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## An Intervention Study in Grade 3 Based Upon Reciprocal Teaching

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### Abstract

This article reports the results of a twelve-week intervention study in which 30 students in the third grade in a socially disadvantaged neighbourhood received training in a reciprocal teaching reading programme twice a week. Previously, (a) no study of the effects of reciprocal teaching had been conducted in a Swedish context under the conditions of larger groups in grade 3 or (b) in a socially disadvantaged neighbourhood. In the present study, the students were instructed in 'text talk' in large groups, with 15 participants in each group. Each session lasted 15 to 20 minutes. Some text talks were video recorded. The video recordings were analysed qualitatively. The students' reading comprehension was tested before the intervention, immediately after completing the intervention, and three months after completing the intervention. The results presented suggest that the students' reading comprehension significantly increased. In the conclusion, the study indicates that reciprocal teaching had a positive effect on students in grade 3 in a Swedish context; however, uncontrolled intervening variables cannot be ruled out.

**Keywords:** *Large-group design, reading comprehension, reciprocal teaching, young readers*

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## Introduction

When Swedish students enter the third grade, they are exposed to national testing and assessment for the first time, and they are not only required to read on the lines, but also to read between and beyond them. Every text requires that the reader, in order to make meaning from it, penetrates beneath the surface of the text and fills in the gaps in the writer's train of thought (Lundberg, 2002).

Research has demonstrated that Swedish teachers have the necessary tools to teach students how to read on the lines but lack sufficient tools to teach them to 'read to learn', i.e., reading with comprehension (Lundberg & Reichenberg, 2013). A dilemma is that many teachers seem to have a strong belief that if students simply read repeatedly, they will become good comprehenders. However, there is no reason to believe that students will automatically discover that they could use adequate reading strategies (Lundberg & Reichenberg, 2013). Furthermore, students' ability to develop good reading comprehension varies depending on the neighbourhood in which they live. Previous sociological research has suggested that reading comprehension varies depending upon the neighbourhood of the school (e.g. Garner & Raudenbush 1991). However, little attention has been paid to how schools can reduce the negative effect that living in a socially disadvantaged neighbourhood has on reading comprehension. At the same time, education research has shown that (a) group-based explicit structured designs for reading instruction can scaffold students who struggle with reading comprehension, and that (b) an important ingredient of efficiently teaching comprehension strategies is professional development for teachers (Block & Duffy, 2008). Consequently, we believe that further studies are needed to investigate how schools can contribute to reducing the negative neighbourhoods' effects. In particular, we believe that the reading programme reciprocal teaching (RT) can be used to successfully improve students' reading comprehension in a socially disadvantaged neighbourhood. RT was developed as a technique to help teachers bridge the gap for students who demonstrated a discrepancy between decoding skills and comprehension skills through structured, teacher-led group instruction (Palincsar, Ransom, & Derber, 1989). Accordingly, we build upon the 'Slavinian' idea that structured reading programmes can scaffold poor comprehenders (Slavin, 2009). We also rest upon the 'Vygotskian' idea that comprehension is built through social interaction (Vygotsky, 1978).

The aim of this study was to investigate the effects of reciprocal teaching on students' reading comprehension in grade 3 in a socially disadvantaged neighbourhood. More precisely, the present study attempted to answer the following research question: What are the effects of reciprocal teaching on students' reading comprehension?

## Comprehension Instruction

Research has demonstrated the relationship between strategic processing and comprehension. Strategies are processes for enhancing comprehension and overcoming comprehension failures. Furthermore, research has identified five ingredients of efficient comprehension strategies instruction (e.g., Cantrell, Almasi, Carter, Rintamaa, & Madden, 2010):

1. Strategies need to be directly and explicitly taught. Consequently, modelling, verbalizing, and scaffolding strategy have been important parts of most comprehension-strategy interventions since the early studies of direct instruction in the 1980s (Palincsar & Brown, 1984; Beck, McKeown, Sandora, Kucan, & Worthy, 1996; Pressley & Wharton-McDonald, 2002).
2. Efficient comprehension instruction includes instruction in multiple strategies to establish a repertoire of deeper-level strategies that can be adapted to particular texts and tasks (Dole, Nokes, & Drits, 2009). Deeper-level comprehension strategies are presumably required to construct mental representations that reflect deep, inferential understanding of text content such as initiating and answering questions, activating relevant background knowledge, summarizing main ideas, predicting text content—i.e., what would be in the text—and monitoring comprehension. These typically occur in different classroom interventions (Guthrie, Wigfield, & Perencevich, 2004, Palincsar & Brown, 1984).
3. The idea of reading comprehension as a collaborative social activity is permeating most contemporary strategy interventions (Palincsar & Brown, 1984; Dole et al., 2009).
4. The development of strategic reading requires time. This is reflected in the extent of effective interventions, lasting from 8 weeks (e.g., Palincsar & Brown; Beck et al., 1996) to an entire school year.
5. An important ingredient of efficient comprehension strategies instruction is professional development for teachers (Block & Duffy, 2008).

As can be seen above research has demonstrated the importance of research-based instructional procedure that incorporates multiple strategy instruction and thus teaching students how to coordinate the use of multiple strategies while reading (Gersten & Baker, 2001; Pressley & Wharton-McDonald, 2002). Teaching multiple strategies is sensible because proficient readers use multiple strategies while reading. The most frequently used multiple strategy instruction is Reciprocal teaching (RT). RT was originally developed for struggling readers in grade 7. However, the RT method has been tested on other grades and categories of students with equal success.

### **RT Strategies**

There are four strategies in RT: (a) prediction, (b) generating questions, (c) clarifying, and (d) summarizing. Predicting allows the reader to draw inferences and use schemes. In order to do this successfully, the students must activate the relevant background knowledge that they already have about the topic read. Asking for clarification allows readers to verify that they have really understood the text. Their attention is called to the fact that there may be many reasons that a text is difficult to understand (new words, unclear reference words, and unfamiliar concepts). Developing questions forces the reader to concentrate on main points rather than details. This is an important strategy for active reading. Many students in the third grade, for example, may believe that the purpose of reading is to say the words correctly; they may not be particularly uncomfortable with the fact that the words, and even passages, do not make sense. When summarizing a text, the reader has to identify and integrate the most important information from the original text.

A key concept in reciprocal teaching is that the text is read segment by segment. Teachers segment the text in advance at the points where they expect their students to have difficulties. The students stop reading at these places and carry out a collaborative construction of meaning. Stopping to discuss a text also allows the readers to consider different alternatives. Making meaning during reading gives students the opportunity to learn from one another, question, consider alternative possibilities, and test their own ideas in a safe environment. This is very different from reading a whole text silently in the classroom and then discussing it. The latter assumes either that students have been able to make sense of the text on their own, or if they have encountered difficulties in the text that they can articulate them when it is discussed in the classroom. Another key concept is that the teacher thinks aloud and models for the students how the strategies work and can be practiced. Modelling is a form of scaffolding (Hacker & Tenen, 2002). During this activity, the students are mostly observers and do not engage in complex cognitive activities by themselves. Gradually, the students take over the responsibility for the text talk. Responsibility implies that the students, and not merely the teacher, are allowed to govern the text talk and thus initiate questions and select who gets to respond.

The rationale for RT is derived from both developmental and cognitive theory and research. The four strategies are examples of the kinds of cognitive activity that successful learners engage in while interacting with text (Palincsar & Klenk, 1992, Bereiter & Bird, 1985). Furthermore, RT is based on three theoretical principles that were prominent in the work of Vygotsky (1978). The first one: the origins of all higher cognitive processes are first social, that is that mental functioning occurs first between people in social interactions. The second one: the zone of proximal development, i.e. the distance between the actual developmental level and the level of potential development under adult guidance or in collaboration with more capable peers. The third one: psychological processes are acquired in contextualized, holistic activity, that is, the strategies are not broken into component skills, nor are they practiced in isolation (Palincsar & Klenk, 1992).

Since the introduction of the reciprocal teaching method (Brown and Palincsar 1984) numerous studies have been conducted to examine its efficacy. Most of the studies have been implemented in formal learning settings from elementary school through to college. These studies have revealed improvement in students' abilities to summarize, generate questions, clarify and predict (Rosenshine & Meister, 1994, Lederer, 2000).

Reciprocal teaching has also been researched in countries other than the United States. In a Dutch study (Van den Bos et al., 2007) 38 adults (age range 20-72 years; mean age of 36 years) with intellectual disability participated. Their IQs ranged from 45 to 69 with a mean IQ of 58. The intervention programme involved 15 weekly lessons of 1 h each, taught during 3 months. Blocks of lessons included each of Brown and Palincsar's strategies of summarizing, questioning, clarifying and predicting, as participants read and studied narrative and expository texts. Direct programme effects – as determined by posttest-pretest contrasts for strategy tests – were substantial, except for the questioning strategy. Secondly, there was a transfer effect to general text comprehension. Moreover, the results on this test were well maintained at a follow-up test.

In an Israeli study 35 persons, aged 15–21, with intellectual disability (n=35) participated in 24 sessions of literacy strategy instruction (experimental condition) or remedial literacy-skill acquisition-lessons (control condition) (Alfassi, Weiss & Lifshitz, 2009). The strategies were taught using the reciprocal teaching method developed by Palincsar and Brown. Control subjects were exposed to direct instruction of basic reading skills that were presented sequentially and practiced solitarily by the students. Opportunities were given to respond to questions and to summarise but no strategy instruction was provided to foster comprehension monitoring. Two different measures of comprehension and a measure of strategy use were administered to test for variation across different methods of instruction. Findings on all measures provide support for the claim that strategy instruction is indeed superior to traditional remedial methods of skill acquisition in fostering reading literacy comprehension.

Yu-Fen Yang of Taiwan conducted a study to develop a reciprocal teaching/learning strategy in remedial English reading classes (2010). Yang's study concluded that the students expressed that they observed and learned from the teacher's or their peers' externalization of strategy usage. Students' reading progress in the remedial instruction incorporating the RT system was also identified by the pre- and post-tests. This study suggests that there may be benefits for teachers in encouraging students to interact with others in order to clarify and discuss comprehension questions and constantly monitor and regulate their own reading (2010, p.1199f).

Research has also been conducted on the use of reciprocal teaching in primary grades. Pilonieta and Medina conducted a series of procedures to implement their version of reciprocal teaching in elementary school students (2009). They adopted an age-appropriate model for reciprocal teaching and called it "Reciprocal Teaching for the Primary Grades," or RTPG (2009). Their research indicates that even in younger children, reciprocal teaching apparently benefited the students and they showed retention of the RTPG when re-tested 6 months later (2009).

## Method

### Sampling and participants

For strategic reasons, we wanted to study a school in a socially disadvantaged neighbourhood. The particular school was sampled for reasons of convenience (non-random and non-randomized). The optimal design would have been to include a control group with the same conditions receiving an equivalent reading programme; however, no students within the same target group were available at the time of the study. Consequently, we settled for the sub-optimal design.

Thirty students and three teachers from Oak School participated in the intervention study. The teachers were between 58 and 63 years old, and each had between 37 and 40 years of teaching experience. The students were in the third grade and were 10 years old during the intervention. During the course of the study, a small number of students moved, but this did not influence the overall results, including the statistical analyses.

The students' decoding ability was tested regularly by the teachers. Twenty-seven students were considered adequate at decoding, while three students were not. The first of these three students was about to be investigated for dyslexia, the second had difficulties with pronunciation of words that delayed his reading development, and the third had difficulty with time on task.

### *Ethical Considerations*

The students and their parents signed consent forms, and all participation was voluntary. The names of the school and the students in this article are fictitious.

### *Data Collection*

The present study includes two different types of data: test data and video data. The two data forms should be considered as complementary, and each contributes differently to the study. However, the data forms are not integrated with one another.

The goal of the study was to conduct a repeated-measures design in order to measure change over time. Consequently, we wanted to compare individual students' test scores with the group mean to investigate changes over time.

Reading comprehension was measured using two Swedish-language standardized tests: the DLS (Järpsten, 1999) and the National Test (The Swedish National Agency for Education, 2013). The National Test consists of two sub-tests on fictional text and expository text.

The tests were conducted at the following times: The DLS reading test for grade 2 was conducted in September 2012 and January 2013; the DLS reading test for grade 3 was conducted in February 2013

and April 2013; and the National Tests (fiction and expository) for grade 3 were conducted in March 2013.

This material was analysed with the aid of SPSS (IBM Corp, 2012). The tests were not used to screen or categorize individual students. The use of standardized tests provides such an opportunity, but this was never the intention. Rather, the intention was to follow a group of students over time.

### ***Intervention Texts***

The fiction texts used in the intervention study were taken from textbooks. They were relatively short and ranged from 42 to 107 words (Franzén, 2002). None of the students had previous experiences with the texts. The LIX value of the texts ranged between 12 and 27 and, according to LIX, they were very easy to read. LIX is a Swedish readability formula developed by the Swedish scholar Björnsson (1968).

### ***Procedure***

The intervention was initiated in October 2012 and was repeated twice a week over a 12-week period. All the teachers in the study received the same instructions and all utilized reciprocal teaching. In accordance with previous research (Palinscar & Brown, 1984), the text talks were organized with 15 people in each group. In previous Scandinavian studies on reciprocal teaching, there has been a small group design with four to five students in each group. The students have attended lower secondary or secondary schools (see also Andreassen & Bråten, 2011; Lundberg & Reichenberg, 2013; Palinscar & Brown, 1984). However, classroom teachers generally teach in large groups. Consequently, the authors in the current study wanted to investigate the effects of Reciprocal Teaching in large groups in a primary school.

Each group practiced for 15 to 20 minutes twice a week as recommended by Palinscar and Brown (1984). All students participated in all text talks.

One strategy was introduced at a time. Each strategy was presented as a character in order to reduce abstraction and make the strategies concrete. The fortune teller represented predication. Curious George represented question initiation. Maja the detective represented clarifying. A cowboy with a lasso represented summarizing (see also Oczkus, 2003).

In previous studies, we asked the students to take on the role of question initiators; however, in those studies the students were much older. Furthermore, those studies were conducted in small groups. Therefore, we did not ask students to take on the role of question initiators, but asked teachers to encourage students to ask questions. One reason for this was that we did not want to cause the students to have cognitive overload (Spörer et al., 2009).

**New strategy:** In the study, the authors also introduced a new strategy called “new words” to improve upon reciprocal teaching (Lundberg & Reichenberg, 2013). Rather than asking, “Did you find any difficult words?” the teachers were encouraged to ask, “Did you find any new words?” The difference between the two ways of posing questions is that in the first type of question there is an implicit performance expectation for the students. The result may be increased performance anxiety. Students generally do not want to be evaluated in public during whole-class instruction. The second question does not raise any performance expectations but rather encourages students to be curious while reading.

**Video recordings:** Some text talks were video recorded. The selection of video-recorded text talks was conditioned by the availability of video cameras at the school.

**Seminars:** We met with the teachers in seminars before, during, and after the intervention. In the seminars before the intervention, author number one demonstrated text talks for the teachers. During the demonstration lessons, author number one acted as teacher and the teachers acted as students. During the seminars, the teachers also practiced segmenting texts and introducing the strategies of reciprocal teaching to the students. The purpose was partly to make the teachers more comfortable with the model, and partly to allow them to identify with their students during a text talk. Moreover, the teachers received instructional materials on reciprocal teaching.

In the seminars, during the intervention, the authors and teachers watched the video-recorded text talks together, and the teachers received feedback from the authors on how to improve the text talk. The video recordings were used as a tool to ensure that the teachers taught in accordance with the model. Each seminar lasted about two hours.

**Transcription of text talks:** The video recordings were transcribed. The focus was on the content of talk in interaction rather than the pronunciation of single words, pauses, hesitations, and so on, as in conversation analysis (Norrby, 1996). Accordingly, the transcription is less detailed than in conversation analysis. All utterances and some contextual cues, such as hesitation, were transcribed. The representation of the text talk is orthographic. Capital letters at the beginning of the sentence, punctuation,

commas and other signs of written language are present. The excerpts are organized by speaker, utterance, and activity.

## Results

We first present reading comprehension results before and after the intervention, and we excerpts from video-recorded text talks will follow.

The Wilcoxon test, 'Z' (Siegel, 1956; Wilcoxon, 1945), was used to investigate differences in the students' reading comprehension before and after the intervention. The Wilcoxon test does not require that the raw data be normally distributed, and it is a common and robust test for comparing test scores among students over time (Henriksson, 2008). An initial Shapiro-Wilk test of normality (Shapiro & Wilk, 1965) showed that the data were not normally distributed, which prompted the use of the non-parametric Wilcoxon test.

### Test Results

Table 1 shows that the students had higher test scores after the intervention (January and February 2013) than before the intervention (September 2012).

Table 1. Results from the DLS reading test before (September 2012) and after intervention (January 2013 and February 2013). Maximum score: 18 points.

	Number of students	Mean	Standard deviation
Sept. 2012: DLS reading test for grade 2	30	10.0	3.2
Jan. 2013: DLS reading test for grade 2	27	13.8	2.6
Feb. 2013: DLS reading test for grade 3	28	14.6	2.2

*Note: The number of students changes over time because several students moved during the course of the study. This did not, however, influence the overall results, including the statistical analyses.*

The difference between the students' performance in September 2012, before the intervention (mean = 10.0), and in January 2013, after the intervention (mean = 13.8), is significant (Wilcoxon's test,  $Z = -4.33$ ;  $p < 0.001$ ). The difference between their performance in September 2012 and in February 2013 (mean = 14.6) is also significant ( $Z = -4.52$ ;  $p < 0.001$ ).

Table 1 also shows that the variance among the students decreased over time. The standard deviation in September 2012 (3.2) is higher than in January and February 2013 (2.6 and 2.2 respectively). This indicates that the group became more homogenized over time with regard to their reading comprehension performance.

After the intervention study was over, three more measurements were taken in March 2013 in order to investigate how the students were performing after some time had passed (Table 2). The three measurements were a DLS reading comprehension test for grade 3 (the same type of test that had been conducted in February 2013), a National Test (fiction text) for grade 3, and a National Test (expository text) for Grade 3.

Table 2. Results from three extra reading comprehension tests given to the same class, one month after the end of the intervention study (March 2013). Maximum score: 18 points.

	Number of students	Mean	Standard deviation
March 2013: DLS reading test for grade 3	28	16.9	1.78
March 2013: National Exam, fiction text test for grade 3	27	17.8	0.48
March 2013: National Exam, expository texts test for grade 3	28	17.4	1.20

The results show that the students performed well on the DLS test in March (Table 2, mean 16.9). The difference between this DLS score (Table 2, mean 16.9) and the DLS score from September 2012 (Table 1, mean = 10.0) is statistically significant ( $Z = -4.58$ ;  $p < 0.001$ ). Table 2 also shows that the DLS variance among the students in March 2013 (1.78) had been further reduced compared with the previous DLS tests (3.2; 2.6; 2.2), which indicates that the group was becoming more homogenized over time with regard to test scores on reading comprehension tests. Furthermore, the scores from the National

Examinations (mean = 17.8 and 17.4) confirm that the students were performing well after the end of the intervention study.

### **Text Talk**

#### *The text*

Let us look at how the teacher and student constructed meaning from the “Wish List” text:

“*Wish List*”  
 Every Christmas or birthday, Måns wishes for a toy lorry.  
 “Grandma, now what I want more than anything else is a lorry!”  
 Grandma visits every possible store to find a lorry, but she cannot find any. Måns is happy to get a garbage truck instead, but it is not a lorry.  
 Måns’s daddy travels to London for a couple of days and guess what he brings? Yes, a large lorry!  
 “Grandma, you have to see this! This is what the lorry looks like! The one that you could not find anywhere else!”  
 “Now let us play with it together, you and I.”

The text is relatively easy to read and has 104 words. The LIX value of the text is 25, so it is comparable to children’s textbooks. There are several gaps in the text for the reader to fill in. We are not told why Måns wishes to own a lorry, nor do we learn why Måns’ dad goes to London. The text does not mention that London is the capital of England. Furthermore, there are several infrequent words: “jaunts” for travel and the reinforcing phrase “more than.”

### **Application**

How did the teacher apply reciprocal teaching in the classroom? The talk about “Wish List” can be divided into three phases: talk before, talk during, and talk after the reading.

The teachers crafted four cards. Each showed a character representing a strategy in reciprocal teaching. Let us look at how teacher Caroline utilized the cards during the text talk. The excerpts are organized by speaker, utterance, and activity.

#### *Before the Reading*

Teacher Caroline:	What do you see on the picture?	The teacher shows a card with a fortune teller.
Student:	Saida	
Teacher Caroline:	What does Saida do when we read our books and texts?	
Students:	She tells us what will happen next.	
Teacher Caroline:	What is this character? Do you remember what we talked about?	After the teacher has checked that the students remember the first strategy of prediction, she picks up the next card with Curious George.
Students:	Curious George.	
Teacher Caroline:	What does he help us to do? There are several question marks around his face. What could that mean?	
Students:	Questions. He is thinking.	
Teacher Caroline:	What do you think that he is thinking about in the picture?	Uses the verb “think”.
Student:	He wonders what kind of thing that is.	
Teacher Caroline:	What is that?	Repeats but does not evaluate. Notes that she wants something more.
Another Student:	Now I see. It is a lorry.	The students make a number of suggestions.

#### *During the reading*

After talking about the text beforehand, the teacher starts reading aloud for the students. During the reading, a student spontaneously asks, “What is a lorry?” The teacher pauses briefly. The pause

happens during the sentence, “Guess what he brings?” The student spontaneously shouts, “A lorry?” After reading, the teacher brings up a new card.

Teacher Caroline:	Now I am going to introduce a new card. Who have I picked up now? Who is this?	The teacher shows a card.
Student:	A detective. Maja the detective.	
Teacher Caroline:	If you were a detective, what would you like to detect?	Students make several suggestions.
Teacher Caroline:	Is there any word here that is new that you have not encountered before?	
Student:	A lorry.	
Teacher Caroline?	What does that mean?	Turning back the question to the student.
Teacher Caroline:	Now I have the last picture. If you got a lasso, what would you think about then?	Shows a fourth card with a lasso

Before the actual reading, the teacher lets the students repeat the two strategies of prediction and question initiation. These strategies are important before you begin to read a text. The teacher departs from the picture of Måns and asks the students what they think Curious George is thinking about. By using the word “think,” she signals that the students can guess. During the text talk, the teacher signals that she is not evaluating the questions as right or wrong. Rather, she replies to the students’ questions as if they could have multiple answers. “Yes, that could be the vase.” Furthermore, she wants the students to think for themselves. She signals this by not directly answering the students, but by turning the question back to the students.

### Discussion and Conclusions

The aim of the study was to investigate effects of reciprocal teaching on the reading comprehension of students in the third grade. This grade level was chosen because no previous study of Swedish education had investigated the effects of reciprocal teaching on text comprehension among students in grade 3. The study suggests that reciprocal teaching improves students’ reading comprehension in grade 3. The collective reading of short text segments and step-by-step training in four strategies supported students’ efforts to find meaning in texts (cf. Slavin, 2009). Furthermore, the students’ reading comprehension increased significantly ( $p < 0.001$ ) and the effects were persistent ( $p < 0.001$ ). A key aspect of reciprocal teaching is that the students get to lead the text talk and initiate questions. This is common practice in small group designs (Lundberg & Reichenberg, 2013). In the present study, the students did not take the role of question initiator and thus did not lead the text talk. This decision was based on the reading development of the students and the risk of cognitive overload (Rosenshine & Meister, 1994, p. 247; Spörer, et al., 2009). One could speculate that if students lead the talk, they will focus more on mastering the strategy of imitating questions than on the content of the text. The study also shows that reciprocal teaching can be taught successfully under large-group conditions in a Swedish context with students in grade 3. In previous studies small-group design was used (Reichenberg, 2008; Lundberg & Reichenberg, 2013). The results are in line with Pilonieta, & Medina (2009). However, the teachers complained that it was time-consuming. Consequently, the large-group design was used in the present study. We cannot rule out the possibility that the magnitude of the effect would have been even greater with a small-group design. It can be argued that text talks are time-consuming, but by participating in text talks, students will probably internalize the relevant strategies and use them on their own. However, to be able to teach students reading comprehension, teachers need practice. This underscores the need to focus on the teaching of reading comprehension in teacher education, i.e., reading strategies and metacognitive strategies. Otherwise, we run the risk of educating students to be uncritical and passive readers. Students who cannot meet the demands in school also run the risk of failing both in school and later on in working life and society. A limitation is that the study was conducted without a control group. This decision was based on the consideration that having a class participate in a study without being exposed to reading instruction would be unethical. In a forthcoming study, we will attempt to create a design that includes both large-group instruction and a control group that is exposed to reading instruction after the study.



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