Does Cooperative Use of Reading Strategies lead to Improved Text Comprehension?

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Abstract

Comprehending texts usually requires students in primary education to deploy reading strategies, especially when texts are difficult. The dearth of possible reading strategies might overwhelm the individual and may actually detract from rather than add to text comprehension. In this study, students worked together either unstructured or structured. In the structured cooperative reading condition, participants each received a card that summarized which phase of the reading process that participant was responsible for. Three hundred and twenty-seven students were assigned to either an unstructured group, a structured group or a control wherein students read individually. The expectation was that students who could work together, especially those who only had to focus on a specific set of reading strategies, would outperform students in the control condition and would experience less mental effort. The results are mostly contrary to these expectations, as individuals outperformed group-members. With regards to mental-effort, text-difficulty proved to be an influential factor.

Keywords: reading, cooperation, strategies, primary education.

1. Introduction

Informational texts, such as those used in history and science, facilitate students' reading development (Maloch & Horsey, 2013). In order to comprehend a text, readers must be able to organize the information in the text into a coherent mental representation, and this process is influenced by the structure of the text (Kintsch & van Dijk, 1978). The construction of a rich mental representation of the text meaning depends on the reader's ability to integrate the information across the text with his or her prior knowledge.

However, because of limited processing capacities, readers often cannot remember and learn everything in a text. Past research has shown that struggling readers are less sensitive than good readers to these different text structures and experience particular difficulties in using informational text structure to mentally organize the content of a text (Lovett et al., 1996; Meyer, Brandt, & Bluth, 1980). Whereas good readers spontaneously apply 'structure strategies' to understand texts (Meyer et al., 2010; Meyer, Brandt, & Bluth, 1980; Meyer & Poon, 2001), struggling readers are less aware of the function of text structure, and tend towards a listing of facts, rather than an integration of text meaning. When struggling readers have to show comprehension, their list-strategy lead to an overloading of the already limited memory capacity of struggling readers (Meyer, 2003).

Signaling the structure of information in the text can scaffold students' comprehension processes (Garcia et al., 2015). Effective instructional programs, such as 'structure strategy' (Meyer & Poon, 2001; Meyer et al., 2010) and 'cognitive strategy instruction' (e.g. Englert, Tarrant, Mariage, & Oxer, 1994) have been developed to support readers' learning from informational texts.

Much research into reading strategies has been on the individual use of reading strategies, with interventions often aiming at a single strategy (i.e., prediction, question asking, imagery generation, monitoring or summarization) and comparisons between an experimental and a control group. However, research by Pressley and Afflerbach (1995) showed that good readers do not depend on just a single strategy, but use a repertoire of

strategies, which are deployed adaptively depending on the situation at hand. When teaching such repertoires and explaining when certain strategies are appropriate, text comprehension generally increases (see Dignath, Buettner, & Langfeldt, 2008; Donker et al., 2014).

Palincsar and Brown (1984) describe a way of instruction aimed at "reading for meaning" which features four reading strategies: prediction, generating questions, summarizing and clarifying. The first three of these four strategies closely match with the three phases of Zimmerman (2002), with clarifying likely to occur in any of the phases. They also put forward reciprocal teaching as an effective method to foster the acquisition of reading strategies (Palincsar & Brown, 1984; Rosenshine & Meister, 1994). Palincsar and Brown advocated strategy development in the context of small group reading, with students in the group taking turns leading the group as it applied strategies to reading. Working in groups leads to a more dynamic deployment of reading strategies and better understanding of the text (Pressley, El-Dinary, Gaskins, Schuder, Bergman, Almasi, & Brown, 1992). The translation to the classroom context can be difficult, however, as students tend to use their strategies more flexibly than intended by Palincsar and Brown, and teachers tend to use this method only as part of other instructional methods (Hacker & Tenent, 2002; Marks, Pressley, Coley, Craig, Gardner, DePinto & Rose, 1993).

Research has shown that cooperative learning techniques are effective for improving both academic and social skills of children and adolescents (Johnson & Johnson, 1981; Madden & Slavin, 1983; Slavin, 1984). Much research on learning strategy learning and use focuses on the individual learning and application of learning strategies (see Dignath et al. 2008; Donker et al., 2014). However, whether individual application of learning strategies is superior (or inferior) to application of these same strategies in groups of students remains an open question. Moreover, the issue of a benefit to working together becomes more salient in the domain of reading comprehension, as many reading tasks nowadays do require students to read together already. However, how learning strategies factor into this cooperative reading, also remains an open question.

Many studies describe that students working together stimulates higher-order cognitive explaining why cooperative learning leads to higher (meta)cognitive outcomes as compared to individualistic learning methods (e.g., Johnson & Johnson, 2009). When students work together in groups, which most often happens in the context of problem-solving tasks, task-relevant information and processing is shared between group members (Akkerman, Van Den Bossche, Admiraal, Gijselaers, Segers, Simons, & Kirschner, 2007; Beers, Boshuizen, Kirschner, & Gijselaers, 2006; Kirschner, Paas, & Kirschner, 2009). Whereas individual students only need to process the problem task and deploy reading strategies when necessary, group members also need to discuss the task and coordinate group efforts, which causes load (Kirschner et al., 2009).

Using reading strategies is not an effortless endeavor; students need to use their limited cognitive resources to deploy these strategies effectively. Generally speaking, more difficult texts require more effortful processing when trying to comprehend the text compared to easier texts (e.g., Osman & Hannafin, 1992). This not only has to do with the text itself being more difficult, but also likely more strategies being required to make sense of this task. Moreover, more difficult texts may require too much cognitive resources from the individual learner, leading to less understanding of a text.

Whether this additional load is extraneous or germane to learning depends on the difficulty of the task and the way communication is set-up. A benefit of having students reading together is that the cognitive requirements of the task, both of the text and the strategies used in text comprehension, can be shared. According to cognitive load theory, individual learning is restrained by the limited capacity of working memory (Paas, Tuovinen, Tabbers, & Van Gerven, 2003; Sweller, Van Merriënboer, & Paas, 1998). People

can only hold or process a limited amount of information in this working memory at any given time (about four to nine elements; Cowan, 2001; Miller, 1956). Information-processing that requires more working memory capacity than is available, will likely result in poor performance. Easy tasks that can be performed and learned from by the individual learner, as intrinsic load is not too high, make learning in a group superfluous and communication within the group would only add extraneous load. However, when working together on difficult tasks improves learning compared to individual learning, the communication within a group is necessary for and possibly aids in learning, making this cognitive load germane (Vollrath, Sheppard, Hinsz, & Davis, 1989).

Even in the case of tasks where working together would be beneficial for the learning of individuals, the way students communicate may influence the level of extraneous and germane load imposed by communication. Merely placing students together in groups and telling them to work together will not bring about the expected benefits of cooperative learning for social and/or academic outcomes as the success and effectiveness of cooperative learning depends on several factors. Rather, Johnson and Johnson (2009) posit that there are five basic elements or characteristics of a cooperative learning activity that largely influence the success of group learning: positive interdependence, individual accountability, interpersonal and small group skills, group processing, and promoted interaction. Structuring the reading process in order to fit these five characteristics, should enhance cooperation.

For example, problem-based education often incorporates different tasks within a group working on a problem, such as a scribe and coordinator, which should help streamline the cooperative process and increase the effectiveness of cooperative learning (Slavin, 1990). In the case of text comprehension, rather than making all students equally responsible for the whole reading process, each student could be given a specific task in the group that he or she needs to fulfill. Such scripting of cooperative activities can improve learning (Kirschner, Beers, Boshuizen, & Gijselaers, 2008) because it allows students to bring specific and different perspectives to the table that lead to deeper problem analysis.

Whereas information division in the study by Kirschner et al. (2009) occurred on the basis of task content (i.e., dividing intrinsic load), task-division could be based on the various strategies that may be used for text comprehension. However, even when students read in groups, each of those students is responsible for his or her own strategy use, thus depending on a plethora of possible strategy choices. As with the research described in the prior paragraph, students could also be assigned to specific reading strategy tasks. For example, one student within a group would be responsible for making a summary, whereas another student would be responsible for dealing with difficult words. Provided each student has knowledge of their respective strategy, how to use the strategy and when to deploy this strategy, group members can depend upon each other to successfully comprehend the text. This division into tasks should make clear what each student should do, have them focus on those tasks, and limit what each student needs to take into account at any given time. As such, extraneous load for communicating should be reduced and germane load increased.

Current study

The current study focuses on cooperation, either pre-structured or unstructured, as a possibility to reduce individual learners' difficulties with text comprehension. Herein it takes an atypical approach to cooperation, as scripting for the pre-structured condition was based on the usage of strategies rather than division of content. The research questions are whether working in small groups leads to 1) higher individual text comprehension scores and 2) lower individual mental effort scores compared to students having to work alone. This is expected to be true for a more difficult text, where individual learners may encounter too much intrinsic load for effectively read the text by their own, but not for an easy text, where working in

groups only adds superfluous cooperation. Furthermore, this effect was expected to be strongest for students in lower grades and weaker for students in higher grades due to differences in reading expertise. Moreover, the tasks given to the structured groups should have an added positive effect to cooperative reading compared to unstructured groups.

2. Method

2.1 Participants

Three hundred and twenty-seven Dutch primary education students (Age $M = 9.49$, $SD = 1.30$) participated in this experiment. These were students from two primary schools in the northern part of the Netherlands who were willing to participate freely in the study. One hundred and sixty-two were female, 165 were male. They were all native Dutch speakers.

In their regular curriculum, all students were taught with the same method for comprehensive reading from third to sixth grade ("Nieuwsbegrip"), which bases their texts on recent events. Because all students of the same Grade had received the same prior texts and instruction on strategies, this made participants relatively comparable. A major part herein is devoted to learning strategies and metacognitive thinking about these strategies. From third grade, students are taught a set of strategies, such as rereading, predicting, setting goals, and summarizing. These strategies and the circumstances in which they need to be implemented become more complex in higher grades. Furthermore, these schools implement weekly co-operative reading sessions followed by intra-class discussions of the text. Participants therefore should have at least some experi-ence with reading strategies and cooperative reading.

2.2 Cito-score

There was no pre-test, but there was information available on students' general reading ability, by taking their reading scores on the last test from the Dutch National Institute for Educational Measurement (Cito), which is part of a tracking system used throughout the Netherlands to monitor the process of students. These reading scores did not differ significantly between the three conditions (all $p > .40$), providing at least some evidence that the three conditions of participants can be considered equivalent (see Table 1). These reading scores are on the same scale for different Grades, making them highly comparable. Here, only these reading scores were used as a general indicator of general reading competence, and in the analyses, both Grade and Cito-score were included as covariates.

Table 1: *Average Cito-level*

	n	Cito-level (SD)
Individual	90	2.06 (1.11)
Unstr. Group	106	2.25 (1.24)
Struct. Group	131	2.41 (1.29)

2.3 Design

An experimental design with three conditions was implemented in this experiment; 1) individuals, 2) unstructured groups, and 3) structured groups. Although the primary interest for comparison was the structured group with the control condition, in order to differentiate between the effects of group working versus providing structure, an unstructured group was created. Every class was randomly distributed over these three conditions, so all students from one class were in the same condition. Classes contained between fourteen and thirty students.

2.4 Materials

Role-cards

Participants in the pre-structured condition were provided with a single role during the reading of a text, in line with the division of Zimmerman (2002), and Palincsar and Brown (1984). To make clear what their role was, participants received not only instructions beforehand on the four possible strategic roles, but also received task-cards summarizing their responsibilities.

Four task-cards were implemented for the pre-structured condition; one pre-reading card, one during-reading card, one post-reading card and a reader card. The back of

each card contained the same text, indicating how the group should work together. The front of each card was different and indicated which three activities to undertake during their phase. The pre-reading card indicated that the holder had to determine reading goals, explore the text structure and activate prior knowledge. The during-reading card indicated that the holder had to monitor comprehension, ask questions and predict what would happen next. The post-reading card indicated that the holder had to summarize the text, check the reading goals and check the integration of new information of the text with their prior knowledge Finally, the reader card indicated that the holder had to clearly read aloud to the rest of the group, adjust his/her speed or reread when requested and keep track of where in the text they were.

Strategy list

Participants in either the Unstructured or Individuals condition did not receive the role-cards. However, differences between conditions might then be attributable to a reminder-function of the role-cards. As such, all strategies presented on the role-cards, were presented as a list (including categories) to participants in the Unstructured or Individual conditions.

Texts

Two texts were used, both from the database of "Nieuwsbegrip", of two levels of difficulty (as determined by both length and complexity), which allows us to investigate both the effects of grade and within subject differences due to text difficulty. The first text on the subject of a zoo was easier, as it was intended for Grade 4, and relatively short, containing 185 words. Eight closed questions with three answer options each were asked of the students afterwards (Cohen's Kappa = .79). Half of the questions dealt with factual information, the other half with causal relations. This text had to be read within fifteen minutes, with five minutes for the questions. The second was a relatively long text (696 words) on the subject of geothermic energy, which was written for grade six. Ten closed questions with three answer options each were asked of the students on the text (Cronbach's alpha = .65). Half of the questions dealt with factual information, the other half with causal relations. This text had to be read within 30 minutes, with ten minutes for answering questions.

Mental effort

Mental effort was rated on a single item, asking students to subjectively rate the mental effort required in answering the questions on a five-point Likert-item ("How much effort did answering the questions require of you?", cf. cognitive load scale, Paas & Van Merriënboer, 1994). Prior studies within the framework of this theory have used this singular item in order to interpret the intrinsic, germanous and extraneous loads between conditions. Considering intrinsic load should be similar for all participants, variations in mental effort measures could only be due to extraneous or germane processes.

2.5 Procedure

Students were randomly assigned to one of the three conditions per class. Participants first received a general instruction as to what they would have to do (read two texts, try to understand them as best they could, and answer questions about the text), and how long this would take (one hour and fifteen minutes in total; one hour for the texts and answers, fifteen minutes for everything else). After this, they were instructed to study the handout with strategies for two minutes and see how familiar they were with the strategies. If they were unfamiliar, they were provided instruction on the spot with two examples from their recent curriculum. They then received condition specific instruction.

Unstructured cooperative groups

Students in the Unstructured groups condition were randomly assigned to groups of four participants, with remaining students added to make groups of five. Group membership and the size of the group were noted on each group members' answering forms. After the general instruction, participants were instructed to cooperatively read the first text and that they would have to individually answer questions. Participants in each group then received

the first text that they read together, with half of the groups receiving the difficult text first, and half receiving the easy text first. Participants could appoint one or more members to read aloud. One researcher surveyed the room and intervened if students read only by themselves. After reading the text, participants had to solve the questions individually and also filled in the mental effort ratings individually. Once completed, participants in each group received the other text, read this together and answered text questions and mental effort ratings individually.

Structured cooperative groups
After the general instruction, participants were instructed to cooperatively read the first text, for which they had twenty minutes, and that they would have to individually answer questions. They were then instructed to shuffle the task-cards and randomly distributed the tasks amongst the group, each member announcing aloud what their task was. The researcher then provided a brief instruction that each participant was responsible for the activities on their particular card and had to make sure their strategies were applied by the group. For the second text, they passed their cards on to their neighbor on the left, so each group member had performed two tasks at the end of the experiment. For each text, each participant noted which task-card they had received. One researcher surveyed the room and intervened if students read only by themselves.

Individuals
After the general instruction, participants were instructed to quietly read the first text by themselves. After reading the text, participants had to solve the questions individually and also filled in the mental effort ratings individually. Once completed, participants received the other text, read this text by themselves, and answered text questions and mental effort ratings individually.

2.6 Pre-analyses

There were no significant differences between conditions on the pre-test ($p = .18$), Cito-score ($p = .12$), the ratio of boys/girls ($p = .11$), grade ($p = .63$) or age ($p = .93$).

Conditions' composition
There were no significant differences between conditions when it came to gender-distribution ($p = .67$), but there were significant differences in Cito-scores ($p < .01$).

Primary Analyses
Significance levels were set at .05. Partial eta squared (η_p^2) is reported as a measure of effect size, with 0.01, 0.06, and 0.16 corresponding to small, medium, and large effect sizes, respectively (see Cohen, 1988, pp. 278-280). Both the grade level (3rd through 6th) and Cito-score were expected to be significant covariates, likely to interact with text difficulty and mental effort, and these were included in all analyses below.

The independent variables were text difficulty (easy or difficult text) as within subjects factor and condition (individual, unstructured, and structured group) as between-subjects factor. Cito-score and Grade (3rd to 6th) were used as covariates. The dependent variables were performance, as measured by the scores on the items belonging to each text, and mental effort, as measured by the single item described earlier.

Comparisons were made through a repeated measures ANOVA in SPSS 25.0. Ideally, multilevel analyses would have been run on the groups. However, as individuals were not members of a group, or rather formed a group of one, this was not a possibility.

Finally, we also correlated cito-scores with scores on the easy and difficult texts, in order to see whether the standardized tests matched the tests made specifically for this study. Both easy ($r = .41$, $p < .001$) and the difficult ($r = .28$, $p = .029$) correlated significantly with Cito-scores.

3. Results

3.1 Performance

As performance on the difficult text was rated on ten items, and the easy text on eight items, performance scores were recalculated into percentage-scores to make them comparable. No effect on performance scores of the order in which the texts were presented was found

($p > .40$). A repeated-measures ANOVA was run, with Text as within subject factor, Condition as between subjects factor, grade and Cito-score as covariates, and the performance scores on the two tests as dependent variables.

Table 2: *Percentage*-scores of performance (SD in parentheses)

	n	Text Easy	Text Difficult
Individuals	90	67.4 (19.3)	50.3 (17.8)
Unstr. Group	106	65.3 (21.5)	46.6 (18.0)
Struct. Group	131	63.2 (21.4)	52.0 (18.3)

Between-subjects

The results of the ANOVA showed a significant between-subject effects of the condition ($F(2, 322) = 7.92, p < .001, \eta_p^2 = .047$). Both Grade ($\eta_p^2 = .18$) and Cito-scores ($\eta_p^2 = .19$) were significant covariates ($p < .001$). LSD post-hoc analysis further revealed that the Individuals outperformed both the Unstructured ($p = .001$) and Structured groups $p < .001$), whereas no differences between the Unstructured and Structured Groups were found ($p = .89$).

Within-subjects

The ANOVA also showed within subjects effects, with a main effect between texts ($p < .001$), with participants scoring better on the easy ($M = 65.0, SD = 20.8$) than on the difficult task ($M = 49.8, SD = 18.1$). Furthermore, an interaction effect was found on Text-Difficulty x Cito-score ($F(1, 322) = 15.75, p < .001, \eta_p^2 = .047$), with performance scores for the easy text being higher for participants with higher Cito-scores, whereas this effect was less pronounced for the difficult text. Also, an interaction effect was found between Text-Difficulty x Condition ($F(2, 322) = 3.46, p = .033, \eta_p^2 = .021$); whereas the participants in the Structured group performed worst of the three conditions for the easy text, it was the Unstructured group that performed worst for the difficult text.

Without covariates

There is a problem with reporting partial eta squared. It is dependent on what is included in the model. If the covariates account for variance, the error term is reduced and partial eta square become quite large. This gives the appearance that the effects are much more sizable than they really are (for a discussion, see Pierce, Block & Aguinis, 2004).

Rerunning the above analysis without the two covariates, we did not find any significant differences between the conditions, $F(2,322) = .90, p = .41$. Therefore, we also reran the analysis, but split up for the four included grades (also not including Cito-scores). The results of these separate ANOVAs showed no effects for grades three ($p = 42$) or six ($p = .66$), but did show significant differences for grades four ($p = .039, \eta_p^2 = .087$) and five ($p = .022, \eta_p^2 = .066$; see Table 3).

Table 3. Score percentage (SD in parentheses)

	n	Text Easy	Text Difficult
Grade 3	79	56.1 *(16.1)*	40.8 *(15.9)*
Grade 4	74	61.6 *(18.9)*	43.1 *(14.3)*
Grade 5	115	68.6 *(23.7)*	53.7 *(18.1)*
Grade 6	59	74.4 *(17.3)*	62.5 *(15.6)*

3.2 Mental effort

A repeated-measures ANOVA was run, with Text as within subject factor, Condition as between subjects factor, and class, grade and Cito-score as covariates, and the mental effort scores on the two tests as dependent variables. There were no main effects of Grade ($p = .55$) or Cito-score ($p = .72$).

Between-subjects

The repeated ANOVA did not show differences between conditions on mental effort ($p = .295$) and the covariates were not significant either. As such, the analysis was not repeated without covariates as was done with performance scores.

Within-subjects

A significant difference ($F(1,281) = 24.74, p < .001, \eta_p^2 = .08$) between the mental effort invested in the easy text ($M = 2.28, SD = .25$) and the difficult text ($M = 2.83, SD = .25$) was found. Furthermore, an interaction effect was found on Text-Difficulty x Grade ($F(1, 281) = 10.70, p = .001, \eta_p^2 = .037$), which showed that for the easy text, mental effort decreased for higher grades but remained quite similar

for the difficult text. A second interaction was found for Text-Difficulty x Condition ($F(2, 281) = 5.71$, $p = .004$, $\eta_p^2 = .039$). For the difficult text, mental effort was slightly higher for the cooperation groups compared to the individual group. However, for the easy text, mental effort was higher for both the Individual and Structured Groups condition, but this was lower compared to the difficult text in mental effort for the Unstructured group (see Figure 1)

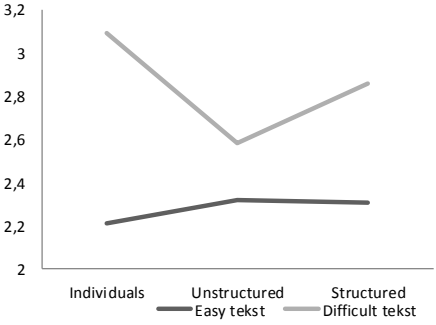

Figure 1: Mental effort

Correlations

Because the between-subjects ANOVA did not show differences between conditions, we did check whether mental effort and performance correlated. For both the easy ($r = -.10$, $p = .044$) and difficult text ($r = -.16$, $p = .003$), mental effort was negatively correlated with performance on the text questions.

3.3 Reading Tasks

Performance and mental effort scores were compared for participants working in structured groups, to investigate any differences between the provided tasks on cards. For both easy and difficult texts an ANOVA was performed, with condition as independent variable, grade and Cito-score as covariates, and performance and mental effort scores as dependent variables. The results show no differences between the tasks on performance or mental effort scores (all $p > .35$), that is, what students were responsible for (pre-reading, during reading or after reading activities) did not influence their overall performance or mental effort.

4. Discussion

The current study focused on cooperation as a possible solution for difficulties in text comprehension for individual students. The research question was whether working in small groups led to higher text comprehension scores and lower mental effort scores compared to students that had to work alone.

With regards to the mental effort scores, the interaction effect does support the expectations, as it showed that only the individuals had to spent more effort on the difficult text compared to the invested effort on the easy text. These results fit with prior research on the subject, specifically with the idea that group-based learning offers the opportunity to share processing demands of a learning task (see Akkerman et al., 2007; Beers et al., 2006; Kirschner et al., 2009). Furthermore, for the easy text, group members spent more effort compared to the individuals, which is in line with the idea that communication within a group requires effort (Kirschner et al., 2009). If a task is relatively easy and can be performed by an individual with little effort, forcing students to work together only increases the amount of effort each of these group-members has to invest because of their requirement to communicate (Stasser, Taylor, & Hanna, 1989; Vollrath et al., 1989). It therefore seems paramount not to have students work together on tasks they could just as well do alone, as working together also requires mental resources that may be more beneficially utilized.

Contrary to the expectations, cooperative reading did not lead to better performance on the difficult task compared to the performance of individual students. In fact, individual performance was superior to that of either group conditions for both texts. Particularly for the more difficult text, where group members could rely on the mental resources of others, it is odd that individuals would still outperform group-members. Further analyses showed that these differences interacted with students' grade and Cito-score. Specifically, significant differences were found only in performance between condition for grades four and five. This most

likely has to do with task difficulty: both texts were likely too easy for students in grade six and too hard for those in grade 3, regardless of condition.

One explanation comes from Barron (2003) who found that successful groups engaged in each other's thinking, whereas members of low performing groups mostly keep to their own perspectives. Applied to this particular study, in the structured group, we explicitly required students to focus on their particular role. As such, it may be that group members kept mostly to their "own" learning strategies, without linking these to the strategies of other group members. This would actually fragment the strategy use amongst group members, rather than having a group effort in using strategies. Furthermore, students may have engaged in strategic activities because they were tasked to do so, not because they had understood why and when they needed them.

Research has shown that positive results with cooperative learning have mostly been found when measures were taken to ensure effective cooperation (Fischer, Bruhn, Gräsel, & Mandl, 2002; Kirschner et al., 2009). Even with strict structuring and scripting, cooperative learning is not a guarantee for success (Beers et al., 2005; Mäkitalo, Weinberger, Häkkinen, Järvelä, & Fischer, 2005; Van Bruggen, Kirschner, & Jochems, 2002; Van Drie, Van Boxtel, Jaspers, & Kanselaar, 2005). Studies using less scripted or constrained environments show mixed and even negative findings regarding both learning process. While this study did provide students with scripted tasks in the structured condition, whether or not these scripts were followed and led to structured discussions, is unclear.

From a practical perspective, this research has important ramifications. Considering the amount of cooperative reading that happens in the classroom, for example through reciprocal teaching (Palincsar & Brown, 1984; Rosenshine & Meister, 1994), the results of this study show that working together is not always a superior option compared to working individually. This is not to say that cooperative reading has no place in teaching text comprehension. It may be that students can learn from each other, both on the level of reading strategies and the text itself (Pressley et al., 1992), but the circumstances for working together need to be optimal.

There were several limitations to this study. First, the lack of a separate pretest makes it impossible to verify whether prior knowledge of students was similar between conditions or between and within groups in the cooperation conditions. However, groups and conditions on Cito-score were compared and no differences on these Cito-scores between the groups or conditions were found. Second, there is only the assumption that students had sufficient metacognitive and cooperative skills for the intervention to have any effect. While this assumption is supported by the way the curriculum at the school is designed, measurements of cooperative and metacognitive skills either beforehand or during text-comprehension might have shed more light on the skills of the students (see for example Strom & Strom, 2011). Third, due to the rigor of the experiment, students might have been forced to read individually, whereas their regular classroom practice might have been cooperative reading, or vice versa. No data on regular classroom practices were collected, so this remains a possible confounder. Fourth, with regards to the results, the effect sizes were rather small. However, considering the briefness of the intervention, even a small effect size is considerable, and invites for future research along this line. Fifth, In this study, we only looked at informative texts as learning material, but other types of texts such as narrative texts may yield different results. Finally, we only looked at more cognitive aspects of cooperative text comprehension, but motivation may be just as or even more important to self-regulated or other-regulated learning (Järvelä, Järvenoja, & Malmberg, 2012).

While the findings generally are unfavorable towards cooperative text comprehension when it comes to performance scores, this does not mean students should never cooperate. Rather, it seems very important to

make a careful consideration of what students are capable of and what tasks they have to perform, as students engaging in difficult tasks do seem to benefit from working together from a mental effort standpoint, which in the long run may enhance not only text comprehension and learning, but also enhance cooperative and metacognitive skills. Primarily though, as the introductory editorial of this special issue indicated, students working within cooperative learning are likely working together on foundational skills; this also may explain the results of this study wherein students were tied to specific roles that entailed specific foundational skills of reading.

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Samenvatting

Leidt samenwerkend gebruik van leerstrategieën tot beter tekstbegrip?

Het begrip van teksten vereist van leerlingen in het primair onderwijs gebruikelijk het inzetten van leesstrategieën, met name als het gaat om moeilijke teksten. De breedte van scala aan mogelijke leesstrategieën die ingezet kunnen worden, is mogelijk teveel voor de individuele leerling en kan daardoor juist afbreuk doen aan het begrip van de tekst. In deze studie, werden 327 leerlingen in één van drie condities geplaats: een zelf lezen conditie, een ongestructureerde samenwerk conditie en een gestructureerde

samenwerk conditie. De structuur kwam voort uit leesrollen die individuen in de groep moesten vervullen. De verwachting was dat de structuur zou helpen in het kiezen en toepassen van leesstrategieën en daardoor tot betere leesprestaties en minder mentale inspanning zou leiden. Echter, de resultaten staan in sterk contrast met deze verwachting, want het waren de individuen die het best presteerden. Met betrekking tot mentale inspanning, was er een sterk effect van de moeilijkheid van de tekst.

Kernwoorden: lezen, samenwerken, strategieën, primair onderwijs