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ABSTRACT

A study examined how metacognition and motivation related to performance among college learners seeking to improve their skills in reading and writing. Subjects, 27 female and 16 male students representing a range of ethnicities and socio-economic conditions who were enrolled in a pre-freshman summer program at a major northern university, had their metacognitive knowledge, locus of control, reading comprehension, and writing performance measured. All participants received 12 hours of direct instruction in metacognitive skill development during the six-week program. Prior to instruction, all participants completed two questionnaires (for metacognition and locus of control), the Nelson-Denny Test, a cloze task, and a writing sample. After instruction, subjects completed all the measures again. Results indicated that: (1) subjects gained metacognitive knowledge of reading but not of writing; (2) reading comprehension and writing performance scores improved significantly; (3) gains in metacognitive knowledge and reading comprehension showed no statistically significant association; and (4) locus of control scores remained stable. Findings suggest that college learners can improve their metacognitive skill development through training. (Contains 13 references.) (RS)

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Supporting College Learners:

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Supporting College Learners: Metacognition, Locus of Control, Reading Comprehension and Writing Performance

Learning in a college environment demands sophisticated skills of reading and writing. However, not all college students possess such skills. Academically under prepared college students have long been a part of American higher education (Wyatt, 1992). The under prepared college student is at a serious disadvantage in an environment where success depends on the rapid decoding, comprehension, analysis, and synthesis of large amounts of text. Such students can benefit from increasing their strategic knowledge about the processing of text. Paris, Wasik, and Turner (1991) identify two components central to strategic reading: metacognitive knowledge about reading strategies and the motivation to use such strategies. This paper reports on a study which focuses on how metacognition and motivation relate to performance among college learners seeking to improve their skills in reading and writing. Specifically the study addressed the following questions: a.) can college learners learn from metacognitive skill instruction for both reading and writing? b.) are gains in metacognitive development associated with improvement in reading comprehension and writing performance? and, c.) are gains in metacognitive development associated with the motivational component of locus of control?

Rationale

Metacognition has been defined by Flavell and Wellman (1977) as knowledge about or knowledge that manages any aspect of cognition.

Reading research has documented metacognitive skill as one of the characteristics of a skilled reader (Hare & Pulliam, 1980; Paris, Wasik, & Turner, 1991; Paris, Lipson, & Wixson, 1983). Writing process research also acknowledges the importance of metacognitive skill to write effectively (Englert, Raphael, Fear, & Anderson, 1988; Hayes and Flower,1987).

Most of the research done linking metacognition to reading and writing processes has focused on children. Relatively little has been done examining these relationships among adults, and in particular, within the population of college learners. Furthermore, scholarship on metacognition has examined reading and writing separately rather than integrate the two. As theorists in both camps stress the active role of the agent and the importance of process, the overlap between reading and writing becomes more apparent. Kucer (1987) and Tierney and Person (1983) identify reading and writing as processes by which the learner constructs meaning. This notion is consistent with Wittrock (1983) who identifies reading and writing as "generative processes" in which the reader "generates" relationships between the text and her prior knowledge. The recent interfacing of reading and writing scholarship strengthens the case for extending the research on metacognition to both reading and writing processes.

Wittrock's notion of reading and writing as "generative processes" also highlights the imporantance of motivation. The reader or writer must attend to the process and have the motivation to create relationships between the text and herself (Wittrock, 1983). Paris et al. (1983, 1991) point out the intentional nature of strategic behavior

and identify motivation as central to effective use of metacognitive knowledge. One specific element of motivation which may have a direct influence on one's use of metacognitive knowledge is one's attributions for success or failure in accomplishing tasks. Locus of control is defined as the extent to which an individual perceives herself as being in control of specific outcomes (McCarthy, Meier & Rinderer, 1985). A learner with internal locus of control attributes outcomes to factors such as ability and effort; whereas, a learner with external locus of control attributes outcomes to factors such as task difficulty or luck. A person's tendency to be more internal or external may influence engaging in metacognitive activity while reading and writing.

The theme of engagement in reading and writing tasks is developing within the reading and writing research committees. Consequently, reading and writing scholarship will benefit from research examining relationships between metacognition and locus of control. This study seeks to explore these relationships.

Methodology

Subjects

Subjects were 43 students (27 female, 16 male) enrolled in a pre-freshmen summer program at a major northern university. Four sections of the reading/writing course required for the program were selected for the metacognitive instruction. Several of the students enrolled in the targeted sections (57 total) did not provide consent or dropped out of the testing phases. While all students in the targeted sections received metacognitive instruction, 43 participants provided consent and completed the majority of the testing activities needed for the study.

The students represented a range of ethnicity (African-American, Hispanic, Asian, and Caucasian) and were from a range of socio-economic conditions. The program targets students who show academic potential but who can benefit from intensive instruction in reading and writing, mathematics, and college study skills.

Measurement of Variables

Metacognitive Knowledge

A questionnaire was used to assess participants' metacognitive knowledge of reading and writing. The questionnaire was comprised of two sets of scenarios. One scenario depicted "Vickie" who struggled with an assigned essay and the other scenario depicted "Joel" who was trying to write a paper for a class. Participants were asked to respond to several situations involving either Vickie or Joel by answering either "yes" or "no" to nine suggested activities for each situation. Three of the suggestions represented highly strategic metacognitive activity; three represented strategic metacognitive activity; and three represented non-strategic activity. In response to Vickie's being confused about the essay, a student would respond by checking either the "yes" response or the "no" response for each the following suggestions: "stop reading?" (non-strategic); "go back and read again?" (strategic); or, "ask yourself, what don't I understand?" (highly strategic). A yes response to a highly strategic activity was scored as 2; a yes response to a strategic activity was scored as 1; a yes response to a non-strategic activity was scored as 0; a no response to either a strategic or highly strategic activity was scored as a 0; and a no response to a non-strategic activity was scored as a 1. Students were also allowed to

write down other suggestions in response to an open-ended prompt. Each open-ended suggestion was coded according to an established rubric by two independent raters. Raters were trained in the use of the rubric and then worked to achieve inter-rater reliability. Raters achieved 88% reliability for mutually identifying strategies from the open-ended responses, and 90% for mutually identifying values for each strategy generated by the open-ended prompts. Values for both the forced-choice and open-ended responses were totaled yielding a pre and post metacognitive knowledge score for reading (METAREAD1, METAREAD2) and a pre and post metacognitive knowledge score for writing (METAWRITE1, METAWRITE2). Gain scores for reading and writing (METAREADGAIN, METAWRITEGAIN) were used to determine associations between gains in metacognition and gains in comprehension.

Locus of Control

Locus of control was assessed by a questionnaire which was based on that used by Hiebert, Winograd, and Danner (1984) and then further developed through pilot testing. The Hiebert et al. (1984) measure was used to identify children's attributions of success and failure for reading situations. Unlike the Hiebert et al. instrument, the instrument used for this study focused only on successes in reading. This decision was made because earlier versions of the instrument including both proved to be too time-consuming and confusing for the students to complete. The final instrument consisted of 22 items; 11 items devoted to reading and 11 items devoted to writing. The stem for the reading items was "when I understand what I read it is because . . .," while the stem for the writing items was "when I write a good paper,

it is because . . ." An attribution (either internal or external) followed each stem. Internal attributions for reading included: studying hard, being smart, having confidence, having well-written text to read, paying close attention, and knowing what to do (using strategies). External attributions for reading included: being lucky, having a good teacher, reading easy material, receiving help, and reading well-written material. Attributions for the writing stem were parallel although worded slightly differently to represent a writing situation. Participants were asked to identify the extent to which they either agreed or disagreed to a particular attribution as causing success. Strongly agree was scored as a 4, agree scored as a 3, disagree scored as 2 and strongly disagree scored as 1. Two of the items allowed open-ended responses in which participants wrote in causes for success. Two independent raters scored the open-ended responses by isolating each attribution, identifying it as either internal or external, and scoring each as a 3. The two raters achieved 100% reliability for mutually identifying attributions from the open-ended responses and 93% reliability for mutually identifying attributions generated by the participants as either external or internal. The locus of control score was equal to the total ratings for the internal causes minus the total ratings for the external causes from all items. Values for both the forced-choice and open-ended responses were totaled yielding a pre and post locus of control score for reading (LOCUSREAD1, LOCUSREAD2) and a pre and post locus of control score for writing (LOCUSWRITE1, LOCUSWRITE2). The range of values including only the

forced-choice items would be +20 (highly internal) to -20 (highly external).

Reading Comprehension

Reading comprehension was assessed by the vocabulary and comprehension subtests of the Nelson-Denny Reading Test (Forms E and F). Developmental Standard Scores (normalized curve equivalent scores) were used yielding pre and post scores for vocabulary (VOCAB1, VOCAB2) and comprehension (COMP1,COMP2). Reading comprehension was also assessed by performance on two cloze procedure tasks taken from an essay about college pressures. Each cloze passage was approximately 600 words with every tenth word omitted excluding the first and last sentences of the passage. Because criteria for determining reading level do not exist when scoring cloze tasks using synonyms, (Harris and Sipay, 1990), cloze passages were scored according to exact word replacements and total scores (CLOZE1, CLOZE2) based on the percentage of correctly identified items out of the deleted items. Gains in reading comprehension (CLOZEGAIN, COMPGAIN, and VOCABGAIN) were used to determine possible associations between gains in metacognitive knowledge and gains in reading comprehension.

Writing Performance

Writing performance was measured by participants' completing a narrative essay in which they responded to a prompt asking them about an experience and what they learned from the experience. Participants' responded to the same prompt both prior to and after instruction. Two independent raters who were blind to the essay authors and the type of essay (pre or post) rated each essay using the six point Holistic Method

of the GED Essay Scoring Guide. The final score for each essay was comprised of the average of the two rater's scores yielding pre and post scores for writing performance (ESSAY1, ESSAY2). With the exception of three essays, each rater scored all essays within one point of the other rater. Scores for the three remaining essays were determined by consensus.

Procedures

All participants received 12 hours of direct instruction in metacognitive skill development during the second class day of each week. This represented half of the time devoted to direct instruction over the six-week program. The students had additional time (two hours) later in each week for continued practice using metacognitive knowledge during reading and writing tasks. Prior to instruction, all participants completed the two questionnaires (for metacognition and locus of control), the Nelson-Denny Test, the cloze task, and the writing sample. After the instruction, participants completed all the measures again.

Metacognitive Instruction.

Creating the instructional intervention demanded integrating scholarship on metacognition from both reading researchers and writing process researchers. The organizing framework for the specific lessons appeals to the generally accepted notion of metacognitive knowledge as being both awareness and regulation of cognitive processes, two components recognized by most definitions of metacognition (Jacobs & Paris, 1987). Awareness includes declarative knowledge of specific reading and writing strategies and regulation includes both the

procedural and conditional knowledge needed to decide how and when to use specific strategies. Specific strategies were organized according to three phases of both the reading and writing process -- planning (prior), drafting (during) and responding (after) reading and/or writing. For example, strategies corresponding to planning for reading included strategies such as goal setting, activating prior knowledge, previewing text and making predictions. Planning strategies for writing were parallel, however, organizing ideas was stressed as opposed to previewing and predicting. Drafting involved extensive practice in self-questioning and the monitoring of comprehension. Marking text was an important emphasis of drafting. Responding strategies included evaluating one's understanding, reacting to text, and relating one's knowledge to text. Awareness of text features (i.e. text structure, tone, imagery, author's perspective) was also an important element of responding to text.

Students were introduced to a reading/writing process model and were taught to think of reading and writing and iterative processes that are linked. Lessons on strategies were integrated with the course text, Writing with Power by Peter Elbow and weekly reading assignments of essays and articles written by various authors. Participants' also completed a "reading log," a reading response process journal in which they were asked to record what they were thinking as they read their text. Reading logs were written for each reading assignment and collected each week. The response journal has been documented as one way to measure students' developing metacognitive awareness (Newton, 1991). Within this context it proved to be helpful in encouraging

students to articulate their processes of reading as they read assigned texts.

Results

Means and standard deviations of both pre and post metacognitive survey responses for both reading and writing were computed. Differences between the means were analyzed by use of *t* tests for correlated samples. There was a significant increase at the $p < .001$ level in scores from METAREAD1 ($M = 35.6047$, $SD = 11.1934$) to METAREAD2 ($M = 44.0000$, $SD = 9.7055$), $t(41) = 5.8450$, $p = .0000007$). However, there was not a significant increase between METAWRITE1 ($M = 45.9070$, $SD = 8.6073$) and METAWRITE2 ($M = 47.5714$, $SD = 6.9287$), $t(41) = 1.3466$, $p = .1855$.

On the measures of reading comprehension, participants showed a significant gain at the $p < .01$ level between COMP1 ($M = 293.1395$, $SD = 47.2862$) and COMP2 ($M = 306.6571$, $SD = 13.5840$), $t(34) = .0023$; and participants also showed a gain at the $p < .05$ level between VOCAB1 ($M = 289.8837$, $SD = 65.5476$) and VOCAB2 ($M = 306.6286$, $SD = 11.73$), $t(34)$, $p = .031$. Participants did not gain significantly in performance from CLOZE1 ($M = .428$, $SD = .12483$) to CLOZE2 ($M = .4312$, $SD = .0126$), $t(39) = .2185$, $p = .8282$. However, writing performance did improve significantly at the $p < .05$ level from ESSAY1 ($M = 3.9615$, $SD = .7896$) to ESSAY2 ($M = 4.3333$, $SD = 1.1432$), $t(38) = 2.1021$, $p = .0422$.

In order to determine possible relationships between gains in metacognitive knowledge and gains in reading comprehension, simple regression analyses were used with gains in metacognitive knowledge as the predictor variable and gains in reading comprehension (VOCABGAIN and

COMPGAIN) as criterion variables. METAREADGAIN and COMPGAIN were not shown to be significantly associated according to regression analysis. A multiple R between METAREADGAIN and COMPGAIN was computed to be .0463, $F(1, 31) = .005$, $p = .9460$. Regression analysis for METAREADGAIN and VOCABGAIN did show a significant association, however, the direction of the relationship is opposite what was anticipated, $F(1,31) = 6.649$, $p = .0149$, R-sq = .1766.

Locus of control scores remained stable. In order to determine possible associations between gains in metacognitive knowledge and locus of control, simple regression analysis procedures were used to determine relationships between pre locus of control scores (LOCUSREAD1, LOCUSWRITE1) and gains in metacognitive knowledge. Simple regression analysis revealed no significant associations between LOCUSREAD1 and METAREADGAIN $F(1,31) = .051$, $p = .8231$, R-sq = .0016, or between LOCUSWRITE1 and METAWRITEGAIN $F(1,31) = .3.242$, $p = .0815$, R-sq = .0947.

Discussion

Gains in metacognitive knowledge for reading suggest that college learners can be influenced by direct metacognitive instruction. Examining the means on the measures of metacognitive knowledge suggests that within this population, learners were initially less sophisticated in their strategic knowledge for reading than they were for writing. A lack of a significant gain for metacognitive knowledge for writing can in part be explained by ceiling effect on the writing measure. Furthermore, the gain scores in metacognitive knowledge for writing may have lacked the range to show a significant association between that gain and the gain in writing performance which was significant.

The lack of significant associations between gains in metacognitive knowledge and gains in reading comprehension is somewhat disturbing as these associations were predicted. This could be explained, however, by the nature of standardized tests. Students taking standardized tests are told not to mark the texts, and must work under a time constraint, conditions not conducive to strategy knowledge use. This could explain the inverse relationship between METAREADGAIN and VOCABGAIN.

The unanticipated lack of relationship between gain in metacognitive knowledge and locus of control can perhaps be explained by the operational definition of locus of control for the study. Within the study locus of control was presented globally on a continuum from highly internal to highly external. All attributions chosen by the learner were included in the locus of control score. A more appropriate procedure may be to examine the construct according to specific attributions. Specific internal attributions may have a greater association with gains in metacognitive knowledge. Post hoc analyses which examine specific attributions may generate more useful data.

Perhaps the most compelling finding of the study is that college learners can improve their metacognitive skill development through training. However, the findings of this study do not document a relationship between such gains in metacognitive knowledge and gains reading comprehension or in writing performance. Furthermore, the role of locus of control is still unclear. Consequently, more research will need to be done to clarify these relationships.

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