The Effects of Metacognitive Awareness on Readers’ Comprehension: Additional Evidence for Acquisition-based Reading Instruction

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Introduction

The notion of metacognition has been defined as accessible knowledge about cognitive matters, issues, and processes, and as the awareness of possessing and applying such knowledge in cognitive activities. The metacognitive sense of knowing enables the learner to predict, comprehend, monitor, and assess the information in the text. Since the inception of Flavell’s metacognitive theory, metacognition has become an area of interest for research and inquiry. Over the last three decades, controversies abound as regards the role of metacognition in reading, the benefits and limitations of metacognitive awareness on comprehension, and the boundaries between cognitive domains and metacognitive domains. Beneath chaotic inconsistencies among the findings of research, it seems that the central question that anchors the apparent controversies is: Can metacognitive awareness serve as a predictor or index for comprehension? And to what extent?

It is in the spirit of seeking answers to this research question that a pilot study was conducted to explore the effects of metacognitive awareness on readers’ comprehension. The findings of the study were analyzed to provide evidence to support acquisition-based instruction, a holistic approach which draws on Krashen’s acquisition hypothesis (1985), natural approach for language acquisition (1983), and free voluntary reading hypothesis (1993), and is consistent with Goodman’s (1986) whole language philosophy.

This paper begins with a brief synthesis of research literature on the definition of metacognition in reading, and related constructs to metacognition, the role of metacognition in reading, and metacognition and intuitive knowledge. It is followed by a report of the findings and analysis of a pilot study investigating the effects of metacognition on comprehension. The implications for instruction and research will be discussed in terms of the role of learning and acquisition in reading.

It is very important to note that the term metacognition is used in this paper to be in contrast with acquisition. While metacognitive awareness pertains to a conscious, explicit process in which readers are involved in using language and terms “theorizing” about reading and reading strategies, and linguistic conventions as an object, acquisition is implicit, naturalistic in nature taking place as readers are engaged in literacy events for the purpose of meaning construction and communication.

Since reading research is generally considered as research on first language users, readers refer to users of English as first language unless specified in this paper. It is the assumption of the paper that L1 reading process is essentially the same as L2 process in terms of meaning construction and communication, and that there are universal

**Literature Review**

**Definition of Metacognition**

The term “metacognition” emerged in the professional literature of reading research in the 1970s following the work of cognitive psychologist John Flavell (Garner, 1994; Poissant, 1994). According to Flavell’s model, metacognition contains metacognitive knowledge, and metacognitive monitoring and self-regulation.

Metacognitive knowledge is defined in Flavell, Miller, and Miller (1993) as “the segment of your acquired world knowledge that has to do with cognitive matters” (p. 164). Specifically, metacognitive knowledge involves knowledge about “persons (problem-poser/solver), tasks (problem), and strategies (ways to solve the problem)” (p.164). The personal aspect of metacognitive knowledge deals with the beliefs and knowledge about thinking and analyzing. The task dimension of metacognitive knowledge consists of the resources one has in solving the problem and the cognitive demands of the problem. The strategy category of metacognitive knowledge refers to the approaches that one takes to achieve the cognitive goal.

Similar to the concept of metacognitive knowledge, metacognitive monitoring and self-regulation is defined simplistically by Flavell et al (1993) as “one’s management of one’s cognitive activities during problem solving” (p. 166).

Although Flavell (1981) recognized the facilitating role of “metacognitive knowledge” in learning and thinking, he did not suggest that metacognitive knowledge is infallible and superior. He treated it as a component of rather than a super ordinate of thinking.

Like other world knowledge, metacognitive knowledge can vary in clarity, explicitness, and complexity or elaborateness. Similarly, it can also be inaccurate, internally inconsistent, or otherwise flawed. Some of it seems more procedural in nature, and some of it more propositional or declarative. Most of it can be characterized as knowledge or beliefs about what factors or variables act and interact in what ways to affect the course and outcome of social cognitive enterprise. (p 274).

Most importantly, Flavell (1981) made it explicit that metacognitive knowledge is not qualitatively different from other types of knowledge.

Metacognitive knowledge and experiences are not assumed a priori to be qualitatively different in nature from nonmetacognitive knowledge and experiences; my present assumption is that the differences lie only in the content and function, not in the form or process (p. 273).

**Metacognition, Schema and Constructivist Learning Theories**
It is important to note the inherent theoretical links between metacognition, schema theory and constructivist learning theories. Schema is considered as structured knowledge on a particular topic, subject, or issue. According to Piaget (1970), schema is formed through assimilation and accommodation. The former enables one to associate information with the exiting schemata, while through accommodation, new schemata are created. Disequilibrium occurs when readers’ existing schemata are being challenged and conceptual conflicts are resulted. Readers’ conscious efforts to revert to the new state of equilibrium would lead to the changes in the sophistication and maturity of schemata.

The sophistication and maturity of schemata do not only lie in the content and substance of the schemata, but also in the ability to monitor and modify schemata in which metacognition enacts a role. MoConaughty (1980) identified three types of schema: simple description schema, information processing schema, and social inference schema. She found that all three kinds of schemata are used by all the readers, regardless of their age and ability levels, in the written retelling of the stories presented to them. The differences among the groups are demonstrated in the way that the schema is selected, profiled, structured and organized.

The theoretical links between Flavell’s (170) metacognitive theory, and Piaget’s (1970) constructivist learning and development theory, and Vygotskian’s (1962, 1978) socio-generative perspective on language and thinking. Piaget conceptualized knowledge as a mental representation, rather than a replica of reality. Learners perceive things that they have prior knowledge. Consequently, learning is a developmental process in which learners construct mental representations of the outside world. Piaget identified four stages of learning: sensori-motor, pre-operational including pre-conceptual and intuitive, concrete operations, and formal operations. Metacognition begins to develop when learners enter the operational stages of learning. Flavell’s metacognitive theory is also informed by Vygotsky’s socio-oriented learning theory. According to Vygotsky, it is the complex of social and cultural relationships that mediate literacy praxis and learning. This was translated to the social dimension of the metacognitive enterprise—interactions among person, task, and strategy.

**Metacognition in Reading**

Flavell’s framework of metacognition has had mixed influences on reading research. On the one hand, it has contributed to the study of comprehension and to the development of instructional practices that support comprehension. On the other hand, it has been prone to many misinterpretations concerning the role of metacognition in reading/literacy development. Research on children’s acquisition of *metalinguistic knowledge seems to give the impression that younger and poorer readers are less capable of acquiring such knowledge than older and more proficient readers (Adams, 1990), and thus to promote the misconception that “the idea that kids are helped by being taught first about language” (K. Goodman, 1986, p. 53). In its extreme form, the differences in learning are interpreted as the difference in metacognitive and metalinguistic awareness (Brown, 1980; Wong, 1987).
Research on the effects of metacognitive awareness on reading has showed that the effects of metacognitive awareness on comprehension tend to be differential. The metacognitive strategies range from word knowledge (Nagy & Anderson, 1984) to text structure (Armbuster, 1984). According to one meta-analysis of 41 metacognitive strategies instruction studies conducted from 1979-1991, readers generally improve more in comprehension (effect size of .56) than in vocabulary (effect size=.23) (Fan, 1993).

The effects of metacognition on second language reading appear to share a similar pattern with those on first language reading. In Krashen’s (1985) Acquisition-Learning model, metacognition serves as monitor, which functions as an editor of linguistic output. Krashen (1985) emphasized two conditions as indispensable to the use of monitor: first, “the performer must be consciously concerned about correctness” of his or her output, and second, “he or she must know the rule” (p. 2). The limitations of learners’ linguistic knowledge and the constraints in context and condition would affect the effectiveness in their use of the monitor.

**Metacognition and Intuitive Knowledge**

While extensive research has been done on readers’ metacognitive knowledge (Baker, 1982; Garner, 1987), little attention was assigned to the role of intuitive or implicit knowledge that learners bring with them in literacy development. Intuitive knowledge refers to the knowing of “things that we know but aren’t consciously aware that we know” (Y. Goodman, 2003, p.xviii). It is often neglected in research because intuitive knowledge is difficult to observe, describe and measure. As miscue analysis and retrospective miscue analysis research reveal, readers’ intuitive knowledge about language and reading provides a launching pad for readers to make predictions about the linguistic structure of the text or to make self-corrections of their miscues. There is no doubt that readers’ intuitive knowledge can be at variance with the scientific conception. But allowing readers to explore language in a monitor-free condition makes learning a meaningful, productive and rewarding experience.

Research in reading and literacy development (Harste, Woodward, & Burke, 1984; Haste, 1994; Y. Goodman, 1980, 1996, 2003; Y. Goodman & Flurkey, 1996) has revealed that learners’ mental representation of the mechanism of reading and literacy develops through the use of language and transaction with connected discourse. Learners’ curiosity and ability to talk about reading and language does not arise from the control of monitor. Literacy is in essence an on-going conversational process in which learners construct meanings, traditions and values of written text. Metacognitive and metalinguistic awareness is a result of learners’ practices and exposure to language use, and, therefore, should not be considered as a condition or a predictor of reader’s proficiency. As Y. Goodman and Flurkey (1996) state:

> All readers have conscious knowledge about reading. The readers we’ve worked with make comments on whether or not they are good readers and provide evidence to support their beliefs based on their stance toward the reading process. They state what good readers are capable of and they make statements about what could help them become better readers… Although their statements may represent misconceptions of the reading
process, they show that they are consciously aware of language cueing systems and reading strategies. (p. 102).

Method

Participants

The participants of the pilot study were placed in two college developmental reading classes in a major comprehensive community college in South Florida, USA: an intermediate-level (REA 0002) reading course, and an advanced-level (REA 0003) reading course. A total of 40 participant with 20 in each class were reported in the study. The courses were offered during a 12-week session in Summer 2003. The ethnic and age demographics of the two groups were similar, and the majority of the learners were adult African-Americans who are native speakers of English.

Context

The notion of college developmental education in the United States refers to the programs and practices offered in the institution of higher learning for under-prepared students and non-traditional students who need instruction, assistance and support in the development of reading, writing, and mathematics skills. College developmental education is grounded on the principles of developmental psychology, and subscribe to theories of adult learning. It has been estimated that almost 80% of the incoming college students need at least one developmental course (National Center for Educational Statistics, 1995).

College developmental reading focuses on the development of literal and critical comprehension skills, and reading strategies. The reading skills and strategies addressed in the college developmental reading curriculum include phonics, vocabulary, main idea (stated and implied main idea), supporting details, relationships within, between and among sentences, patterns of organization, fact and opinion, inference, purpose and tone, and argument (Langan, 2003; Smith, 2003).

The institution in which the pilot study was conducted consists of a three-level reading program. The course was numbered sequentially as REA 0001 (basic level), REA 0002 (intermediate level), and REA 0003 (advanced level). REA 0001 is approximately equivalent to Grade 6-9 reading level. REA 0002 is about Grade 8-12 reading level. And REA 0003 corresponds to Grade 9-13 reading level. Although the reading level in itself is an arbitrary concept in measuring the actual competence of readers, it does suggest that college developmental reading is in essence built on the foundational knowledge that a learner should possess from K-12.

Students were placed in either one of the three levels of reading course based on the scores in a computerized placement test. The institution, in consultation with the department, set the score range for each level. The progression along the reading levels is contingent upon their successful completion of the course requirements. A departmentally devised and administered test is offered for the first two levels of reading.
An exit test designed by the State Department of Education is required before the students are allowed to take college-level course in English.

To help consolidate student learning and enhance student success, lab sessions are offered to pair with the class. As part of the requirements of college developmental reading program, students spend equal amount of the time in the class and in the lab. While the class focuses on instruction, the lab provides more individualized support and administers diagnostic and mastery tests to monitor student learning.

The participants of the study were from REA 0002 and REA 0003 classes. REA 0002 focuses on developing readers’ ability to “a) recognize and use vocabulary at the appropriate readability level, b) develop a variety of reading strategies to comprehend and analyze materials at the appropriate readability level, c) develop and apply study strategies to support reading, and d) develop self-awareness as a reader and identify personal reading/thinking processes” (Zhang, 2003a, p. 2).

REA 0003 addresses the competency and skills requirements of the exit exam designed and administered by the state. Specifically, REA 0003 prepares students to “a) comprehend and analyze materials at the college level, b) apply a variety of reading and critical thinking strategies, c) use strategies for improving reading rate and performance in tests, and d) enhance self-awareness as a reader, and develop the language to articulate and evaluate personal reading processes” (Zhang, 2003b, p.2).

As can be seen from the above, developing metacognitive sense of reading is required for both levels of reading classes. For REA 0002 level students, the focus is on developing comprehension under monitored condition (Krashen, et al, 1983), whereas REA 0003 level students, the focus is on developing comprehension under monitor-free condition (Krashen, et al, 1983). An example of a monitored condition would be the use of reading guides, direct instructions, and follow-up quizzes or tests. In the monitor-free condition, students were involved in writing reading journals, and to reflect on their reading processes.

**Data**

The data of the study were collected from the participants’ response to the Index of reading Awareness (Jacob & Paris, 1984), which is comprised of 20 multiple choice items (Appendix A). The results were scored according to the given protocol. Each choice item a), b), and c) is assigned a 0-2 score. For instance, in the following example, a is assigned 0, b is assigned 1, and c is assigned 2. The full score for the whole index is 40.

Which of these is the best way to remember a story?
- a. Repeat every word
- b. Think about remembering it.
- c. Write it in your own words.

The participants’ comprehension competencies were measured in terms of their lexicon comprehension, text comprehension, critical comprehension, and holistic
comprehension. Lexicon comprehension involves morphemic analysis of words, and the comprehension of vocabulary in context. Text comprehension deals with the understanding of main ideas and supporting details as well as the relationships within, between or among sentences, and the pattern of organization. Critical comprehension addresses fact and opinion, inference, purpose and tone, and evaluation of argument. Holistic comprehension is concerned with the collective and combinative comprehension of lexicon, text and critical comprehension. The categorization of comprehension skills is compatible with the curriculum, and is consistent with the operation of language cueing systems in reading.

Four tests that measured the components of reading comprehension were administered through the lab, and were scored through the electronic grading program ParScore. The scores were analyzed for the values of means, median, standard deviation, and correlation. The t-test for statistical significance was performed for each correlational coefficient between the value obtained from the Index of Reading Awareness and the scores in each one of four comprehension measurements.

### Results

The analysis provides clear support that metacognitive awareness is possessed by all readers with varying reading proficiency level and comprehension abilities (see Table 1 and 2 in the appendix for detail). Two major patterns of findings have transpired. First, no significant correlation exists between metacognitive awareness and word comprehension (r=−.29, p<0.001 for REA 0002 and r=.27, p<0.001 for REA 0003), and between metacognitive awareness and total comprehension (r=−.02, p<0.001 for REA 0002 and r=−.11, p<0.001 for REA 0003), although slight correlations were found between metacognitive awareness and critical comprehension (r=.37, p<0.001 for REA 0002; r=.31, p<0.001 for REA 0003). This suggests that readers’ comprehension does not directly affect readers’ vocabulary development and the development of comprehension in general. The negative correlation between the metacognitive awareness and reading comprehension suggests that good readers may not be more metacognitively aware than poor readers, and that the criterion for judging good readers and poor readers based on metacognitive awareness must be revisited.

Second, no significant differences were found in metacognitive awareness (M=30.4, SD= 3.13 for REA 0002; M=32, SD=4.29 for REA 0003) between participants. And the correlational patterns among the variables examined are also similar between the participants from REA 0002 and those from REA 0003. This suggests that readers’ placement does not necessarily reflect their actual reading competence.

### Discussion

Given the nature of the pilot study, there are a number of limitations that might compromise the findings and interpretation of the study. First, the sample of the study was small. Second, the sampling frame was based on the existing class structure. Third, the investigator was the instructor of the class, and thus might influence the behaviors of the students with his own perspective and bias. Fourth, given the length of the class spanning over a period of 12 weeks, it might be well nigh possible that the instruction
students received in the class and the lab made a difference on their performance in the index and the comprehension test. Fifth, this study adopts a naturalist design in that the data collected from the students were part of the curriculum. This might affect the validity. Sixth, the instruments used in this study were multiple choice items; hence, the data sources generated from these instruments could not cover the whole

Nevertheless, the study provides evidence that metacognitive knowledge and comprehension are not linearly correlated. Their relationship is far more complex and dynamic. Teaching students to monitor their reading process does not necessarily lead to the improvement of learning outcome. Therefore, metacognitive knowledge is better to be considered as of equal primacy to readers’ comprehending activity. And these two perform functions that are not substitutable in thinking and learning. As Ellis (1994) stated:

In consciousness-raising activities, the learners are not expected to produce the target structure, only to understand it by formulating some kind of cognitive representation of how it works. Whereas practice is aimed at developing implicit knowledge of the rule, consciousness-raising is directed at explicit knowledge (i.e. there is no expectancy that learners will be able to use the rule in communicative output) (p. 643).

It seems that explicit knowledge of reading and literacy is neither a necessary, nor a sufficient condition for the acquisition of implicit knowledge. Explicit knowledge and implicit knowledge address different domains and aspects of learning. Halliday (1975) classified language learning as learning language, learning about language, and learning through language. Learning language is essentially a process of acquiring language in Krashen’s (1985) term in which language is learned as a communicative tool. Learning about language regard language itself as the object of study. Learning through language is to gain and construct knowledge through the medium of language. It is matrix of the three combined forces that enable the learner to grow and to explore “zones of proximal development” (Vygotsky, 1978).

An acquisition-based reading curriculum provides opportunities for learners to reflect on their reading processes, experiment with language in creative ways, and to lower their affective filter. An acquisition-based reading curriculum maximizes comprehensible input which allows learners to navigate the wealth of information and resources and truly enjoy freedom that literacy brings.


**Appendix A**
Index of Reading Awareness (Jacob & Paris, 1984)

Read the sentences carefully and circle the BEST answer for you. Please note there are NO right or wrong answers.

1. Which of these is the best way to remember a story?
   a. Repeat every word
   b. Think about remembering it.
   c. Write it in your own words.

2. If you are reading for science or social studies, what would you do to remember the information?
   a. Ask yourself questions about important ideas.
   b. Skip the parts you do not understand.
   c. Concentrate and try hard to remember it.

3. What do you do if you come to a word and you do not know what it means?
   a. Use the words around it to figure it out.
   b. Ask someone else.
   c. Move to the next word.

4. If you could read only some of the sentences in the story because you were in a hurry, which ones would you read?
   a. The sentences in the middle of the story.
   b. The sentences that tell the most about the story.
   c. The interesting, exciting sentences.

5. Why do you go back and read things over?
   a. It is good practice.
   b. You did not understand it.
   c. You forgot some words.

6. What would help you to become a better reader?
   a. More people helping when you read.
   b. Reading easier books with shorter words.
   c. Checking to ensure that you understand what you read.

7. What do you do if you do not know what a whole sentence means?
   a. Read it again.
   b. Sound out all of the words.
   c. Think about the other sentences in the paragraph.

8. What is special about the first sentence or two in a story?
   a. They always begin with “Once upon a time…”
   b. The first sentences are most interesting.
   c. They often tell what the story is about.
9. If the teacher told you to read a story to remember the general meaning, what would you do?
   a. Skim through the story to find the main parts.
   b. Read all of the story and try to remember everything.
   c. Read the story and remember all of the words.

10. How can you tell which sentences are the most important ones in a story?
   a. They are the ones that tell the most about the characters and what happens.
   b. They are the most interesting ones.
   c. All of them are important.

11. How are the last sentences of a story special?
   a. They are exciting, action sentences.
   b. They tell what happened.
   c. They are harder to read.

12. When you tell other people about what you read, what do you tell them?
   a. What happened in the story.
   b. The number of pages in the story.
   c. Who the characters are.

13. If you had to read fast and could only read some words, which one would you try to read?
   a. The new vocabulary words, because they are important.
   b. The words you could pronounce.
   c. The words that tell you the most about the story.

14. If you are reading a library book to write a book report, which would help you most?
   a. Sound out words you do not know.
   b. Write it down in your own words.
   c. Skip the parts you do not understand.

15. If you are reading for a test, which would help you the most?
   a. Read the story as many times as possible.
   b. Talk about it with somebody to make sure you understand it.
   c. Repeat the sentences.

16. What parts of the story do you skip as you read?
   a. The hard words and parts you do not understand.
   b. The unimportant parts that do not mean anything for the story.
   c. You never skip anything.

17. What is the hardest part about reading for you?
   a. Sounding the hard words.
   b. When you do not understand the story.
c. Nothing is hard about reading for you.

18. If you are reading a story for fun, what would you do?
   a. Look at the pictures to get the meaning.
   b. Read the story as fast as you can.
   c. Imagine the story like a movie in your mind.

19. Before you start to read, what kind of plans do you make to help you read better?
   a. You do not make any plans. You just start reading.
   b. You choose a comfortable place.
   c. You think about why you are reading.

20. What things do you read faster than others?
   a. Books that are easy to read.
   b. Stories that you have previously read.
   c. Books that have a lot of pictures.

Appendix B
Table 1 Correlation between Metacognitive Awareness and Readers’ Comprehension for REA 0002 Students

<table>
<thead>
<tr>
<th>REA 0002</th>
<th>Lexicon Comprehension</th>
<th>Text Comprehension</th>
<th>Critical Comprehension</th>
<th>Holistic Comprehension</th>
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</thead>
<tbody>
<tr>
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<td>0.09*</td>
<td>0.31*</td>
<td>-0.02*</td>
</tr>
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<td>-0.19*</td>
<td>0.71*</td>
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<tr>
<td>Text Comprehension</td>
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<td></td>
<td>0.32</td>
<td>0.45</td>
</tr>
<tr>
<td>Critical Comprehension</td>
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<td></td>
<td></td>
<td>0.16**</td>
</tr>
</tbody>
</table>

*: p<0.001  
**: p<0.05

Table 2 Correlation between Metacognitive Awareness and Readers’ Comprehension for REA 0003 Students

<table>
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<th>REA 0003</th>
<th>Lexicon Comprehension</th>
<th>Text Comprehension</th>
<th>Critical Comprehension</th>
<th>Holistic Comprehension</th>
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<tbody>
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<td>Metacognitive Awareness</td>
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<td>0.39*</td>
<td>0.37*</td>
<td>-0.11*</td>
</tr>
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<td>0.08*</td>
<td>-0.08**</td>
</tr>
<tr>
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<td></td>
<td>0.23**</td>
<td>0.04</td>
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<td></td>
<td></td>
<td>0.46**</td>
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*: p<0.001  
**: p<0.05