 12 | .81 |
| 6 Vocabulary interest | 2.37 | .40 | 1 | 3 | .72 |
| 7 Reading interest | 2.09 | .49 | 1 | 3 | .80 |
| | Teaching Strategies (N = 18) | | | | |
| *Grade 1* | | | | | |
| 8 Text comprehension | 4.51 | .78 | 1 | 6 | .75 |
| *Grade 3* | | | | | |
| 9 Vocabulary | 4.92 | .71 | 1 | 6 | .56 |
| 10 Text comprehension | 4.49 | .78 | 1 | 6 | .81 |
| 11 Reading interest | 4.91 | .75 | 1 | 6 | .60 |

The Pearson correlations between the observed constructs were calculated to estimate the effects of teachers' teaching strategies on the students' grades 1 and 3 text comprehension, vocabulary and interest in reading. Based on the students' results, the average score for each scale was calculated at the class level (N = 18). Then, the students' aggregated results were correlated with the score of each teaching strategy used by the language teachers (Table 2).

Table 2. *Correlations between the students' aggregated results at the class level (n = 18) and their teachers' teaching strategies.*

| | Measures | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Students' Average Results at the Class Level | | | | | | Teaching Strategies | | |
| **Students' average results at the class level** | *Grade 1* | | | | | | | | | | | |
| | 1 Vocabulary | 1.00 | | | | | | | | | | |
| | 2 Text comprehension | .48* | 1.00 | | | | | | | | | |
| | 3 Reading Interest | .63** | .50* | 1.00 | | | | | | | | |
| | *Grade 3* | | | | | | | | | | | |
| | 4 Vocabulary | .80** | .66** | .81** | 1.00 | | | | | | | |
| | 5 Text comprehension | .75** | .57* | .55* | .78** | 1.00 | | | | | | |
| | 6 Vocabulary interest | .57* | .26 | .47* | .46 | .34 | 1.00 | | | | | |
| | 7 Reading interest | .45 | .27 | .33 | .39 | .32 | .54** | 1.00 | | | | |
| **Teaching strategies** | *Grade 1* | | | | | | | | | | | |
| | 8 Text comprehension | .24 | .03 | −.01 | .07 | .05 | .07 | −.32 | 1.00 | | | |
| | *Grade 3* | | | | | | | | | | | |
| | 9 Vocabulary | .61** | .35 | .44 | .49* | .33 | .36 | .06 | .26 | 1.00 | | |
| | 10 Text comprehension | .13 | −.02 | −.11 | −.10 | −.09 | −.11 | −.16 | .29 | .45 | 1.00 | |
| | 11 Reading interest | .64** | .52* | .61** | .64** | .57* | .47 | .33 | .12 | .76** | .31 | 1.00 |

*Note*: ** indicates $p < .01$; * indicates $p < .05$.

Table 3. *Fit indices and standardised direct effects of grade 3 teachers' teaching strategies on students' results in grade 3.*

| Teaching Strategy | Fit Indices of the Models | | | | | | | | Strategies' Direct Effects on Students' Results | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *df* | CMIN/DF | $\chi^2$ | p | CFI | TLI | IFI | RMSEA | Voc | Text | VocInter | ReadInter |
| 1 Vocabulary | 166 | 1.74 | 289.002 | <.001 | .90 | .90 | .91 | .05 | .23 | .19 | .10 | .09 |
| 2 Text comprehension | 226 | 1.61 | 363.882 | <.001 | .92 | .90 | .92 | .05 | −.11 | −.12 | −.14 | −.12 |
| 3 Reading interest | 166 | 1.75 | 290.132 | <.001 | .91 | .90 | .91 | .05 | .50 | .18 | .25 | .22 |

*Note:* All effects are statistically significant, $p < .01$; Voc = vocabulary; Text = text comprehension; VocInter = vocabulary interest; ReadInter = reading interest.

The first hypothesis was supported by the statistically significant correlations between students' grades 1 and 3 results at the class level. The vocabulary results in grade 3 showed t correlations (*r* above .66) with the characteristics of grade 1: vocabulary, text comprehension and reading interest. Furthermore, text comprehension in grade 3 was associated with all the students' results in grade 1 (*r* above .55) and with their vocabulary in grade 3 (*r* = .78). A moderate correlation was identified between grade 3 students' interest in vocabulary and interest in reading (*r* = .54).

Mainly moderate but statistically significant correlations were found between the teaching strategy for developing students' interest in grade 3 and the students' aggregated results in vocabulary and text comprehension in both grades 1 and 3 (*r* between .52 to .64). Significant correlations were also identified between teachers' strategy of developing students' vocabulary and the students' results in grade 1 (*r* = .61) and grade 3 (*r* = .49). A strong correlation was calculated between two teaching strategies used by the language teachers in grade 3, namely, promoting students' reading interest and developing their vocabulary (*r* = .76).

The authors used SEM to estimate the direct effects of teaching strategies used by language teachers in grade 3 on their students' results of the same year. Three SEM models were conducted separately for teachers' teaching strategies to promote students' vocabulary, text comprehension and reading interest in grade 3 (Table 3). The single-level models fit the data well. Teachers' strategy of supporting students' reading interest had the strongest positive direct effects in grade 3 on the students' results in vocabulary (β = .50; *p* < .01) and interest in vocabulary (β = .25; *p* < .01). Teachers' strategy of promoting students' reading interest had smaller positive effects on the students' interest to read (β = .22; *p* < .01) and comprehend the text (β = .18; *p* < .01). A positive effect was also identified for teachers' strategy to develop students' vocabulary (β = .23; *p* < .01) as well as the text comprehension results (β = .19; *p* < .01). Promoting students' vocabulary had positive but small effects on the students' interest in vocabulary (β = .10; *p* < .01) and interest in reading (β = .09; *p* < .01). Negative associations were found between teachers' use of text comprehension strategies and all the results of their students in grade 3 (see Table 3).

The hypothesised mediated SEM model (Figure 1) was tested to determine the direct and indirect effects of grade 1 teachers' strategies on their students' text comprehension, vocabulary and reading interest in both grades 1 and 3. The final mediated model (Figure 2) was conducted by modifying the hypothesised model, in which students' reading interest in grade 3 was divided into two factors as the result of EFA, and non-significant effects were removed to fit the data. In the mediated model, the effects of grade 1 teaching strategies on all the results of the students in grade 1 were positive but small (see Table 2). The model fit indices for the SEM model were acceptable: *df* = 337, χ2 = 525.278, *p* =.000, CFI = .90, TLI = .90, IFI = .90 and RMSEA = .05.

*Figure 2. The mediated model of direct and indirect effects of teachers' teaching strategies on students'*
*outcomes and interest.*
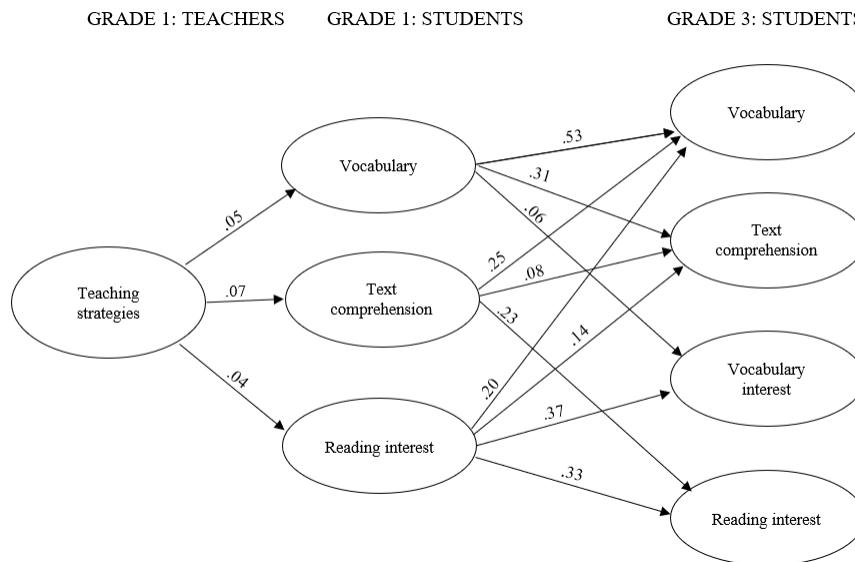


It was assumed that the teaching strategies used in grade 1 to develop students' vocabulary, text comprehension and reading interest would be effective in the long term. It was found that students' higher vocabulary scores in grade 1 predicted their grade 3 vocabulary ($\beta$ = .53; $p$ < .01) and text comprehension results ($\beta$ = .31; $p$ < .01). Their higher comprehension scores in grade 1 also predicted their higher scores in vocabulary ($\beta$ = .25; $p$ < .01) and reading interest in grade 3 ($\beta$ = .23; $p$ < .01). Reading interest in grade 1 was predictive of students' higher interest in grade 3 in vocabulary ($\beta$ = .37; $p$ < .01) and interest in reading ($\beta$ = .33; $p$ < .01), vocabulary interest ($\beta$ = .20; $p$ < .01) and text comprehension ($\beta$ = .14; $p$ < .01).

Based on the SEM model, the indirect effects of teaching strategies on the students' results in grade 3 via the effects of students' results in grade 1 were calculated. For example, to detect the indirect effect of grade 1 teaching strategies on students' vocabulary in grade 3, the effects from teaching strategies on grade 1 reading results and interest were multiplied by the effects of the reading results and interest on vocabulary in grade 3 and the three products summed up. Altogether, the teaching strategies implemented by the teachers in Grade 1 had a small effect on the students' text comprehension ($\beta$ = .03; $p$ < .01), reading interest ($\beta$ = .03; $p$ < .01) and vocabulary interest ($\beta$ = .02; $p$ < .01). The biggest indirect effect of teaching strategies was calculated for students' vocabulary in grade 3 ($\beta$ = .06; $p$ < .01).

### 4.   DISCUSSION

Knowledge about how teaching strategies affect students' vocabulary, text comprehension and interest will allow teachers to support students' reading outcomes through their reading interest in the best possible way. This study examined the direct and indirect effects of teachers' teaching strategies on their students' reading outcomes and reading interest in Estonian primary schools. Correlation analysis indicated that students who achieved better results in reading and who were interested in reading in grade 1 had better results in vocabulary, text comprehension and reading interest in grade 3. Moreover, the development of students' reading interest by teachers in grade 3 was associated with the students' vocabulary acquisition and text comprehension in both grades 1 and 3. A structural equation model revealed that the frequent use of teaching strategies by teachers in grade 1 had a small positive long-term effect on students' reading outcomes and interest in reading in grade 3. Therefore, teachers should more conscientiously use various teaching strategies that consider students' age, reading competence and interest.

### 4.1  Relationship between reading outcomes and interest

We expected that students who achieve better results in vocabulary, text comprehension and reading interest in grade 1 also have better results in grade 3. A strong positive correlation ($r = .80$) was observed between students' vocabulary results in grade 1 and their vocabulary results in grade 3. Furthermore, students' vocabulary in grade 1 positively correlated with their text comprehension in grade 3. In some studies, results similar to ours were obtained. In their longitudinal study, Verhoeven et al. (2011) identified the associations between vocabulary growth and reading development amongst Dutch children throughout primary school. More precisely, the students' relative rates of vocabulary growth predicted their proficiency in text comprehension in later primary grades. Another study examined the changes in students' vocabulary and text comprehension in Estonian primary schools (Uibu & Timm, 2014). Vocabulary was found to be the most significant predictor of text comprehension in three consecutive years. Students with advanced vocabulary were more likely to have advanced proficiency in text comprehension over the course of many years.

We found that reading interest in grade 1 was associated significantly with students' reading outcomes in grade 3, particularly vocabulary ($r = .81$) and text comprehension ($r = .55$). Without reasonable stimulation, students' reading motivation may decline. Becker et al. (2010) investigated the bidirectional relationships between interest and comprehension amongst students from grades 3 to 6. Their study concluded that the association between reading interest and students' later text comprehension was mediated by how much reading the students did. Thus, how students comprehend texts and acquire vocabulary is related to their further interest in reading (Wang & Guthrie, 2004).

*4.2 Direct effects of teaching strategies*

We assumed that the strategies used to develop students' vocabulary and enhance their text comprehension and reading interest would be effective in the short and long terms. In this study, direct effects of grade 3 teachers' teaching strategies were found on their students' results in the same year. The strongest positive effect was detected between supporting students' reading interest and the students' vocabulary results (β = .50). The moderate positive effects in grade 3 were also found between supporting students' reading interest and the students' interest in vocabulary and reading as well as the text comprehension results. In line with our findings, previous research has established the positive impact of grade 3 teachers' teaching strategy of developing reading interest on grade 3 students' reading outcomes and reading interest (Käsper et al., 2018). In addition, students' reading interest is positively associated with their progress in vocabulary (Angelos & McGriff, 2002) and text comprehension (Applegate & Applegate, 2010; Wigfield et al., 2016). Various types of texts considering students' interest are recommended to promote students' vocabulary and reading skills via interest. Age-appropriate activities (e.g. story (re)telling, word games and role plays) in which students are actively engaged help sustain their interest and promote their reading skills (Guthrie & Klauda, 2014; Pressley & Hilden, 2002). A comparative study conducted in Estonia and Finland with 70 grade 3 teachers found that combining various strategies has a positive effect on students' text comprehension (Tang et al. 2017).

Some negative associations in grade 3 were found between what teachers did to promote students' text comprehension and their students' vocabulary, text comprehension and interest. One possible explanation for these results might be that learning how to comprehend the text is a difficult process for students because it involves several cognitive processes at different comprehension levels, i.e. making inferences and analysing and evaluating texts (Tennent, 2015). In order to comprehend the text, students need to understand the meaning of words. However, vocabulary building is a complicated process, as students need to determine the meanings of unfamiliar words to achieve a deeper understanding of these words, as well as to improve the use of such words in different contexts (Nation, 2001; Qian, 2002). Therefore, teaching students how to derive the meanings of unknown words in sentences and in a text is necessary. Nevertheless, supporting students' interest in expanding their vocabulary independently is not enough (Block & Mangieri, 2006).

The negative effects of teachers' text comprehension strategies on students' reading interest in grade 3 can be explained differently. Previous research has found that over-repeating new vocabulary or re-telling stories to confirm the content of the text in reading lessons might diminish students' interest in reading (Sekelj & Rigo, 2011) primarily because such activities can be tedious and demotivating for learners, or instruction that makes few attempts to spark students' interest can decrease interest in reading. Another explanation for the measured negative effects might be how certain evaluation practices contribute to some students' declining interest

(Duke & Pearson, 2002). Teachers are required to assess their students' reading skills frequently. Activities that emphasise social comparison and encourage excessive competition amongst students (e.g. class ranking) may make students fixated on how their reading skills compare with those of others, which can erode some feelings of competence and their interest in reading (Wigfield & Tonks, 2004). Instruction in primary grades should encourage active learning, and teaching strategies should involve students' participation in discussions, role plays and dramatising (Harmin & Toth, 2006).

Although previous research has encouraged the use of multiple strategies in the classroom (Tang et al., 2017), teachers may be using an excessive number of strategies, diluting their efficacy. Nevertheless, research has not yet revealed the threshold at which these strategies become ineffective. In other words, with the assumption that teachers are familiar with the strategies used to develop students' vocabulary and text comprehension, overusing some strategies may actually have negative effects on students' reading outcomes and interest in reading.

## 4.3  Indirect effects of teaching strategies

Besides assessing the direct effects of teachers' strategies on students' reading outcomes and reading interest, this study also examined the indirect effects of such strategies. Mediated SEM was used to explore the indirect effects of teachers' teaching strategies on their students' reading outcomes and interest. The teaching strategies implemented by the teachers in grade 1 had small positive effects on the students' vocabulary in grade 3. One possible explanation for our findings might lie in the students' reading habits. It is found that early reading habits are beneficial for vocabulary growth (Cain & Oakhill, 2011). Therefore, the way teachers build a foundation for reading habits at the beginning of primary grades can facilitate vocabulary growth amongst students in upper primary grades. For example, it was found that early enjoyment of books should be nurtured but can be further developed in the early years of schooling to support students' vocabulary (Cain & Oakhill, 2011). Our findings can also be explained by the specific activities that the teachers used in grade 1. When they used activities such as word repetition and explanation together, students' vocabulary results improved by 22%. Thus, combining different teaching activities was found to be the most efficient way to promote students' vocabulary (Biemiller & Boote, 2006).

Next, grade 1 teaching strategies had small indirect positive effects on students' text comprehension in grade 3. In line with our results, Foorman et al. (2006) found significant positive effects on students' text comprehension by activities in which teachers allocate time during reading instruction for their students' reading outcomes. These activities were in a whole-class instruction format with text reading (the teacher reads aloud, the students read aloud and then the students read silently) and feedback about students' reading. The effects of various teaching strategies on primary grade (grades 1 to 5) students' text comprehension have been

investigated in another study (Taylor et al., 2002). It was found that teachers who used activities prompting the analysis and synthesis of skills (e.g. high-level questioning, summarising the content or simply actively involving students) positively influenced students' text comprehension the most. Another possible reason for our near-zero indirect effects could be that teachers and schools approach students in different ways. Some teachers might claim to use different activities more frequently than they actually do because they feel that doing so is required to be an effective teacher. Instead of disclosing the kinds of activities they currently use in their lessons, teachers may report activities they believe they *should* use. As the Estonian Language and Literature syllabus that is used up to grade 4 (Põhikooli riiklik õppekava, 2011/2014) is integrated by nature, it might create the impression that teachers are promoting students' text comprehension when they are actually focusing on something else.

Lastly, we also found a positive but weak indirect effect of grade 1 teaching strategies on students' reading interest in grade 3. A possible explanation for our results could be explained by constant positive feedback. Researchers have established that teachers may foster reading interest by acknowledging students' accomplishments and providing positive feedback (Edmunds & Bauserman, 2006). When students see themselves as capable readers, this could motivate them and thus benefit their reading interest in the long term. Providing positive feedback is also necessary because primary school students' reading interest may naturally decline over their school years (Edmunds & Bauserman, 2006).

### *4.4 Limitations and conclusions*

This study had some limitations related to its methodology. *First*, the vocabulary and text comprehension tasks for students were composed only based on fictional texts. Other types of texts (e.g. informational text or science fiction) may be used with other teaching strategies, which could in turn produce different effects on students' reading outcomes. *Second*, although self-reported questionnaires are typically regarded as efficient instruments to measure the frequency of teaching strategies, they have their own limitations. Notably, teachers' self-reported descriptions may not entirely reflect the reality of the classroom environment. Observations should be included in future studies to mitigate inaccuracies in the self-reported questionnaire. *Third,* it is noted that teacher effects cannot be entangled from other effects, since the same teacher teaches the same students from Grade 1 to 3. Therefore, it is necessary to bear that in mind while conducting the studies by adding potential measurement errors in the analysis. *Fourth*, as common in a longitudinal design, the study was unable to maintain the full retention of participants. Therefore, surveying a larger sample of teachers would be advisable. *Fifth*, teaching strategies vary, and researchers have to make a decision about the kinds of strategies that are most appropriate for the study. In subsequent studies, the impact of completely different strategies could be tested (especially if there are students from the upper grades).

*Sixth*, in grade 1, the reliability of the measures was acceptable, as the number of items in the scales was small. While the correlations between students' results were above .55, that indicates that the measures were correct.

Despite these limitations, the study has several strengths. The study showed the importance of reading interest in text comprehension. The National Curriculum for Basic Schools should emphasise the importance of developing students' reading interest to improve students' comprehension more thoroughly. This topic is interesting and merits investigation amongst policymakers and commercial actors who often try to persuade teachers that their curriculum is effective. This study also revealed the weak positive effects of the teaching strategies used by teachers in grade 1 on their students' vocabulary, text comprehension and interest in the long term. Thus, teachers likely need to change their teaching strategies over the years based on their students' age, abilities and cognitive skills.

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