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Metacognitive Strategies and Reading Achievement among Developmental Students in an Urban Community College

Stephen P. O'Neill

Several empirical studies have demonstrated positive relationships between the use of metacognitive strategies and reading achievement among both elementary and secondary school subjects (Bean, Singer and Sorter, 1986; Cross and Paris, 1988; Palincsar and Ransom, 1988) and college students (Nist, Simpson and Hogrebe, 1985; Palmer and Goetz, 1985; Weinstein and Underwood, 1985). Gambrell and Heathington (1981), and Long and Long (1987) have observed that good readers characteristically monitor their comprehension and retention of material. On the other hand, poor readers have been described as not using metacognitive strategies effectively (Campione, 1987; Cohen, 1988; Kaufman, Randlett and Price, 1985). A related body of literature suggests that metacognitive strategies can be taught to college students (Baker and Brown, 1984; Burley, 1985; Everson et al., 1992 Nist, Simpson and Hogrebe, 1985; Simpson, 1984). Several investigations of interventions aimed at evaluating the effectiveness of metacognitive training have suggested that students who have the poorest reading skills initially tend to benefit most (Andre and Anderson, 1979; Brown, 1985). Wong (1985) has suggested that such findings may be explained by the fact that the better readers in these studies were already
using some metacognitive strategies, so that their growth might not be as dramatic as that of students who were employing no strategies initially. However, Wong also suggested that instruction could be structured so as to enable students at various levels of reading ability to use more sophisticated metacognitive strategies.

These considerations suggest a need for additional research on these topics: the use of metacognitive strategies among readers of differing reading abilities; investigations of the relative impact of metacognitive interventions versus alternative remedial approaches on poorer and better college readers; and the relationship between the use of metacognitive strategies and reading comprehension among readers of differing skill levels. Research in these areas is particularly important in view of the challenges presented by the increasing number of underprepared students entering urban community colleges (Collinson, 1989; Jaschik, 1987). The community college offers a vehicle for enhancing the occupational and social mobility of underprepared urban students (Veltman, 1980), but in an era of financial constraint it is critical that developmental reading interventions used with these students be as efficient as possible. While the utility of metacognitive interventions has been demonstrated for various populations of underprepared students there is evidence that a metacognitive approach may not represent the most efficient method of improving the reading achievement of developmental students in an urban community college. O'Neill and Todaro (1991) conducted a study of comparing the relative effectiveness of a metacognitive intervention and a traditional direct instruction remedial reading program in improving the reading skills of students enrolled in required developmental reading courses at a city community college. These students had been assigned to either the most basic
developmental course, RDL 01, or to a second level developmental course, RDL 02. Those students assigned to RDL 01 were reading at or below the seventh grade reading level, based on the CUNY Reading Assessment Test. Those assigned to RDL 02 were reading at or below the eleventh grade level, based on the same measure.

The researchers assessed gains over a semester, 75 hours of instruction, in both the use of metacognitive strategies of previewing, monitoring and summarizing and reading comprehension, including the comprehension of main ideas, direct statements and inferences. The results of the study provided little support for the use of metacognitive training with these two levels of developmental students. The metacognitive intervention did not result in significantly greater gains than the direct instruction intervention in the use of previewing or summarizing. The metacognitive intervention produced greater gains in monitoring than the direct instruction condition for the higher level developmental students but not for the lower developmental students. With respect to gains in reading comprehension, the metacognitive and direct instruction conditions did not differ significantly with respect to comprehension of main ideas. There was a significant interaction with respect to the comprehension of direct statements, such that the metacognitive approach yielded greater gains with the lower level students, while direct instruction produced greater gains with the higher level students. For inferences, the direct instruction condition produced significantly greater gains among both the lower and the upper level developmental students.

These data suggest that metacognitive training is no more effective than a traditional direct instruction approach in developing reading comprehension skills among college
students in these reading ability groups. A question left unanswered by the study is that of the relationship between the use of metacognitive strategies and reading comprehension among these groups. Given that findings for these students with respect to the effectiveness of metacognitive training appeared to differ from the findings of previous studies on other college populations, it seemed reasonable to investigate the more fundamental question of whether the use of metacognitive strategies was related to reading comprehension within the populations of urban community college students with seventh and eleventh grade level reading comprehension. The study reported here sought to address this question by reanalyzing the data of the previous study focusing on the relationships among measures of use of metacognitive strategies and measures of reading comprehension.

Method

Subjects. Participating were 151 students enrolled in reading and study skills classes at a community college. Sixty-five of the students (43 percent) were in RDL 01 classes; thus they had initial reading comprehension scores on the CUNY Reading Assessment Test (RAT) below a scale score of 7, indicating less than a seventh grade reading level. Eighty-six of the students (57 percent) had been assigned to the RDL 02 classes, as a result of a scale score of below 12 on the RAT. These students were reading below the eleventh grade level. A total of 102 participants (38 RDL 01 and 64 RDL 02) were assigned to one of five class sections in which the metacognitive intervention was used, while 49 participants (27 RDL 01 and 22 RDL 02) were assigned to one of four class sections in which the direct instruction method was used. Assignment to classes was self-selected in that students chose their sections at registration time unaware of the study. Only those classes taught
by cooperating teachers were eligible for participation in the study. The instructors who participated were solicited by a general invitation to the Reading faculty. All respondents were assigned to a treatment group after a discussion with the researcher during which they indicated their instructional preferences. During the experiment, periodic conversations with the cooperating instructors enabled the researcher to monitor the classroom activities.

Most of the students in both the metacognitive group (64.4 percent) and the direct instruction group (54.3 percent) were female. Approximately half of the students in each group were between 17 and 25 years of age, and the other half were over 25. The modal category with respect to ethnic background was Hispanic, comprising 46.1 percent of the metacognitive group and 45.9 percent of the direct instruction group. African-Americans comprised 42.2 percent of the metacognitive group and 38.9 percent of the direct instruction group. English was the primary language of 57.8 percent of the metacognitive group and 52.1 percent of the direct instruction group. More than one-third of each group indicated that their primary language was Spanish.

**Instructional procedures.** The classes employing the metacognitive intervention were designed to teach students what metacognitive strategies are as well as why, how and when to use them. Students learned how to formulate a problem or set a goal in workable terms for their reading. They were also taught to recall prior knowledge that might be related to the reading material while they preview. They were taught monitoring, the habit of checking their reading consciously to determine if they were comprehending. Finally, they learned to summarize and evaluate what they learned and were encouraged to relate this new knowledge to other knowledge. These strategies were taught initially
by direct explanation depending on the needs of students. During the instruction, instructors modeled the cognitive strategies in conjunction with the reading tasks to show students how to incorporate the strategies into a reading task. Eventually, students were encouraged to model these same strategies (previewing, self-questioning, monitoring, summarizing) in both whole class and small group formats (Dansereau, 1985; Lochhead, 1985) using articles or textbook selections.

For example, in small groups of three or four, students took turns modeling aloud their thinking strategies for comprehending a textbook selection. As one student modeled, the other members provided feedback at appropriate intervals. Using headings, subheadings, italics and visuals, they demonstrated awareness of the organization and the major topics to be discussed. Competence in establishing goals and monitoring one’s reading were reflected in the students’ previewing and ongoing self-questioning. In addition, monitoring was demonstrated by periodic summaries about what was being read, and answering preview questions and other ongoing questions that emerged. Closure thinking was indicated by conclusions about the author’s purpose, the value of the material and whether it related to other material read by the students. Students in classes using the direct instruction method were taught the same reading and study skills as the metacognitive groups but without explanation of the underlying strategies or explicit reference to strategic conscious monitoring of their cognitive activities. Instructors explained the skills and demonstrated the procedures of the task but did not model their mental processes during the explanation of a skill. There were opportunities for students to practice and receive feedback on the accuracy of their work. However, thinking aloud exercises and small group work for the purpose of receiving feedback
on one's thinking processes were not used in these groups. The direct instruction classes experienced a more teacher-centered approach, while the metacognitive groups experienced a more student-centered approach. In each treatment group, instructors chose reading texts from a selection of departmental offerings appropriate for each level. Supplementary material was chosen on an individual basis.

**Testing materials**

**How I read scale.** Metacognitive activity in reading was measured by the **How I Read Scale** (Everson et al., 1992). This 32-item scale assesses how students think before, during and after they read by requiring students to respond to the degree of frequency with which they use various metacognitive actions of previewing, monitoring and summarizing. Responses are arranged on a 5 point Likert scale format with options ranging from never to always. The internal consistency reliability has been assessed at .90 by computing Cronbach’s alpha coefficient. Sample items from the scale are listed below.

- I quickly look over what I’ll be reading.
- I think: “What do I already know about this topic?”
- I look for things that might be important, like words in dark print, headings, charts, and pictures.
- I think “Do I understand everything?”
- I think “What should I remember?”
- I think about what I already know about when I’m reading.
- From time to time, I summarize what I’ve read so far.
- I think “Should I reread or review anything?”
- I think “Did everything make sense?”

(Responses: Always, Most of the time, Sometimes, Hardly ever, Never.)

**CUNY Reading Assessment Test.** Reading achievement was measured by the City University of New York Reading Assessment Test (RAT). The RAT is comprised of several short passages followed by three or four
multiple choice questions testing for main idea, direct statement or inference skills. Students are given 30 minutes to read and respond to the questions. The RAT yields scores for comprehension of main idea, direct statements and inferences. The forms of the test used in the study were selected independently by the Director of Testing and the Chairperson of the Reading Faculty and were administered during general college testing periods. The reliability estimates for Form A of the test was .89 based on the Kuder-Richardson Formula 20. The same form of the pretest was not given to all students. The form of the test depended on when an individual last took the test. For example, entering students' scores were their placement scores while continuing students who might have taken a lower level reading course had a different form of the test. There is a university conversion scale to convert raw scores to scale scores for the various forms of the test. The form of the posttest was the same for all the students in the study.

Results

Table 1 presents the correlations among the pre-treatment metacognitive measure (How I Read Scale) and the pre-treatment scores on the comprehension measure (RAT). None of these correlations were significant. Thus, contrary to the results of other studies which have indicated positive relationships between the use of metacognitive strategies and reading comprehension (Nist, Simpson and Hogrebe, 1985; Palmer and Goetz, 1985; Weinstein and Underwood, 1985), in the present sample of developmental reading students attending a community college there was no relationship prior to treatment between the use of metacognitive strategies and performance on the RAT measure of reading comprehension.
Table 2 presents correlations between metacognitive measures and comprehension measures at post-treatment. Here there were a number of significant negative correlations among the lower level (RDL 01) students. Among RDL 01 students in the metacognitive group, comprehension of main ideas at post-treatment was correlated negatively \((r = -.35, p < .05)\) with the use of previewing. This same skill was also correlated negatively with monitoring \((r = -.36, p < .05)\). In addition, comprehension of direct statements was related negatively to use of monitoring \((r = -.38, p < .05)\) and summarizing \((r = -.32, p < .05)\) for RDL 01 students in the metacognitive group.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Comprehension Variable</th>
<th>RDL 01 Correlation Among (N = 38)</th>
<th>RDL 02 Correlation Among (N = 27)</th>
<th>RDL 01 Correlation Among (N = 64)</th>
<th>RDL 02 Correlation Among (N = 22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previewing</td>
<td>Main Idea</td>
<td>-.11</td>
<td>.06</td>
<td>.09</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>Direct Statement</td>
<td>.04</td>
<td>.14</td>
<td>.09</td>
<td>-.31</td>
</tr>
<tr>
<td></td>
<td>Inference</td>
<td>-.14</td>
<td>.06</td>
<td>-.14</td>
<td>.27</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Main Idea</td>
<td>-.14</td>
<td>-.07</td>
<td>.06</td>
<td>-.04</td>
</tr>
<tr>
<td></td>
<td>Direct Statement</td>
<td>-.08</td>
<td>.04</td>
<td>.13</td>
<td>-.26</td>
</tr>
<tr>
<td></td>
<td>Inference</td>
<td>-.01</td>
<td>.03</td>
<td>-.18</td>
<td>.23</td>
</tr>
<tr>
<td>Summarizing</td>
<td>Main Idea</td>
<td>-.21</td>
<td>-.13</td>
<td>.12</td>
<td>.03</td>
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<tr>
<td></td>
<td>Direct Statement</td>
<td>-.11</td>
<td>.08</td>
<td>.12</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>Inference</td>
<td>.04</td>
<td>.04</td>
<td>.00</td>
<td>-.08</td>
</tr>
</tbody>
</table>

*All correlations are non-significant.

In contrast, among RDL 01 students in the direct instruction condition, a single positive correlation was significant: comprehension of main ideas at post-treatment was related significantly to the use of summarizing \((r = .39, p < .05)\).
Thus, among the lower level students exposed to specific instruction in the use of metacognitive strategies, greater use of such strategies at post-treatment was associated with relatively poor reading comprehension for main ideas and direct statements. Among these readers not exposed to metacognitive training, but to traditional direct instruction, the one significant relationship between metacognitive processes and comprehension was positive; most of the nonsignificant correlations were also positive. Thus, the trend among lower level readers in the direct instruction condition was toward a positive relationship between metacognitive processing and comprehension.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Comprehension Variable</th>
<th>RDL 01 Metacog. (N = 38)</th>
<th>RDL 01 Direct (N = 27)</th>
<th>RDL 02 Metacog. (N = 64)</th>
<th>RDL 02 Direct (N = 22)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Main Idea</td>
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<td>.10</td>
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<td>.13</td>
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<tr>
<td></td>
<td>Direct Statement</td>
<td>-.27</td>
<td>.21</td>
<td>.16</td>
<td>-.14</td>
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<td>Inference</td>
<td>-.06</td>
<td>.10</td>
<td>-.16</td>
<td>.02</td>
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<tr>
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<td>Main Idea</td>
<td>-.36*</td>
<td>.21</td>
<td>.19</td>
<td>.15</td>
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<tr>
<td></td>
<td>Direct Statement</td>
<td>-.38*</td>
<td>.01</td>
<td>.16</td>
<td>-.11</td>
</tr>
<tr>
<td></td>
<td>Inference</td>
<td>.15</td>
<td>.26</td>
<td>-.12</td>
<td>.08</td>
</tr>
<tr>
<td>Summarizing</td>
<td>Main Idea</td>
<td>-.33*</td>
<td>.39*</td>
<td>.18</td>
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<tr>
<td></td>
<td>Direct Statement</td>
<td>-.32*</td>
<td>.22</td>
<td>.06</td>
<td>-.42</td>
</tr>
<tr>
<td></td>
<td>Inference</td>
<td>.18</td>
<td>.10</td>
<td>-.17</td>
<td>-.23</td>
</tr>
</tbody>
</table>

*p < .05 (two-tailed)

Among those in the higher level RDL 02 developmental reading classes, there were no significant relationships between the metacognitive processing measures and any of the comprehension measures.
Discussion

The findings obtained with respect to pre-treatment measures of metacognitive processing and reading comprehension may reflect the quite low comprehension scores achieved by both RDL 01 and RDL 02 students. Previously reported positive relationships between metacognitive processing and reading comprehension may have reflected greater variability in comprehension level of the subjects. Findings obtained with respect to post-treatment relationships between metacognition and reading comprehension may be understood in the context of gains in both areas in the study reported by O'Neill and Todaro (1991), where experimental RDL 01 subjects registered significant pre-treatment to post-treatment gains in comprehension of main ideas and inferences, as well as in the use of previewing. Thus these students used previewing more frequently and had better comprehension for main ideas at post-treatment than at pre-treatment in spite of the observed negative relationship between the use of previewing and comprehension of main ideas. This finding suggests that perhaps the students who made the strongest effort to master the use of previewing strategies were somewhat distracted from the task of comprehending.

The use of metacognitive strategies is a learned skill which must become habitual to be effective. It is possible that over time those students utilizing metacognitive strategies more frequently will be able to integrate these strategies more efficiently to improve reading comprehension. In this context, it would be very interesting to follow up on the metacognitive processing and reading comprehension performance of these students over a longer period of time. Until such follow-up studies are carried out, it should not be concluded on the basis of the observed negative correlations that direct instruction is
necessarily preferable to metacognitive instruction for use with developmental students at the RDL 01 level. In fact, O'Neill and Todaro reported that RDL 01 students exposed to metacognitive instruction made significant gains in the same areas of comprehension (main ideas and inferences) as RDL 01 students exposed to direct instruction.

It is noteworthy that among the relatively high level RDL 02 students, no significant relationships were observed at post-treatment between use of metacognitive strategies and reading comprehension. Again, O'Neill and Todaro reported that both RDL 02 groups made gains in reading comprehension. Apparently the higher level developmental readers exposed to metacognitive training were somewhat better able to integrate and use this instruction than their RDL 01 counterparts. Thus, the students making the greatest strides in the direction of mastering metacognitive strategies did not suffer any relative performance decrements in comprehension. These findings suggest that the type of metacognitive training employed in this study may be relatively more effective for higher level developmental readers than for lower level readers. Here again, however, the relative effectiveness of metacognitive and direct instruction interventions in the long term can be determined only through studies employing measures of metacognitive activity and reading comprehension taken one or more semesters after the conclusion of the intervention.

It is clear from the results of the present study that the impact of metacognitive training may differ depending upon the initial reading skill level of the student. Further research must be done to determine the optimum developmental intervention to employ with students having differing skill levels. Research efforts should be directed at identifying specific metacognitive strategies which might be mastered
readily by students at differing developmental levels. It does not appear that any one form of intervention provides the optimum approach for all developmental students. Much work remains to be done to determine the most effective teaching strategies to use with differing students.

In addition, greater attention to research design is needed to increase the validity and reliability of metacognitive studies. Pre and post comprehension and metacognitive data are needed for measuring growth accurately. Where self-reports are used, concern must be given to reducing the illusion of knowing (Glenberg and Epstein, 1987), thereby insuring a more accurate self-assessment. In correlational studies, the important relationships among subskills should not be overlooked. There is a lack of research on the relationship between the various levels of metacognitive activity and literal and critical reading achievement. Future research should explore the use of several dependent measures to study the relationship of the use of metacognitive strategies to reading achievement. The use of a standardized reading test as the sole measure of comprehension raises some questions (DeFina, Anstendig and DeLawler, 1991; Byrnes, Forehand, Garrison, Griffin, McFadden and Stepp-Bolling, 1991; O'Neill and Hynes, 1985). Can urban developmental students who have experienced a one semester comprehensive metacognitive program select and apply appropriate strategies in a timed standardized reading test condition more effectively than those who have received specific concentrated instruction (King, Biggs and Lipsky, 1984)? Moreover, does this sole dependent measure truly reflect a natural reading condition during which students have an opportunity to apply a wide range of metacognitive strategies? In this regard, researchers and practitioners also need to develop reliable textbook-formatted instruments for
pre and posttesting reading skills and that also are compatible for use with metacognitive self-report scales. Question material should assess students' literal and critical abilities as well as their knowledge of the relationship of the organization of the material to its comprehension. Efforts should be made to identify specific metacognitive strategies which result in the greatest improvements in literal and critical reading skills.

References


Collinson, M. (1989). Help poor youngsters or lose them to the streets, colleges are warned. The Chronicle of Education.


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