The Effects of the RAP Strategy Used in a Peer-tutoring Setting to Foster Reading Comprehension in High-Risk Fourth Graders

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Children who do not adequately master the transition from "learning to read" (LTR) to "reading to learn" (RTL) will clearly fall behind in every subject area during their secondary education. The purpose of this study was to determine whether a simple reading comprehension strategy developed by Schumaker, Denton, and Deshler (1984) ("RAP", Read, Ask, and Put) is suitable for application as a low-threshold peer-tutoring intervention under everyday school conditions and to test its efficacy for at-risk students. A randomized two-group design with repeated measures was implemented. We included 22 teams of low-achieving (tutees) and high-achieving (tutors) fourth graders. For the first three weeks, the tutees in the first group were trained in the use of the RAP strategy combined with a token economy, while the students in the second group continued to perform regular classroom activities. During the following four weeks, a scoring system, visual feedback, and verbal encouragement on the basis of attribution theory were employed as interventional components, and all twenty-two low-achieving children received the intervention. The students at risk in the first group improved only slightly in their comprehension skills during the first phase of the experiment, whereas they demonstrated striking gains in the subsequent four weeks. Although the tutees in the second group only participated in the intervention for four weeks, they also exhibited respectable enhancements. The explorative nature of this study does not allow for causal inferences. However, the results provide hope that supporting struggling text comprehenders during their last year of elementary school by using the RAP strategy within a peer-tutorial setting can significantly improve their skill level if the intervention continues for several weeks, including scoring, visual feedback, and operant conditioning.

Keywords: **Elementary School, Reading Comprehension, Paraphrasing Strategy, Peer-tutoring, Motivation, Learning Disabilities**

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Importance of Reading Comprehension

Reading comprehension is "[…] the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (Snow & Sweet, 2003, p. 1). It describes the competence of understanding the intent of a text by mastering the thinking processes of selecting facts, information, or ideas (Veeravagu, Muthusamy, Marimuthu, & Subrayan, 2010). The acquisition of ample reading comprehension skills is one of the main objectives of elementary education (Schmidt, Rozendal, & Greenman, 2002; Grünke, Wilbert, & Stegemann, 2013). As soon as students attain some proficiency in this respect, they are expected to use it in almost every school subject nearly all of the time. Thus, reading comprehension is often considered the most crucial skill for succeeding in formal education (Antoniou, 2010). Moreover, it has a heavy influence on job prospects and private life because of the need to be able to process and understand the meaning of information that comes in written form (e.g., newspaper articles, official letters, emails, text messages, or websites) to classify it and react appropriately (Salas & Peyton, 2009). Reading comprehension skills support adequate participation in social life and culture and prevent social marginalization (Antoniou, 2010; Grünke et al., 2013; Solís, Scammacca, Barth, & Roberts, 2017).

Development of Reading Comprehension

The ability to extract meaning from written text develops over time. During the first three years of their elementary education, most children learn to decode letters into words and sentences ("learning to read", LTR). Subsequently, they typically acquire the competency to arrive at the meaning and extract information from text sources ("reading to learn", RTL) (Harlaat, Dale, & Plomin, 2007). From this point onwards, they are expected to apply this skill in everyday situations at school, as well as in private.

In most cases, this process is continuous, with larger developmental steps during the first months of elementary education and smaller steps as students' progress further (Oakhill, Berenhaus, & Cain, 2015). Before systematic reading instruction is initiated, girls and boys try to memorize texts that are read to them word by word. At the age of six to nine years, instead of superficial memorization, children start to regard texts on a semantic level, which indicates they attempt to identify the overall meaning (Cain, 2015). To enable them to capture the message of a writing product, they require perquisite skills to fall back on. In their Direct and Inferential Mediation Model (DIME), Cromley and Azevedo (2007) point out that background knowledge and familiarity with a substantial variety of sight words both significantly contribute to understanding the main ideas and details of the information read. The same applies to reading fluency skills and text comprehension abilities.

Reasons for Problems in Reading Comprehension and their Consequences

Unfortunately, not all children master the transition from LTR to RTL. This may have multiple causes. For example, struggling comprehenders might lack the ability to apply the complex and sophisticated cognitive and meta-cognitive strategies

necessary to process the information in a text as a result of deficits in executive functioning. They might have a knowledge base that is often too narrow to connect new information with previous knowledge. They may experience difficulty staying on task and thus fail to devote the necessary attention to grasp the meaning of a text. Some children and youth demonstrate problems related to other people, places, or times. These problems impede the chances of capturing what a particular author was trying to convey (Mokhtari & Thompson, 2006; Ostrolenk, Forgeot d' Arc, Jelenic, Samson, & Mottron, 2017; Westby, 2014).

The aforementioned challenges are oftentimes associated with an immigrant background and a low socio-economic status of the students' families (Babuder & Kavkler, 2014; Spencer & Wagner, 2017). The results of the "Progress in International Reading Literacy Study" (PIRLS 2016) indicate that children with a high socio-economic status are one and a half school years ahead in terms of reading comprehension compared to their peers from a deprived background (Mullis, Martin, Foy, & Hooper, 2017). This might be due to the fact that girls and boys from privileged families typically receive more fortified home learning support in an environment that encourages the use of proper language, reading, and writing skills (Crampton & Hall, 2017; Gutman & Feinstein, 2007; Hart & Risley, 1995; Washbrook & Waldfogel, 2010). Numerous studies indicate that in general, these differences are fairly modest in size; however, they are likely to accrue over time to create larger disparities. A poor home learning environment has been shown to substantially add to an overall familial stress level (e.g., Hartas, 2011; Hunt, Virgo, Klett-Davies, Page, & Apps, 2010).

If the risk factors for developing serious text comprehension problems cannot be compensated, they will intensify and lead to serious harmful effects. According to Bailey, Hoeft, Aboud, and Cutting (2016), approximately 10 percent of all students show a remarkably low level of understanding text despite adequate decoding skills at the end of their elementary education and beyond. They demonstrate severe problems remembering or recalling details, drawing conclusions, or predicting outcomes of a writing product. In contrast to proficient readers, they do not routinely use appropriate metacognitive strategies when reading. They fail to locate important passages of a text, summarize the main statements, or use self-questioning techniques to enable comprehension (Graham & Harris, 1997; Swanson & De La Paz, 1998).

The consequences are often dramatic. Poor comprehenders fall further and further behind academically by the end of grade 3 and beyond. As the level of text difficulty that they are expected to process continuously increases over grade levels, they hold less and less chance to keep up with the rest of their class. In secondary education, very little time is spent on explicitly helping students with their reading comprehension (Solís et al., 2017). Thus, struggling students will have difficulties achieving a sufficient grade and are at a high risk for failing to graduate with a decent school leaving certificate (Schmidt et al., 2002). They thus match the definition for children and youth with learning disabilities (LD) by Grünke and Morrison Cavendish (2016) who characterize students with LD as individuals who "… fail to develop the knowledge, skill, will, and self-regulation necessary to succeed in key subject areas" (p. 1).

Appropriate Interventions for Struggling Comprehenders in a Changing School System

To prevent children from falling behind in their reading comprehension skills or from developing an LD, it is crucial to continuously settle discrepancies between an actual and target state. However, most teachers tend to focus mainly on reading fluency and disregard comprehension (Catts, Compton, Tomblin, & Bridges, 2012; Ritchey, Palombo, Silverman, & Speece, 2017). Fluency and basic skills, such as phonological and syntactical awareness, are important. Albeit, particularly children at risk for failure need explicit instruction on how to understand a text, analyze the information it contains, and correctly interpret what the writer is stating.

Because of the key role that reading comprehension plays in school success, enhancing the respective competencies of poor comprehenders by directly and amply teaching them as soon as they have acquired sufficient deciding skills appears to be vital (Kim, Vaughn, Wanzek, & Wei, 2004; Solís et al., 2017). A substantial number of students with LD are educated in mainstream classrooms. Most of these students will not master the transition from LTR to RTL without special help. Therefore, the demanding task is to develop appropriate interventions to adequately support these girls and boys (Harn, Fritz, & Berg, 2014). Interventions that help teachers cope with the challenges of heterogeneous classes are advantageous. Moreover, interventions that can easily be implemented into regular lessons and are beneficial for every student in the class (independent of whether a learner is a strong or a poor reader) are particularly useful (Solís et al., 2017).

To tackle these challenges, there are a number of evidence-based interventions to support struggling readers in inclusive settings to acquire ample text comprehension skills (Berkeley, Scruggs, & Mastropieri, 2010; Harn et al., 2014; Reed & Vaughn, 2012; Suggate, 2016; Watson, Gable, Gear, & Hughes, 2012). Joseph, Alber-Morgan, Cullen, and Rouse (2015) demonstrated the effectiveness of self-questioning for students with and without disabilities in their review of 35 experimental research studies. Furthermore, a secondary analysis of 25 original articles by Mahdavi and Tensfeldt (2013) suggests that a blending of two or more reading comprehension strategies (e.g., peer learning, self-questioning, story grammar and text structure, vocabulary development, story mapping and graphic organizers) seems to be most effective. According to Antoniou (2010), approaches with the highest effectiveness involve a combination of a content-enhancement approach and cognitive and metacognitive strategy instruction. Furthermore, the promotion of reading comprehension should comprise a highly structured and explicit instruction on strategy use, scaffolding and multiple possibilities to practice the strategy (Williams et al., 2005).

RAP strategy

The so-called *RAP strategy* developed by Schumaker, Denton, and Deshler (1994) meets the criteria of the most potent strategies to teach reading comprehension. It was particularly designed for nonfictional, expository texts. "RAP" is an acronym that represents (1) "Read a paragraph", (2) "Ask yourself: What main idea does it contain?", and (3) "Put the main idea into your own words". The purpose of the RAP strategy is to aid students to identify the gist of a given paragraph by executing these three steps (Ellis & Graves, 1990; Hagaman & Reid, 2008; Katims & Harris,

1997). Learners are provided with a scaffold that helps them to not only detect but also remember the key information in an expository text (Hagaman, Casey, & Reid, 2012a, 2012b). They have to break a writing product into paragraphs ("chunks"), ask appropriate comprehension questions, and paraphrase the central thought of a passage in only a few words (Schumaker, Denton, & Deshler, 1994). The strategy uses the self-regulated strategy (SRSD) model by Graham and Harris (1996) to arrange the instruction regarding the principles of cognitive modeling, fading, self-instruction, supported and independent practice (Hagaman et al., 2012a, 2012b; Hagaman, Luschen, & Reid, 2010).

Research indicates that the RAP strategy is effective across multiple age groups (Watson et al., 2012). With regard to middle and high school students with reading comprehension problems and/or LD, there is a stable body of findings that documents the benefits of this approach (Ellis & Graves, 1990; Hagaman et al., 2012a; Hagaman & Reid, 2008; Katims & Harris, 1997; Lauterbach & Bender, 1995). However, the literature on elementary school children is less extensive. The participants in the single case studies by Hagaman et al. (2012b), Ilter (2017), and Kemp (2017) were between nine and eleven years old. In all three studies, the children benefited from the treatment. In every case, one-on-one settings with trained instructors were applied to administer the strategy to the children. Summarizing previous research, the RAP strategy may be an appropriate technique to enhance reading comprehension "that can be easily used in general education classrooms" (Ilter, 2017, p. 148).

Peer-tutoring

As a result of missing resources, it is very challenging for regular school teachers to meet every students' needs for high quality education (McLeskey & Waldron, 2011) and deliver intensive instruction in small groups or in one-on-one-settings (Schmidt et al., 2002). This is particularly true for inclusive school environments with greatly diverse learners. To implement interventions that are evidence-based and at the same time socially valid, easy to apply, and suitable for meeting the needs of different individuals (Mitchell, 2014), peer-tutorial learning might be an appropriate approach for fostering reading comprehension (Schmidt et al., 2002).

Peer-tutoring is defined as a "class of practices and strategies that employ peers as one-on-one teachers to provide individualized instruction, practice, repetition, and clarification of concepts" (Utley, Mortweet, & Greenwood, 1997, p. 9). Several reviews and meta-analyses underlie the effectiveness of this approach across multiple age groups regarding academic benefits, e.g., reading performance and social-emotional aspects (e.g., Bowman-Perrott, Burke, Zhang, & Zaini, 2014; Bowman-Perrott et al., 2013; Ginsberg-Block, Rohrbeck, & Fantuzzo, 2006). Research indicates that students with LD and/or behavior problems benefit from peer-tutoring strategies at least as much as students without special needs (Bowman-Perrot et al., 2013; Mitchell, 2014; Okilwa & Shelby, 2010). Thus, peer-tutoring seems to be an effective method to kill two birds with one stone: to provide effective reading intervention and facilitate social integration in inclusive classrooms (Mitchell, 2014).

Motivational Strategies

Equipping struggling students with effective learning strategies might not always be sufficient. To prevent them from entering a declining spiral of failure, it is also necessary to create a supportive climate that increases their motivation as one of the key factors to support the endurance and achievement of learning objectives. Several studies on the potency of token economies, as well as positive reinforcement through verbal praise and graphical representation provide evidence that the addition of these components to an intervention can lead to remarkable improvements in different learning outcomes (e.g., Grünke, Knaak, & Hisgen, 2018; Grünke, Sperling, & Burke, 2017; Ivy, Meindl, Overley, & Robson, 2017; Leko, 2016; Mercer, Mercer, & Pullen 2011; Mitchell, 2014; Prater, 2018). The effectiveness of these techniques has been documented in major academic subjects, such as reading (e.g., Billingsley, 1977; Dolezal, Weber, Evavold, Wylie, & McLaughlin, 2007), spelling (e.g., Winterling, 1990), and math (e.g., McLaughlin, 1981; Ross, 1991; Rumberger, 2013). Verbal feedback is particularly helpful in boosting motivation in students if it incorporates certain principles from attribution theory. If internal reasons for positive learning results (e.g., effort or skills) and variable causes for negative outcomes (e.g., lack of trying, too difficult tasks) are offered by a teacher, learners seem to feel very encouraged to continue trying (Foote, 1999).

Moreover, systematic and frequently formative evaluation of the learning effect by measuring the results on mastery probes selected from the academic material being taught – as is the case in curriculum-based assessment (CBA) – was found to be very beneficial to increase the learning achievements (Stecker, Fuchs, & Fuchs, 2005). The effects of feedback can be intensified by displaying it visually (Hattie, 2012). Information about learning results can be shared by teachers (e.g., Voerman, Meijer, Korthagen, Simons, & Robert, 2015) or peers (e.g., Schuster, Morse, Griffen, & Wolery, 1996).

Purpose and Research Questions

The purpose of this study was to enhance the scarce body of literature on the effectiveness of the RAP strategy in fostering the ability to understand text in struggling elementary school students. In particular, we aimed to determine how this approach can profitably be implemented in an inclusive classroom environment under everyday conditions in school. Organizing learning for very heterogeneous groups of children can be quite demanding (McLeskey & Waldron, 2011; Schmidt et al., 2002). We attempted to meet this challenge by teaching the RAP strategy to poor text comprehenders through peer-tutoring, thus disburdening classroom teachers from having to constantly attend personally to the specific needs of each child.

Previous studies concerning the RAP strategy have used exclusively one-on-one-settings or small groups with professional educators or university staff to teach this technique to struggling readers (Ellis & Graves, 1990; Hagaman, Casey, & Reid, 2012a; Hagaman & Reid, 2008; Katims & Harris, 1997; Lauterbach & Bender, 1995). In addition, few experiments have focused on elementary school children (Hagaman et al., 2012b; Ilter, 2017; Kemp, 2017). These limitations can be used to derive research desiderata for intervention studies like ours. Hagaman et al. (2012a) state that the RAP strategy is also effective when implemented by professionals without

specialized training; however, it is unclear whether and how this technique works in a peer-tutoring setting and how many peer-tutoring sessions are necessary. This is why we sought to tackle the previously described research questions.

Initially, we intended to compare the performance development of a treatment group that consisted of struggling text comprehenders who were supposed to receive a RAP peer-tutoring intervention with a group of equally weak readers who were scheduled to receive the training at a later time. However, after three weeks, the first group had only marginally improved. Therefore, we upgraded and amplified our intervention by incorporating additional motivational strategies as previously described. As a result of ethical considerations, we made the adjusted treatment available to both groups for the following four weeks. We expected all tutees to show significant improvements in their ability to understand text by the end of the second phase of the experiment. In addition, we anticipated that the students who had previously received three weeks of training would demonstrate greater gains than the students who only participated in the second stage of the study.

METHOD

Participants and Setting

The inclusive elementary school in this study was located in a midsize town within the metropolitan area of Cologne, Germany. It enrolled approximately 320 students and included first through fourth grades[1]. The German Federal Office of Statistics (GFOS) categorizes public schools according to their level of diversity, or rather according to the percentage of minority students, into different risk types. In compliance with official school records, approximately 70% of all children in our elementary school had a migration background. Referring to the classification system of the GFOS, it was thus considered a school within the highest risk class. Fifty children were diagnosed with special educational needs, most of them with LD and/or emotional and social disorders (EBD). Twenty-five students migrated to Germany during the refugee crisis in late 2015.

We recruited our sample from the body of eighty students who attended one of the three classes that were in their final year. A preliminary selection of 25 children at risk for failure (tutees) and 25 high capacity tutors was based on the results of subtest 3 of the *German Reading Comprehension Test for 1st to 6th Graders* (ELFE) by Lenhard and Schneider (2006). However, we did not only select the bottom 25 and the top 25 performers from a list of T-values without further consideration. For each case, the respective main teacher, a special educator working for the school, and the first and second author met to discuss the eventual composition of both groups. If a student was viewed as not eligible for the group of tutees or tutors (e.g., because of severe behavior problems or frequent absences), he or she was not contemplated. In these cases, we considered other boys and girls immediately outside the range of the bottom 25 and top 25 list to replace the excluded children. The collocation was discussed until a consensus was reached. Hence, the final selection differed slightly from a choice exclusively based on the test scores.

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1   In Germany, elementary school starts with grade one at age six and ends with grade four. Thus, grade one as the first year of school in Germany is equivalent to Kindergarten in the US.

Subsequent to the allocation of children to the group of tutees or the group of tutors, we assigned teams based on the results of a sociometric inquiry according to Moreno (1960) that we conducted with all 50 participants. Thus, we attempted to avoid putting study groups together that did not get along with each other. We assigned the 25 teams to group 1 (N = 13) or group 2 (N = 12) by chance. As a result of illness during the testing days or five or more times absent during days on which the intervention occurred, we eventually ended up with 12 teams in group 1 and 10 teams in group 2. Using the German version of the *Strengths and Difficulties Questionnaire* for teachers (SDQ; Goodman, 1997), in group 1, six tutees and no tutor were at risk for EBD, whereas in group 2, five tutees and one tutor were at risk for EBD. Further demographic information and the T-values of the ELFE subtest 3 are shown in table 1.

Table 1 . *Demographic information of tutees and tutors*

Group	Role	Gender	Age	Migration Background	Lingua Franca German	M (SD) T-Value ELFE
1	Tutees (N = 12)	0 = 42.9 % 1 = 57.1 %	9;6	0 = 21.4 % 1 = 78.6 %	0 = 35.7 % 1 = 64.3 %	40.98 *(5.77)*
	Tutors (N = 12)	0 = 42.9 % 1 = 57.1 %	9;7	0 = 50 % 1 = 50 %	0 = 21.4 % 1 = 78.6 %	63.08 *(9.13)*
2	Tutees (N = 10)	0 = 63.6 % 1 = 36.4 %	9;8	0 = 54.5 % 1 = 45.5 %	0 = 18.2 % 1 = 81.8 %	42.73 *(6.62)*
	Tutors (N = 10)	0 = 45.5 % 1 = 54.5 %	9;6	0 = 81.8 % 1 = 18.2 %	0 = 0 % 1 = 100 %	69.54 *(9.62)*

Notes. For gender, 0 = male, 1 = female. For migration background and lingua franca German, 0 = no, 1 = yes.

Unfortunately, we were not allowed to conduct further assessments to determine how many of our tutees still met the criteria for an LD according to German state or federal guidelines (see e.g., Al-Yagon et al., 2013; Grünke & Morrison Cavendish, 2016). For most of the fourth graders in the previously described elementary school who were at one point in time officially diagnosed with an LD, the examination dated back two or more years. However, according to the teacher's appraisals and the ELFE test results, all tutees demonstrated considerable problems in the processes involved in understanding or using written language and could thus be considered as having an LD in the broadest sense (Fletcher, Lyon, Fuchs, & Barnes, 2018).

Research Design

This study was initially planned as a randomized pretest-posttest control group design with half of the teams participating in the peer-tutoring intervention and half of the teams receiving regular class instruction by their respective teacher.

After three weeks, we intended to provide the same treatment for the other tutees, while the students that had previously participated in the training would go back to their everyday routine in the classroom. Directly prior to the beginning of the study, after three weeks, and directly following the termination of all treatment endeavors, we planned to assess the reading comprehension of the tutees during three testing phases (t1, t2, and t3). We randomly assigned the teams to the treatment conditions, thus reducing the likelihood that the results would be due to preexisting differences in the two groups. A t-test comparing the reading comprehension scores of the two groups indicated no significant differences between conditions.

However, we deviated from our original plans because it turned out that the tutees showed very little improvements in their ability to grasp the meaning of a text after three weeks (see below). Although the teachers reported that the treatment was very well received by all children and that they enjoyed engaging in it, we did not identify noteworthy progress in the reading comprehension of the tutees. Upcoming school holidays made it impossible to add several more weeks to our timeline and only extend the treatment phase for both groups, hoping that intervention effects will eventually occur. After consulting with the teachers, the first and second authors decided group 2 should not continue without support and all teams should be included in the peer-tutoring intervention for the next four weeks. We thus instructed all tutors and tutees to work together. To enhance the chances of success, we added some motivational features to the treatment (see below). Thus, our final design took on a form as presented in figure 1.
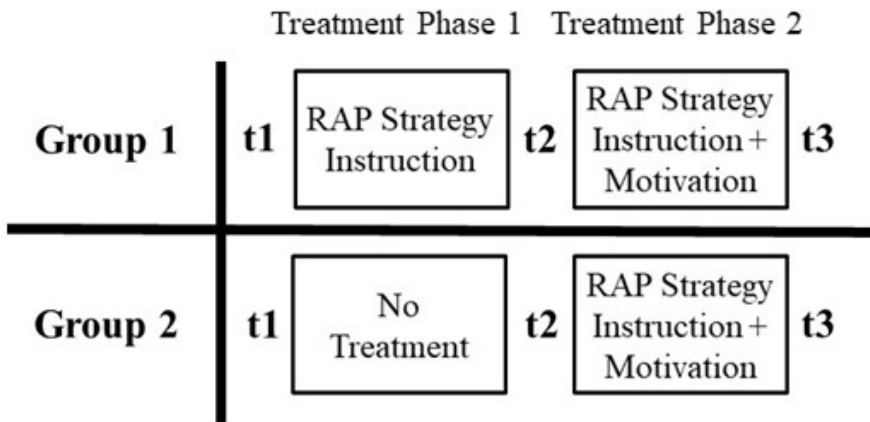

Figure 1. **Time line of study.**

Materials

Each team was provided with an 8.3x11.7" folder with the names of the tutor and the tutee on it that contained (a) a sheet for the teams' sticker collection, (b) a laminated 8.3x11.7" RAP poster that provided an overview of the strategy steps, (c) 26 informational texts, and (d) two different types of 8.3x11.7" notepaper (with and without boxes and lines for summarizing the paragraphs of the reading materials). To make the RAP strategy more accessible to our partly very low-performing tutees, we added three intermediate steps, which resulted in the following sequence for the posters: (1) Read a paragraph. (2) Clarify unknown words. (3) Ask yourself: What is the main idea of the paragraph? (4) Put the main idea in your own words. (5) Read the next paragraph. (6) And so on. The texts were numbered serially and differed in length and difficulty, starting with very short ones of just 100 words and ending with rather long ones of 300 words. A section of the notepaper with lines and boxes is shown in figure 2 (a German version of the worksheet was employed). In treatment phase 2, we provided the tutors with sheets of paper with five simple comprehension questions for each text.

In addition to the folders, we provided each team with pens to take notes. For the second intervention phase, we complemented the folders with 8.3x11.7" empty graphs, including x- and y-axes to document the performance development of the tutees. All aforementioned materials were handed out to the participants at the beginning of each session and collected at the end.

Read - Ask - Paraphrase

Title of the text: _____

1. Paragraph: _____

_____

_____

_____

2. Paragraph: _____

_____

Figure 2. **Notepaper for applying the RAP strategy.**

To monitor the performance of the tutees, we developed a pool of 15 informational texts on different topics (e.g., American Indians, volcanoes, or ants) of between 280 and 320 words with lists of 10 corresponding comprehension questions. The questions were stated in such a way that only one specific and distinct answer

could be counted as correct. To control the level of difficulty, we ensured that the LIX readability index was always between 25 and 30. This parameter was created by Björnsson (1968) and is calculated by applying the following formula: LIX = A/B + (C x 100)/A, where A represents the number of words, B represents the number of periods (defined by period, colon or capital first letter), and C represents the number of long words (more than 6 letters). The LIX readability index is considered to be a quick to use, reliable, and easy to interpret tool to determine the reading difficulty of language material (Anderson, 1983). In addition, the items were previously tested with a small sample of fourth graders to ensure that they were of relatively equal difficulty.[2]

Instructional Procedure

During each of the two intervention phases, all teams met three times per week (Monday, Wednesday, and Friday) for 20 to 30 minutes in different resource rooms of their school. The treatment followed the basic explicit instruction pattern of "I do it", "We do it", and "You do it" (Archer & Hughes, 2010). In the first lesson, the tutors motivated the tutees and presented the poster to them that visualized the steps of the RAP strategy. The tutors subsequently modeled the procedure step by step while thinking aloud. To accomplish this task, they used the first and thus shortest text in the folder and notepaper with lines and boxes on it. The tutees were subsequently asked to repeat the action with the same text, while the tutors scaffolded their attempts. If there was any time left, the tutors went over the steps of the strategy again, explaining what each activity entailed. During the second lesson, the tutors modeled the approach once more, but this time with a slightly more difficult text from the folder. Afterwards, the tutees had to read the next text and fill out their own notepaper with the help of the tutors while referring to the poster. All following sessions focused on alternately modeling and scaffolding the strategy. The length and difficulty of the texts continuously increased. From the third week onward, the teams used notepaper without lines and boxes. The amount of support for the tutees depended on the degree to which the respective child needed help.

For group 1, the second treatment phase focused almost exclusively on independent performance. Because the tutees were already thoroughly familiar with the RAP strategy and the instructional procedure, the intervention was limited to guided practice with continuously more complex texts. During treatment phase 2, the tutors always asked five comprehension questions pertaining to a text that they had worked on during a particular lesson and recorded the answers with the help of the teacher who was present.

To maintain the tutees' motivation in group 1 at a high level during treatment phase 1, we set up a token economy in which a teacher awarded the teams with stickers on a daily basis for good behavior and for staying on task. The stickers and the pleasure of gradually completing the sheet for sticking them on seemed to have a rewarding value in themselves.

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2   An electronic versions of the RAP poster, the 26 informative texts to teach text comprehension skills, the notepaper with boxes and lines, and the 15 texts to measure performance will be emailed by the first author upon request.

For treatment phase 2, we provided all teams with empty sticker sheets and added a scoring system, as well as visual feedback to the intervention. At the end of each session, the tutors asked the tutees five questions about a text they had previously read. For every correct answer, the tutees earned a point. The tutors visualized the progress of their tutees on the graphs and praised them for their efforts. At the end of each lesson and during other suitable moments of the training, the tutors were encouraged to include information regarding the reasons of different learning outcomes on the side of the tutees. It was supposed to contain internal attributions if the results were favorable (e.g., "I noticed that you tried really hard today and it paid off"). If a tutee did not produce positive outcomes or was not on task, it had to include a variable attribution (e.g., "You did not do as good as yesterday. Let us give it another try tomorrow," or "You did not work quite as hard as usual. Next time will be better") (Hareli & Hess, 2008; Nob, 2016).

Dependent Measures and Data Analysis

During each testing phase, every tutee was given a randomly selected text from the previously described pool on three consecutive days. The students were asked to silently read it. Each desk was equipped with a pen and notepaper, ready to use. When a child indicated that he or she had finished reading a text, a research assistant handed them a test form with ten questions and took away the text (however, the tutees were allowed to keep the notepaper). We ensured that no student was given the same text on two or more different occasions. No time limits were imposed on the participants. However, no student required longer than 20 minutes to finish the assignment.

Each sheet was independently scored by either a senior researcher or a PhD and a graduate student of special education. In the rare case of a discrepancy, the respective team discussed the responses until they agreed on the points that should be allocated to a particular answer. We determined an overall reading comprehension score for each tutee in each testing phase by averaging the three respective scores into one single value. Variations between measurements for individual children during each testing phase were generally rather low and never exceeded 20%. Thus, we decided to only include the mean scores in the subsequent data analysis.

Fidelity of Implementation

To increase treatment fidelity, we instructed all tutors prior to both intervention phases during two two-hour training sessions together with the teachers and provided them with a detailed script to follow. The briefing was performed in a scaffolded manner. After the first author demonstrated the procedures during the peer-tutoring sessions, the responsibility of initiating and applying the instruction was slowly shifted from the trainer to the tutors. Three doctoral students and the teachers functioned as in proxy students to provide the children with opportunities to role-play and simulate the actual peer-tutorial sessions. During the first intervention phase of three weeks, every session was attended by a previously instructed college graduate student in special education and the teachers. During the second intervention phase of four weeks, in cooperation with the teachers, one of the aforementioned PhD

candidates or a previously instructed college graduate student in special education closely observed each lesson and intervened when a team deviated from the script.

After both intervention phases, the first author conducted informal feedback talks with the tutors regarding supportive and obstructive factors concerning the tutors' job. Furthermore, the teachers reported strengths and weaknesses from their point of view in a semistructured group discussion.

RESULTS

Figure 3 presents the results of the study in form of boxplots. The graph does not suggest significant improvements from t1 to t2 in either group. However, the increases in performance from t2 to t3 seem remarkable. It must also be noted that at t3, the variability in group 1 appears considerably smaller than the variability in group 2.
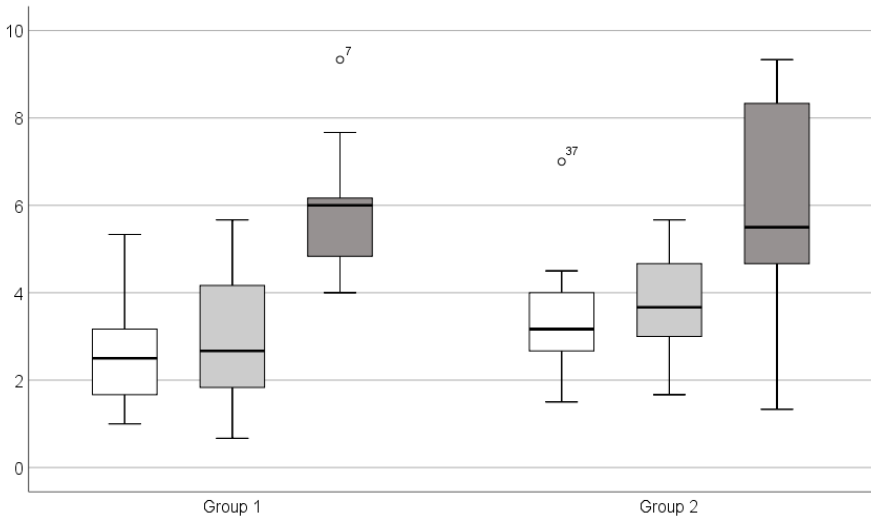
Figure 3. **Boxplots of the reading comprehension test results for all measurement points in group 1 (n = 12) and group 2 (n = 10).**

Table 2 provides specific information on the actual means and standard deviations for the performance data on reading comprehension by time point for both groups. It is remarkable that the values in group 2 at t2 showed a very large standard deviation. The dispersions of the data sets were very similar in both groups at t1 (SD=1.25 and SD=1.49) and t2 (SD=1.48 and SD=1.41), as well as in group 1 at t3 (SD=1.47), whereas the average distance of each data point from the mean of the data series in group 2 (SD=2.39) was 162.59% higher in group 2 at t3 than it was in group 1 (SD=1.47) at the same time. Accordingly, if the intervention is applied for a longer period of time while including a motivational system roughly in the middle of the

treatment, students seem to benefit from it in a more uniform way than if the training is implemented for a shorter phase but with the incorporation of the motivational system immediately from the start.

Table 2. *Results of the reading comprehension tests*

Group	M *(SD)* t1	M *(SD)* t2	M *(SD)* t3
1	2.59 *(1.25)*	2.95 *(1.48)*	5.88 *(1.47)*
2	3.36 *(1.49)*	3.58 *(1.41)*	5.92 *(2.39)*

As shown in Table 3, paired t-tests indicated no noteworthy enhancements between phases 1 and 2 (RAP strategy instruction without a motivational system) in the groups. However, there were significant improvements between phases 2 and 3 (RAP strategy instruction plus a motivational system) in both treatment conditions. The same is true for comparisons between t1 and t3. The effect sizes (d) according to Cohen (1977) can be considered very large when contrasting the results from t2 with t3 or from t1 and t3. In both cases, group 1 produced considerably larger effect sizes (d=1.99 and 2.17) than group 2 (d=1.08 and 1.21).

Table 3. *Changes in performance of tutees in the reading comprehension tests*

Time Period	Group	M *(SD)*	t	F	p	d
t1-t2	1	.36 *(1.29)*	1.01	12	.34	.26
	2	.21 *(1.31)*	.54	10	.60	.18
t2-t3	1	2.96 *(1.27)*	8.09	11	.00**	1.99
	2	2.15 *(2.40)*	2.83	9	.02**	1.08
t1-t3	1	3.24 *(.95)*	11.81	11	.00**	2.17
	2	2.42 *(2.95)*	2.59	9	.03**	1.21

The results of the t-tests for independent samples at each measuring point (t1 to t3) indicated that there were no significant differences between the two treatment conditions. Furthermore, we investigated the number of students who benefited from the peer-tutoring intervention. With respect to the differences between t3 and t1, all students in group 1 achieved better results in the reading comprehension tests after the whole intervention was completed. The mean results at t3 were at minimum two points higher than those at t1. In group 2, three students achieved lower results at t3 than at t1, whereas six students reached a minimum of two points more than at t1 and one student only one point more. A median split was performed to identify students with and without improvement in a more conservative and valid way (Klauer, 2002). As illustrated in Table 4, in group 1, more students showed improvements at or above the median than under the median. In group 2, the same number of students showed improvements and no improvements. However, the differences between the two conditions were not significant (Chi-Quadrat according to Pearson = 1.47, *df* = 1, *p* = .23).

Table 4. *Number of tutees per group with growth in the reading comprehension tests at or above (improvement) or under (no improvement) the median*

	Group 1	Group 2	N
improvement	9	5	14
no improvement	3	5	8
N	12	10	22

Notes. Considered are only tutees with full participation at t1, t2 and t3.

DISCUSSION

Main Findings

In this pilot study, we investigated the effects of combining a RAP strategy intervention with peer-tutoring on the reading comprehension of struggling fourth graders in inclusive elementary classrooms with and without different motivational strategies. We applied a randomized control group design with two experimental conditions. In the first condition, tutees received instruction on how to use the RAP strategy for three weeks (three times per week) while applying a simple token economy and then continued to be schooled in this technique for four additional weeks while also being motivated through a scoring system, visual feedback, and frequent verbal praise on the basis of attribution theory. The circumstances in the second phase of the experiment (which lasted four weeks with three sessions per week) were identical for both groups, whereas the tutees in the second condition received no treatment during the first three weeks.

Overall, the visual and statistical analyses suggest that the teaching of the RAP strategy along with the implementation of a multifaceted motivational system produced noteworthy gains in the reading comprehension skills of our tutees. We found significant improvements with large effect sizes in both groups over the whole treatment period. The enhancements in the first group were higher than in the second; however, the differences between the conditions were not significant. Furthermore, considering the overall treatment gains in both groups and dividing all participants into responders and nonresponders via the median split, we identified nine responders and only three nonresponders in group 1 (whereas the partition in group 2 was tied five to five).

The substantial impact that our motivational intervention had on the performance of the tutees was striking. Although intervention phase 2 lasted only four weeks with twelve sessions, a remarkable number of students showed considerable improvements in their test scores. We assume that this is the result of combining a simple reward system with a scoring procedure and visual feedback. Informal evaluation interviews between the first or second author and the tutors indicated that particularly the visual feedback seemed to be a motivator for the tutees. This finding corresponds with other studies on the significance of feedback (e.g., Grünke et al., 2016; Leko, 2016; Mercer, Mercer, & Pullen, 2011; Mitchell, 2014).

In summary, it must be noted that a simple token economy did not have the same effect as the combination of monitoring progress, constant visual feedback, and frequent verbal praise. The findings suggest that a motivation system similar to our system is essential for a RAP strategy intervention to be effective. Without operative means to keep struggling readers trying hard to make progress, not much seems to be achieved by endeavors to boost students' comprehension skills.

Limitations

In common with all research projects, this study exhibits numerous limitations. First, the small sample size must be taken into account when interpreting the results. Furthermore, all participants were of similar age and attended the same inclusive elementary school. Our tutees all showed severe difficulties in understanding or using written language and could thus be considered as having an LD. In addition, six tutees in group 1 and five tutees in group 2 were classified as being at risk for EBD. Thus, our participants constituted a rather small and unique sample, which makes generalization of the findings difficult.

A second limitation pertains to the design. After the first three weeks, it was clear that a longer intervention and an optimized and more extensive motivational system was necessary to improve reading comprehension with the RAP strategy within our peer-tutoring setting. However, because the second part of the treatment was the same for both groups, there is no way to draw reliable conclusions regarding the performance that participants would have shown had they not received any or a different treatment. This constitutes a serious threat to the internal validity of our study. Furthermore, we did not include a follow-up assessment, which makes it impossible to make statements regarding the stability of the findings.

Another critical point is the eligibility of the texts that we used for the reading comprehension tests. We were unable to control how familiar the participants were with the content. Although we randomly selected three texts per measurement point for every student, it is possible that the results were influenced by prior knowledge. A final problem concerns the way we measured performance. Informal observations by the college graduate students who were present during intervention sessions suggested that some tutees had trouble with their handwriting. This problem occurred not only during the intervention but also during test sessions. Thus, the current results might have been inflated by differing levels of handwriting fluency and did not only reflect reading comprehension abilities.

Practical Implications

Despite these limitations, this study provides valuable suggestions on how to more effectively support struggling comprehenders to better understand a text under the demanding circumstances of everyday life in school. Our intervention was low in cost, all materials were homemade, and no additional teaching staff was needed. As a result of our suboptimal research design, our study exhibited some considerable confinements regarding its internal validity. However, it must be appreciated that we were able to provide evidence regarding the applicability of a very resource-friendly intervention with a rather demanding group of students. A considerable number of the tutees exhibited social-emotional problems. The social skills deficits and the

disruptive behaviors of students with EBD or at risk for EBD typically do not only affect literacy outcomes (Benner, Nelson, Ralston & Mooney, 2010) but also influence the interaction between tutor and tutee and thus interfere with the efficacy of the intervention (Sutherland & Snyder, 2007). Fortunately, we were able to show that peer-tutoring can be used as a beneficial approach for students with challenging behavior (Thompson, 2011).

However, in previous research on peer-mediated instructions for students with EBD or at risk for EBD, the treatment lasted considerably longer than in our case. Most of the interventions described in the meta-analysis by Benner et al. (2010) stretched over a period of between 25 and 33 sessions. Although our experiences with a rather short training were all in all very positive, it must be assumed that a longer treatment would be necessary to elicit lasting effects in the area of social skills on the side of children with behavioral problems.

As previously stated, the intervention phase in our study with only nine sessions of 20 to 30 minutes training in each unit was clearly not sufficient to elicit noteworthy improvements in reading comprehension. However, one advantage in our study was the insight that a lack of resources does not have to be an obstacle when planning to apply long-range treatments. Hagaman et al. (2012b) demonstrated that the RAP strategy approach can be successfully implemented into multi-tiered-systems. Resorting to one-on-one settings with trained instructors requires five sessions per student (ebd.), which indicates 125 sessions for a group of 25 students. Such an intensive one-on-one support is very sumptuous. In their study with older students with intellectual disabilities, Hua, Woods-Groves, Ford, and Nobles (2014) proposed small group settings with two or three students per instructor to cope with meager resources and implement a high rate of opportunities to respond at the same time. Similar to the work of Hua and his team, we contributed to finding sustainable answers to questions on how to get by with limited means when trying to provide the most serviceable support for struggling comprehenders. Peer-tutoring provides more opportunities to respond for every student because of the one-on-one-setting of tutor and tutee. As shown for the PALS reading strategy, peer-tutoring settings facilitated frequent interaction, increased opportunities to practice the reading comprehension strategy and direct feedback (McMaster, Fuchs, & Fuchs, 2007). Furthermore, it is more resource-friendly than instructor-directed one-on-one or small-group settings. Compared with one-on-one-settings with trained instructors, more sessions are necessary for strategy instruction and practicing; however, overall, it is only a fraction of the resources needed in instructor-directed one-on-one-settings. This conclusion for combining the RAP strategy and peer-tutoring corresponds with the periods how they were used in collaborative strategic reading for students with LD (e.g., Boardman, Vaughn, Buckley, Reutebuch, Roberts, & Klingner, 2016) or other peer-tutoring reading programs in primary schools (e.g., Flores & Duran, 2016; Lee, 2014).

Moreover, our findings highlight the bearing of a solid motivational system as a means to actively upgrade sound strategy instruction. We were able to document the necessity of incorporating potent ways to boost the desire of students to work on goal-directed behavior into a treatment plan that focused on improving reading comprehension skills. Especially in peer-tutorial settings, teachers and tutors need suitable strategies to motivate their students. In our study, we used a scoring

system, based on curriculum-based assessment, visual feedback, and verbal praise grounded in attribution theory, to encourage tutees in their endeavors to become better comprehenders. To enhance positive dependency, educators must implement such approaches to keep the teams working hard to enable increases in performance. Focusing on motivation, especially when working with students with or at risk for EBD, seems to be a critical point: "Tier 2 and 3 interventions should include embedded instructional management procedures and motivators to help students regulate their attention and behavior, as well as actively engage during instruction" (Benner et al., 2010, p. 99). Tutors need support to handle challenging situations, particularly challenging behavior.

During informal feedback talks between the first or second author and the tutors about supportive and obstructive factors concerning the tutors' job after the first intervention phase, the interaction with tutees with EBD or risk at EBD was of substantial concern. The tutors asked for supplementary help to handle disruptive and off-task behavior particularly during the first sessions. Nevertheless, they reported feelings of success and positive developments over time. Thus, tutors must be carefully briefed on how to apply well-grounded motivational tools to reduce or cope with disruptive and off-task behavior. However exigent and ambitious the task of keeping even rather maladjusted tutees on course might be, our findings give rise to the conclusion that it is possible.

Future Studies

In further studies, a longer treatment phase with at least 20 sessions, flanked with a multicomponent motivational intervention that consists of curriculum-based assessment, visual feedback, goal setting, and verbal praise should be compared with modified variants of motivation and with no training at all. In any event, in future research, designs that are more valid than ours must be applied. Furthermore, with respect to the fidelity of implementation, different combinations of settings for instruction and practice should be investigated (e.g., a teacher-led instruction of the RAP strategy in a whole-class or small-group setting to ensure the understanding of the strategy itself followed by practicing the strategy in a peer-tutorial setting).

To obtain more conclusive results, it would certainly be of benefit to involve a sample that is larger than the current sample. In consideration of the fact that a rather ambitious reading comprehension strategy such as RAP has never been implemented in a peer-tutorial-setting, the explorative nature of our experiment with a relatively small number of students is certainly understandable and justifiable. Nevertheless, the next step would be to recruit a considerably larger sample, consisting of children of different ages and with different challenges that need to be scrupulously specified and assessed. On this basis, the differential effectiveness for different student groups can be determined.

Examining possible influencing factors, it is important to take a close look at variables that affect the efficiency of the tandems. Informally observing the teams, we identified increasing independence in working with the materials over time; however, in several tandems, we encountered problems in managing the transition from the stage of supporting the strategy to the stage of independent performance. Some tutors needed explicit help to be aware of the point in time where fading out direct

support for the tutee was suitable. For better results in reading comprehension tests, independent performance is a critical point. Thus, if tutees did not practice independently over a longer period of time, this could be an influencing factor for none or small effects. Future studies must determine when to provide specific types of assistance for the tutors and tutees to optimize the crossover from direct instruction to guided and independent practice.

Finally, research on the benefits of instructing struggling comprehenders in the RAP strategy through peer-tutoring while incorporating established multicomponent motivational systems should take interfering variables, such as handwriting fluency, into account. We did not measure the speed with which our tutees were able to retrieve graphic letter forms. However, as previously stated, it became obvious during the course of the study that some children struggled with this skill. Future studies should take into account as many covariates that will likely influence the results of the intervention as possible to arrive at even more meaningful conclusions.

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