RECIPROCAL TEACHING AND TRANSENVIRONMENTAL PROGRAMMING:
A TWO-PRONGED APPROACH TO FACILITATING THE READING COMPREHENSION
OF STUDENTS WITH LEARNING DISABILITIES
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ABSTRACT

This paper reports on experimental evaluation of the effectiveness of combining two metacognitive instructional approaches to enhance the reading comprehension skills of poor readers. More specifically the study aimed to evaluate the extent to which reciprocal teaching procedures combined with transenvironmental programming would facilitate comprehension of text and promote transfer of learning for a group of upper primary poor readers. The results support previous research into the facilitative effects of reciprocal teaching on reading comprehension, and of transenvironmental programming on transfer of learning across settings; and indicate that the combination of the two instructional programs provides a very effective means of improving the comprehension skills of poor readers.

INTRODUCTION

Recent research evidence reviewed by Palincsar and Brown (1987) suggests that poor readers are often passive, inactive learners who do not appreciate that what they read should make sense, and who therefore fail to employ appropriate task-specific strategies to monitor their comprehension of text and to restore meaning when there has been a breakdown in comprehension. Moreover, even when told to use specific strategies for a particular reading task, they often fail to maintain those strategies over time or transfer and generalize them to other educational environments (Anderson-Inman, 1986; Ellis, Lenz & Sabornie, 1987a, 1987b; Palincsar & Brown, 1987).

This conceptualization of the problems encountered by poor readers has corresponded with a growing research emphasis on the metacognitive aspects of reading (Cross & Paris, 1988; Reeve & Brown, 1985; Palincsar & Brown, 1987; Wong, 1985). Metacognition, as defined by Baker (1982) involves an awareness of the skills, strategies, and resources needed to perform a task effectively; along with the ability to use self-regulatory mechanisms such as planning, monitoring, evaluating and modifying strategies, so as to ensure the successful completion of the task. Metacognitive training programs, with their emphasis on acquisition and control of
task-specific strategies, have proved to be particularly effective in facilitating the performance of children with learning problems; yet the goal of effective transfer and generalization of learned strategies has remained an elusive one (Ellis et al, 1987a, 1987b; Palincsar & Brown, 1987), prompting a refinement and modification of the concept of metacognition (Reeve & Brown, 1985).

This refinement is based on the social learning theories of Vygotsky (1978), who suggested that the development of cognitive and metacognitive skills may be facilitated by social and linguistic interaction with others such as parents, teachers or peers (Cole & Chan, in press; Flavell, 1979; Palincsar, 1986b; Reeve & Brown, 1985). Central to this perspective is the notion of "scaffolded instruction", i.e. a process whereby the teacher or expert adult provides the support necessary to move the child from the acquisition of skills that are emerging but not yet mature, through various levels of competency, to eventual mastery of the skills. Critical to the success of scaffolded instruction is the role of dialogue, as it is the means whereby support is provided and adjusted (Palincsar, 1986b). Metacognitive instructional programs based on this model involve initial teacher modelling, explanation and questioning to make the task explicit; followed by guided practice and feedback, which is faded as the child gradually learns to use the strategy independently (Palincsar, 1986a, 1986b; Palincsar & Brown, 1987).

Palincsar and Brown (1983) have reported significant improvement in students' comprehension of text through the use of an instructional program based on the scaffolded instructional approach described above. Their program, which they termed reciprocal teaching, has been characterised as "a dialogue between teachers and students for the purpose of jointly constructing the meaning of text" (Palincsar, 1986a, p.119). The dialogue is structured by the use of four strategies which represent the kind of strategic engagement experienced by successful readers: (i) question generating, (ii) summarizing, (iii) clarifying, and (iv) predicting (Palincsar, 1986a, 1986b; Palincsar & Brown, 1987).

In reciprocal teaching the teacher initially models and explains how to use the four strategies, together with information about their importance, and the context in which they are useful. After the initial days of instruction, students are asked to take turns at being "the teacher" by leading out in the dialogue for one segment at a time, while the teacher provides feedback and coaching as necessary to enable them to do this successfully. Thus the dialogue acts
as a kind of scaffold - a temporary and adjustable support to instruction, which allows the teacher to adjust instruction to the students’ individual needs and to gradually withdraw support as the students acquire and refine the strategies being learnt (Palincsar, 1986a, 1986b, 1987; Palincsar & Brown, 1987). A review by Moore (1988) of research into reciprocal teaching indicates that, in general, reciprocal teaching procedures show powerful effects which transfer and generalize.

Another approach to promoting the transfer and generalization of learned strategies has been described by Anderson-Inman (1986). Her transenvironmental programming approach makes use of four component processes for promoting the transfer of targeted skills across classroom settings (e.g. from the resource room to the regular classroom): namely (i) assessment of the specific skills and behaviours required for classroom success; (ii) resource room interventions which help the child acquire these specific skills and behaviours; (iii) providing the child with specific, metacognitive instruction as to the usefulness of the strategy being taught, and how, when, and where it can be used in the classroom setting; and (iv) assessment to determine the extent to which the resource room instruction has been effective in promoting targeted skills to the regular classroom, with readjustment or modification of the resource room program as necessary.

An essential feature of this approach is that of active collaboration and consultation between the resource teacher, the regular class teacher, and the student (Anderson-Inman, 1986; Idol, West & Lloyd, 1988). Research indicates that this approach also has powerful effects in promoting transfer and generalization of strategy training (Anderson-Inman, 1986; Ellis et al, 1987b).

**Purposes of this Study**

The purpose of this study was to evaluate the extent to which a combination of both reciprocal teaching procedures and transenvironmental programming would facilitate comprehension of text and promote transfer of learning for a group of upper primary poor readers.

The particular research questions which this study addressed were:
1. Do reciprocal teaching procedures improve reading competence in students with learning disabilities?
2. Does transenvironmental programming with specific
instructions to transfer and generalize promote transfer and generalization of strategies across settings and academic subjects?

METHOD

Experimental Design

A multiple-baseline single subject research design across three different instructional conditions was used. The three conditions were: (1) reciprocal teaching in small groups in the resource room; (2) transfer of learning to the reading class in the home classrooms; and (3) transfer of learning to the social studies class in the home classroom.

The sequence of phases for the reciprocal teaching condition (Condition 1) was baseline, reciprocal teaching, maintenance, reciprocal teaching, and maintenance, with the final maintenance phase being conducted 4 weeks after the last reciprocal teaching training session.

The phases for the reading class transfer condition (Condition 2) were: (1) baseline, consisting of 3 probes in the home room reading class spread over 5 weeks; environmental transfer, consisting of one probe per week for the next 4 weeks (Weeks 6-9 of the study); and maintenance, which involved three more weekly probes with the final probe corresponding with the final maintenance phase in week 12 of Condition 1.

The sequence for Condition 3 was similar to that of condition 2 except that the probes were conducted in the home room social studies class. Two baseline probes were conducted in Weeks 1 and 5 of the program. A third baseline probe was planned for Week 8 but did not eventuate because of an excursion. There were three environmental transfer probes in weeks, 9,10 and 11, and one final maintenance probe in Week 12 of the program.

Subjects

The subjects of this study were a group of Year 5 and Year 6 students (aged 11-12) who had been identified by their class teachers as having learning disabilities, and who were receiving remedial reading instruction from the resource
teacher on a withdrawal basis. Of the five students from Year 6, three were boys from one home class and two were girls from another home class, while the two students from Year 5 were boys. A third boy from the Year 5 classroom left the school part way through the intervention and so was eliminated from the study.

Preliminary testing on the Progressive Tests in Reading Comprehension (Reid & Elley, 1986) indicated comprehension deficits for all subjects, with percentile rankings ranging from 4 to 33 and stanine scores from 1 to 4.

Testing with the St Lucia Graded Word Reading Test (Andrews, 1973) indicated that the word recognition reading ages of the Year 6 students ranged from 8 to 10 years, and that they were a little lower for the Year 5 students. Further testing with the Burns\Roe Informal Reading Inventory, Grade 3 passage (Richedk, List & Lerner, 1983), in which the Year 6 students achieved 96% to 99% word recognition accuracy and the Year 5 students 92% to 93% word recognition accuracy, suggested that Grade 3 reading material would be appropriate for this group. (For this inventory instructional level is set at 95% or above on word recognition accuracy in oral reading and frustration level at 90% or below). For this reason it was decided to target reading materials at the Grade 3 readability level, and to provide whatever word recognition assistance was necessary for the Year 5 boys.

Instructional Materials

Instructional materials consisted of a total of 58 short (250-300 word) expository passages written at the Grade 3 readability level as indicated by the Rix readability formula (Anderson, 1983). The passages for the reciprocal teaching intervention (Condition 1) and for the home room reading class transfer measure (Condition 2) were adapted from various reading kits and library books and contained descriptive information put into story form. Thirty such passages were prepared for Condition 1 and ten for Condition 2. In consultation with the classroom teachers the passages for the social studies transfer measure (Condition 3) were adapted from reference materials currently used in the social studies classes. Because each class was working on different social studies units, a total of eighteen passages was required for this condition - six for each classroom.

Each passages was accompanied by a short answer comprehension test consisting of 8 questions in which half of
the questions were about main idea propositions in the passage and half were about supporting details.

Procedures

Reciprocal Teaching Condition (Condition 1)

The sessions in the reciprocal teaching condition took place in a small resource room off the library where distractions would be at a minimum. The sessions were conducted in two groups (the two Year 5 poor readers in one group and the five Year 6 poor readers in the other) in half-hour sessions three days per week, (sometimes only 2 days because of holidays, excursions etc) for eleven consecutive weeks in term 2, and for one week in Term 3, resulting in a total of 30 sessions.

During each of the four baseline sessions the students were given a passage and asked to read it silently and carefully. They were told that they would be required to answer comprehension questions from memory after reading the passage, and that they could ask for assistance with any words they could not read or understand. When all students indicated that they had finished reading the passage, the text was removed and the children wrote down short answers to the questions which were asked orally by the experimenter.

During the reciprocal teaching phases, reciprocal teaching procedures as described by Palincsar (1986,1987) and Palincsar and Brown (1983,1986) were used to enhance comprehension of the text before the students answered the questions.

The maintenance phases were identical to the baseline phase with the students reading the passage silently and answering the comprehension questions without the benefit of the reciprocal teaching dialogue.

The students' scores were graphed daily throughout all the phases of the reciprocal teaching condition and shared with the children at the beginning of each session.

Transfer to the Reading and Social Studies Classes - (Conditions 2 and 3)
The subjects, along with their classmates, were given similar comprehension tasks in their reading and social studies classes as a measure of their transfer of the learned strategies from the resource room to the regular classroom. The assessment procedure was similar to that used in the baseline and maintenance phases of the reciprocal teaching condition, i.e. after reading the passage silently, during which time they could ask for help with unknown words, the children wrote down from memory short answers to the questions asked orally by the class teacher. The class teacher then collected the sheets for marking by the experimenter. Only the scores of the experimental subjects were recorded, although occasional checks of the performance of the other class members revealed that they found the passages easy and scored consistently in the range of 70% to 100% correct.

During the baseline phase no hint was given by the experimenter or the class teachers that these comprehension exercises were in any way related to what they were learning in the resource room. However, during the environmental transfer phase the students were instructed by the experimenter and the class teachers to use the strategies they had been learning in the resource room whenever they were given one of the reading comprehension tests (Condition 2) or social studies comprehension tests (Condition 3) in class. During the maintenance phase all such instructions and prompts to employ the strategies were discontinued to determine whether students were transferring the strategies independently.

RESULTS

The three dependent measures analysed were the percentage correct on the total number of questions, percentage correct on the main idea questions, and percentage correct on the detail questions. For each dependent measure the percentage correct scores were graphed as a function of sessions for the various phases in the three different conditions, i.e. the reciprocal teaching condition, the reading class transfer condition and the social studies class transfer condition. As the Year 5 and Year 6 students were taught in different instructional groups the data for the two groups were graphed and analysed separately. This paper concentrates on analysis and discussion of the mean accuracy for each group for the total scores.
The average results of the total comprehension scores for the Years 5 and 6 students are presented in Fig. 1 and Fig. 2, respectively.

Analysis of the data revealed a number of key findings regarding the efficacy of combining reciprocal teaching with transenvironmental programming procedures.

(1) The average comprehension scores for each group rose dramatically as a result of the reciprocal teaching training (Condition 1), and the effects were durable over a four week interval. Overall, the Year 5 students improved their performance on the comprehension questions by an average of 65% from a baseline mean level of 18% correct to a final maintenance mean level of 83% correct as a result of reciprocal teaching (see Fig. 1). The effect of training was impressive.

The corresponding scores for the Year 6 students in Condition 1 were a mean of 40% accuracy during baseline and 79% during the final maintenance phase, giving an overall improvement of 39% (see Fig. 2). While these results do not appear quite as dramatic as those of the Year 5 students, this is partially explained by the higher baseline entry level of the Year 6 students.

(2) The two Year 5 students, who were also the poorer readers, required more reciprocal teaching training sessions than the Year 6 students for their performance in Condition 1 to improve and stabilise, and it was only after the second reciprocal teaching phase that their maintenance of the strategies stabilised (Fig. 1). After a baseline average of 18% the very first reciprocal teaching training session resulted in immediate dramatic improvement with a mean accuracy score of 82.5% for that session. Thereafter the students demonstrated somewhat variable performance for the next 8 sessions, stabilising at a mean of 89% correct for the last 4 training sessions. The overall mean for this phase was 75% accuracy.

With the reciprocal teaching withdrawn, the first maintenance phase evidenced a regression in the level of performance to a mean accuracy of 57.5%, which was, nevertheless, still considerably better than baseline performance. However, as soon as reciprocal teaching was re-
introduced, performance returned to the previous level with a mean accuracy of 91%. This high level of performance was maintained in the final post-training (maintenance) sessions, with only a slight decrement to a mean accuracy of 83%, which was approximately 25% higher than mean performance in the first maintenance phase.

(3) In general, the performance of the older students in Year 6 improved after only a few reciprocal teaching sessions and high comprehension scores were maintained throughout the rest of the phases of the reciprocal teaching condition (Fig. 2). As with the Year 5 students, the very first reciprocal teaching session resulted in immediate dramatic improvement to a mean of 87% for that session. However, in contrast to the Year 5 group, mean accuracy scores for the Year 6 students stabilised very quickly, with only minor fluctuations, to give an overall average for the phase of 83% correct. Perhaps because the average scores of the Year 6 students stabilised so quickly during reciprocal teaching, decrement in the first maintenance phase to a mean of 80% accuracy was minimal when compared to that of the Year 5 students for the same phase (57.5% mean accuracy). The second reciprocal teaching and maintenance phases were almost a repeat of the first with mean accuracy scores of 85% and 79% respectively. It seems evident that the greater maturity of the Year 6 students, combined with the fact that the Grade 3 readability level materials presented far fewer decoding problems for them than for the Year 5 students, led to their much more rapid mastery of the strategies.

(4) The students in Year 5, in common with most students with learning disabilities, were unable to spontaneously transfer the learned strategies from the resource room to the home room conditions (see Fig. 1). In Condition 2 and Condition 3, respectively, the Year 5 students achieved stable baseline scores of 30% and 25% mean accuracy despite the fact that when the second and third probes were undertaken the students had already had the benefit of a number of sessions of reciprocal teaching training in the small group withdrawal situation of Condition 1, thus suggesting that unprompted transfer of learning was not taking place.

By way of contrast, the Year 6 students showed some evidence of unprompted transfer of the strategies during the baseline phases of both transfer conditions (see Fig. 2). Average baseline scores in the reading class transfer condition improved by 40% from 41% on the first probe to 81% on the last probe, with a mean accuracy score for the phase of 62%; while average baseline scores in the social studies class transfer condition showed a 19% gain from 44% to 63%, with
53.5% mean accuracy for the phase. These results indicate that once reciprocal teaching was introduced in Condition 1, the Year 6 students were able to spontaneously transfer the strategies from the small group setting to the home room conditions before being prompted to do so in the environmental transfer phases.

(5) Instructions to use the strategies in the reading and social studies classes during the environmental transfer phases of Conditions 2 and 3 resulted in moderate improvement for the Year 5 students, with an overall mean accuracy of 51% for the reading class transfer condition and 50.5% for the social studies class transfer condition.

Because the Year 6 students were already spontaneously transferring the strategies, instructions to use the strategies in the environmental transfer phases served to stabilise their performance at 80% mean accuracy for the reading class transfer condition and 74% mean accuracy for the social studies class transfer condition.

(6) Mastery of the strategies in the reciprocal teaching condition appeared to be an important factor in facilitating transfer of the strategies to the classroom context. Stabilising of performance by the Year 6 students during the first reciprocal teaching phase of Condition 1 appears to be a factor in allowing these students to spontaneously transfer their use of the strategies, even before being prompted to do so, to the reading and social studies classes during the baseline phases of Conditions 2 and 3 (Fig. 2). The fact that performance of the Year 5 students in the reciprocal teaching condition had not stabilised when these baseline transfer probes were undertaken, would make the likelihood of unprompted transfer occurring rather problematic (Fig. 1). Moreover, during the maintenance phase of the reading class transfer condition (Condition 2), performance of the Year 5 students showed an accelerating trend (Fig. 1), with a mean accuracy score of 60.5%, and an average score on the final probe of 81.5%. This accelerating trend was evident also in the social studies transfer condition (Condition 3), with a mean score of 75%. It would appear that the reason why the scores of the Year 5 students continued to improve during the maintenance phases even after instructions to use the strategies had been discontinued, was that the maintenance phases of Conditions 2 and 3 corresponded with the stage when employment of the strategies had stabilised in the reciprocal teaching training condition. By way of contrast, the comprehension scores of the Year 6 students, whose performance in the reciprocal teaching condition had stabilised during the
first reciprocal teaching training session, were maintained in the final phase at a level of 88% mean accuracy in the reading class transfer condition and at a slightly lower level of 70% mean accuracy for the social studies class transfer condition (see Fig. 2).

These findings provide support for the proposition that mastery of strategies stabilised in a resource room reciprocal teaching situation, combined with prompts and instructions to employ the strategies in the home room in a transenvironmental programming mode, facilitates comprehension of text and transfer of learning for students with learning disabilities.

DISCUSSION

Reciprocal Teaching

This study demonstrates the effectiveness of reciprocal teaching procedures for enhancing reading competence in students with learning disabilities. This conclusion is evident from the great improvement in the percentage of comprehension questions answered correctly by all subjects in the study as a result of involvement in the reciprocal teaching procedures. It could be argued that this improvement came about as a result of interaction with the text during the reciprocal teaching dialogue, but the same high scores were achieved during the maintenance phase, when there was no interactive discussion of the text before students answered the questions, indicating that they were using the strategies independently. Moreover, the effects were durable in that they were maintained over a 4-week period after the reciprocal teaching dialogue had been discontinued. The improved performance during the maintenance phase was a clear indication of the effects of training.

A number of reasons can be advanced for the success of the reciprocal teaching intervention in this study. First, there are indications that the reciprocal teaching dialogue helped the subjects overcome comprehension skills deficits. For example, there were indications that improvements, over time, in the use of the strategies during reciprocal teaching (e.g. the ability to ask teacher-like questions or make succinct summaries), corresponded with the improvement in comprehension scores. At first the students had difficulty, not only in framing questions, but also in asking questions which could be answered from information in the text rather than being purely speculative or tangential to the text. It
seemed that their increasing ability to ask appropriate questions and lead the dialogue in a teacher-like way, helped students focus on and understand the content of the passages, something they had apparently not done very effectively before. This is consistent with the findings of Palincsar (1986a) and Palincsar and Brown (1983,1986) into the efficacy of reciprocal teaching dialogue for promoting sophisticated use of the strategies.

Second, it can be argued that the use of content material which presented relatively few decoding problems, was an important factor in enabling the students to attain immediate success, thus motivating them in the continued use and mastery of the strategies.

Third, the opportunity for students to graph their daily results, and hence see the payoff for their efforts, also proved to be highly motivating for them.

Fourth, the reciprocal teaching dialogue provided an ideal venue for helping students learn to monitor their comprehension and take steps to correct any breakdown in meaning. For example, during the discussion and dialogue it was discovered that one reason why the two Year 5 boys initially did so poorly in the daily comprehension tests, was that they often read only part of the sentence, leaving out the part with qualifying words like "didn't" or "but", which gave the sentence the opposite meaning to what they thought. Apparently, up till this time it had never occurred to them to read the rest of the sentence to clear up any confusion in meaning which might result. After this was pointed out to them, they took great delight in telling each other to "Read the rest of the sentence" whenever this kind of breakdown in meaning occurred. Moreover, after a time the strategy appeared to become internalized as the problem no longer occurred, and, of course, their comprehension scores improved considerably.

Transenvironmental Programming

In general, this study supported the usefulness of transenvironmental programming, in which students are given explicit instruction to employ the strategies they have learned in the resource room when they are given similar reading tasks in the regular classroom.

A number of expected and unexpected results occurred during the transfer conditions. As expected, the Year 5 students, in common with most students with learning
disabilities, showed no evidence of unprompted transfer of the strategies. It could also be predicted that the Year 5 students would be more successful at transferring the strategies to the social studies condition than to the reading condition, because of the cumulative effects of previous instructions to use the strategies in the reading class during Condition 2. An unexpected finding was that the Year 5 students had some difficulty using the strategies in the home classroom in either condition, even after being prompted to do so, until towards the end of the program. Another unexpected finding was that the Year 6 students showed evidence of unprompted transfer of the strategies to the reading and social studies class settings as soon as they had been introduced to reciprocal teaching in the withdrawal situation. Also unexpected was the fact that the Year 6 students were more successful at transferring strategies to the reading class than to the social studies class.

Taken together these outcomes suggest that successful transfer of strategies may depend on a number of factors besides explicitly instructing students to use the strategies in other settings. First, as discussed earlier, it seems evident that mastery of the comprehension strategies in the resource room context was a prerequisite for successful transfer of strategies to the home classroom. As the Year 6 students mastered the strategies very quickly, this may partially explain their unprompted transfer of strategies from the resource room to the classroom setting. On the other hand, performance of the Year 5 boys in the reciprocal teaching setting did not stabilise till towards the end of the study, which may be a reason for their more gradual improvement in transferring the strategies to the home classroom.

Second, inspection of the individual results revealed that those students in both Years 5 and 6 who had the most difficulty in transferring the strategies, were those with the greatest comprehension and word recognition deficits at the commencement of the study, suggesting that students' initial reading levels may have been a factor influencing transfer. It can be speculated that, had instructions to transfer strategies to the home classroom setting been continued for a longer period of time after mastery of the strategies in the withdrawal situation, then this intervention may have been more successful for those students with lower initial reading ability levels.

A third factor which may have influenced the degree of transfer to the classroom setting was the extent to which the home classroom teachers made allowances for students to use
their newly acquired strategies. For example, part way through the environmental transfer phase for the reading class transfer condition, the Year 5 boys complained that their teacher was not allowing them the time they needed to self-question, summarize, clarify and predict while they were reading silently. Consultation with the teacher helped to rectify this situation, but this may be one reason why transfer of the strategies for this group of students was minimal at first. This finding supports the arguments of researchers such as Anderson-Inman (1986), Ellis and his colleagues (1987a, 1987b) and Idol and her associates (1988), that there needs to be very close cooperation and collaboration between the resource teacher and regular class teacher if successful transfer of strategies across settings is to be achieved.

A fourth factor, which may explain why the Year 6 students were more successful at using the strategies in the reading class than in the social studies class transfer condition, may have to do with the students' familiarity and background knowledge of the content of the instructional materials. Although every effort was made to rewrite the materials at the Grade 3 readability level, some of the social studies units, especially the one on energy for the Year 6 girls, contained many unfamiliar words and concepts which probably affected comprehension even though the students were using the strategies. This finding suggests that the students would have benefited from Anderson-Inman's (1986) recommendation to preteach difficult concepts in the resource room before being asked to transfer the strategies to the home room.

As a final point of interest, anecdotal evidence concerning the efficacy of the program for promoting transfer of strategies was obtained during informal discussion with the students on the last day of instruction. A this time a number of students revealed that they were spontaneously beginning to transfer and generalize the strategies to other school subjects, without ever being prompted to do so. For instance, one of the Year 5 boys indicated that he had used the clarifying strategy the day before to help him understand what to do in a maths problem - something he would not have bothered to do previously. This suggests that if booster sessions were planned for the rest of the year, as suggested by Palincsar (1987), then the facilitative effect on transfer of learning would be strengthened.

Implications for Classroom Practice
The results of this study support previous research into
the facilitative effects of reciprocal teaching on reading
comprehension, and of transenvironmental programming on
transfer of learning across settings; and, moreover, indicate
that a combination of the two instructional programs provides
a very effective means of improving the comprehension skills
of poor readers.

The results also suggest a number of important
implications for classroom practice if this combination of
reciprocal teaching and transenvironmental programming is to
be most effective.

(1) There should be thorough mastery of the reciprocal
teaching strategies in the training situation before attempts
are made to prompt transfer of the strategies to other
learning situations.

(2) Instructional materials should be written at a reading
level which presents few word recognition problems for the
targeted students, i.e. their instructional reading level, so
that working memory space can be used for higher level
comprehension processes. This may mean rewriting text at a
suitable level, which can be a time consuming process.
However, if a number of teachers work together a bank of such
materials can be built up.

(3) Instructions to employ the strategies in other contexts
need to be continued over a period of time (possibly longer
than was planned for in this intervention), so as to allow
performance in the transfer situation to stabilise. Also, the
program needs to be flexible enough to allow for individual
differences in mastery and transfer of the strategies, e.g.
the prompts to transfer the strategies may need to be
continued longer for some students than for others.

(4) There needs to be close cooperation and collaboration
between the resource teacher, the regular classroom teacher
and the student, to ensure that all understand and are working
towards the same goals.

(5) Transfer of the strategies to unfamiliar content material
may be facilitated by preteaching difficult concepts in the
resource room.

(6) An alternative to resource room based instruction would
be for the class teacher to use reciprocal teaching techniques
in natural reading groups. As the other students in the class
thus became familiar with the strategies they could act as
peer-tutors in prompting the targeted students in the transfer and generalization of the strategies.

Limitations of the Present Study and Suggestions for Future Research

Interpretation of the data in the present study was limited by a number of factors inherent in the chosen methodological approach and in the contingencies of school organisation and management. Further areas requiring investigation are discussed below in relation to the limitations of the present study.

A major limitation was the lack of a third probe in the baseline phase of the social studies class transfer condition, due to an excursion at the time when the probe was due. For this reason it was not possible to investigate whether instructions to use the strategies in the reading class transfer condition would lead to unprompted use of the strategies in the social studies class transfer condition. Further research could examine the extent to which students spontaneously transfer strategies to other school subjects when they are instructed to use newly acquired strategies in one particular subject.

Another limitation of this study was inherent in the fact that instructional levels had to be modified to meet the decoding needs of the students. While this was an essential feature of the program as explained earlier, the ultimate goal of remedial instruction for students with learning disabilities should be to enable them to function as far as possible at grade level. This suggests that a comprehensive remedial reading program should aim at improving both comprehension and word recognition skills. The implication for future research is that, if the social instructional approach used in this study is effective in improving comprehension skills, the same kind of training could be used to teach word recognition skills.

A third limitation of this intervention lay in the fact that it required withdrawal of students from the regular classroom, a procedure which can create communication problems at times. An important consideration for future research would be the development and trialing of a reciprocal teaching/environmental transfer package which could be effectively used by regular teachers in their own classrooms, perhaps with the assistance of a support teacher. A classroom based intervention of this nature would have the double
advantage of minimising communication breakdowns between the support teacher, the regular teacher and the students; and maximising the impact of the intervention by allowing for coordinated efforts by the class teacher, the support teacher and peer group in assisting and prompting the targeted students to acquire and transfer the reciprocal teaching comprehension strategies.

THE GRAPHS

Copies of Fig. 1 and Fig. 2 referred to in this paper, are available on request from Ms Merle Bruce, Avondale College, Cooranbong, NSW, 2265. Phone 049-771107.

REFERENCES


