

SUMMARY:

Enhancing the Reading Ability of Primary School Children in a Peer-Tutoring Team

The **main objective** of this intervention study was to create a theoretically based and empirically evaluated training program for enhancing the reading ability of primary school children.

The intervention is based on **theoretical and empirical knowledge** from several different areas: research on learning strategies, metacognition and self-regulation; psycholinguistic research; the analysis of expert readers; and the results of empirical evaluations of interventions that teach reading strategies.

The **intervention** contains two main parts. The first part is a peer-tutored form of the repeated reading method (Samuels, 1997; Fuchs & Fuchs, 1999) that tries to improve individuals' ability to decode words. The second part is an adaption of the reciprocal teaching program (Brown & Palincsar, 1984) that aims to enhance reading comprehension by fostering cognitive and metacognitive reading strategies (clarifying unknown words, asking and answering questions on the text, writing a summary, and making predictions about future events in the text). These strategies are used in "reading teams" with one or several partners. In each paragraph one of the participating children takes the teaching role. This child has two tasks: the first is organizational, such as directing other children's strategy use and organizing the flow of the group; the second is monitoring and regulating the common comprehension of the text.

The **pilot study** had two main aims: the first was to detect treatment effects of the intervention, and the second was to determine whether it is better to work in reading teams with one partner or with several partners. These questions were examined by a quasi-experimental pre-post design with control group ($n=213$, 9 classes of third-grade students). ANOVA with mean differences was used for the data analysis. In the self-developed strategy test, the trained students showed significantly superior results in their declarative knowledge. Their procedural knowledge of strategies was also better, but the difference was not statistically significant. The results for reading comprehension ("Nights of the puffings"; PILRS 2001) revealed significant effects only for the students working in reading teams with one partner. Therefore, in the main study the training period was extended and metacognitive reflection phases were added to the training to enhance the quality of the reciprocal teaching dialogs in the reading teams.

The **main study** had both quantitative and qualitative components. The **quantitative component** had a quasi-experimental pre-post design with control group ($n=500$; 23 classes of third-grade students). The primary task was to compare four variations of the intervention (peer-tutored repeated reading, reciprocal teaching, reciprocal teaching with practical exercises in solo work, control group with conventional reading lessons). The analysis focused on the effect of these intervention variations, and additionally on the development of reading comprehension by analyzing the correlation between reading strategies and reading comprehension.

For the first variation of the intervention, the peer-tutored repeated reading, results revealed effects in the desired direction: a t -test of mean differences based on propensity score matching showed that the trained students were significantly superior in decoding words (ELFE 1-6, subscale word) versus control students.

For the reciprocal teaching variation, the main hypothesis was that primary school children of all ability groups are able to learn cognitive and metacognitive reading strategies in self-regulated terms without individual coaching, and that this ability has a positive effect on reading comprehension, although previous studies of reciprocal teaching have used competent adult trainers. The propensity score matched mean differences were compared, and the differences between the experimental and the control groups were tested with a t -test. Furthermore, in order to judge whether the training has an effect for all primary school children, groups were formed based on propensity scores. Due to the necessity of several t -tests the level of error was adjusted with a *familywise error rate* by the Bonferroni-Holm method. The results showed that the trained students had significantly higher declarative and procedural knowledge of strategies than the

control students. Similar effects were found for reading comprehension with non-fictional texts and hierarchically higher processes of text comprehension. These findings were also replicated by examining the different ability groups: all groups except the group with the lowest reading ability showed significant improvement in reading comprehension in comparison to the subgroups of the control students. The comparison of subgroup differences within the variations pre- and post- intervention showed differences in development: at the beginning, the ability groups were easily discernible in both the experimental and control groups; at the end, the trained group still had easily discernible ability groups at a higher level. In contrast, the ability groups in the control variation were more similar to each other than they had been at the beginning, because the superior readers nearly stagnated in development. This effect was found for the procedural knowledge of strategies, the hierarchically higher processes of text comprehension and the monitoring of reading comprehension.

By comparing the reciprocal teaching variations with and without practical exercises in solo work, statistically significant advantages in declarative strategy knowledge were found for the students without practical exercises in solo work. However, children participating in the variation with solo work had superior procedural strategy knowledge. The analysis of the ability groups revealed that the group with the lowest reading ability caused these differences. The group of average readers showed no differences and the group of the best readers benefitted from extended time in the reading team. In contrast to this advantage for low ability readers, positive effects were found in reading comprehension of non-fictional texts and in hierarchically higher processes of text comprehension in the other variation (without practical exercises in solo work). However, when the level of error was corrected, these effects were not statistically significant.

The **qualitative part of the main study** focused on one group of children ($n=5$) working a total of six times in the reading team under two different conditions: with one partner and with the whole group. These cooperative phases were examined with qualitative content analysis in order to determine whether primary school children are able to monitor and regulate their reading comprehension by using cognitive or metacognitive strategies. The results showed that students of all ability groups are able to do so, but low-level readers do so on a more basic level. Comparing the two different forms of teamwork, the whole group tended to have more social-constructive activities of higher quality. For both groups the students were on task for an average of 91% of the time spent in the reading team. Regarding individual students, on the other hand, the student with the lowest ability was actively on task for a strikingly small amount of time. However, the analysis of the attentiveness (Munich Attention Inventory; Helmke, 1988) of this low-ability student showed that passive on-task time was high. Thus, the time in the reading team could be an opportunity for observational learning for this child, but the quantitative part of the study found evidence that this is not sufficient and that an opportunity for practice is also necessary. This could be teamwork with only one partner, because under this condition the low ability reader showed average monitoring and regulating activities, but only when studying with a partner of a slightly higher level.

Considering the correlation between reading strategies and reading comprehension, both parts of the study, the **quantitative** and the **qualitative**, provided important information. **In the quantitative part** there was no correlation between reading strategies and reading comprehension in the beginning, but in the end the knowledge about reading strategies explained 33% of the variance in reading comprehension. Following a hierarchical ranking the regression analysis showed that all strategies were statistically significant predictors for reading comprehension. The strategy of predicting seemed to be most important, followed by summary, questioning, and clarifying unknown words. These results match with the analysis of the qualitative data: for the strategies of predicting (at text level) and of clarifying unknown words (at word level), a lot of elaborative activities were found – a sign for hierarchically higher processes of reading comprehension, especially on text level. In contrast, using the strategy of questioning, the reader seemed to focus especially on contents that are explicitly mentioned in the text – a sign for hierarchically lower processes of reading comprehension. These text reproducing activities were not found for the strategy of summary whereas the other activities distributed similarly.

In **conclusion**, all the results of this intervention study should be interpreted carefully due to the non-randomized cluster sample based on a few whole classes. Subject to that restriction the following conclusions can be drawn: the potential of training reading skills in conventional reading lessons is not fully realized, and conventional reading lessons can be enhanced by training with peer-tutored repeated reading.

The development of reading comprehension seems to be linked with the knowledge about reading strategies. This knowledge needs to be trained in order to prevent stagnation in the development of hierarchically higher processes of understanding texts. The reciprocal teaching training implemented in this study may enhance the knowledge of reading strategies and may foster these hierarchically higher processes of reading comprehension for primary school children of every ability group. There were indications that the strategies used in the training program work on every level of reading comprehension: predicting and summary are mainly used for constructing macro-propositions; questioning aims at propositions in the surface structure of the text; and clarifying unknown words is used at word level. All these strategies can be learned, even at primary school age, in a self-regulated manner by working in reading teams without a competent adult trainer. However, the quality of the reading team dialogs is important and it should be enhanced by regular reflection phases with the whole class under the professional guidance of a teacher. Furthermore, it can be assumed that it is helpful to work with a single partner and also in a small group; the objective is to open an opportunity of observation and an opportunity of practice for students of every ability group.

