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Integrating self-regulation in whole-class reciprocal teaching: A moderator–mediator analysis of incremental effects on fifth graders' reading comprehension

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ABSTRACT

In this classroom intervention study, reciprocal teaching (RT) of reading strategies was combined with explicit instruction in self-regulated learning (SRL) to promote the reading comprehension of fifth-grade students (N = 306). Twelve intact classes were randomly assigned either to an RT + SRL condition or to an RT condition without explicit instruction in self-regulation. Three additional classes served as a no-treatment comparison group. Strategies instruction was delivered by trained assistants in conventional German language lessons. Students practiced the application of these strategies in small groups. Both at posttest and at maintenance (8 weeks after the intervention), students in the two intervention conditions (RT and RT + SRL) outperformed comparison students in measures of reading comprehension, strategy-related task performance, and self-efficacy for reading. Relative to RT students, students in the RT + SRL condition were better able to maintain training-induced performance gains over the follow-up interval. A moderated mediation analysis revealed that this difference in the sustainability of the two treatments was (a) mediated by the successful mastery of the learned strategies and (b) most evident among students with poor reading fluency skills.

1. Introduction

Reading comprehension constitutes one of the most important cognitive skills students acquire during primary and secondary education (Mason, 2004). Being able to read a text and comprehend the content of what is read is not only a key to academic success in school but also represents an essential prerequisite for lifelong learning (OECD, 2010). Throughout the past two decades, cognitive researchers and educational psychologists have explored the cognitive skills required for competent reading and examined how these skills can be taught to school-aged children (Andreassen & Bråten, 2011; Guthrie et al., 2004; Spörer, Brunstein, & Kieschke, 2009). However, large-scale studies like PISA (OECD, 2010) documented that many, but far from all, students acquire an adequate degree of literacy during their school career. Thus, there remains a need to develop age-appropriate interventions that can reliably enhance the reading comprehension of all students and to implement such programs in schools. In order to design such classroom-based interventions and further improve their efficaciousness, it is important to identify instructional procedures (and further critical intervention elements) that are likely to produce a lasting effect on students' reading competence. Since students in the same class may differ greatly with respect to their mastery of basic reading skills (e.g., decoding skills), there is also a need to tailor such interventions to subgroups of students with varying degrees of linguistic proficiency (e.g., students who have not yet developed an adequate degree of literacy).

Building on these ideas, the aim of the present research was to optimize a reading comprehension training developed by Palincsar and Brown (1984) to foster the understanding of text among poor comprehenders ("Reciprocal Teaching"; RT), and to implement this newly designed program in regular language lessons. For this purpose, we (a) compared a traditional version of RT with an extended version that accentuated principles of self-regulated learning (SRL) to increase the strength and sustainability of intervention effects; (b) investigated the mediational mechanisms accounting for the hypothesized differences between these two RT-based treatments; and (c) explored their differential efficaciousness for subgroups of students which differed with respect to basic reading skills (here: reading fluency). To meet these objectives, we first specified our hypotheses in a moderated mediation model that combined the

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analysis of mediational relations (How does a program achieve its effects?) with the analysis of moderator effects (Is a program effective for different subgroups of students?) and then tested the validity of this model in a sample of fifth graders.

1.1. Theoretical background

The RAND Reading Study Group (Snow, 2002) defined reading as a purposive activity that relies on "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (p. 11). According to this definition, a reader requires a host of mental resources (e.g., attention, memory, prior knowledge) and cognitive skills (e.g., vocabulary and decoding skills) to combine the information provided by a text with knowledge and experiences stored in memory. A model that accounts for the complexity of the cognitive processes involved in reading (from recognizing words to text comprehension) is Kintsch's (1988, 1998) Construction-Integration model. According to Kintsch, comprehension results from an interaction of the text base with the reader's previous experience and background knowledge. To comprehend, the reader must first construct a network of text representations at different linguistic, semantic, and situational levels and then select and integrate the relevant information into a final representation of the text.

In a similar vein, Cromley and Azevedo (2007; see also Cromley, Snyder-Hogan, & Luciw-Dubas, 2010) defined reading comprehension as a conglomerate of many skills and abilities, such as background knowledge, reading strategies, word reading, reading vocabulary, and the ability to draw inferences, and specified the relations among these variables in what is known as the Direct and Inferential Mediation (DIME) model. In this model, reading comprehension directly depends on vocabulary and background knowledge. The ability to draw inferences is influenced by vocabulary, background knowledge, and reading strategies. Inferences mediate the effect of the aforementioned variables on reading comprehension. The DIME model postulates that reading fluency is another key element of reading comprehension. Compared to less fluent readers, highly fluent readers decode words automatically (i.e., without a great deal of mental effort) and, therefore, have more cognitive resources available when they try to construct the meaning of a text (Alexander, Graham, & Harris, 1998; Cromley & Azevedo, 2007; Farstrup & Samuels, 2002).

Such models can be used, not only to define, and explore in depth, the cognitive skills and processes involved in reading but also to derive valuable information about how students' comprehension may be improved. An auspicious way of doing this is through the careful instruction of reading strategies (Dole, Nokes, & Drits, 2009; Graesser, 2007; National Institute of Child Health, 2000; Pressley, 1998; Pressley, Borkwski, & Schneider, 1989). Here, the goal is to teach students cognitive tools a good reader uses when reading a text and thereby help them become "good strategy users" (Pressley, Borkwski, & Schneider, 1989; Pressley, Goodchild, Fleet, Zajchowski, & Evans, 1989; Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989) or "strategic readers" (Jones & Leahy, 2006; Paris, Lipson, & Wixson, 1983) who are better equipped to make sense out of what they read.

Numerous methods for promoting students' reading comprehension through cognitive strategies instruction have been reported in the recent literature (for an overview, see Slavin, Cheung, Groff, & Lake, 2008 and Slavin, Lake, Chambers, Cheung, & Davis, 2009). Despite differences in the type of strategies taught to students, most of these programs share the idea that effective interventions combine the explicit (or direct) instruction of reading strategies with techniques of cognitive modeling, scaffolding, and guided practice (Duffy, 2009; Pressley & Gaskins, 2006). Such programs not only teach students how to enact a specific strategy (or a set of strategies), but also encourage them to reflect "why" (i.e., for what purpose) and "when" (i.e., in which situation) it might be useful to enact the respective strategy in a given task context (Paris et al., 1983; Pressley, Borkwski, et al., 1989; Pressley, Goodchild, et al., 1989; Pressley, Johnson, et al., 1989; Veenman, van Hout-Wolters, & Afflerbach, 2006).

1.2. Reciprocal Teaching (RT)

A program that complies with these instructional conditions is Palincsar and Brown's (1984) Reciprocal Teaching. RT is a procedure in which small groups of students are explicitly instructed in how to use comprehension-fostering as well as comprehension-monitoring strategies as they seek to understand written text material (e.g., an expository text). Using clarifying, summarizing, questioning, and predicting strategies, students learn to monitor and improve their comprehension achievements.

RT builds on Vygotsky's (1978) idea that children are most likely to improve their cognitive abilities when instructional procedures are attuned to their zone of proximal development. Vygotsky defined his zone as the range between one task the child can solve independently and another task the same child can only solve with the guidance of a more knowledgeable expert model (or a competent peer or adult).

Accordingly, in an RT-based training program, children learn to construct comprehension collaboratively with the help of their teachers and peers. During training, students and teachers jointly engage in dialogs about the text. The teacher models good strategy use and gives feedback when a student seeks to apply the observed strategic behavior to a given text (Palincsar, 1986). As the teacher scaffolds the group process, gradually, the students take over the teacher's role monitoring and directing the group members' efforts to co-construct meaning from text. The 'teacher-student' guides and organizes the learning process and thereby deepens his or her own knowledge about why, how, and when a specific strategy should be used. In this way, students improve their ability to take responsibility for their joint learning efforts.

A considerable number of studies have documented the efficaciousness of RT-based interventions for at-risk children, average readers, and poor comprehenders across a wide range of age groups (Hart & Speece, 1998; Johnson-Glenberg, 2000; Lysynchuk, Pressley, & Vye, 1990; Palincsar & Brown, 1984). In a meta-analytic review comprising 16 RT studies, Rosenshine and Meister (1994) reported a mean effect size of $d = 0.32$ for standardized test and $d = 0.88$ for experimenter-developed reading tasks, favoring RT over comparison conditions. Hattie (2009) synthesized the results of two meta-analyses and computed a mean effect size of $d = .74$. From his analysis, Hattie (2009, p. 204) concluded that the instructional effects were highest when cognitive modeling techniques and reciprocal dialogs were combined with explicit strategies instruction and extended periods of practice.

Despite this evidence, a number of difficulties and complications may prevent substantial intervention effects when RT is used to foster students' reading comprehension in the complex environment of a whole-class setting. First, several researchers have reported that it may be difficult to implement RT with a sufficient degree of fidelity in conventional language lessons (Fuchs et al., 2001; Marks & Pressley, 1993). In an observational study, Hacker and Tenent (2002) found that relative to the guidelines specified in the RT program, teachers often modified reciprocal instruction methods (e.g., how students were instructed to practice reading strategies) to adjust to the specific demands inherent in classroom lessons. Unfortunately, these modifications often led to deficits and inefficiencies in the implementation of the core instructional practices characteristic of RT (e.g., strategy use, meaningful dialogs within groups, and scaffolded instruction). Notably, in the original